

Economic and Financial
Decision Making in

DISASTER RISK REDUCTION

Nepal Case Study



Authors

Charlotte Benson
Ram Prasad Gyanwaly
Hari P Regmi

Published By

Ministry of Home Affairs (MoHA) and
United Nations Development Programme (UNDP)

Any part of this publication may be cited, copied, translated into other languages or adapted to meet local needs without prior permission from Ministry of Home Affairs (MoHA) and United Nations Development Programme (UNDP) provided that the source is clearly stated.

Designed & Processed by: Wordscape, 977-1-5526699
Printed in Kathmandu, Nepal

Economic and Financial
Decision Making in

DISASTER RISK REDUCTION

Nepal Case Study



Contents

Foreword	
Acknowledgements	
Acronyms	
Executive summary	1
Introduction	7
1.1 Country background	7
1.2 Study rationale	8
1.3 Objectives of study	10
1.4 Methodology	11
1.5 Outline of the report	13
Natural hazards, vulnerability and climate change	15
2.1 Natural hazards	15
2.2 Natural hazards, rising vulnerability and climate change	16
Economic and budgetary impacts of disasters in Nepal	19
3.1 Theoretical impacts	19
3.2 Macroeconomic impacts of disasters in Nepal	21
Key findings and recommendations: current gaps and challenges in disaster risk management from an economic perspective and potential ways forward	27
4.1 Macro-economic evidences on the impact of disasters	27
4.1.1 Gaps/challenges	27
4.1.2 Recommended action	28
4.1.2.1 Eclectic, qualitative analysis of the macroeconomic impact of disasters	28
4.1.2.2 Econometric modelling	30
4.1.2.3 Climate change impact scenarios	34
4.2 Budgetary arrangements and allocations for disaster risk management	34
4.2.1 Current budgetary and fiscal arrangements for disaster risk reduction and response	34

4.2.1.1	Post-disaster relief and recovery	35
4.2.1.2	Disaster risk reduction	39
4.2.1.3	Government revenue impacts	39
4.2.2	Gaps/challenges	40
4.2.3	Recommended actions	46
4.2.2.1	Review of current financial arrangements for post-disaster response	46
4.2.3.2	Enhanced funding mechanisms for disaster risk reduction	50
4.2.3.3	Establishment of a system to track disaster-related expenditure	53
4.2.3.4	Garnering greater international support for disaster risk management	55
4.3	Disaster loss data	56
4.3.1	Gaps/challenges	56
4.3.2	Recommended action	58
4.3.2.1	Establishment of a more comprehensive disaster database	58
4.4	Damage assessment procedures	60
4.4.1	Gaps/challenges	60
4.4.2	Recommended action	61
4.4.2.1	Improved damage assessment methodology	61
4.5	Project appraisal and evaluation guidelines	62
4.5.1	Gaps/challenges	62
4.5.2	Recommended action	63
4.5.2.1	Incorporation of guidance on the analysis of disaster risk related concerns into NPC project preparation guidelines	63
	Potential role of economic data, tools and analysis in overcoming other disaster risk management gaps and challenges	65
5.1	Mainstreaming disaster risk reduction concerns into national development policy	65
5.1.1	Gaps/challenges	65
5.1.2	Role of economic data, tools and analysis	69
5.2	Implementation of the National Strategy on Disaster Risk Management	70
5.2.1	Gaps/challenges	70
5.2.2	Role of economic data, tools and analysis	72
5.3	Addressing gaps in disaster risk management	72
5.3.1	Gaps/challenges	72
5.3.2	Role of economic data, tools and analysis	74
	References	79

Annexes

Annex A:	List of people met over the course of the study	85
----------	---	----

Boxes

Box 1:	Hazard and disaster terminology	12
Box 2:	The macroeconomic consequences of the 2008 Koshi and far-western floods	23
Box 3:	Modelling the economic consequences of rainfall in Ethiopia	30

Box 4:	Funding rehabilitation: the implications for long-term growth	33
Box 5:	Kathmandu Valley earthquake scenario data	34
Box 6:	Disaster response funding in Kavre Palanchok District	36
Box 7:	Living with disasters - the case of Khanathole VDC	41
Box 8:	GoN support to the 2008 floods relief and recovery efforts	43
Box 9:	Strengthening budgetary arrangements for disaster relief and emergency recovery – potential new arrangements	46
Box 10:	The Indian Calamity Relief Fund	46
Box 11:	The annual budget allocation and release process in Nepal	51
Box 12:	Tracking expenditure on cross-cutting objectives: experience with gender and pro-poor spending in Nepal	54
Box 13:	UNDP disaster risk reduction activities in Nepal	55
Box 14:	Principles in mainstreaming disaster risk reduction into development	66
Box 15:	Enhancing resilience to natural hazards in the agricultural sector	68
Box 16:	Community-based disaster risk management initiatives	75

Tables

Table 1:	Global deaths resulting as a consequence of natural hazards, 1988-2007	10
Table 2:	Potential use of economic data, tools and analysis to strengthen disaster risk management (DRM) in Nepal	29
Table 3:	GoN budgetary allocations for disaster response and recovery	35

Figures

Figure 1:	Transmission of an earthquake shock through an economy	21
Figure 2:	Annual growth in GDP and agricultural GDP in Nepal, 1987/88 to 2006/07	22
Figure 3:	Annual growth of rice, wheat and maize production in Nepal, 1987/88 to 2006/07	22
Figure 4:	Annual natural hazard related deaths in Nepal excluding epidemics, 1983-2006	58
Figure 5:	Flood, landslide and avalanche related deaths in Nepal, 1983-2006	59
Figure 6:	Reported 'economic' losses occurring as a consequence of floods, landslides and avalanches in Nepal, 1983-2007	59

Foreword

It is my pleasure to present this report, **Economic and Financial Decision Making in Disaster Risk Reduction: Nepal Case Study** prepared with technical assistance from UNDP, on behalf of the Ministry of Home Affairs. The findings are intended to support the Government of Nepal and other developing countries, to prepare and implement comprehensive and strategic approaches to disaster risk management.

The case study is an effort to explore ways of using information on macro economic performance and public finance to secure greater commitment to disaster risk reduction. It is hoped that the report will inspire relevant policy and programming decisions, particularly with regards to mainstreaming disaster risk reduction and budgeting into the national plan.

This is the first study of its kind, undertaken to systematically explore the use of economic

and financial tools in a comprehensive fashion to strengthen the management capacity for disaster risk reduction.

The report has captured several factors linked to disasters, such as demographic growth, rapid urban expansion, weak land use planning, growth of informal settlements, poor construction methods, steep land farming practice, encroachment of river plain and forest areas and environmental degradation, taking into account higher incidences of drought, floods, water-induced landslides and Glacial Lake Outburst Floods (GLOFs) due to climate change.

I hope that this report will provide enough foresight to all relevant authorities on the necessity of developing appropriate models for integrating the natural disaster management plan into the Government of Nepal's planning and budgeting exercises.



Robert Piper

UN Resident and
Humanitarian Coordinator for Nepal &
UNDP Resident Representative

Acknowledgements

This study has been undertaken on behalf of the Ministry of Home Affairs (MoHA), Government of Nepal, and United Nations Development Programme (UNDP). The financial support of UNDP is gratefully acknowledged.

The authors would like to extend their thanks to all those interviewed during the course of the study. A full list of people met is provided in Annex A. Particular thanks is extended to Mr. Shankar Prasad Koirala, Joint Secretary, Planning and Special Service Division of the Ministry of Home Affairs and his colleagues in the Disaster Management Division for their time so generously given and for the information

provided. The Disaster Risk Reduction Focal Points located within various government agencies also played an important role.

The considerable support of Robert Piper, Vijaya. P Singh, Ghulam M Sherani and colleagues in the UNDP country office in Nepal, of Fenella Frost and Rahul Sengupta in UNDP's Bureau for Crisis Prevention and Recovery (BCPR) in Geneva and Krishna Vatsa and Caroline Borchard in BCPR's South and South West Asia Regional Office is gratefully acknowledged.

The opinions expressed are those of the lead author and do not necessarily represent the views of the MoHA or UNDP.

Acronyms

BCPR	Bureau for Crisis Prevention and Recovery
CNDRC	Central Natural Disaster Relief Committee
DDRC	District Disaster Relief Committee
DIPECHO	Disaster Preparedness European Commission Humanitarian Aid department
DNCDM	Department of Narcotics Control and Disaster Management
DoHM	Department of Hydrology and Meteorology
Dol	Department of Irrigation
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DoMG	Department of Mines and Geology
DoR	Department of Roads
DoSCWM	Department of Soil Conservation and Watershed Management
DoUDBC	Department of Urban Development and Building Construction
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSGE	Dynamic Stochastic General Equilibrium (model)
DoDWS	Department of Water Supply and Sewerage
DWIDP	Department of Water Induced Disaster Prevention
ECLAC	Economic Commission for Latin America and the Caribbean
EM-DAT	Emergency Events Database
FCGO	Financial Comptroller General Office
GDP	Gross Domestic Product
GLOF	Glacier Lake Outburst Flood
GoN	Government of Nepal
HDI	Human Development Index
HFA	Hyogo Framework for Action 2005-2015
INGO	International Non-Governmental Organisation
ISDR	International Strategy for Disaster Reduction
ISSET	Institute for Social and Environmental Transition
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
MDGs	Millennium Development Goals

MoAC	Ministry of Agriculture and Cooperatives
MoEST	Ministry of Environment, Science and Technology
MoES	Ministry of Education and Sports
MoF	Ministry of Finance
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoLD	Ministry of Local Development
MoPPW	Ministry of Physical Planning and Works
MoPR	Ministry of Peace and Reconstruction
MWR	Ministry of Water Resources
NADRM	National Authority for Disaster Risk Management
NAPA	National Adaptation Programme of Action
NCDRM	National Commission for Disaster Risk Management
NGO	Non-Governmental Organisation
NMEM	Nepal Macroeconomic Model
NPC	National Planning Commission
NRB	Nepal Rastra Bank
NSET	National Society for Earthquake Technology - Nepal
OPMCM	Office of the Prime Minister and Cabinet Ministers
RMSM	Revised Minimum Standard Model
SAARC	South Asian Association for Regional Cooperation
TYIP	Three Year Interim Plan (2007/08 – 2009/1)
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate change
UN-OCHA	UN Office for the Coordination of Humanitarian Affairs
VAT	Value-Added-Tax
VDC	Village Development Committee
WECS	Water and Energy Commission Secretariat
WFP	World Food Programme
bn	Billion
FY	Fiscal Year
ha	Hectare
km	Kilometre
m	Million
NRS	Nepali rupee
US\$	United States dollar
%	Percent

Executive summary

A. Disasters and the macroeconomy

Nepal is a small land-locked country with an estimated per capita Gross Domestic Product (GDP) of US\$470 in 2008/09¹ and a predominantly rural population. The level of absolute poverty has fallen significantly in recent years, to 31% in 2003/04, but income inequality has grown. The country also faces significant problems of food security. Nepal's rugged and fragile geophysical structure, very high peaks, the high angle of slopes, complex geology, variable climatic conditions and active tectonic processes make the country very vulnerable to a wide range of natural hazards (UNDP, 2004). By global standards, Nepal ranks high in terms of disaster-related deaths, lying in 23rd place in terms of total natural hazard-related deaths over the period 1988-2007 and in seventh position for deaths resulting as a consequence of floods, landslides and avalanches alone. Nepal is also located at the boundary between the Indian and Tibetan tectonic plates and the entire country lies in a high earthquake intensity belt (MoHA et al, 2008).

From an economic perspective, the country is particularly sensitive to major, periodic drought events, reflecting the country's heavy dependence on rain fed agriculture. Meanwhile, floods and landslides are more insidious annual events, resulting in loss of life, crops and infrastructure

every year. At first glance, however, the Nepal macroeconomy appears relatively resilient to the impact of natural hazards other than drought, despite high annual death rates. This apparent immunity reflects a range of factors, including the annual occurrence of floods and landslides, implying that the benefits of a hazard-free year cannot be directly measured; the complex relationship between flooding and crop performance, with certain agricultural benefits from more moderate flooding to some extent offsetting production losses in more severely affected countries; the substantial economic impact of the country's decade-long conflict, making it difficult to discern the consequences of (lesser) hazard-related shocks; and substantial informal border trade in rice commodities and informal inflows of remittances, both implying that the impacts of disasters cannot be fully gauged from official figures alone but also, most likely, lessening the impact of disasters on the formal economy. Despite these various factors, available evidence suggests that, cumulatively, disasters are economically significant events for the country as a whole, resulting in average annual losses equivalent to some 1% of GDP and much higher losses in some years. These direct losses have potential further indirect and secondary impacts, including for longer term rates of growth. A major earthquake in the Kathmandu Valley of a similar magnitude to that experienced in 1934 could have particularly

significant economic ramifications. There is also growing evidence that disaster events are affecting human capital development, via their impact on levels of education and health, with further detrimental consequences for long-term growth.

It is widely held that the incidence of disasters in Nepal is increasing due to rising vulnerability, which in turn is linked to factors such as demographic growth, rapid urban expansion, relatively weak land use planning, the growth of informal settlements, poor construction methods, steep land farming practices, the encroachment of river banks and forest areas and environmental degradation. Climate change appears set to exacerbate the situation, resulting in a higher incidence of droughts, floods, water-induced landslides and Glacier Lake Outburst Floods (GLOFs).

B. Objectives of study

Nepal is formally committed to mainstreaming disaster risk reduction into development as a signatory of the Hyogo Framework for Action (HFA), 2005-2015, and several other international agreements. In support of these commitments and the implementation of Nepal's National Strategy on Disaster Risk Management (2009), in which these international commitments are reflected, this study seeks to develop an evidence-based strategic approach to mainstreaming Disaster Risk Reduction (DRR) into development in Nepal, based on sound economic and financial analysis.

This country study is part of a broader study being undertaken by the United Nations Development Programme (UNDP) to explore how economic and financial information and related tools of analysis could be better used to advocate for and secure greater commitment to disaster risk reduction and influence related policy and programming decisions. Nepal is the second of two country studies in the series. The first study was undertaken in Malawi.

C. Methodology

The Nepal study is based on a series of interviews which were conducted with a wide range of public sector stakeholders on various aspects of disaster risk management over the period 16th to 27th March and 25th May to 5th June 2009. Meetings were also conducted with key donor agencies with an interest in disaster risk management and climate change.

The interviews sought to establish the current state of disaster risk management in Nepal and to identify key gaps and challenges. They also explored how economic and financial information and tools could potentially be used to greater advantage to strengthen disaster risk management and contribute towards the development of a more strategic, integrated approach to the issue. The interviews were supplemented with a review of key literature, budgetary documents and macroeconomic data. A half-day meeting was held on 3rd June 2009 with key stakeholders to present and discuss the preliminary findings of the study and recommendations on ways forward.

D. Key findings and recommendations: current gaps and challenges in disaster risk management from an economic perspective and potential ways forward

The study has revealed a number of economic- and financial-related gaps and challenges in strengthening disaster risk management in Nepal and related scope for using economic data, tools and analysis to help overcome these gaps and challenges.

D.1 Macro-economic evidence on the impact of disasters

There has been relatively little macro-economic and financial analysis of the impact of disasters in Nepal, effectively limiting political commitment to disaster risk reduction. It is widely appreciated that crop performance is closely tied to climatic factors. However, the links, via indirect and secondary consequences, to other aspects of economic performance, such as public finance, fiscal and monetary policy, the balance of payments and longer term growth, have been much more poorly articulated. Moreover, there has been no scenario-based analysis of the potential economic consequences impact of a major disaster, such as an earthquake in the Kathmandu valley.

Reflecting this, natural hazards have only infrequently been identified as an impediment to either economic or social development in Nepal, except by organisations working directly in the disaster arena, and there has been relatively limited political commitment to disaster risk reduction. This commitment is beginning to pick up as a consequence of considerable sensitisation work by Nepal's

development partners including UNDP and others. However, a widespread perception remains that investments in disaster risk reduction represent yet another, significant demand on public resources. If this attitude continues to prevail, it could result in significant funding constraints for disaster risk management and limit both the achievements of the new National Strategy on Disaster Risk Management and, ultimately, the long-term rate of socio-economic development in the country. Enhanced understanding of the macroeconomic impact of past disasters, the potential impacts of future ones and the economic benefits of disaster risk reduction is therefore urgently required, particularly in the light of rising vulnerability and concerns about the adverse impacts of climate change on the incidence and severity of hazard events in Nepal.

Recommended actions

- ❑ Eclectic analysis, exploring the historical interaction between natural hazards, macro-economic performance and public finance, should be undertaken to explore the many complex and dynamic pathways through which extreme hazard events influence the economy and its financial system, enhancing understanding of disasters as economic events and supporting the identification of policy and investment solutions. In view of measurement difficulties relating to the annual occurrence of natural hazards in Nepal, eclectic analysis should be undertaken at the sub-national and sectoral as well as national level.
- ❑ Options for incorporating potential disaster events into economic forecasting and other econometric model should be explored to support enhanced economic planning and decision-making. Both the National Planning Commission's (NPC's) informal Harrod-Domar based model and the new dynamic stochastic general equilibrium model currently under development could be potentially useful in this regard. In addition, development of a separate model specifically to explore the macroeconomic consequences of a potential major earthquake in the Kathmandu valley and related policy options, both ex ante and ex post seems necessary.
- ❑ Analysis of the potential economic implications of the impact of climate

change on the frequency and intensity of hydrometeorological hazards in Nepal would provide valuable additional information, informing the development of strategies to strengthen long-term resilience to climate change.

D.2 Budgetary arrangements and allocations for disaster risk management

An overhaul of current budgetary arrangements for disaster risk management at both the national and local level in Nepal and a review of related levels of funding are required to ensure a clear, cohesive and transparent budgetary framework for both ex ante disaster risk reduction and post-disaster relief and recovery, linked to well-defined tracking and monitoring procedures and incentives for investment in risk reduction.

National budgetary resources, although not appropriated separately under the disaster budget heads as such, are inbuilt in annual budgets for potential emergency relief and rehabilitation activities in Nepal under a number of central, line agency specific and local government budget heads. The government since fiscal year 2008/09 has introduced a separate budget head (95-3-672, recurrent and 95-4-672 capital) under the Ministry of Finance with budgetary allocation made for disaster risk mitigation. This constitutes good practice in a country such as Nepal where disasters occur every year. Line ministries can secure additional funding by including recovery components in their investment programmes for subsequent fiscal years.

However, there are a number of problems with the current arrangements, including that:-

- ❑ Total budgetary provision for relief and response activities may be insufficient even in 'good' years of low loss, resulting in unplanned budgetary reallocations and possibly even funding-related delays in the recovery process.
- ❑ Budgetary mechanisms for relief and recovery operations in the event of a drought are particularly limited.
- ❑ There has been no financial planning for a major earthquake.
- ❑ The disbursement of funds to the government line agencies and local government bodies can take a number of months, perhaps as many as five to six months for approval and release of funds.

- ❑ There are no criteria specifying when a disaster event is on a sufficiently serious scale to permit recourse to public funding.
- ❑ Budgetary resources for disaster risk reduction are almost certainly insufficient.
- ❑ There is no single source of information on total government resources available for post-disaster response nor on actual spending on either disaster response or risk reduction expenditure.

Although Article 98 of Interim Constitution of Nepal has made provision of a contingency fund, which states “An Act may create a Contingency Fund into which shall be paid from time to time such moneys as may be determined by law. Such Fund shall be under the control of the Government of Nepal. Any unforeseen expenditures shall be met out of such Fund by the Government of Nepal. The amount of the expenditures so met shall be reimbursed as soon as possible by an Act.” It is clear from the above provision that this fund could be used as a window for DRM, but the government is yet to operationalize it with promulgation of an appropriate law with arrangement of seed funding and successive fund replenishment mechanism.

Recommended actions

- ❑ A more in-depth review should be undertaken to establish the level of public resources required for post-disaster funding, the actual provision of funds, how these funds are sources and the scale of any residual funding gap.
- ❑ Current financial arrangements for post-disaster response should be reviewed and revised. The revised arrangements should be based on a clear strategy for financing different tranches of loss, covering both localised, annual events and less frequent, more extreme ones. The application of a combination of mechanisms for different layers of loss coverage is likely to be constructive. The review should pay particular regard to options for formalising and strengthening the current budgetary arrangements for post-disaster relief and emergency repair activities, including the more timely disbursement of resources; the availability of funding for post-drought relief and recovery; and the establishment of criteria to determine when a disaster event is on a sufficiently serious scale to

permit recourse to public finance.

- ❑ As a matter of urgency, a new set of arrangements to meet emergency disaster response needs should be established as soon as possible. There are two possible options, one in effect, formalizing and strengthening current, in part informal, arrangements under which line agencies earmark resources annually for use in the event of disasters by creating emergency disaster response budgetary sub-heads for relevant line agencies; and the second entailing the creation of a single central emergency disaster response fund and removing all funding responsibilities for emergency repairs removed from individual line agencies. In both cases, new comprehensive emergency response assistance norms would need to be drawn up; related damage and needs assessment procedures and information enhanced; transparent, streamlined approval, disbursement, monitoring and reporting systems established; and related legislation requiring regular, adequate annual budgetary allocations to these budget heads and formalising related operational and reporting procedures enacted. Under either option, VDCs, municipalities and DDCs should be required to maintain a small fund for relief and emergency recovery purposes each year which they would be required to fully utilise these funds before requesting assistance from higher levels of government. Longer term rehabilitation costs should be projected and placed on the development project in subsequent years.
- ❑ A well-defined line of dedicated disaster risk reduction funding accessible by all relevant line agencies should be established, ideally including mechanisms to encourage collaborative, inter-ministerial programmes around disaster risk reduction.
- ❑ Financial incentives should be developed to encourage greater engagement in disaster risk reduction at the local level. One option would be to create a central government disaster risk reduction fund under the MoLD that local bodies could access if they put up matching fund. Related advocacy efforts would be required to strengthen local understanding of the potential importance and long-term benefits of investments in this area and encourage

use of the facility. Some technical guidance would also be needed.

- ❑ A tracking system should be established to monitor all disaster-related expenditure in Nepal, covering both risk reduction and response. This system is important in ensuring that there is adequate transparency around such spending and that any funding gaps are clearly visible. The tracking system should be directly linked into disaster-related objectives and goals, including individual project goals, under the new National Strategy on Disaster Risk Management and related plan of action and to a comprehensive database on disaster losses, placing disaster-response spending in the context of actual damage. The tracking system would also facilitate a comparison of ex ante and ex post expenditure. A system that covers climate change adaptation expenditure as well would be particularly beneficial.
- ❑ The international community should be encouraged to become more heavily involved in both disaster risk reduction and climate change adaptation issues. One option would be to establish a multi-donor trust fund for disaster risk reduction or climate change adaptation. The latter could also play a potentially important role in bringing the disaster risk management and climate change adaptation communities closer together.

D.3 Disaster loss data

There is only partial and somewhat disparate historical information available on direct disaster losses in Nepal and official loss figures almost certainly under-report the scale of damage. The Ministry of Home Affairs (MoHA) database on disaster losses only covers loss of life, injuries, affected households, animal losses, damage to housing and cattle sheds and loss of land. Information on damage to public infrastructure is dispersed across a number of sources and much of it is apparently extremely difficult to access. These data deficiencies hamper efforts to analyse the wider macro-economic impacts of disasters and to assess the appropriateness and adequacy of disaster-related spending, both ex ante and ex post. Moreover, the under-reporting of losses reduces any sense of urgency of the need to address disaster risk concerns in policy and programming decisions.

Recommended actions

- ❑ A comprehensive, consolidated database on disasters losses needs to be established, detailing the full extent of damage arising as a consequence of natural hazards. This database should be linked into a disaster expenditure tracking system, as outlined above.
- ❑ Potential problems in implementation need to be identified and resolved at the earliest possible stage and related improvements made in the underlying damage assessment process (see below).

D.4 Damage assessment procedures

Loss data limitations in part reflect shortcomings in the damage assessment process. MoHA has developed a standardised format for reporting losses but this form is often not used, there are no accompanying damage assessment guidelines and little related training has been provided. The Ministry of Agriculture and Cooperatives has similarly developed a damage assessment form for use by agricultural and livestock extension workers in the field but current reporting practices are somewhat haphazard. Other line agencies interviewed for the purposes of this study provide no guidelines, training or reporting formats relating to damage assessment.

Recommended action

- ❑ Comprehensive, standardised damage assessment methodologies need to be introduced across the country and related training provided, extending several donor and NGO-led initiatives currently underway to improve specific parts of the system.

D.5 Project appraisal and evaluation guidelines

Economic appraisals of certain disaster risk reduction projects are required in Nepal but existing government guidelines provide no specific guidance on how to assess such projects, to assess the potential risk reduction benefits of other projects or to explore the potential risks posed by hazard events to development projects. Consideration of disaster risk concerns as part of the economic appraisal process is an essential step in ensuring that development gains from individual projects are sustainable in hazard-prone countries, in ensuring that potential disaster risk reduction benefits both of dedicated disaster risk reduction projects

and other development projects are adequately examined and in highlighting related issues of responsibility and accountability. Moreover, the incorporation of disaster risk reduction concerns into the cost benefit analysis of development projects can create important economic incentives for risk reduction, particularly in highly-resource constrained countries where any spending carries a high opportunity cost.

Recommended action

- Existing guidelines for submission of project proposals to NPC for its approval which lacks guidance on the analysis of disaster risk-related and longer-term climate change concerns, calls for a comprehensive review and necessary revision both within economic and other forms of project analysis. Vulnerability to natural hazards is complex and multi-faceted, requiring consideration from all angles - environmental, social, institutional and technical, as well as economic - and incorporation into broader planning tools such as logical framework analysis and results-based management frameworks. In parallel, indicators for monitoring and evaluating disaster risk reduction impacts and outcomes need to be further developed.

E. Potential role of economic data, tools and analysis in overcoming other disaster risk management gaps and challenges

There are a number of other non-economic gaps and challenges to be overcome in strengthening disaster risk management in Nepal. Many of these gaps and challenges are already well recognised and plans are underfoot to tackle some of them. Economic and financial tools, analysis and data could play an indirect role in furthering progress.

Mainstreaming disaster risk concerns into national development policy

There have been some preliminary endeavours to mainstream disaster risk reduction concerns into broader development policy in Nepal. Further effort is required to ensure that these endeavours are sustained and, most importantly, translated into practical action. Disaster risk reduction has yet to be dealt with as a truly cross-cutting theme across the periodic plan. Improved evidence on the economic and budgetary consequences of

disasters would help, clarifying the precise nature and level of importance of disasters as economic and budgetary issues and strengthening the case for mainstreaming. Establishment of a system to track disaster-related expenditure would provide more specific support, providing an important building block in the development and application of monitoring and evaluation indicators. Moving beyond economic data, tools and analysis, disaster risk related screening of all new government policies should also be introduced.

Implementation of the Strategy on Disaster Risk Management

The new National Strategy on Disaster Risk Management outlines a comprehensive, holistic approach to disaster risk management, covering ex ante risk reduction and preparedness as well as post-disaster response. Economic and budgetary analysis of the impact of natural hazards in Nepal and improved data on disaster losses could play a key role in the related sensitisation process by demonstrating the importance of enhanced disaster risk management and its mainstreaming into broader development. Economic and budgetary analysis is also important in explaining the rationale behind the strategy's important proposed creation of a new national authority for disaster risk management at the heart of government, closely linked into development planning and budgetary decision making. Meanwhile, eclectic sectoral analysis could play an important role in identifying key priorities in the translation of the strategy into a plan of action; and enhanced project screening tools, strengthening capacity to analyse disaster risk concerns and options for enhanced resilience, would help ensure that the various components of the action plan are collectively rational, comprehensive and cohesive. Establishment of a system to track disaster-related expenditure would provide a key tool for use in monitoring progress in implementation of the strategy and action plan and their achievements.

Addressing gaps in disaster risk management

Cost benefit and related analysis could play an important role in examining the implications of gaps in certain areas of disaster risk reduction and preparedness and supporting relevant ministries in securing greater government-wide commitment to, and funding for, related investment and recurrent funding needs.

Introduction

1.1 Country background

Nepal is a small land-locked country with an estimated per capita gross domestic product (GDP) of US\$470 in 2008/09.² It had a population of 27.6 million people in 2006 (World Bank, 2008a), some 85% of which is based in rural areas. The economy remains heavily dependent on agriculture which, despite a decline from an almost half share in total GDP in the early 1990s, still accounts for around a third of GDP and is closely linked into the country's predominantly agro-processing based industrial sector. The country has considerable potential for growth by exploiting its hydropower and tourism potential (MoPE, 2004).

In 2005, Nepal ranked 142nd out of 177 countries according to the Human Development Index (HDI), scoring an index of 0.534. This compares with an HDI of only 0.380 20 years previously and 0.469 a decade ago (UNDP, 2007). The country's level of absolute poverty has also fallen significantly in recent years, declining from 42% in 1996/97 to 31% in 2003/04. This progress has been primarily attributed to increasing urbanisation, rising 32% between 2001 and 2006, and new related job opportunities; an increase in wage rates, as well as employment, in the non-agricultural sector; higher agricultural wages, in turn boosted an expanding road

network; growth in overseas remittances; and an increase in the segment of the population of an economically active age (NPC, 2007; DFID, 2007). However, disparities in poverty between urban and rural areas and between different geographical regions and groups have widened over the same period (ibid), whilst the level of poverty is still extremely high. Income inequality has also grown, with an increase in the Gini coefficient from 0.34 to 0.41. Some 78% of the poor are depend on the agricultural sector as the mainstay of employment (NPC, 2007). The country also faces significant problems of food security. According to NPC (2007), 39.9 % of the population do not consume 'minimum calories; whilst NSET (2008) sites Ministry of Health and Population (MoHP) figures that indicate that, as of 2006, 49% of children under five were stunted and 20% were severely stunted. The 2009 drought and continued impact of the world food price crisis could result in increasing problems of malnutrition.

The country experienced a decade-long conflict from 1996 to 2006, resulting in nearly 11,300 deaths, considerable internal displacement, disruptions to the delivery of essential services, health and education and a decline in new investment (NPC, 2007; NSET, 2008). Following the end of the conflict in 2006, subsequent democratic elections in April

¹ According to the Nepal Central Bureau of Statistics website at <http://www.cbs.gov.np/index.php>. Visited 30 April 2009.

2008 and, a month later, a resolution declaring the country a Federal Democratic Republic and abolishing the 240-year old monarchy, the country is now in the process of drafting a new Constitution. This Constitution is expected to introduce a federal system of government, with considerable decentralisation of government. Members of the international community have expressed their commitment and eagerness to work with the new government in establishing lasting peace and stability and delivering tangible peace dividends to the Nepali people (ADB, 2008a). The end of conflict is anticipated to result in higher investment and inflows of foreign aid (NPC, 2007).

Nepal has three major river systems from east to West – the Koshi River, the Gandaki River and the Karnali River, all ultimately becoming major tributaries of the Ganges River in northern India – and around 6,000 rivers and rivulets, including permanent and seasonal rivers, streams, and creeks (NSET, 2008; World Bank, 2008a). The country is divided into three broad ecological regions: the Himalayan mountains in the north of the country, rising to 8,488 m above mean sea level at their peak; hills and valleys in the middle; and a plain area, known as the Terai, in the south, with levels of elevation as low as 60m above mean sea level. The Terai is the country's principal food grain producing area and almost half the population lives there (Regmi and Adhikari, 2007; GoN/UNDP, 2008). However, the Terai, which is an extension of the Indo-Gangetic plain, frequently experiences floods during the monsoon season (June – September), with further, longer-term problems arising as rivers periodically shift course. Meanwhile, the fragile landscape of Nepal's mountains and hills is vulnerable to landslides and GLOFs (MoPE, 2004; Regmi and Adhikari, 2007). Indeed, the country experiences floods, landslides and fires on a regular, annual basis. Nepal is also located at the boundary between the Indian and Tibetan tectonic plates and the entire country lies in a high earthquake intensity belt (MoHA et al, 2008) (see Section 2.1).

By global standards, Nepal ranks high in terms of disaster-related deaths. The global Emergency Events Database (EM-DAT) (see Section 4.3.1) indicates that the country lies in 23rd place in terms of total natural hazard-related deaths over the period 1988-2007, the most recent 20-year

period for which data is available (Table 1). If heatwaves and insect infestations are excluded, Nepal rises to 19th place. In terms of flood-related deaths alone, it lies in eighth position and in seventh position for deaths resulting from floods, landslides and avalanches. Inevitably, such rankings are biased by the choice of period of analysis and by whether or not individual countries experience infrequent low probability, high magnitude events over the selected period. In the case of the period 1988-2007, for instance, countries affected by the 2005 Indian Ocean tsunami feature significantly in the 'league table' of disaster-related deaths. Over the same period, Nepal itself experienced one significant earthquake event, in 1988, resulting in 709 deaths according to EM-DAT. It also experienced particularly high flood-related losses in 1993 and, again, in 1996. However, even if the total deaths reported in 1993 and 1996 are excluded, the country still lies in 17th place in terms of flood-related deaths and 12th position in terms of deaths resulting as a consequence of floods, landslides and avalanches combined. These rankings are startlingly high, particularly in view of Nepal's relatively small geographic and demographic size relative to many other countries featured in the same league table. They underline the high annual human toll of floods in Nepal, even in 'normal' years, and the urgent need to reduce disaster losses in the country.

Administratively, Nepal is divided into five regions: Eastern, Central, Western, Mid-Western and Far-Western. It is further split into 14 zones and 75 districts, which in turn are sub-divided into 3,913 village development committees (VDCs) and 58 municipalities (NPC/UN, 2005).

1.2 Study rationale

Nepal, along with another 167 nations and multilateral institutions, is formally committed to mainstreaming disaster risk reduction into development as a signatory of the Hyogo Framework for Action, 2005-2015 (HFA). This 10 year framework resolves to reduce disaster losses. It is centred on three principal strategic goals, the first of which is 'the 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' (UN/ISDR, 2005: 3).

Mainstreaming is also identified as the second of seven strategic goals outlined in the South Asian Association for Regional Cooperation (SAARC) Comprehensive Framework on Disaster Management in South Asia, which is aligned with the implementation of the HFA (SAARC, 2006). This framework was approved by the SAARC Council of Ministers on 30 July 2006 and by the Fourteenth SAARC Summit in New Delhi in 3-4 April 2007. The November 2007 Delhi Declaration on Disaster Risk Reduction, adopted at the Second Asian Ministerial Conference on Disaster Risk Reduction and including Nepal as a signatory country, again reiterates the importance of mainstreaming, as the second of six key areas of action. Mainstreaming initiatives advocated by the Declaration include the mainstreaming of disaster risk reduction into national sustainable development strategies, plans and programmes in key sectors and efforts to ensure that development does not create further disasters; further strengthening of the legislative frameworks and institutional mechanisms for disaster risk reduction; the positioning of communities at the centre of all aspects of disaster risk management; the conduct of risk assessment as an ongoing process; and the strengthening of financial mechanisms for disaster reduction.

At the national level, these commitments are reflected in Nepal's draft National Strategy on Disaster Risk Management, which outlines a comprehensive, holistic approach to disaster risk management, moving Nepal to the cutting edge of best international practice. This Strategy is currently pending Cabinet approval. Ahead of its approval, disaster risk focal points have been informally appointed in twelve government ministries and agencies to promote and support disaster risk mainstreaming. Work has also been begun to sensitise government staff to the importance of mainstreaming, already resulting in a high level of sensitisation to the issue as compared with levels of awareness in many other developing country governments. International agencies, in particular the United Nations Development Programme (UNDP), have played a key role in this process.

Growing concerns about the impact of climate change on the frequency and intensity of natural hazards in Nepal have also contributed to growing awareness of the need for risk reduction. These concerns have been in part

triggered by several years of aberrant weather, most notably some six successive years of winter season drought and the delayed onset of the monsoon (see Section 2.2). In parallel, increasing evidence that global warming is happening faster than previously anticipated, in turn requiring greater emphasis on adaptation rather than mitigation alone, and that the poor are being disproportionately affected, has led to increasing awareness of the importance of climate change adaptation across the world (The Economist, 2008). In consequence, the GoN and a number of international development partners are beginning to explore how they can support Nepal in adapting to climate change, in turn stimulating further interest in disaster risk reduction as part of the adaptation agenda.

However, there is also a widespread perception in Nepal that disaster risk reduction is very costly, that substantive progress in disaster risk reduction will therefore require considerable financial resources and thus that more general budgetary constraints constitute a major impediment to practical progress. Achieving a better understanding of the economic and budgetary impacts of disasters, of the potential economic and financial benefits of risk reduction – basically, that disaster risk reduction can ‘pay’ – and of how to utilise economic and financial information most effectively to influence decision making is therefore important in ensuring that growing awareness of the need for disaster risk reduction is translated into concrete progress.

Economic and financial goals and concerns are not the only factors influencing government decision making. However, in the face of tight budget constraints and many competing demands for public resources, there is widespread pressure to demonstrate that public resources are well spent and contribute, in particular, to sustainable socio-economic development and poverty reduction. Such evidence is particularly essential in engaging with financial and economic decision makers in Government, particularly within the Ministry of Finance (MoF) and National Planning Commission (NPC). Indeed, MoHA identifies its current inability to convince policy makers and planners that disaster risk reduction is a cost-effective use of resources and limited existing awareness of the negative consequences of disasters for development as key challenges in

Table 1: Global deaths resulting as a consequence of natural hazards, 1988-2007

World ranking	Total deaths		excluding those arising as a consequence of heatwaves and insect infestations		Flood-related deaths		Flood, landslide and avalanche related deaths	
	Country	No of deaths	Country	No of deaths	Country	No of deaths	Country	No of deaths
1	Indonesia	182950	Indonesia	182950	Venezuela	30252	Venezuela	30270
2	Bangladesh	159987	Bangladesh	157816	India	27516	India	29952
3	India	107747	India	98395	China P Rep	26388	China P Rep	28302
4	Pakistan	83498	Pakistan	82287	Bangladesh	7924	Bangladesh	7924
5	Iran Islam Rep	72924	Iran Islam Rep	72924	Pakistan	6476	Pakistan	6960
6	China P Rep	44112	China P Rep	43922	Viet Nam	3822	Indonesia	4811
7	Sri Lanka	36211	Sri Lanka	36211	Indonesia	3566	Nepal	4553
8	Venezuela	30466	Venezuela	30466	Nepal	3397	Viet Nam	4139
9	Soviet Union	25823	Soviet Union	25823	Afghanistan	3096	Afghanistan	3868
10	Philippines	22811	Philippines	22811	Haiti	2960	Philippines	3510
11	France	21379	Turkey	20196	Somalia	2608	Haiti	2960
12	Italy	20538	Honduras	15386	Thailand	2087	Somalia	2608
13	Turkey	20266	Afghanistan	12886	Iran Islam Rep	2078	Brazil	2409
14	Spain	15472	Viet Nam	11555	Ethiopia	1886	Iran Islam Rep	2151
15	Honduras	15386	Thailand	11301	Brazil	1754	Thailand	2134
16	Afghanistan	13458	Haiti	7357	Mexico	1563	Ethiopia	1925
17	Viet Nam	11555	Japan	6913	Korea Dem P Rep	1505	Tajikistan	1859
18	Thailand	11301	United States	5820	Tajikistan	1492	Colombia	1839
19	Germany	9630	Nepal	5446	Philippines	1460	Mexico	1634
20	United States	7389	Nicaragua	4037	Algeria	1274	Korea Dem P Rep	1505
21	Haiti	7357	Algeria	3852	Colombia	1267	Algeria	1289
22	Japan	6985	Colombia	3412	Cambodia	1127	Mozambique	1134
23	Nepal	5554	Russia	3299	Mozambique	1047	Cambodia	1127
24	Russia	5219	Mexico	3077	Morocco	1029	Morocco	1060
25	Mexico	4172	Somalia	2959	Korea Rep	941	Peru	1035

Source: EM-DAT: The OFDA/CRED International Disaster Database, www.emdat.be - Université Catholique de Louvain - Brussels - Belgium. Visited 5 March 2009.

securing sustainable, predictable resources for this purpose (MoHA, 2008).

1.3 Objectives of study

This study seeks to address current shortcomings by developing an evidence-based, strategic approach to mainstreaming disaster risk reduction into development in Nepal, based on sound economic and financial analysis. The study focuses on economic and financial decision making both ex ante, before hazard events occur, and ex post, in relief and recovery efforts. It has five principal objectives:-

- ❑ To explore economic and financial arguments for encouraging greater engagement in and commitment to

disaster risk reduction.

- ❑ To examine existing budgetary arrangements for disaster risk reduction and post-disaster response and opportunities for strengthening current arrangements.
- ❑ To explore the extent to which disaster risk reduction concerns are currently mainstreamed into development policy and practice and the potential use of economic and financial tools and information in enhancing mainstreaming.
- ❑ To identify any significant gaps in disaster risk reduction initiatives in Nepal and the potential use of economic and financial arguments to secure their funding.
- ❑ To explore synergies and potential

opportunities for coordination with the climate change adaptation community.

It is intended that its findings will be used to help improve understanding and use of financial and economic information and instruments in order to promote good practice in the area of disaster risk management, both by the Government of Nepal (GoN) and its international partners. Its findings could also be of use to non-economic stakeholders, within and outside the Government, in seeking to better engage with and influence decision making in this area. Outputs include the development of a road map on further analysis and action required to support strengthened disaster risk management in Nepal.

This country study is part of a broader study being undertaken by UNDP to explore how economic and financial information and related tools of analysis could be better used to advocate for and secure greater commitment to disaster risk reduction and influence related policy and programming decisions. Nepal is the second of two country studies in the series. The first study was undertaken in Malawi.

1.4 Methodology

The Nepal study is based on a series of interviews that were conducted with a wide range of public sector stakeholders on various aspects of disaster risk management over the

period 16th to 27th March and 25th May to 5th June 2009. Meetings were also conducted with key donor agencies and non-governmental organisations (NGOs) with an interest in disaster risk management and climate change. The interviews sought to establish the current state of disaster risk management in Nepal and to identify key gaps and challenges. They also explored how economic and financial information and tools could potentially be used to greater advantage to strengthen disaster risk management and contribute towards the development of a more strategic, integrated approach to the issue. People met over the course of the study are listed in Annex A. The interviews were supplemented with a review of key literature, budgetary documents and macroeconomic data. A half-day meeting was held on 3rd June 2009 with key stakeholders to present and discuss the preliminary findings of the study and recommendations on ways forward.

Focal points for the study were established in MoHA, NPC and MoF. These focal points have played an important function in ensuring that the study has been fully informed by government experience, that it is factually correct and that the study's findings will be effectively fed into future GoN work in this area.

Hazard and disaster terminology used in this report are explained in Box 1.

Box 1: Hazard and disaster terminology

It is widely acknowledged within the disaster community that hazard and disaster terminology are used inconsistently across the sector, reflecting the involvement of practitioners and researchers from a wide range of disciplines. Key terms are used as follows for the purpose of this guidance note series.

A natural hazard is a geophysical, atmospheric or hydrological event (e.g. earthquake, landslide, tsunami, windstorm, wave or surge, flood or drought) that has the potential to cause harm or loss.

Vulnerability is the potential to suffer harm or loss, related to the capacity to anticipate a hazard, cope with it, resist it and recover from its impact. Both vulnerability and its antithesis, resilience, are determined by physical, environmental, social, economic, political, cultural and institutional factors.

A disaster is the occurrence of an extreme hazard event that impacts on vulnerable communities causing substantial damage, disruption and possible casualties, and leaving the affected communities unable to function normally without outside assistance

Disaster risk is a function of the characteristics and frequency of hazards experienced in a specified location, the nature of the elements at risk, and their inherent degree of vulnerability or resilience.

Disaster risk reduction refers to a range of measures intended to minimise the vulnerability of a society to potential natural hazard events before they happen and, thus, to reduce their adverse impacts. It includes structural and non-structural mitigation measures and shorter-term preparedness.

Disaster risk management refers to a logical process designed to reduce or accommodate risk arising from natural hazards and mitigate the impacts of disasters. Activities include the identification, analysis and evaluation of risk in order to decide the most timely, efficient and effective means of risk treatment. This treatment can include financial planning for remaining risk – for instance, via the use of insurance or the creation of contingency budgets.

Mitigation is any structural (physical) and non-structural (e.g., land-use planning measures, public education) measure undertaken to minimise the adverse impact of potential natural hazard events.

Preparedness is activities and measures taken before hazard events occur to forecast and warn against them, evacuate people, livestock and property when they threaten and ensure effective response (e.g., stockpiling food supplies).

Relief, rehabilitation and reconstruction are any measures undertaken in the aftermath of a disaster to, respectively, save lives and address immediate humanitarian needs, restore normal activities and restore physical infrastructure and services.

Climate change is a statistically significant change in measurements of either the mean state or variability of the climate for a place or region over an extended period of time, either directly or indirectly due to the impact of human activity on the composition of the global atmosphere or due to natural variability.

Source: Benson and Twigg (2007)

1.5 Outline of the report

Sections 2 and 3 of the remainder of this report set the scene for analysis. Section 2 outlines the nature of natural hazards faced in Nepal, related vulnerability and the likely impact of climate change on the future nature and incidence of climatic extreme events. Section 3 examines the macro-economic and budgetary impacts of disasters in recent years.

Key findings on economic and financial gaps and challenges in strengthening disaster risk management in Nepal and related recommendations are presented in Section 4. These gaps and challenges concern macro-economic evidence on the impact of disasters; existing budgetary arrangements and allocations for disaster risk reduction, relief and recovery; damage assessment procedures and the availability of disaster loss data; and the extent

to which existing project economic appraisal and evaluation guidelines support analysis of disaster risk related issues.

Section 5 discusses the potential contribution of economic and financial tools, analysis and data in overcoming non-economic gaps and challenges in strengthening disaster risk management in Nepal, pertaining to the mainstreaming of disaster risk reduction concerns into national development and sectoral policies, implementation of the new National Strategy on Disaster Risk Management and investment in disaster risk reduction initiatives. Many of these gaps and challenges are already well recognised and plans are underfoot to tackle some of them. Economic and financial tools, analysis and data could help further progress.

People met over the course of the study are listed in Annex A.

Natural hazards, vulnerability and climate change

Natural hazards

Nepal's rugged and fragile geophysical structure, very high peaks, the high angle of slopes, complex geology, variable climatic conditions and active tectonic processes make the country very vulnerable to a wide range of natural hazards (UNDP, 2004).³ Floods and landslides are the most recurrent natural hazards, occurring annually and claiming just over 200 deaths per annum on average over the period 1997-2006. The country also experiences earthquakes, droughts, glacial lake outburst floods (GLOFs), forest fires and more minor hazard events such as avalanches, storms and hailstorms (ibid).

Climatological hazards Precipitation patterns in Nepal are influenced by or correlated with several large-scale climatological phenomena including the El Nino/Southern Oscillation, regional scale land and sea surface temperature changes and extreme global events, such as catastrophic volcanic eruptions (Regmi and Adhikari, 2007). The amount of precipitation varies considerably across the country due to its non-uniform rugged terrain, but summer monsoon rainfall generally declines from southeast to northwest (MoPE, 2004).

Most floods occur during the monsoon season, between June and September, when 80% of annual precipitation falls, coinciding with snowmelt in the mountains (MoPE, 2004; Regmi and Adhikari, 2007). Flash floods and bishyari (major floods caused when landslides that dam rivers are breached) are common in the mountains. Riverine flooding occurs when rivers augmented by monsoon rains overflow their banks in the plains in the south of the country, as well as in northern Uttar Pradesh, Bihar, West Bengal and Bangladesh (Dixit et al, 2007; Dixit et al, 2008). Most parts of the middle mountains and Terai are 'exposed' to severe flooding (NSET, 2008: 8). Particularly severe flooding occurred in 1993 and 2007.⁴ Almost half a million people were affected by widespread flooding in the latter event, caused by the early onset of strong monsoon rains, and over 23,000 houses were destroyed.

Landslide events also peak in the monsoon season, triggered by high rainfall. The inherently weak geological characteristics of the Himalayas make them highly vulnerable to both heavy rainfall and earthquakes (NSET, 2008). All part of the hills and mountains are 'exposed' to landslides during the monsoon period (NSET, 2008: 8).

³ The most recent decade for which data is available. The figure stated is based on MoHA data.

⁴ The August 2008 Koshi flood in the Terai occurred because a poorly maintained embankment failed. The situation was exacerbated by steadily increasing sedimentation of the river bed, which has resulted in approximately a one metre rise in the river bed within the embankments each decade since the embankments were put in place in 1959. The 2008 flood occurred at a time when river flows were below the long-term average for the month of August (Moench et al, 2008).

Drought poses a further threat, both within the monsoon season and in the remainder of the year when they can damage winter crops.⁵ The Ministry of Agriculture and Cooperatives (MoAC) identified drought as agriculture's most significant natural hazard during an interview for the purposes of this study.

Geological hazards The entire country lies in a high earthquake intensity belt and experiences frequent earthquakes as the northward-moving Indian Plate pushes against the more stable Tibetan block (MoHA et al, 2008; NSET, 2008).⁶ Nepal's most densely populated area, the Kathmandu Valley, is located on the site of a prehistoric lake filled with soft sediments which tends to amplify earthquake shaking. There is a high probability of liquefaction in many of the valley's urban areas, particularly near rivers (NSET-GHI, 1998).

Nepal has experienced three major earthquakes in the last century – in 1934, 1980 and 1988. The 1934 earthquake affected eastern and central Nepal, including the Kathmandu valley, and measured 8.4 on the Richter scale. It resulted in over 8,500 deaths and damaged or destroyed some 38,000 buildings (NSET, 2008). The 1980 earthquake occurred in the far west, measuring 6.5 on the Richter Scale, killing 178 people and damaging 40,000 houses. The 1998 earthquake occurred in the east of the country, also measuring 6.5 on the Richter Scale, resulting in 721 deaths and damaging some 66,000 structures (ibid; Upreti, 2006). According to Bahadur (undated), the country can statistically expect two earthquakes of magnitude 7.5-8 on the Richter scale every 40 years and one earthquake of 8+ on the Richter scale every 80 years.

2.2 Natural hazards, rising vulnerability and climate change

It is widely held that the incidence of disasters in Nepal is increasing due to rising vulnerability (e.g., MoHA et al, 2008; NSET, 2008; SAARC, 2008), in line with experience in many other developing countries. In the case of Nepal, this growth in vulnerability is linked to various factors including demographic growth; rapid urban expansion, in excess of 3.5% per annum; relatively weak land use planning; the growth of informal settlements; poor construction methods; steep land farming practices; the encroachment of river plain and forest areas; and environmental degradation. According to the World Bank (2008a), over 39% of Nepal's total geographic area is classified as forest, of which at least 23% is forested. However, it has been estimated that a quarter of Nepal's forest area is heavily degraded, leading to increased landslides, soil erosion and flooding. Some 80% of the population depends on the forests for daily fuel wood supply and 42 % on it for livestock fodder (Regmi and Adhikari, 2007). Disturbance of drainage by the construction of roads and canals has also increased the incidence of flooding, particularly in the Terai Valley where there has been considerable infrastructural investment over the past five decades (Dixit et al, 2007). Ironically, flood protection embankments have also played a part, for example by obstructing tributary rivers, blocking drainage and, more indirectly, by encouraging investments in flood plain areas that are then put at risk because of inadequately maintained embankments (Dixit et al, 2007). Meanwhile, weak understanding of notions of vulnerability and of opportunities to influence the outcome of hazard events has led to a sense of fatalism and complacency (MoHA et al, 2008).

⁵ Droughts entail a temporary reduction in water or moisture availability to significantly below the normal or expected amount for a specified period (OECD, 1994). Droughts are notoriously difficult to define because 'drought' as a concept is derived from recognition of impacts; and because the relationship between rainfall variability and impacts depends on the specifics of a particular agro-ecological zone or economy. Glantz (1987), in a widely cited review, distinguishes meteorological, hydrological, agricultural and social drought. A general working definition of meteorological drought is 'a reduction in rainfall supply compared with a specified average condition over some specified period' (Hulme, 1995). Agricultural drought is defined as a reduction in moisture availability below the optimum level required by a crop during different stages of its growth cycle, resulting in impaired growth and reduced yields. Hydrological drought pertains to the impact of a reduction in precipitation on surface or sub-surface water shortfall and so may lag behind periods of agricultural or meteorological drought (Wilhite, 1993). Meteorological drought may result in hydrological conditions that have a direct impact on irrigated crops, some forms of non-agricultural production, including hydro-electric power generation, and human water supply. Social drought relates to the impact of drought on human activities, including indirect as well as direct impacts.

⁶ Upreti (2006: 32) reports a much higher figure, stating that 207,740 buildings, temples & travellers' shelters (Pati Pauwa) were damaged and that the Kathmandu Valley 'was almost completely destroyed' whilst rural houses in the hills of eastern and central Nepal were 'heavily damaged'.

A new factor looks set to exacerbate this cycle: global climate change. Climate change models predict that Nepal will face greater variability in precipitation patterns, with reduced rainfall in the winter months and higher rainfall over fewer days during the monsoon, as a consequence of global warming (MoPE, 2004; Regmi and Adhikari, 2007; World Bank, 2008a). The rise in mean temperature will also result in glacier melt and increased evapotranspiration. Changes in precipitation and glacier melt will together result in a higher incidence of droughts, floods, water-induced landslides and GLOFs, as well as soil erosion and increased siltation of riverbeds and fertile land. River flows are expected to increase during the monsoon months and decline in the winter. These impacts will have particularly severe consequences for the agricultural sector, which is highly sensitive to climatic variability (see Section 5.1), and food security if no action is taken.

In recent years, scientists have confirmed that climate change is already underway, with increasing global temperatures. In the case of Nepal, the incidence of floods, droughts and landslides is reported to be increasing in terms of both magnitude and frequency (e.g., MoPE, 2004; Regmi and Adhikari, 2007; GoN/UNDP, 2008). In particular, there has been a series of winter season droughts every year since 2004. In 2008/09, some 14% of the wheat crop (equivalent to around NRS 5bn at current market prices) and 17% of the barley crop were alone lost due to the winter drought. Delays in the onset of the monsoon have also been reported in recent years, with further consequences for agriculture (Regmi and Adhikari, 2007); and the country is experiencing accelerated snow and glacier melt. The latter has resulted in expanding glacier lakes up to critical geostatic

thresholds and the formation of new glacier lakes (GoN/UNDP, 2008). Over 20 glacial lakes are reported to be potentially dangerous because of their apparent potential for glacial lake outburst (World Bank, 2008a).⁷

The GoN's Initial National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change was submitted in September 2004. Nepal is currently in the process of preparing its Second Communication, a National Adaptation Programme of Action (NAPA), a national climate change policy and a National Strategy on Climate Risk Prevention and Mitigation. The Ministry of Environment, Science and Technology (MoEST) has also begun some awareness raising activities around the issue of climate change at the local level. However, GoN/UNDP (2008:3) reports that to date:

'...although there is a general perception among the general public that weather and climate conditions have changed compared to a few decades back and started to directly affect people's lives, there is a lack of basic understanding and awareness on climate change effects and its potential impact. There is a low level of clarity among policy makers and development practitioners on how severely the poorer segment of the Nepalese society would be affected. As a result, the issue of climate change has not yet featured prominently on their agenda.'

Climate change is mentioned in passing in the GoN's current periodic plan, the Three Year Interim Plan 2007-2010 (TYIP), but is not linked to long-term national development goals whilst few substantive adaptation activities have been undertaken to date, on the part of either the government or donors.

⁷ For instance, the size of the Tsho Rolpa Glacier Lake increased from 0.23 km² in 1957-1959 to 1.02 km² in 1979 and to 1.65 km² in 1997 (Regmi and Adhikari, 2007). The water level was subsequently lowered, under a four-year project costing US\$ 3.2 million funded by the World Bank and Netherlands Government.

Economic and budgetary impacts of disasters in Nepal

Theoretical impacts

Disaster losses are conventionally categorized as direct (or stock) losses, indirect losses and secondary effects. Direct losses relate to the physical damage to capital assets, including buildings, infrastructure, industrial plants, standing crops, grain stores, livestock and social infrastructure, as well as loss of human life and injury. Indirect effects relate to disruptions to the flow of goods and services stemming from these direct losses, including, for instance, reduced output, loss of earnings and job losses. Secondary effects concern both the short- and long-term broader socio-economic impacts of a disaster, such as those on GDP growth, fiscal and monetary performance, the balance of payments, foreign reserves, indebtedness and the scale and incidence of poverty.

The scale and nature of direct losses depends on the type and intensity of a hazard event, the geographical area of impact and its timing relative to the agricultural cycle. For example, physical damage in the event of a drought is typically largely limited to crops and livestock. Both rainfed and, depending on levels of stored water (both artificial and groundwater), irrigated crops may be adversely affected. Droughts can also delay planting operations while drier

conditions are sometimes associated with pest outbreaks. In contrast, earthquakes have little impact on standing crops, excluding localised losses occurring as a consequence of landslides. However, they can cause widespread destruction of infrastructure and other productive capacity, potentially including agricultural infrastructure and input distribution and marketing networks. Floods can cause extensive physical damage both to infrastructure and agriculture, particularly if floodwaters recede slowly and/or result in large deposits of sediment in fields and irrigation channels. For instance, direct losses arising as a consequence of the 2008 Koshi flood included damage to some 5,000 ha of agricultural land; to various segments of road, totalling 17 km, along the critical East-West Highway, in turn hampering movement of agricultural produce from the Eastern Terai to other parts of the country; and to underground optical fibre, phone lines and installations, resulting in telecommunication problems (ADB, 2008c; IASC, 2008; Pathak, 2008). The flood also damaged and destroyed to housing, household assets, livestock and productive assets, such as agricultural tools and machinery. In common with droughts, floods can be associated with an increased incidence of pestilence and crop disease as well, with adverse implications for crop yields.

³ The most recent decade for which data is available. The figure stated is based on MoHA data.

⁴ The August 2008 Koshi flood in the Terai occurred because a poorly maintained embankment failed. The situation was exacerbated by steadily increasing sedimentation of the river bed, which has resulted in approximately a one metre rise in the river bed within the embankments each decade since the embankments were put in place in 1959. The 2008 flood occurred at a time when river flows were below the long-term average for the month of August (Moench et al, 2008).

These direct losses can lead to a wide array of indirect and secondary effects. For instance, crop losses can result in higher commercial and/or food aid import requirements, with potential implications for the balance of payments and levels of official foreign reserves. Prices may be forced up, particularly where food staple shortages are exacerbated by disruptions to the transport network, in turn fuelling inflation and affecting poor households disproportionately. For instance, the 2008 Koshi flood was reported to have a significant upward impact on commodity prices, particularly of onions, potatoes and fire wood (IASC, 2008). At the same time, the price of some goods can decline due to supplier problems in accessing markets, as also observed following the Koshi flood when the price of perishable food items such as bananas and vegetables were reported to fall sharply in areas east of Koshi – and rise in western and north eastern feeder markets – because of the closure of the East-West Highway (IASC, 2008; WFP, 2008).

There are also potential budgetary consequences, relating both to possible disaster-related reductions in government revenue and additional, unplanned expenditure in support of the relief and recovery effort. The government may be obliged to address these budgetary pressures via the partial reallocation of already committed financial resources, with implications for planned investment, and/or a widening of the fiscal deficit. The latter will imply increased domestic and/or external borrowing or an expansion of the money supply, each, in turn, with potentially significant knock-on effects (Benson and Clay, 2004).

There are additional implications for agro-industry, in some instances with a lag effect, and for domestic demand. There may be further consequences for agricultural production in subsequent cropping seasons, in part depending on access to inputs and the extent of damage to agricultural land and infrastructure. The continued risk of further natural hazards can also have long term impacts on, for instance, land and property prices. In the case of Nepal, for instance, the red mark used by the Department of Water Induced Disaster Prevention (DWIDP) to delineate the extent of hazard vulnerability drives land prices down and is not popular with many communities (Dixit et al, 2007).

Longer-term impacts of disasters are more difficult to determine empirically but may be significant, in part because disasters reduce the pace of capital accumulation by destroying existing productive and social capital (including standing crops) and diverting scarce resources away from new investment.

The potential complex and far-reaching impact of a disaster event through an economy is illustrated in Figure 1 in the context of a major earthquake event, such as could be experienced in the Kathmandu Valley of Nepal.

However, there is nothing inevitable about a country's level of economic vulnerability to natural hazards. Instead, the actual scale and nature of the economic consequences of a hazard event are mediated by a complex, dynamic set of factors determining vulnerability as well as by the severity, duration and geographical scale and location of the hazard event itself. These factors include an economy's structure; its stage of development; prevailing economic, social and political conditions (such as the extent and nature of any internal or external conflict); and the policy environment. Vulnerability can change quickly, in a decade or less, in countries experiencing rapid economic change.

The relationship between the level of development of an economy and the impact of a disaster is particularly complex as development alters, but does not necessarily reduce, vulnerability. Influences determining the impact of development on vulnerability include the quality of physical infrastructure and related extent of land use planning; the degree of sectoral and geographical integration between directly hazard affected area and other parts of the country, the domestic economy and wider global economy; the particular focus of any economic specialisation or, conversely, diversification; the coverage and robustness of the financial sector; government revenue-raising capabilities; the openness of the economy; the consequences of development for the state of the environment; and investment decisions around disaster risk reduction (Benson and Clay, 2004).

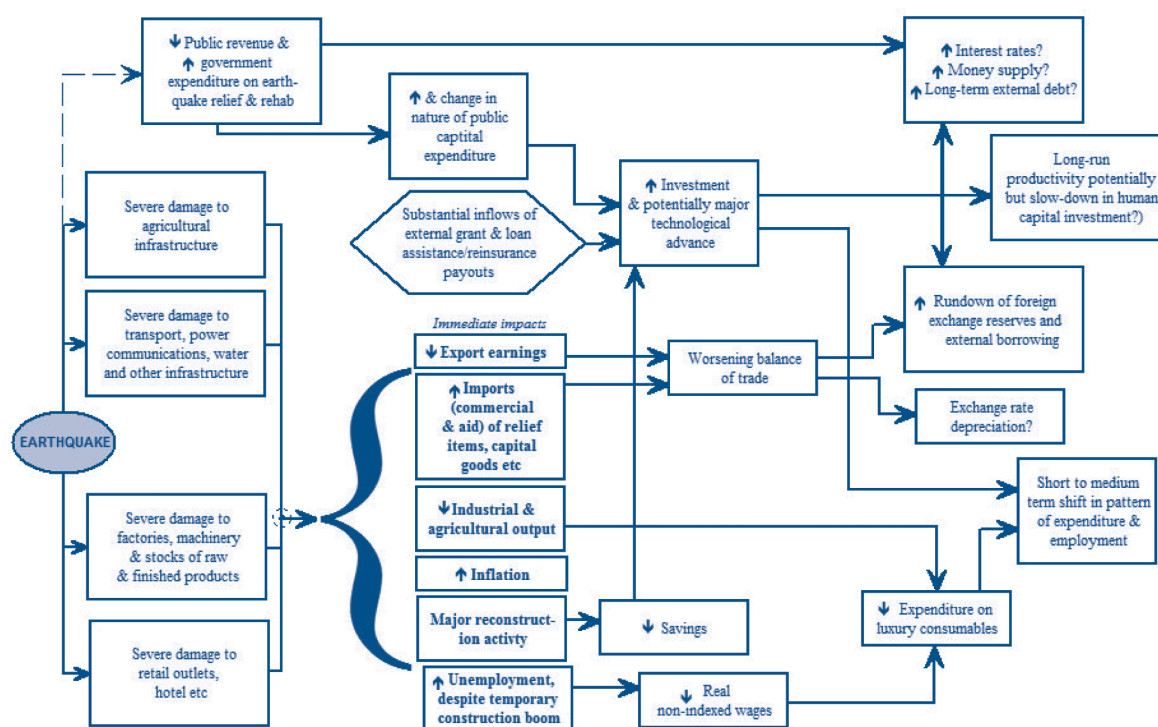
3.2 Macroeconomic impacts of disasters in Nepal

Nepal's economy, as defined in terms of GDP growth performance, is highly sensitive to major drought events, reflecting the country's heavy dependence on rain fed agriculture. Nepal has 2.65 million ha of agricultural land, of which 1.7 million ha is irrigable but less than 1.1 m ha is actually irrigated (WFP and NDRI, 2008a). Moreover, most irrigation facilities only function during the monsoon season and are constructed to provide water to paddy fields. Year-round irrigation is only provided to about a third of irrigated land. This heavily rainfall-dependent sector, in turn, accounted for a third of GDP in 2005/06, thus remaining the dominant economic sector despite declining in significance from almost half of GDP in the early 1990s. As of 2004, the agricultural sector also provided a livelihood for over 80 % of the population; and was the basic source of inputs to the country's predominantly agro-processing based industrial sector⁸ (MoPE, 2004). The strong correlation between drought events, agricultural sector value added and GDP performance is indicated in Figure 2.

Agricultural GDP performance, in turn, closely mirrors trends in rice production (Figure 3). Rice is Nepal's most important crop, followed by maize and then wheat.

However, despite high annual deaths as a consequence of other types of hazards, at first glance the Nepal economy – as again defined in terms of GDP growth performance – appears relatively resilient to the impact of other types of natural hazard. The two most significant hazard events over the past 30 years in terms of loss of life – the 1988 earthquake and the 1993 floods and landslides – had little immediately discernible impact on annual rates of growth of either total or agricultural GDP (Figure 2). For instance, the 1993 floods and landslides resulted in some 1,300 deaths, affected almost 74,000 families and fully or partially destroyed over 39,000 houses. They damaged some 43,330 hectares of fertile land, around 367 kilometres of roads, six major bridges, 213 wooden and suspension bridges, 452 schools, health posts and government buildings, 25 culverts, 37 large and small irrigation systems and thousands of farmer managed irrigation

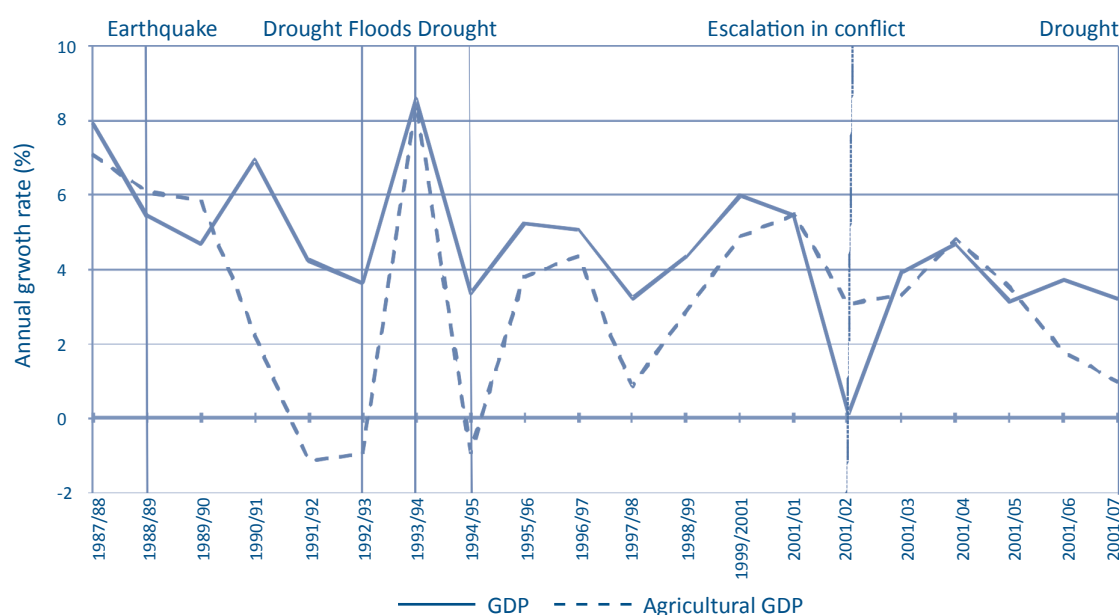
Figure 1: Transmission of an earthquake shock through an economy



Source: Benson, 2003

⁷ For instance, the size of the Tsho Rolpa Glacier Lake increased from 0.23 km² in 1957-1959 to 1.02 km² in 1979 and to 1.65 km² in 1997 (Regmi and Adhikari, 2007). The water level was subsequently lowered, under a four-year project costing US\$ 3.2 million funded by the World Bank and Netherlands Government.

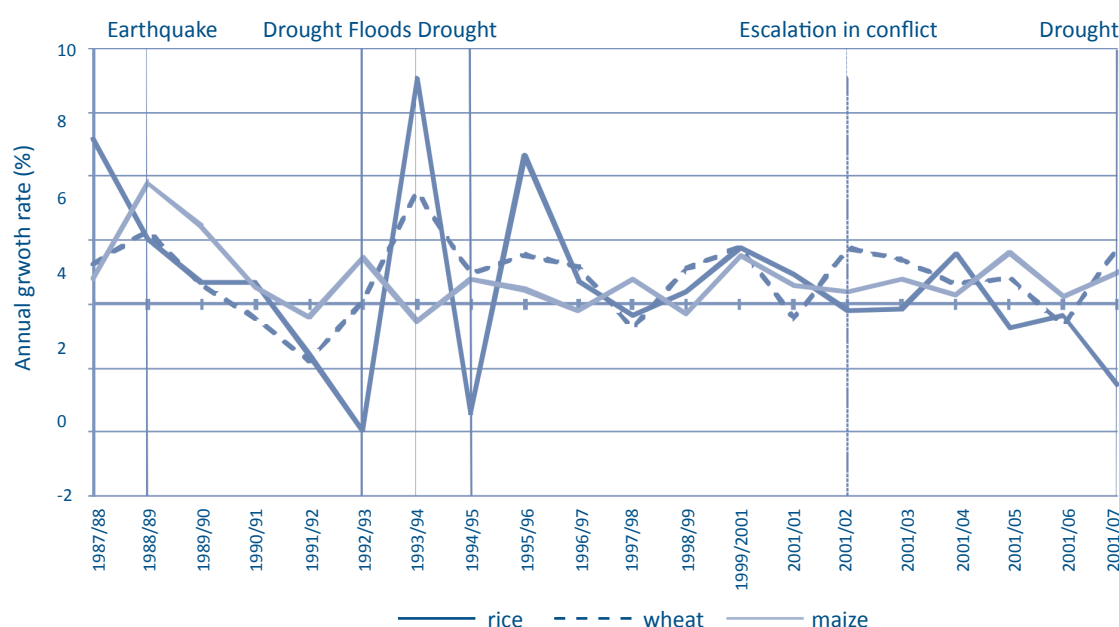
Figure 2: Annual growth in GDP and agricultural GDP in Nepal, 1987/88 to 2006/07



schemes. They also severed a penstock pipe, resulting in the loss of almost half of the country's total installed electricity capacity from the Integrated Nepal Power System; and, by washing out three bridges along the Prithvi Highway, isolated the capital from the Terai (Dixit et al, 2007). In total, 43 districts were affected. UNDP (2004) estimated that damage in the five most affected districts alone totalled NRS 4bn, equivalent to around 3% of

GDP and 13% of the total annual government budget. However, overall, the agricultural sector performed temporarily well for the year as a whole, with paddy production bouncing back from poor performance in 1992/93 to a level in slight excess of 1991/92 output. Total GDP grew by 8.6% year-on-year. The macroeconomic impacts of the more recent 2008 Koshi and far-western floods were also expected to be very minimal (Box 2).

Figure 3: Annual growth of rice, wheat and maize production in Nepal, 1987/88 to 2006/07



Box 2: The macroeconomic consequences of the 2008 Koshi and far-western floods

The Koshi and far-western floods resulted in an estimated NRS 2.3 billion (US\$29.2 m) direct damage to assets and a further NRS 3.6m (US\$44.8m) indirect damage, together equivalent to 0.6% of projected GDP for FY 2008-2009. However, the impact of the floods was fairly localised and, assuming relatively rapid restoration of infrastructure and reclamation of agricultural land, it was expected that the floods would have a very limited impact on macroeconomic performance. In consequence, the GDP growth forecast for the year was only revised down from 7.0 to 6.7%, and the agricultural GDP growth forecast from 4.5 to 4.1%, following the floods. Growth in the non-agricultural sector was also expected to be 0.2 percentage points lower than previously forecast, due to the impact of damage to transport and communications infrastructure on manufacturing activities and trade.

The floods were expected to have a minimal impact on prices, given their relatively limited effect on overall agricultural production coupled with supply alternatives from India (see below). Meanwhile, adverse impacts on the balance of trade, relating to higher inflows of imports for reconstruction purposes and to resolve supply disruptions resulting as a consequence of damage to the East-West Highway, were expected to be offset by sustained growth in inflows of remittances and tourism earnings.

Source: ADB, 2008

The apparent economic immunity to non-drought natural hazards events may reflect a number of factors. First, it may partly reflect the fact that the benefits of a flood and landslide free year cannot be directly measured because of their annual occurrence. These hazards are insidious – be they localized – annual events, resulting in loss of life, crops and infrastructure every single year, with a potentially significant cumulative impact on Nepal's development. The country also experiences localized droughts, the potentially devastating impacts of which are not necessarily reflected in national year-on-year performance in the same way as nationwide droughts.⁹ Under such circumstances, it is important to consider the unit of analysis in investigating the impact of a disaster and related risk reduction needs. The scale of losses may be very high within the affected area, justifying risk reduction investments. At the same time, it should be borne in mind that non-affected areas may benefit from difficulties elsewhere, for instance in the form of increased demand for agricultural products, consumer durables and construction materials. These issues warrant further investigation.

Second, with specific regard to the impacts on agricultural production, the relationship between flooding and crop performance is

complex. Moderate flooding is beneficial for agriculture, improving soil fertility and productivity by depositing micro-nutrients, fine silt and loam on fields (Dixit et al, 2008). In contrast, more intense flooding damages and destroys crops and agricultural land due to the prolonged inundation of flood waters, flood-related river bank erosion and cutting, shifts in the course of rivers and heavy deposition of sediment. Thus, for instance, WFP et al (2007) note in relation to the 2007 floods that crop land near rivers and in low-lying areas were heavily affected by floods, with high or total crop losses, but that the standing paddy crop in other areas benefited from the temporary immersion, with an overall surplus production expected from the latter areas. Similarly, in 2008 overall crop harvests were expected to be good, including in the flood-affected districts (ADB, 2008c), again emphasising the significance of the choice of unit of analysis in investigating economic impacts of disasters. The impact of floods on paddy production is further complicated by the fact that the outcome is in part influenced by the duration of flooding. Depending on the maturity of the paddy plants, paddy can withstand up to 10 days of submersion. Prolonged water logging, however, causes anaerobic conditions that result in plant rot.

⁹ For instance, WFP and NDRI (2008a) report that despite a good national crop in 2007/08, the Far and Mid-Western Hills and Mountains were hit by drought.

A further factor that is likely to have influenced both the economic impact of disasters in Nepal in recent years and the degree of ease in measuring such impacts is the country's decade long-conflict and its aftermath. This conflict created political and business uncertainty, stymieing economic activities and investment and resulting in a reduction in tourism, a key source of foreign exchange. The conflict resulted in the destruction of physical infrastructure valued at at least US\$250 m, the internal displacement of nearly 400,000 rural families and the migration of thousands more across the Indian border (Ra and Singh, 2005). The conflict escalated sharply in 2001, resulting in only a 0.1% increase in real GDP year-on-year; several successive years of comparatively poor growth; and a decline in development expenditure by a third between 2001 and 2005 (*ibid*). A 2004 study by the National Peace Campaign (2004) put the total cost of conflict over the period 1996-2003 alone at \$66.2 billion whilst a Department for International Development (DFID) study estimated the costs of conflict at 8–10% of GDP.¹⁰ However, by constraining economic linkages between different parts of the country, the conflict may have limited the geographical impact of individual disaster events. The conflict may also have served to downplay their apparent economic consequences by disrupting the collation of data on disaster losses and economic activity. More generally, the significant adverse economic impact of the conflict, particularly from 2001, dominated trends in economic performance, making it difficult to discern the consequences of (lesser) hazard-related shocks. More recently, the post-conflict rebound has had a similar effect, more than offsetting the adverse impacts of disasters. Despite some continuing political uncertainty, slow progress in reconstruction, fuel and electricity shortages and rising fuel prices following the end of the conflict, improved security, good harvests linked to favourable climatic conditions, improved transportation, and increased tourism resulted in a notable improvement in GDP in 2007/08, with an estimated 5.6% rate of growth.¹¹ The post-conflict economic rebound has also resulted in strong economic growth projections for 2008/09, outweighing the adverse economic

consequences both of the Koshi and far-western floods and of increasing power outages.

Fourth, efforts to measure the impact of disasters, including droughts, on the Nepali economy are complicated by substantial informal border trade in rice¹² – Nepal's primary food import – and other commodities and by considerable informal inflows of remittances, a large proportion of which are hand-carried from India.¹³ These flows imply that the impacts of disasters are difficult to measure using official economic data alone. For instance, droughts in 2006/7 destroyed the rice crop in the Eastern Terai, the major rice-producing region of the country. Nationally, rice production declined by almost 530,000 tonnes or 12.6%. However, official imports only increased from an average 60,000 tonnes per year to around 150,000 tonnes and there was little evidence of any increase in the domestic price of rice. Instead, the price trend of coarse rice was reported to be normal in most district headquarters (WFP, 2007), implying that domestic shortfalls were met via an increase in unrecorded imports.

Despite contributing to measurement problems, informal flows of remittances and commodities have almost certainly lessened the impact of disasters on the economy, including on the formal balance of payments, foreign exchange reserves and domestic demand. Their positive role has been further reinforced by the fact that disasters themselves trigger further out-migration to India and elsewhere (WFP and NDRI, 2008b). Evidence from the past indicates that the economic impact of disasters on the formal external sector may once have been far more significant, before large-scale formal and informal out-migration began. For instance, a severe widespread drought in 1982/83 resulted in a significant deterioration in the balance of trade, to a NRS 680m trade deficit. This, in turn, led to the introduction of import controls (NPC, 1985).

Fifth, impacts of natural hazards on the wider economy may be partially hidden by the strong influence of Indian economic performance on that of Nepal. For instance, trends in inflation in Nepal closely follow those in India.

¹⁰ The National Peace Campaign and DFID documents are both cited in Ra and Singh (2005).

¹¹ According to the GoN Central Bureau of Statistics website at <http://www.cbs.gov.np/index.php#>, visited 15th June 2009.

¹² Nepal typically imports up to 600,000 metric tonnes of food each year, predominantly through open borders with India (WFP, 2008).

¹³ Out-migration and the related inflow of remittances is a relatively new phenomenon on such a large-scale basis. Both formal and informal out-migration for employment purposes has increased enormously over the past decade, in the case of formal migration rising from a mere 2,132 people in 1995/96 to 193,803 people in 2005/06 (MoF, 2006).

Finally, it is important to note that there are significant data problems relating both to disaster-related losses (see Sections 4.3 and 4.4) and the estimation of agricultural production and other economic activities in Nepal. These could serve either to downplay or exaggerate the impacts of disasters in Nepal. In the case of disaster-related losses, official figures are almost certainly considerable under-estimates of actual losses, again downplaying the potential significance of disasters as economic shocks.

Despite these various factors and the lack of any detailed analysis of the economic impact of disasters in Nepal, available evidence suggests that, at least collectively, disasters are economically significant events for the country as a whole and stymie its economic growth potential. MoHA et al (2008: 3-4) have made some back-of-the envelope estimates of the direct financial costs of disasters, based on reported physical losses in the DesInventar database (see Section 4.3). They calculate that in 'normal' years (without large events) annual direct losses equivalent to less than 0.01% of national GDP are experienced, rising up to 4% of GDP for 'significant, large' hazards. According to the same source, direct costs of the 1988 earthquake exceeded actual annual GDP growth for the same year; and a larger earthquake event, such as the 1934, could result in losses 'several ten times' higher.

World Bank estimates of losses to crop production alone suggest even higher annual losses as a consequence of natural hazards. These estimates place average annual losses at equivalent to 3.4% of the total value of crop production, with crop losses rising to 6.0% (equivalent to NRS 6.9 bn or US\$ 99m) in

2006/07 (World Bank, 2008b).¹⁴ The 3.4% mean translates approximately into an average 0.6% of GDP, based on an approximately 50% share of crop production in total agricultural GDP and a third share of agricultural GDP in total GDP – a missing 0.6% of GDP every year.¹⁵ If other damage is taken into account, average losses could be equivalent to around 1% of GDP, and significantly higher in some years.

There is also growing evidence that disaster events are affecting human capital development in Nepal via their impact on levels of education and health, with implications for longer-term rates of growth. For instance, Gautam and Oswald (2008) document the impact that disaster events have had on school attendance by preventing children from physically reaching schools; by reducing household capacity to meet the cost of school fees and stationary; by resulting in the transfer of children into income-generating activities to supplement household earnings; and by resulting in increased (adult) male migration, requiring children to stay at home to help with domestic and agricultural work. Similarly, Archarya, and Aryal (2008) report that the 2008 Koshi flood disrupted the education of some 23,000 school students, including both displaced students and students of the host schools where the displaced were sheltered. Disasters have also exacerbated problems of water contamination, leading to an increase in water-borne diseases such as cholera and diarrhoea; and contributed to food insecurity, by destroying crops and agricultural land. According to NSET (2008), many of the epidemic outbreaks in Nepal are hazard related, as reflected in the fact that epidemic-related deaths peak in July, August and September.

¹⁴ The document does not indicate the period of time over which this average was estimated.

¹⁵ Agriculture accounted for 33.6% of GDP in 2005/06.

Key findings and recommendations: current gaps and challenges in disaster risk management from an economic perspective and potential ways forward

The study has revealed a number of economic- and financial-related gaps and challenges in strengthening disaster risk management in Nepal. These gaps and challenges relate to macro-economic evidence on the impact of disasters; existing budgetary arrangements and allocations for disaster risk management; the availability of disaster loss data; damage assessment procedures; and the extent to which existing project economic appraisal and evaluation guidelines support analysis of disaster risk related issues.

The potential scope for using economic data, tools and analysis to overcome these gaps and challenges is indicated in Table 2 and discussed in further detail below. Some of the recommended actions would also contribute more indirectly to the resolution of other non-economic gaps and challenges, as also indicated in Table 2. These other gaps and challenges are explored in Section 5 of this report.

4.1 Macro-economic evidence on the impact of disasters

4.1.1 Gaps/challenges

There has been relatively little macro-economic and financial analysis of the impact of disasters in

Nepal, effectively limiting political commitment to disaster risk reduction. It is widely appreciated that the country's crop performance is closely tied to climatic factors. However, the links, via indirect and secondary consequences, to other aspects of economic performance, such as public finance, fiscal and monetary policy, the balance of payments and longer term growth, have been much more poorly articulated.

The role of climatic factors in determining agricultural performance is regularly discussed, particularly in ex post analyses of broader macroeconomic performance. For instance, successive periodic plans have consistently linked fluctuations in agricultural GDP over the previous plan period to climatic factors. Economic updates produced by the Nepal Rastra Bank and economic assessments by the international community are similarly quick to acknowledge the strong influence of climatic factors on fluctuations in agricultural performance. However, a review of the literature on economic performance revealed little further discussion of the macroeconomic consequences of natural hazard events beyond some limited review of their impact on prices. Similarly, there has been no scenario-based analysis of the potential economic consequences

impact of a major disaster event, such as an earthquake in the Kathmandu valley.

Reflecting this, natural hazards are only infrequently identified as an impediment to either economic or social development in Nepal, except by organisations working directly in the disaster arena, and there has been relatively limited political commitment to disaster risk reduction. This political commitment is now gradually increasing as a consequence of considerable sensitisation work by UNDP and others, reflecting wider trends globally. However, as already noted, a widespread perception remains that investments in disaster risk reduction represent yet another, significant demand on public resources. If this attitude continues to prevail, it could result in significant funding constraints for disaster risk management and limit both the achievements of the new National Strategy on Disaster Risk Management and, ultimately, the long-term rate of socio-economic development in the country. Enhanced understanding of the macroeconomic impact of past disasters, the potential impacts of future ones and the economic benefits of disaster risk reduction is therefore urgently required, particularly in the light of rising vulnerability and concerns about the adverse impacts of climate change on the incidence and severity of hazard events in Nepal.

4.1.2 Recommended action

4.1.2.1 Eclectic, qualitative analysis of the macroeconomic impact of disasters

Eclectic analysis, exploring the historical interaction between natural hazards, macro-economic performance and public finance, is extremely useful in investigating the many complex and dynamic pathways through which extreme hazard events influence an economy and its financial system, in translating findings into policy and investment solutions and in identifying areas and issues for further investigation, including empirical quantification. Under an eclectic approach, disasters are not treated as ‘black box’ economic shocks. Instead, a country-specific historical narrative

is established, exploring the precise nature of each hazard type and teasing out the various economic, political and social factors that have determined the impact of different disaster events. It can also include an analysis of the likely future impact of disasters, based on socio-economic trends and prevailing government policies. The approach can entail partial quantitative, as well as qualitative, analysis (Benson and Clay, 2004).

Such analysis should be undertaken in the context of Nepal to help enhance understanding of the indirect and secondary economic consequences of disasters, underlying factors mediating the extent and nature of impact, likely shifts in vulnerability in the short to medium-term¹⁶ and opportunities for strengthening resilience, particularly win-win opportunities that support both disaster risk reduction and sustainable development. Greater understanding of the economic significance of disasters is particularly important in securing widespread political commitment to the new National Strategy on Disaster Risk Management, related funding for its implementation and momentum for some adjustments in budgetary arrangements for disaster risk management (see Section 4.2). The analysis would also help shed light on the implications of broader national development goals for the economy’s hazard resilience.

In view of measurement difficulties relating to the annual occurrence of natural hazards in Nepal implying that a non-disaster counterfactual – that is, the benefits of a hazard-free year – cannot be directly measured (see Section 3.2), eclectic analysis should also be undertaken at the sub-national level, focusing on selected case study districts that experience disasters on an intermittent, rather than regular annual, basis and on particularly vulnerable economic sectors. This analysis, moving beyond macroeconomic aggregates to unpack their consequence via more detailed sector-based and sub-national analysis, would be extremely useful in obtaining a clearer understanding of the nature and significance of natural hazards as economic and financial

¹⁶ For instance, growth in tourism would help buffer the macroeconomy against disasters as the number of tourist arrivals and levels of tourist expenditure are likely to be relatively hazard insensitive, except in the event of a major earthquake in the Kathmandu valley.

shocks at macro, meso and micro levels in Nepal and factors influencing their outcome. It would also be beneficial in identifying opportunities to enhance resilience at the local and sectoral level and in strengthening local and sectoral budgetary arrangements for disaster risk reduction, relief and recovery. Analysis at the local level is particularly important at the current time, when the GoN is exploring a possible move to a system of federal government.

4.1.2.2 Econometric modelling

Building disaster risks into econometrically-generated GDP growth forecasts is also important for both short and longer term planning purposes. Macroeconomic models are necessarily 'stylised descriptions of reality', based on assumptions about relationships with approximate foundation in empirical evidence' (Nilsson, 2004: 13) and ignoring factors such as the quality of governance or public sector management. Nevertheless, they have some merit both in policy analysis and in forecasting and planning processes. In the case of disaster

related analysis, they can provide a quantitative understanding of the potential impact of disaster events on key economic parameters, including rates of growth, budgetary envelopes and foreign exchange reserves, and of the implications of possible policy responses and investment decisions. Such analysis complements the knowledge and understanding gained via the more eclectic approach outlined above. The potential value of such exercises is illustrated by recent research in Ethiopia (Box 3).

Existing extent of use of econometric tools in Nepal There has been relatively limited use of econometric tools in Nepal for any purpose. The NPC has a Harrod-Domar orientated model, linking economic growth and capital investment, which it uses for the preparation of the periodic plan.¹⁸ Total and sector target growth rates are set and levels of investment required to achieve these targets then determined using incremental capital-output ratios for each sector. A financial plan to meet these investment requirements is subsequently prepared, detailing expected

Box 3: Modelling the economic consequences of rainfall in Ethiopia

The World Bank has used its standard macroeconomic projection country model, the Revised Minimum Standard Model (RMSM), to explore the implications of rainfall variability (World Bank, 2006b).¹⁷ Levels of rainfall are fundamental to economic performance in Ethiopia because the agricultural sector accounts for around 50% of GDP, largely comprising smallholder production of cereals under rainfed conditions. The model was run with three rainfall variations: smoothed average 1995–2002 rainfall in all years, stylized drought (assuming average 1995–2002 rainfall in all years except for a stylized, two-year drought of average severity) and historical variability (a stochastic extension of the model that more fully reflects Ethiopia's historical levels of rainfall variability, and, in addition, captures the negative impacts of excessive rains on the agricultural and non-agricultural sectors). The model showed that hydrological variability costs the Ethiopian economy 38% of its potential growth rate and causes a 25% increase in poverty rates. In terms of investment decisions, under both the smoothed rainfall model and the stylized drought model most benefits appeared to derive from investments in market infrastructure, whilst investments in irrigation only generated marginal growth and poverty reduction gains. Under the historical variability model, however, the gains to investment in irrigation and drainage were doubled, reflecting the greater benefits of irrigation under highly variable climatic conditions. The researchers concluded that 'parallel investments in irrigation and market infrastructure can generate synergies for growth and poverty reduction, because together they will provide significant incentives for increased farmer investments in agricultural inputs as well as incentives and opportunities outside of agriculture' (ibid: xxiv).

¹⁷ In the case of Nepal, a more simplified model would probably be required. The NPC explored the use of the World Bank's RMSM some years ago but concluded that it was too data intensive for the Nepal situation. The model also requires consistent long-term runs of data. These are not readily available for Nepal due to the reclassification of GDP in around 2000, when GDP was expanded from eight to 15 sub-sectors.

¹⁸ The NPC was unable to provide any written information on the structure of the model for the purposes of this study.

flows of private investment and international assistance and levels of government revenue and, potentially, borrowing required to meet the residual funding gap. High, medium and low growth scenarios are explored as part of this process¹⁹ but these have apparently not included any disaster-related analysis. Instead, agricultural growth forecasts are based on an average target which assumes weather-related fluctuations in performance between years. Revenue projections are based on the normal scenario and entail no sensitivity analysis.

For annual budgeting purposes, the NPC follows a more informal process, simply estimating public revenue (based on policy variables, trend data and elasticities) and government borrowing and reviewing foreign aid commitments (distinguishing between tied and untied aid) over the forthcoming year to determine budgetary envelopes. There is apparently little link between GDP forecasting and budget resource estimation on an annual basis. GDP forecasting is undertaken separately by the Nepal Rastra Bank (NRB), NPC and MoF, based on some qualitative scenario analysis.

The NRB also has an econometric model, the Nepal Macroeconomic Model (NMEM), which is periodically used for economic growth forecasts and debt sustainability analyses, but not on a regular basis. The NMEM is based on the Keynesian income–expenditure approach in which GDP is determined endogenously. The model includes five exogenous policy variables – taxes, regular expenditures, development expenditures, foreign borrowing and the exchange rate – permitting policy simulation analysis.

The NMEM has been used in the past by Ra and Singh (2005) to analyse the impact of Nepal's decade-long conflict by altering the development expenditure variable, which in turn influences

public consumption, public fixed investment and private fixed investment.²⁰ In theory, the NMEM could be similarly used to explore the consequences of disasters, again via their impact on development expenditure. In this case, the decline in development expenditure would be attributed to its diversion into recurrent spending (in the form of humanitarian relief supplies) and, indirectly, its use in the event of natural hazards (other than drought) to replace destroyed assets, rather than expand the existing capital stock. Such a decline is feasible in the event of a major disaster despite the fact that the international community would probably provide a substantial share of relief and recovery resources because the latter is itself likely to partly offset increased disaster-related aid flows against a decline in non-disaster related assistance. This tendency has been observed in other countries (see, for instance, Benson and Clay, 2004). The model could also be extended to include a production block, in this case capturing the impact of disasters via their impact on capital stock and, possibly, labour supply and thus on total output.

In practice, however, these exercises would have limited value as the NMEM's wider utility has declined significantly in recent years due a number of factors, including a significant change in the structure of Nepal's economy and some major revisions to key macroeconomic data standards since the model was developed (ADB, 2008b). The GoN, with ADB support, is currently initiating a project to update the model for analytical work and macroeconomic forecasting purposes. The project will also include the development of a dynamic stochastic general equilibrium (DSGE) type macroeconomic model for Nepal, with adequate specifications with respect to production, consumption, trade and price mechanisms amongst other factors. DSGE models explicitly state the microeconomic issues

¹⁹ For instance, the Tenth Plan included a conflict and a no-conflict scenario.

²⁰ Three scenarios were analysed: a no-conflict scenario, under which development expenditure grew at its historical (FY1991–FY2001) rate; a conflict scenario, under which development expenditure continued to decline at the current rate of 4.2% per annum for a further 5 years; and a high-conflict scenario, under which development expenditure declined by 8.4% per annum. The model revealed that if the conflict continued for another five years then GDP growth would be reduced by 1.7% per annum under the conflict scenario and 2.1% per annum under the high-conflict scenario. The authors noted that the true impact of the conflict on GDP growth is even higher than that predicted by the model as the simulations did not take account of the effects of the destruction of economic infrastructure, displacement of people or disruption of economic activities on GDP growth, nor fully reflect the impact of lower private investment. They also noted that the impact on GDP growth would persist well beyond the end of the conflict because of lower capital stock and the time required for development expenditure to recover fully.

that give rise to macroeconomic dynamics and the DSGE modelling approach has emerged as an appropriate tool for policy analysis and quantitative data analysis (ibid).

Potential scope for econometric modelling of disaster shocks Despite the above limitations relating to only limited use of macroeconomic models to date in Nepal and, according to ADB (2008b:1), weak related institutional capacity for economic policy analysis, in turn partly due to a lack of appropriate policy analysis tools and an underdeveloped statistical system, there is nevertheless potential scope for using econometric tools to enhance understanding of the macroeconomic consequences of natural hazards in the country and to provide a sound analytical foundation for related policy formulation. This could support enhanced economic planning and decision making, both pre- and post-disaster, and influence patterns of public investment.

- Depending on its precise structure, the new DSGE model could be potentially useful in exploring the consequences of disasters for the Nepal economy. Keen and Pakko (2008) used a DSGE model for this purpose in the USA to investigate the appropriate monetary policy response to Hurricane Katrina, which hit the US Gulf Coast in August 2005. The authors introduced the disaster shock via a decline in the economy's productive capital stock and a transitory negative technology shock, the latter to capture disruptions to production.
- If it is assumed that relief and recovery efforts are funded primarily via the reallocation of planned spending, the NPC's informal Harrod-Domar model could be used to explore the growth implication of major disaster events via a reduction in new

capital investments. There may also be a case for examining related ICORs in areas such as irrigation to see how they could be affected by differing rainfall assumptions and to determine whether the ICORs should be adjusted to capture more realistic rainfall assumptions, based on inter-annual variations in precipitation.

- There may be potential scope for enhancing the NPC's ability to take both the economic growth consequences of disaster shocks and GDP forecasts more generally into account in their more informal annual budgeting process by enhancing climatic forecasting capacity. No seasonal climatic forecasts are currently prepared for Nepal and it was suggested during an interview for the purposes of this study that knock-on difficulties in forecasting highly climatic-sensitive agricultural output make annual GDP forecasting very difficult. This difficulty could partly explain the weak link between GDP forecasting and budget resources estimation. Improved climatic forecasting, particularly the generation of seasonal forecasts, could therefore help strengthen both capacity to take potential disaster shocks into account in economic forecasting and the quality of annual GDP projections more generally, in turn contributing to improved resource estimation and improved financial planning for disasters.
- A separate model should be developed specifically to explore the macroeconomic consequences of a major earthquake in the Kathmandu valley and related policy options, both ex ante and ex post. A tool of this nature has been developed in a Latin American context by IIASA and the World Bank (Box 4). In the case of Nepal, the model could be based on existing earthquake loss projections to limit associated costs (Box 5).

Box 4: Funding rehabilitation: the implications for long-term growth

IASA and the World Bank have developed a catastrophe module add-on to the World Bank's standard macroeconomic projection country model, the Revised Minimum Standard Model (RMSM). This module permits analysts to incorporate future probabilistic losses resulting from natural hazards into macroeconomic forecasting models and to quantify the implications, in particular for growth objectives, of various rehabilitation financing options. The module receives as input a series of samples for the loss-frequency distribution – a cumulative distribution function showing levels of loss associated with maximum credible events of a given probability of occurrence in a given period of time – of natural catastrophe damage to capital stock. Future changes in the frequency and severity of atmospheric and hydrological hazards and increases in the concentration of assets in hazard-prone regions are taken into account as part of this process. The module then identifies reconstruction and relief requirements and adjusts macroeconomic variables within RMSM depending on the availability of funds. The tool can also be used to explore tradeoffs in policies developed to transfer risk, via insurance and other financial instruments.

To illustrate the use of the planning tool and the nature of the findings that it can generate, the tool was applied to three case studies, of Argentina, Honduras, and Nicaragua, under varying assumptions about the sourcing of post-disaster response funding. The results clearly demonstrate that the ability to finance losses following a catastrophe is crucial to recovery and affects the speed with which a country can resume its growth path.

In the case of Argentina, it was assumed that all relief and reconstruction financing would be met out of private consumption and foreign savings and that the country would still achieve its growth projections by making sufficient financial resources available to replace damaged capital stock and fund needed future investment. The model was used to estimate the increased government expenditure and import requirements consequent on a disaster and the implied rise in external debt and decline in private consumption.

The Honduras study considered a situation in which private consumption and foreign savings (external borrowing) are not reliable sources of post-disaster reconstruction and relief funds (in the case of private consumption, because of the high incidence of poverty). The model forecast the impact of a disaster on the Honduran economy assuming no access to foreign assistance to meet reconstruction needs. Under this scenario, investment resources were diverted into private and government disaster-related consumption, leading to chronic underinvestment. The model indicated that this would lead to stagnation in future expected economic performance.

Nicaragua, like Honduras, depends on external funds to sustain infrastructure investment, including post-disaster reconstruction. In this case, the impact of decreased economic growth as a consequence of natural disasters was translated into implications for poverty, using a household-level model to supplement the RMSM. The results indicated that the inability to finance probable losses would stall or defeat poverty reduction measures.

The researchers concluded that risks emanating from natural hazards should be incorporated into economic projections, for three reasons. First, there are high opportunity costs associated with the diversion of scarce financial resources into post-disaster relief and reconstruction efforts. Second, disasters can wreak havoc on the already complicated budgetary planning process. Third, disasters place high demands on international aid resources, diverting resources away from development uses (MacKellar, Freeman, and Ermolieva 1999; Freeman and others 2002).

Box 5: Kathmandu Valley earthquake scenario data

Available earthquake scenario data for the Kathmandu valley dates back around a decade, to some work undertaken by National Society for Earthquake Technology – Nepal (NSET) in conjunction with GeoHazards International (GHI) in 1998 and by the Japan International Cooperation Agency (JICA) in 2002.

The NSET-GHI study examined the consequences of earthquake shaking on the same scale as that experienced during the 1934 events, estimating:-

- 22,000 to 40,000 deaths (depending on method of estimation)
- 25,000 to 95,000 injuries (depending on method of estimation)
- 600,000 to 900,000 homeless
- Heavy damage to 60% of buildings
- Almost 50% of the bridges impassable
- Moderate damage to 10% of paved roads
- Serious damage to some 95% of water pipes and 50% of other water system components
- Damage to almost all telephone exchange buildings and 60% of telephone
- Damage to some 40% of electric lines and all electric substations

The 2002 JICA study explored the consequences of a magnitude 8 earthquake, generating somewhat more conservative, but nevertheless severe, loss estimates. The study indicated that 21% of the building stock could be heavily damaged, with a potential death toll of 1.3% of the valley's population and a 3.8% rate of serious injury.

These data have not been updated to reflect more recent, considerable demographic growth and a related expansion in buildings in the Kathmandu valley. Over the intervening years, there have been various earthquake sensitisation initiatives and the provision of related training on construction techniques, many with the involvement of international agencies as well as the Ministry of Physical Planning and Works (MoPPW). However, new infrastructure is not believed to be any more earthquake resilient, on average, than earlier structures, in part because building codes are rarely adhered to other than for public buildings and the formal planning process is not often followed.

The net value added of updated loss estimates is not clear, particularly as the existing data already have considerable 'shock' value yet have had apparently little impact on policy and decision-makers and the generation of updated estimates could be very costly. It would cost in the region of US\$1 million or more²¹ to generate new earthquake loss prediction data for the Kathmandu valley using the latest assessment tools and technology. However, there is potentially considerable value in using the existing data to explore the macroeconomic impact of an earthquake and related policy options.

4.1.2.3 Climate change impact scenarios

Analysis of the potential economic impact of climatic extreme events on Nepal in the future (50+ years), based on scientifically robust scenarios of the impact of climate change on the frequency and intensity of hydrometeorological hazards, would provide valuable additional information, informing the development of strategies to strengthen long-term resilience to climate change. Such analysis is already planned for 2009 under some DFID-supported scoping work on climate change adaptation.

4.2 Budgetary arrangements and allocations for disaster risk management

4.2.1 Current budgetary and fiscal arrangements for disaster risk reduction and response

Integration of disaster risk concerns into government budgets should be tackled from two angles, ensuring that:-

- Levels of public expenditure on risk reduction are sufficient relative to the

²¹ Estimate provided by NSET during an interview for the purpose of this study.

levels and nature of risk faced, economic and social returns to risk reduction and the reasonable responsibilities and obligations of government; and

- ❑ There are adequate financial arrangements to manage the residual risk.

The latter, although at face value concerned with post-disaster response rather than development, is an important aspect of mainstreaming. Disaster events can place considerable pressure on public resources, potentially forcing the partial reallocation of already committed financial resources and/or resulting in increased government borrowing at a time when government revenue earnings may also be below forecast. As such, natural hazards pose indirect threats to planned activities. Levels of public funding for recurrent and development capital spending in future years can also be reduced by large-scale reconstruction needs. As such, disaster risks should be taken into account as an integral part of financial planning in hazard prone countries (Benson, 2009). This

is particularly important in countries such as Nepal where there are still relatively limited levels of discretionary expenditure and thus limited budgetary flexibility, implying potentially high opportunity costs in reallocating funding post disaster.

4.2.1.1 Post-disaster relief and recovery

In the case of Nepal, a series of annual budgetary allocations are made for post-disaster humanitarian assistance and recovery. Based on evidence collated during interviews for the purposes of this study, these totalled at least NRS 177-182 m in 2007/08 and NRS 2.2bn in 2008/09.

Central Disaster Relief Fund The MoF has an annual budgetary allocation for contingency expenses (Budget line 95-3-945). A portion of these resources are earmarked each year for disaster purposes in the form of the Central Disaster Relief Fund. This fund is solely intended for humanitarian relief and emergency repair purposes and the majority

Table 3: GoN budgetary allocations for disaster response and recovery ^a

Source of funding	Budgetary allocation (m NRS)	
	2007/08	2008/09
Central Government		
MoF		
Central Disaster Relief Fund	50	100
Natural Disaster Relief and Reconstruction	-	2,000 ^b
MoAC	7	10
DWIDP	50	50
DoR	25	30
Roads Fund Board	15-20	15-20
DoDWS	30	30
Total central government	177-182	2,235-2,240
Local government (statutorily required level of disaster response funding)		
VDC	At own discretion	At own discretion
Districts	0.1	0.1
Municipalities	-	At own discretion

^a The Prime Minister's Relief Fund is not included because it is comprised solely of voluntary donations

^b Subsequently increased to NRS 2.5bn after approval of the budget.

of the funding is disbursed via District Disaster Relief Committees (DDRCs) to support affected households. In certain years, a small amount is also released to national agencies for relief and emergency repair purposes (e.g., to MoHP to finance the provision of medical relief). The Ministry of Home Affairs (MoHA) is responsible for preparing proposals on allocations from both the Central Disaster Relief Fund and the Natural Disaster Relief and Reconstruction Fund (see below), based on damage data received from the district level and line agency requests for funding. These proposals then require approval by the Central Natural Disaster Relief Committee (CNDRC) before the funds can be released. DDRCs are responsible for determining the actual use of allocations to the district level.

The size of the Central Disaster Relief Fund has increased rapidly in recent years, rising from NRS 10 m some five years ago to NRS 25 m a few years back and then to NRS 50m in 2007/08. In 2008/09, NRS 1.32bn was allocated for development and recurrent contingency expenses under the MoF budget, of which NRS 100m was apportioned for the Central Disaster Relief Fund.

According to MoHA, the fund is not fully utilised every year. However, this may reflect allocation and disbursement issues rather than over-budgeting. MoHA itself admitted during an interview for this study that the fund is insufficient, even at the much increased level of NRS 100 m. Any remaining funds can be carried across to the following fiscal year. In theory, the Central Disaster Relief Fund can also be topped up during the year if required but this has not apparently happened in recent years.

Natural Disaster Relief and Reconstruction Budget Line The delay in the approval of the FY2008/09 budget to mid-September 2008 facilitated the creation of a new sub-head under the MoF entitled 'Natural Disaster Relief and Reconstruction' to provide funding for the August 2008 Koshi flood recovery operation. This line was allocated NRS 2bn, funded entirely from the GoN's own resources.

Following the FY2008/09 budget's approval, a Cabinet decision was subsequently taken to increase the allocation to NRS 2.5bn to cover relief and recovery efforts in response both to the Koshi and far and mid-western floods. Two related action plans were developed, covering flood recovery needs across all sectors.

As of May 2009, it was not clear if this budget line would be continued in the FY2009/2010 budget but there was some thought that it could be, in part because of concerns about further flooding in the Koshi area.

Line agency emergency resources Various line agencies have budget lines that they can draw upon in the event of a disaster. In common with the Central Disaster Relief Fund, these funds are primarily intended for immediate relief and emergency repair purposes, with the notable exception of funding under MoAC. They include the following:²²

- ❑ **DWIDP** has a total annual budget of NRS 1.2-1.6bn, of which NRS 50m is earmarked for emergency repair and procurement of relief and recovery materials under its river training programme budget. However, it reports that its allocation for disaster response is insufficient. DWIDP also indicated during an interview for the purposes of this study that each district has NRS 400,000 – 500,000 for the purchase and distribution of emergency repair works and that stocks of gabion boxes are maintained in all DWIDP offices across the country, again for emergency purposes.
- ❑ The **Department of Roads** (DoR) earmarked NRS 30m under its maintenance budget for emergency repair works in FY 2008/09, up from NRS 25m in FY 2007/08. This funding is primarily intended for minor repairs during the monsoon season to keep the road system open and is adequate in normal years.
- ❑ The **Roads Fund Board** has a further NRS 15-20m available each year for use for emergency road repairs, of which 70% is allocated to the DoR and 30% to the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR).

²¹ The National Food Corporation (NFC) maintains some food stocks for emergency purposes, primarily for price stabilization functions, but has no budget of its own for the transport, provision or distribution of food in the aftermath of disasters. Instead, it only releases food following purchase by a district food management committee.

- The **Department of Water Supply and Sewerage** (DoWSS) has a budget head entitled Other Maintenance & Rehabilitation Projects (48-4-707) which it draws upon for emergency purposes. This head has been set at NRS 30m for at least three years. It is noteworthy that, of all the government agencies interviewed for the purposes of this study, DoWSS is the only one with an explicit disaster response budget head.
- **MoAC** earmarked NRS 10m for post-disaster agricultural recovery under its 2008/09 budget, up from NRS 5 m in 2006/07 and NRS 7.2 m in 2007/08. The funding is used for the provision of free or subsidised seeds, fertiliser, other agricultural inputs and livestock and for agricultural land reclamation purposes. It is disbursed via district offices, with beneficiaries determined by the DDRCs and a report on use then sent back to the ministry. A MoAC person interviewed for the purposes of this study indicated that NRS 10m is sufficient in years of limited loss and no drought. The amount available is occasionally supplemented with additional resources from the MoF in the aftermath of specific disaster events as, for instance, in 2008/09 (although, as of March 2009, none of the additional funding for agricultural support following the western floods had as yet been released by the MoF to affected districts).

The Ministry of Health also earmarks certain resources each year under its medical supplies and drugs budget for use in the control of epidemics, including possible outbreaks of disease in the aftermath of disaster events.

Somewhat surprisingly, however, the Department of Buildings does not have any budget line it can draw on for post-disaster emergency repairs, although it could see the advantage of a regular funding line. Similarly, the Department of Irrigation has no budgetary resources earmarked for this purpose. Its maintenance budget is already only half the level required by the department to undertake routine maintenance work.

Meanwhile, the Department of Soil Conservation and Watershed Management (DoSCWM) has not been involved in post-disaster response traditionally but is trying to establish a fund for emergency repair works, focusing on direct small-scale support to local communities to prevent further soil erosion or landslides in the event of water-induced disasters (e.g., via the provision and installation of gabion boxes and plastic). DoSCWM's regular funding is already limited, totalling around NRS 250m (of which 20-30% is recurrent), and so cannot be used for this purpose. DoSCWM has requested an initial allocation of NRS1m to establish the fund, within its ceiling for allocations under the FY 2009/2010 budget, and is developing related operational guidelines. Once established, DoSCWM hopes that the size of the fund would rise significantly, perhaps to NRS 100m, via support from the GoN, the donor community and NGOs.

Subsidised loans facility The GoN has a facility for the provision of subsidised loans for post-disaster livelihood and home reconstruction purposes and to support the cancellation or rescheduling of existing personal loans in the wake of a disaster. This facility is only used on an infrequent basis and CNDRC approval is required to activate it. However, the facility was used in response to the 2008 floods, with debt to the value of NRS 9.18 bn waived for small poor farmer and household entrepreneur borrowers from the Agriculture Development Bank, Small Farmers Development Bank, Nepal Bank Limited and Rastriya Banijya Bank. The GoN planned to reimburse the concerned banks over a period of 10 years, beginning in FY 2008/09 (MoF, 2008).²³

Subsequent year development budgets A number of government departments report that some post-disaster reconstruction needs are projectised and placed on the development budget in subsequent years. For instance, repairs to school buildings are financed in this way out of the Sector Wide Approach (SWAp) mechanism budget for new school construction, receiving priority in the allocation of such funding. One interviewee from the MoES estimated that some 5-10 % of the budget for new schools is

²³ Households affected by the 2008 Koshi flood apparently requested soft loans but this request was not granted.

used for this purpose each year. Communities are encouraged to repair any damage occurring near the beginning of the fiscal year themselves to avoid the considerable wait for funding from the subsequent year's budget.^{24 25}

Local government resources All districts are required to maintain a fixed deposit of at least NRS 100,000 for use in the event of a disaster whilst VDCs are also required to maintain some resources for this purpose. Since 2008/09, municipal bodies have similarly been required to establish a relief and recovery fund, in accordance with a 2007 amendment to the Local Self-Governance Act, but are entitled to determine the size of this fund themselves.

In the event of a disaster, VDCs should draw on their local funds as a first recourse of action and request assistance from the DDRCs for any funding deficit. If district funding, in turn, is insufficient, VDCs can request funding from the national level via their DDRCs. Central government announcements on allocations to disaster-affected areas are often made very quickly, implying that local bodies can themselves make rapid decisions on post-disaster spending. VDCs are sanctioned to vire funding from other budget lines temporarily to meet disaster-related needs in anticipation

of the subsequent receipt of prior approved central government funding.

Actual experience at a district level is illustrated in Box 6.

Prime Minister's Relief Fund Finally, the Prime Minister's Relief Fund is also frequently referred to in discussions of public provision to disaster affected areas. In reality, this fund is based on voluntary contributions from the general public and international sources, rather than from government budgetary resources. Donations are given in response to appeals for specific disasters by the Prime Minister, taking two to three months to accumulate.²⁶ Some NRS 70-80 million is typically raised in this way each year. Around NRS 530 m was collected in response to the Koshi floods, including a NRS 320 m contribution from the Indian Government. Of this, some NRS 400 m remained in the fund as of March 2009.

An Office of the Prime Minister and Cabinet Ministers (OPMCM) committee, chaired by the vice-chair of the NPC and including members from key line agencies, decides on the allocation of funding from the Prime Minister's Relief Fund to individual line agencies and MoHA, based on received requests for funding. Following

Box 6: Disaster response funding in Kavre Palanchok District

Kavre Palanchok District in the Central Region of Nepal, due east of Kathmandu, has an estimated population of 400,000 and a local economy orientated around agriculture, livestock and small scale enterprises. The district experiences flashfloods, landslides, storms and droughts but does not regard itself as earthquake prone. The DDC allocates around NRS100,000 each year for disaster relief purposes, solely for compensation to affected people in accordance with the GoN's relief norms (see Section 4.2.2). VDCs provide the district with lists of eligible recipients. This level of funding has been adequate for such purposes in recent years as the district has not experienced any major disaster events. In the event of a more major disaster, a request additional funding from the Central Disaster Relief Fund can be made by the DDRC. The district also supports repairs to district-level infrastructure such as schools, water supply infrastructure and roads from its regular budget on an annual basis.

²⁴ DDCs and INGOs may also provide some funding for school repairs, in the former case for minor or temporary repairs.

²⁵ The MoES also provides funding for the replacement of books and other school resources damaged in the event of a disaster out of its more general central budget for this purpose but the cost of this is relatively small.

²⁶ For instance, following the August 2008 floods government secretaries donated three days' salary to the fund while other civil servants provided one day's earnings (Pathak, 2008). The general public and corporations also made donations. The Kantipur publishing group alone contributed over NRS 10 m (ibid).

approval, funds are released by the OPMCM to MoHA for onward disbursement.

4.2.1.2 Disaster risk reduction

There are some central government budgetary allocations for disaster risk reduction purposes, including to DWIDP for river training, riverbank protection works and measures to protect infrastructure against landslides and floods; to the Ministry of Local Development (MoLD) for small-scale disaster risk reduction works; and to MoEST for flood forecasting and other meteorological services. There are an array of further projects and programmes that also contribute in part to disaster risk reduction, including initiatives in the areas of watershed management, soil conservation and irrigation. Spending in certain other quarters may also include a disaster risk reduction element (e.g., additional expenditure on road drainage and higher quality road surfaces in flood-prone areas, to the extent this happens) whilst programmes in areas such as food security and poverty reduction can contribute to enhanced hazard resilience as well. Finally, expenditure on routine maintenance makes an indirect contribution as infrastructure in a good state of repair is less vulnerable to disasters than poorly maintained structures. In practice, however, maintenance expenditure is sometimes woefully low in Nepal.²⁷

Local bodies also have some disaster risk reduction responsibilities. According to the 1999 Local Self-Governance Act, village, municipal and district development committees are responsible for the construction and maintenance of village, municipal and district public infrastructure respectively, including works to 'control natural calamities' and to lessen related loss of life and property (GoN, 1999). The Act also made local bodies responsible for the maintenance and repair of embankments and culverts handed over to them by various agencies.

4.2.1.3 Government revenue impacts

Disasters can have consequences for government revenue as well as spending. Most obviously, they can result in a decline in government earnings as lower levels of economic activity reduce direct and indirect tax revenue. In the aftermath of a disaster, governments sometimes offer certain tax reductions as an incentive to economic recovery, reducing earnings further. Conversely, governments sometimes increase taxation post disaster to meet additional spending needs.²⁸

In the case of Nepal, there has been no use of fiscal (or monetary) instruments to address the economic consequences of disasters in recent years, although people affected by the Koshi floods apparently sought some land tax concessions. Disasters have also had no discernible impact on direct tax revenue as income tax is only paid by a relatively small, more affluent portion of the population and there is no taxation on the particularly hazard-sensitive agricultural sector. However, the 2008 Koshi floods are reported to have contributed to below trend growth in indirect tax revenue in the Eastern Region as customs, excise and value-added-tax (VAT) earnings were adversely affected by the decline in official imports and economic activity in the affected area.

The Kathmandu Valley accounts for around 60% of income tax and VAT, 50% of excise and 20% of customs earnings. Nevertheless, government earnings could also be relatively resilient in the event of a major earthquake in the Kathmandu Valley as import duties form a substantial part of public revenue and an earthquake could result in considerable import of construction materials.

Local bodies only have limited revenue raising capability, primarily in the form of land taxes, and in many cases are reluctant to exercise even this limited capability because

²⁷ For instance, in FY 2008/09, the DoR maintenance budget was equivalent to a mere 0.5% of the total value of the road network.

²⁸ Some governments choose both courses of action, as happened in Bangladesh following the 1988 and 1998 floods (Benson and Clay, 2004).

²⁹ According to ADB (2005), local bodies are now entitled to 50% of royalties from hydropower and mining activities, 30% of tourism fees (including mountaineering and trekking fees), up to 90% of land registration fees and 10% of revenue from forestry products.

of popularity concerns.²⁹ Instead, they rely on block allocations and tied project grants from central government for much of their income.³⁰ As such, disasters would be expected to have little impact on local budgetary resources.

4.2.2 Gaps/challenges

The GoN's ex ante financial appropriations for disaster response, as outlined above, constitute good budgetary practice in a country such as Nepal where disasters occur every year. Annual budgetary allocations help strengthen both financial planning for disasters and fiscal discipline more broadly (Benson and Clay, 2004). Line ministries can secure additional funding by including recovery components in their investment programmes for subsequent fiscal years, as also noted. Nevertheless, there is considerable scope for improvement to the current system, as outlined below.

Possible inadequate budgetary provision for disaster response Despite rapid increases in budgetary provision for relief and response activities in recent years, current allocations may still be insufficient. Relatively small allocations for post-disaster relief and rehabilitation have been justified on the lines that it is not possible to predict the level of disaster losses in a particular year and, thus, that there is no need for more substantial funding as it may not be used. It is, indeed, important not to over-budget for disaster response in highly resource-constrained countries such as Nepal where any budgetary allocation carries a high opportunity cost.³¹ Moreover, there is an implicit understanding that the international community will step in any way to meet any funding shortfall post disaster. In the event of a major disaster, an international appeal for assistance is launched by MoHA in its capacity as the chair of the Central Natural Disaster Relief Committee.³²

Nevertheless, existing provision may be inadequate even in 'good' years of low loss, resulting in unplanned budgetary reallocations and, possibly, funding-related delays in the recovery process on a regular basis, with potentially significant implications for the welfare of affected households and even unmet needs. For instance, NPC (2007) reports that shortfalls in emergency assistance have contributed to problems of food security. As a further example, DoWSS reports that it faces annual disaster-related damage bills of around NRS 100m, considerably in excess of its NRS 30m budgetary allocation for this purpose each year. This annual funding gap implies that many repairs are not undertaken and thus that, although the GoN has now achieved theoretical clean drinking water coverage reaching 78-80% of the population, in practice only 56-57% of the population are served because of outstanding repairs to the network.³³

Budgetary reallocations apparently typically occur within ministries but may sometimes involve the movement of resources between ministries as well. Reallocations must be approved by NPC and MoF, in a process that takes only 15 days. Such reallocations are presumably most likely to occur near the start of each fiscal year, given the timing of the majority of disasters in Nepal relative to the fiscal cycle. Reallocations at this early stage in the year can be particularly problematic as it is less easy to determine potential surpluses under individual budget heads. Indeed, one interviewee noted the poor timing of the budget cycle relative to the monsoon. MoAC is notably resistant to reallocations in order to protect its existing development projects and reports that it does not make any. DoWSS reports that the MoF itself has denied DoWSS's requests to transfer project funding for emergency repairs because increased access to clean water is a high

³⁰ National government allocates unconditional block grants to the district level for development purposes which can be freely and flexibly used by the recipients for any development activities, according to their priorities (ADB, 2005). Levels of block grant received by individual districts are determined according to a series of criteria relating to population, remoteness, land area and HDI. Additional block allocations are made to municipalities and to VDCs, in the latter case to conduct small-scale development activities at the local level. In FY 2008/09, VDC block allocations were set at between NRS 2 and 3 million, according to their scoring against a range of criteria relating to population, remoteness, HDI and land area. Local bodies also receive some funding for specific activities, referred to as conditional or tied grants, which are channelled through MoLD.

³¹ Foreign assistance accounts for some 25% of the total budget and 60% of the capital budget.

³² Somewhat exceptionally, two international appeals were made in 2008/09, relating to the Koshi and far- and mid-western floods.

³³ Local communities are responsible for routine maintenance and repair work but disaster-related repairs, such as the replacement of pipes that have been swept away by a flood, are the DoWSS's responsibility.

government priority. However, reallocations are thought to occur within other ministries. On some occasions, international aid resources have also been reallocated, either within an existing project or from an existing project into a separate disaster response project. The latter typically entails surplus project funding available under a project in the final stages of completion and so has little repercussion for planned development activities. Some GoN reallocations also entail unspent funding from delayed projects (e.g., as was the case for the DoR in FY 2008/09 when NRS 210m was reallocated for use in response to the far-western floods), with little ramification for planned activities. Unfortunately, however, information on budgetary reallocations is held by individual line agencies and is not aggregated, making it extremely difficult to gauge the total level of budgetary reallocations.

Shortages in disaster response funding are apparently particularly acute at the local level. Although more disaster-prone local bodies typically allocate some ex ante funding for

post-disaster purposes, in accordance with of the Local Self-Governance Act (see above), less disaster-prone ones often do not bother. Even where they have, this funding and related lines available from district and central government (via the Central Disaster Relief Fund) for use by VDCs is primarily concerned with compensation of individuals (see Section 4.2.2) and it can be extremely difficult to secure funding for the rehabilitation of local infrastructure (Box 7). In fact, even use of the mechanism for the compensation of individuals is relatively limited due to poor awareness of the mechanism's existence, the very limited levels of compensation available and disincentives relating to lengthy claims procedures.

In conclusion, anecdotal evidence certainly points to a disaster response funding gap, at both the national and local level. However, there is no single source of information on either funding availability or actual expenditure, making it extremely difficult to estimate the precise scale of this funding gap. Further research is required to establish the level of public resources

Box 7: Living with disasters - the case of Khanalthole VDC

Khanalthole VDC has a population of some 10,000 people, living within 1,100 households. Agriculture, livestock and horticulture activities provide the primary sources of livelihood. The area experiences flashflooding and landslides. The most severe flooding in recent years occurred a decade ago, resulting in 11 deaths. More recent floods have resulted in two to three deaths per annum and the loss of two to three homes and three to four heads of cattle.

In FY 2008/09, Khanalthole VDC received a block allocation of NRS 2.1 from central government, of which some NRS 420,000 was spent on salaries and overheads and the remainder on development. The VDC receives some additional matching funding for several NGO projects and some NRS 10-15,000 per annum from land revenue, its only source of local revenue. The VDC allocates NRS 15-20,000 each year for emergency relief purposes in support of affected individuals, in accordance with related GoN norms (see above). The VDC is responsible for the routine repair and maintenance of local public infrastructure but can request funding for disaster-related repair from district and central government, via the DDRC. In practice, the VDC reports that it undertakes temporary emergency repairs each year to damaged structure, such as drinking water and irrigation facilities, but that resources for more permanent rehabilitation are difficult to secure and, instead, facilities remain in an indefinite state of disrepair.

The VDC ranks disasters as one of its largest challenge, second only to health issues. According to representatives of the VDC, there is good general awareness about the threat of floods and landslides but the VDC lacks resources to reduce risk and does not know how to make its voice heard regarding additional resources for this issue. The VDC receives some support from DWIDP and DoSCWM, primarily in the form of the provision of gabion boxes and related technical support in positioning them. However, there are no hazard maps and no organised flood early warning systems. Instead, villagers simply keep a watch on river levels, particularly in the aftermath of heavy rainfall. There are no NGOs working in the field of disaster risk reduction in the VDC.

required for post-disaster funding, the actual provision of funds, how these funds are sources and the scale of any residual funding gap.

Particularly limited budgetary provision for drought response

Budgetary mechanisms for drought response are particularly limited. The current system is heavily orientated around compensation for loss of life and assets and the repair of public infrastructure, all of which are relatively minimal in the event of a drought. As already noted, MoAC does earmark some resources of its own for disaster response but these are very limited.

No financial planning for a major earthquake event

There has been no financial planning for a major earthquake event, nor, apparently, even any discussion around this issue either within the MoF or NPC, despite the fact that such an event would create substantial financial needs. Admittedly, the international community would step in and support the government at this time. However, some pre-planning is nevertheless important in exploring options, including possible monetary and fiscal tools that the government might choose to pursue post disaster.

Delays in the receipt of post-disaster funding

It can apparently take up to five or six months for central government disaster response funding to reach the local level. Moreover, local bodies sometimes receive less funding than they had anticipated. In such cases, planned programmes of work may suffer if local bodies have already spent resources in anticipation of central government reimbursement, as permitted according to existing budgetary regulations (see above). In practice, local government bodies therefore typically prefer to wait until any post-disaster funding has actually been received from central government before undertaking related expenditure, rather than risk potential funding shortfalls in other areas of spending. This implies related delays in disaster relief and recovery efforts. Delays in the receipt of funding can apparently be particularly acute for disasters occurring towards the end of the fiscal year.

There are also issues relating to the slow release of central government resources to national line agencies, as illustrated by experience following the 2008 floods (Box 8), and to line agency access to its own funding for emergency response and rehabilitation. The latter reflects the fact that the annual distribution of hazard events is bunched around the monsoon period, from June to September, largely coinciding with the first few months of the new fiscal year, as already noted. It can take the GoN several months to release the first tranche of resources under the new budget, implying that line agencies experience short-term cash constraints. Both the DoR and DoI cited this as an issue in disaster rehabilitation. The DoR overcomes the problem to some extent by carrying over resources in kind between fiscal years and by procuring fuel and, to some extent, material supplies on credit from the private sector.

Lack of criteria determining recourse to public funding in the event of a disaster

Nepal currently has no criteria specifying when a disaster event is on a sufficiently serious scale to permit recourse to public funding. The 1982 Act, which allowed for the creation of a disaster relief fund³⁴ at different levels of government, stipulated that the GoN ‘may if it deems necessary, specify the extent of the area affected or likely to be affected by Natural Calamity and declare such area, by publishing a notification in the Nepal Gazette as Disaster Area for a period specified in the same notice’ (GoN, 1982: 1-2). Functions and duties of the Central Natural Calamity Relief Committee, in turn, as outlined by the 1982 Act, included providing recommendations to the GoN on the declaration of disaster areas. However, the Act did not define what conditions must hold for a natural calamity to be declared.

In practice, in the case of the Central Disaster Relief Fund, GoN norms on the use of relief funding suggest that the CNDRC can approve use of the fund in response to any hazard event (including road, air and river accidents as well as natural hazards), however small, if any category of eligible loss occurs. The same criteria are used to determine allocations from village, district

³⁴ The 1982 Act referred to it as a Natural Calamity Aid fund.

Box 8: GoN support to the 2008 floods relief and recovery efforts

Following the 2008 Koshi and far-western floods, ADB (2008c) estimated that public spending of NRS 2.0bn (US\$24m) was required for immediate recovery costs and a further NRS 4 bn (US\$48m) for medium-term rehabilitation and reconstruction, some of which would need to be incurred in the current fiscal year. The GoN initially allocated NRS 2bn for the Koshi flood response alone, later increasing the allocation to NRS 2.5 bn to cover relief and recover efforts in response to the far-western floods as well. (see above).

As of March 2009, a MoF official reported that only half of the original NRS 2bn had so far been apportioned in support of the Koshi flood recovery (with NRS 900m for capital expenditure and NRS 100m for recurrent expenditure). Of this, MoHA had received NRS 480 million for the provision of return packages to families affected by the Koshi flood. MoHA reported that it had also been allocated NRS 700m in support of its humanitarian relief efforts in response to the far- and mid-western floods but that, as of March 2009, MoF had not yet released this funding. Similarly, DWIDP reported that it had received less than half of its NRS 83.3m allocation for the Koshi flood and none of its NRS 216.5m allocation for the far and mid-western floods. With the new monsoon rapidly approaching, some DWIDP project managers at a division or sub-division level had chosen to proceed with the repair works anyway whilst others were anxiously waiting for the funds to be released.

Expectations of forthcoming funding may have been somewhat inflated by considerable confusion following the announcement of the additional NRS 0.5bn for disaster response. A number of government agencies interviewed in March 2009 believed that the GoN had increased the total resources available for the Koshi and far and mid-western floods to NRS 5bn, rather than NRS 2.5bn and were therefore hoping for considerable additional funding allocations. This underlines the need for clear, unambiguous statements on post-disaster funding so that available resources can be used as effectively as possible and plans can be put in place to meet any funding shortfalls.

and municipal disaster response funds. These norms were last revised in 2008 and provide NRS 25,000 compensation for loss of life; NRS 5,000 compensation per family for loss of house, land and/or crops; and NRS 10,000 per family for relocation. They also cover the cost of medical treatment at state health facilities. Even then the situation is unclear as considerably higher levels of compensation were set to be paid to families affected by the August 2008 Koshi floods whilst, in certain other cases, no or only minimal central government support has apparently been provided in response to funding requests following a hazard event. The situation with regard to circumstances warranting the use of other available public resources for disaster response, including that held by individual line agencies, is even less clear. Lack of criteria determining recourse to public funding in the event of a disaster potentially exposes disaster-related funding to abuse.

Similarly, there are no specific criteria determining the Prime Minister's decision to activate the Prime Minister's Relief fund whilst rules on actual use may also be rather loose. For instance, some NRS 400 m of the total NRS 530 m raised in response to the Koshi flood remained in the fund as of March 2009. It was indicated during an interview with OPMCM in March 2009 for the purposes of this study that the remaining resources would probably be used for other, future disasters, raising issues of accountability as the donations were specifically made in response to the Koshi flood appeal.

Insufficient resources for disaster risk reduction There are a wide variety of players undertaking an array of activities which contribute to disaster risk reduction, as already noted. Total risk reduction spending is not reported, making it difficult to determine the total level of resources available for disaster

risk reduction. However, available evidence suggests that available funding is almost certainly insufficient.

For instance, DWIDP reports that it struggles to get sufficient budgetary resources. Funding for its riverbank protection work master plans, covering some 12-13 rivers, is woefully insufficient. More generally, DWIDP reports that it is forced to compromise technically on much of its work due to funding constraints. It also reports that maintenance funding for routine repairs may be insufficient, increasing the risk of embankment failures. In recognition of these funding shortfalls, no doubt highlighted by the 2008 Koshi flood experience, the MoF has indicated that it will increase DWIDP's budgetary ceiling (see Box 11) by 50% in FY 2009/2010. This is a very positive development. Nevertheless, a considerable funding shortfall still remains.³⁵

Funding constraints also limit DoWSS's capacity to incorporate risk reduction features into the country's water supply system. DoWSS takes some measures to protect water supply infrastructure against natural hazards but cannot exceed the standard norm costs on per capita provision set by the GoN. These are relatively limited, in practice curtailing risk reduction endeavours which increase installation costs.

The Department of Mines and Geology (DoMG), which is responsible for geological and seismic investigation, also notes budgetary constraints. For instance, it receives just NRS 4m per year for geo-scientific investigation, some NRS 66 m short of its actual estimated funding requirement. Slow progress in the development of climatic forecasts and hazard maps for the country similarly partly reflects funding constraints. However, difficulties in recruiting and retaining professional staff have posed an additional constraint both for the Department of Hydrology and Meteorology (DoHM) and DoMG, reflecting considerable global demand for technical expertise coupled with low GoN remuneration, in turn resulting in a considerable brain drain. As of March 2009, only four of the

DoHM's professional posts were filled whilst five of the DoMG's 15 geologist posts and ten of WEC's 47 professional positions (mainly engineers and technicians) were vacant as of May 2009.

Meanwhile, local bodies currently receive no specific project grants from central government for disaster risk reduction purposes and, reflecting more general tight budgetary constraints and other immediately pressing demands at this level, allocate very limited resources themselves for this use, as illustrated by the case of Khanathole VDC (see Box 7 above). According to ADB (2005), on average, over half of unconditional grants to local bodies and most of their internally generated resources are spent on administrative overheads and other recurrent expenditures, leaving relatively little for development purposes. This share rises to as much as 80% in the case of smaller VDCs. Some local bodies benefit from donor and NGO disaster risk reduction projects but the coverage of such activities is limited. Problems in securing commitment to disaster risk reduction at the local level are compounded by the very high rate of turnover of district staff, implying that systems of accountability at least at the district level are very poor.

Reflecting these funding constraints, Kavre District reported very limited risk reduction activities during an interview for the purposes of this study. The district has no hazard maps and has undertaken no disaster planning. On-going disaster risk reduction activities are limited to some use of gabion wires for river training and gully protection and some effort to take the risk of landslides into account in the alignment of roads. There is some limited monitoring of larger rivers but there are no flood-related early warning systems. The District Treasury Controller's Office was unable to report how much is spent each year on disaster risk reduction because it does not maintain such figures.

There are similar problems in securing funding for climate change adaptation. For instance,

³⁵ It should be noted that the work of DWIDP is geared towards large-scale structural measures. Alternative, small-scale low cost measures could potentially help limit budgetary requirements (see Section 5.3.1).

GoN/UNDP, 2008 (1-2) reports with regard to an inter-agency Climate Change Network established by MoEST that ‘there is no clear cut mechanism of funding for joint initiatives or actions of the network, and the MoEST is presently not able to make a strong case for budgetary allocations within Treasury (due to a lack of visibility of climate change amidst other government priorities’.

No consolidated reporting of disaster-related expenditure

There is no single source of information on total government resources available for post-disaster response, making it difficult to determine funding gaps and external assistance requirements. Similarly, there is no consolidated information on actual spending on either disaster risk reduction or response, further hindering efforts to assess the adequacy of disaster-related budgetary arrangements, the extent of burden of disaster response expenditure on the public purse or the relative balance of risk reduction and disaster response spending.

In keeping with standard GoN practice, records on allocations from the Central Disaster Relief Fund and Prime Minister’s Relief Fund are submitted by MoHA to the Financial Comptroller General Office (FCGO).³⁶ Individual districts and line agencies are also required to report figures on final end use of any disaster response funding, including that received from MoHA and MoLD, to FCGO. However, FCGO indicated during an interview for the purposes of this study that current reporting is insufficiently transparent and that it could not provide any data on either disaster response or risk reduction spending. MoHA itself was also unable to provide any data on allocations from the various relief funds, disaggregated either by district/agency or disaster, for the purposes of this study. In theory, figures on local government disaster response expenditure could be accessed directly from individual local bodies but this would require considerable effort to collate data from all such sources. Data on post-disaster budgetary reallocations are also poorly recorded and would be difficult to identify retrospectively, via an examination

of data on original budgetary allocations and actual expenditure, because budget heads are often too broad. Similarly, there is no systematic record of the use of the GoN’s post-disaster subsidised loan facility. Information on the use of this facility could be collected from individual banks but, again, this would entail a lengthy, time-consuming investigation.

Data on disaster-related flows of external assistance are also disparate. MoHA does not maintain any records on post-disaster international aid flows whilst the Foreign Aid and Coordination Division within the MoF merely records reported post-disaster support under a miscellaneous category. Some international non-governmental assistance may not be recorded at all by MoF as international non-governmental organisations (INGOs) are required to report activities to the Social Welfare Council under the Ministry of Women, Children and Social Welfare, rather than to MoF. In the event of a major disaster for which an international appeal is launched, the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA) strongly encourages the international community to report post-disaster relief and recovery flows through its financial tracking service, providing a generally transparent record of contributions, including of INGO flows. However, this service is outside the GoN’s own data system.

Meanwhile, risk reduction activities are implemented through various line agencies and local bodies and, by implication, financed through their budgets, as already noted. Total disaster risk reduction expenditure is not reported and even explicit disaster risk reduction activities are not classified as such in broader budgetary overviews. For instance, the table on ‘Sectorwise Prioritisation of the Budget’ in the 2008-09 Budget Speech (MoF, 2008) categorised expenditure under the MRW under just three headings - general administration, irrigation and electricity – despite the fact that the focus of the development projects implemented by DWIDP fell under none of these and, instead, specifically addressed disaster risk reduction. Similarly, external flows

³⁶ The MoF only receives information on the total amount spent by each ministry at the end of the fiscal year. Figures on spending disaggregated by line item are submitted to the FCGO. The FCGO, in turn, is responsible for overseeing all government expenditure against budget allocations, tracking revenue collection and other receipts and preparing consolidated financial statements.

of disaster risk reduction assistance are not directly tracked by the GoN. Instead, they are recorded as sectoral assistance, within the relevant sector.

There are particular challenges in monitoring disaster risk reduction expenditure because of its cross-cutting nature. Relevant initiatives may be scattered across a range of budget heads and in some cases form just one component – or even simply be an indirect benefit – of a wider development project rather than a stand-alone risk reduction project. For instance, DoR routinely takes soil stability and flooding into account in siting new roads and ensures that there is adequate investment in drainage. However, there are no simple heuristics available on the incremental cost of such measures or of, say, seismically-strengthening new infrastructure or introducing disaster risk management components into training for agricultural extension workers.

4.2.3 Recommended actions

An overhaul of current budgetary arrangements for disaster risk management at both the national and local level in Nepal and a review of related levels of funding are required to ensure a clear, cohesive and transparent budgetary framework for both ex ante disaster risk reduction and post-disaster relief and recovery, linked to well-defined tracking and monitoring procedures and incentives for investment in risk reduction. The current system is disjointed, with no clear overview of GoN budgetary allocations for disaster risk reduction or post-disaster relief and recovery, limited criteria governing the types of situation that warrant the use of public resources in the aftermath of a disaster and no consolidated records on actual expenditure. Moreover, the system contains few real incentives to encourage either national or local bodies to engage in disaster risk reduction.

4.2.3.1 Review of current financial arrangements for post-disaster response

Current financial arrangements for disaster response should be further reviewed and revised

to address the shortcomings identified above. The revised arrangements should be based on a clear strategy for financing different tranches of expenditure, covering both localised, annual events and less frequent, more extreme ones. The application of a combination of mechanisms for different layers of loss coverage is likely to be constructive.

❑ *Financial arrangements for 'good' years of low loss* As already noted, further research is required to establish the level of public resources required for post-disaster response, the actual provision of funds, how these funds are sourced and the scale of any residual funding gap. If this research establishes that the GoN faces a regular, annual funding gap for post-disaster relief and recovery then the government should establish sufficient regular annual budgetary allocations to cover minimum expected response spending. The international community is not geared to respond to events lying within regular annual norms. Instead, UN, IFI and bilateral donor disaster regulations typically only permit such agencies to respond to more extreme events, normally following a formal appeal for disaster assistance by the concerned country. Moreover, there is a strong case for leaving responsibility for 'normal' losses in 'good' years within a country to encourage enhanced disaster risk management practices and strengthened resilience.

❑ *Financial arrangements for 'medium-scale' disasters* The GoN should explore mechanisms for meeting additional relief and recovery costs after medium-scale disasters and develop a related financing strategy. Options employed elsewhere include contingent credit or grant agreements with donors according to pre-determined rules and regulations, in turn ensuring quick access to funds post disaster³⁷; use of international risk transfer mechanisms such as insurance mechanisms (including parametric insurance as well as more traditional instruments)³⁸ and

³⁷ For instance, a World Bank disaster risk management project approved in 2005 for Vietnam includes a pre-agreed rapid disbursement facility to fund post-disaster reconstruction of small-scale public infrastructure.

³⁸ For instance, in 2006 the Mexican government took out a parametric earthquake insurance policy, underwritten with a US\$160m catastrophe bond and reinsurance (Swiss Re, 2008). The policy provides US\$150 million relief and rehabilitation financing in the event of an earthquake above a pre-determined threshold (determined by magnitude, depth and location). The policy provides cover for three events within a three-year period.

catastrophe bonds, again perhaps with the support of the international community; contingent debt agreements; the reallocation of government expenditure according to previously-established systems of prioritisation³⁹; and some element of reliance on international appeals. In fact, a system of prioritisation of government expenditure is already in place in Nepal, with existing projects in the budget classified as either first, second or third priority (referred to as P1, P2 or P3). The principle of risk reduction should be firmly imbedded within this system.

- ❑ Financial arrangements for severe events The scale of relief and recovery resources required in the event of a major earthquake would be considerable, overwhelming local financial capacity, and inevitably necessitating substantial support from the international community. However, there are certain advantages in making some financial plans, in part to ensure some immediate availability of funding, whilst the machinations of government and the international community kick in. Pre-planning would also provide increased government control over the recovery effort, including greater scope for it to set its own priorities; support increased transparency in the delivery of relief and reconstruction funding; and, potentially, help promote risk reduction, to the extent that use of such instruments was linked to conditionalities on risk reduction (Benson and Clay, 2004). As above, risk transfer options include various forms of catastrophe insurance,⁴⁰ catastrophe bonds and contingent debt agreements.

The revised arrangements also need to address and resolve several other issues identified above:

- ❑ Mechanisms for post-drought relief and rehabilitation The review should pay particular regard to funding mechanisms for post-drought relief and rehabilitation, especially as the incidence of drought is

predicted to increase with climate change. Major droughts have resulted in large-scale agricultural losses, with significant economic implications both for the overall economy and individual affected households. However, as already noted, Nepal's current system of post-disaster budgetary support is heavily orientated around compensation for loss of life and assets and repair of public infrastructure, all of which are relatively minimal in the event of a drought. Meanwhile, there is relatively little assistance available to support early re-planting.

- ❑ Criteria for accessing disaster response funding The GoN should establish criteria to determine when a disaster event is on a sufficiently serious scale to permit recourse to the public purse at different tiers of government. This would make the system more accountable and place responsibility for the first tranche of losses firmly at the local level, in turn hopefully encouraging more attention to disaster risk reduction. Criteria should be quantitatively defined, in terms of variables such as the absolute number of people directly affected and/or damage to homes, crops or infrastructure. If used, the number of people affected in turn requires careful definition. Definitions based on the value of losses in monetary terms should be avoided in view of related data problems (see Sections 4.3 and 4.4).
- ❑ Rapid disbursement As the new National Strategy notes, it is essential to develop a fast-track system to disburse disaster relief and emergency repair funding to affected communities, supporting rapid provision of humanitarian support and early restoration of essential services.

There has been some informal discussion of possible new budgetary arrangements for post-disaster response in Nepal but, to date, no concrete proposals have been developed. The new National Strategy on Disaster Risk Management itself includes a number of references to the need for funding provision

³⁹ This system of prioritization was developed under the GoN's three-year rolling Medium Term Expenditure Framework (MTEF). The GoN introduced the MTEF at the beginning of the Tenth Plan to strengthen public expenditure management and improve the allocation of public funds. Resources are guaranteed for projects in the highest category, P1.

⁴⁰ For instance, in 2006 the Mexican government took out a parametric earthquake insurance policy, underwritten with a US\$160m catastrophe bond and reinsurance (Swiss Re, 2008). The policy provides US\$150 million relief and rehabilitation financing in the event of an earthquake above a pre-determined threshold (based on magnitude, depth and location). The policy provides cover for three events within a three-year period.

for both disaster response and recovery and disaster risk reduction and preparedness, but does not outline any detailed arrangements.

As a matter of urgency, a new set of arrangements to meet emergency disaster response needs, at least, should be established as soon as possible. One possible new set of arrangements is outlined in Box 9. This proposal basically seeks to formalize and strengthen current, in part informal, arrangements by which line agencies already earmark resources annually for use in the event of disasters by creating emergency disaster response budgetary sub-heads for relevant line agencies and ensuring that related disbursement is rapid. In fact, there is some indication of a preliminary move in this

direction already as the MoF indicated during an interview for the purposes of this study that it planned to provide the MoPPW some funding specifically for disaster response purposes in FY 2009/2010. The DoI has also suggested that its expenditure on disaster response should be formalised through the creation of a specific revolving disaster response for its sole use. The proposal builds in part on the current Indian model (outlined in Box 10), whilst recognizing that Nepal has much smaller administrative units than India and thus that it is unlikely to be particularly cost-effective placing considerable disaster response resources at the district or village level, in full knowledge of the fact that some local bodies would not require any such resources each year.

Box 9: Strengthening budgetary arrangements for disaster relief and emergency recovery – potential new arrangements

Under current arrangements for potential disaster response funding, a range of sectoral line agencies annually earmark resources for this purpose. One option for enhancing current practice essentially involves the formalization of this process. All line agencies could receive an annual budgetary allocation specifically for this purpose under new budget heads, with clear related guidelines governing the use of this funding. MoHA would also receive a budget line for immediate, short-term support to individual affected households, including compensation for loss of life, injury and damage to homes, humanitarian relief assistance, evacuation and search and rescue operations. This would be disbursed via district treasury offices, as is currently the case.

Budgetary allocations would be released in two tranches, at the beginning and half way through the year. Funding remaining in the respective line agency and MoHA relief budget lines at the end of the year would be rolled over, permitting periodic accumulation of funds to help cover higher demand in some years than others.

MoHA and the various line agencies would be authorized to draw on these budget lines without prior approval of the CNDRC or any equivalent future body, supporting rapid disbursement of resources. However, they would be required to submit regular reports on the use of their funding to the central committee; and to provide statements of expenditure before receiving their biannual allocations.

Box 10: The Indian Calamity Relief Fund

The Indian Government operates a Calamity Relief Fund (CRF) to meet immediate relief and emergency recovery expenditure arising as a consequence of natural hazards. Individual state allocations are set for periods of five years, of which 75% is provided by the Federal Government in the form of a non-plan grant and 25% by the respective State Government. Central government resources are remitted to the State Governments biannually, in June and December each year. Unspent balances at the end of each financial year are rolled over. The cost of longer-term rehabilitation of damaged infrastructure and capital assets is met from plan funds under normal budgetary heads, allowing time for re-design to new standards to increase resilience to future hazard events.

Box 10: The Indian Calamity Relief Fund cont'd...

The Federal Government maintains an approved list of items and norms for assistance from the CRF. All related expenditure must comply with this list. The list is far more extensive than the norms currently in operation in Nepal, covering emergency repairs to different items of physical infrastructure as well as compensation to individual affected persons. The Indian norms cover the following items:-

- Compensation for loss of life and injury.
- Humanitarian relief assistance.
- Evacuation operations.
- Provision of temporary accommodation, food, clothing, medical care and so on for affected populations.
- Hiring of boats for the transport of immediate relief supplies and rescue purposes.
- Air dropping of essential supplies.
- Repair or restoration of damaged houses.
- Provision of emergency drinking water supplies.
- Provision of medicines, disinfectants and insecticides to prevent the outbreak of post-disaster epidemics in human populations, cattle and poultry.
- Assistance to eligible farmers and agricultural labourers (in the form of the rehabilitation of land, provision of subsidised inputs, the replacement of livestock and poultry and provision of feed, water, medicines and vaccines).
- Assistance to eligible fishermen.
- Assistance to eligible handicraft and handloom sector artisans.
- Employment generation.
- Repair and limited restoration over a pre-specified period of time (30- 60 days, depending on the magnitude of the disaster and area affected) of damaged infrastructure, covering roads and bridges, drinking water supply, irrigation, power (immediate restoration of power only), primary education, primary health centres and community assets.
- Replacement of damaged medical equipment and lost medical supplies in government hospitals and health centres.
- Operational cost of ambulance services, mobile medical teams and temporary dispensaries.
- Debris clearance
- Draining of flood water.
- Search and rescue operations.
- Disposal of dead bodies and carcasses.
- Training of specialist multi-disciplinary groups or teams of state personnel in disaster management.
- Procurement of essential search, rescue and evacuation equipment.

Sources: Gol (2005) and Gol (2007)

A second, alternative option would be to follow the Indian example more explicitly, with all funding for emergency disaster response placed in a single central disaster response fund and all funding responsibilities for emergency repairs removed from individual line agencies. A variant on this could involve automatic transfer of pre-determined proportions of the central disaster response fund directly to key line agencies at the beginning of each financial year (as happens, for instance, in the Philippines) with the remainder held in the central fund for allocation to local governments and additional allocation to national line agencies as required.

Under either option, a new comprehensive set of norms would need to be drawn up, covering all forms of post-disaster emergency response assistance that the government could reasonably be expected to meet, including norms for repair of different types of infrastructure. Related damage and needs assessment procedures and information would also need to be enhanced to ensure that the size of the funds could be carefully determined and their use adequately monitored (see Section 4.4). The funds should be sufficient to meet minimum annual expected emergency response spending in a 'good' year of low losses. Transparent, streamlined approval,

disbursement, monitoring and reporting systems would also need to be established; ; and related legislation requiring regular, adequate annual budgetary allocations to these budget heads and formalising related operational and reporting procedures enacted.

Under both options, VDCs, municipalities and DDCs would be required to maintain a small fund for relief and emergency recovery purposes each year. These funds would be replenished on an annual basis. VDCs, municipalities and DDCs would be required to fully utilise these funds before requesting assistance from higher levels of government. Under the first option indicated above, these funds would be available from MoHA for humanitarian purposes and from MoLD for emergency repair and rehabilitation of locally-owned and managed public infrastructure. MoLD would hold a specific budget line for emergency repair purpose that it would be authorised to disburse in accordance with pre-specified norms. Under the second option outlined above, local authorities would access funding directly from the central emergency disaster response fund.

It is also recommended that the funding available under either option would only be for immediate relief and emergency recovery purposes only. Longer term rehabilitation costs faced by individual line agencies should be projectised and placed on the development project in subsequent years, perhaps even receiving automatic P1 status (see Section 4.2.3.1). MoLD should also have a budget line to support the longer-term rehabilitation of local infrastructure. Individual DDCs, VDCs and municipalities would be able to apply for these resources in the form of conditional grant fund under subsequent year budgets.

Possible options for raising resources for disaster response also need to be considered. The new National Strategy on Disaster Risk Management mentions the need to explore the potential role of bonds, taxes and donor, charitable and private sector contributions for this purpose. Currently, the GoN only raises additional resources specifically for disaster response from domestic sources via the Prime Minister's Relief Fund. There is also some history of raising revenue for other specific purposes in Nepal. For instance, the 2008/09

Budget Speech announced a 0.5% increase in the registration fee for buying and selling land within the municipalities of Kathmandu Valley to make funds available for a programme to clear the Bagmati, Vishnumati and Dhobikhila rivers in the Kathmandu Valley (MoF, 2008). However, this was only expected to raise NRS 300m. Considerably larger resources are almost certainly required annually for disaster response purposes. Moreover, there is very little taxation of any kind in rural areas and very low recovery rates from sector-specific revenue raising efforts, such as water charges for irrigation users (which only achieves around a 7% recovery rate). This implies that opportunities for meeting disaster-related spending via taxation and levies probably rest on the business community and high income earners, who are primarily located in the Kathmandu Valley. Realistically, there may be relatively little scope for imposing additional regular annual taxes or levies on this group but such taxes or levies could be a potential source of additional funding in the event of medium-scale disasters. This avenue, including the possible replacement of the Prime Minister's Relief Fund with alternative mechanisms which feed more directly into on-budget arrangements for disaster response, requires further exploration.

Mechanisms for targeting compensation for disaster losses to the poorest segments of society and for ensuring that these households get sufficient support also need to be closely examined. The current system of compensation is apparently ineffective, providing only token assistance to affected households. In fact, levels of compensation as stipulated in the GoN norms (see above) are so low that only the poorest families normally apply for them. This implies some implicit targeting of relief assistance on the poorest segments of society. However, more explicit targeting and a review of the levels and forms of compensation are required, perhaps linking disaster relief more directly into wider social protection programmes. There is currently little link between disaster relief and social protection in Nepal.

4.2.3.2 Enhanced funding mechanisms and financial incentives for disaster risk reduction
Disaster risk reduction is not merely about large-scale spending. Instead, it is as much about an approach and even an attitude to

development, exploring alternative ways of achieving development goals and objectives whilst incorporating disaster risk sensitive adjustments into project and programme design, sometimes at relatively little cost. Disaster risk concerns can be addressed, for instance, by altering the design of a building, re-siting a road or tweaking the contents of an agriculture commercialisation project to include drought-resistant crops. As such, the total level of spending on disaster risk reduction is far less important than efforts to ensure that individual elements of a clear, well-formulated, cross-cutting disaster risk management strategy are sufficiently well funded and implemented.

Nevertheless, well-defined lines of dedicated disaster risk reduction funding accessible by all relevant line agencies and local bodies are important in providing an incentive for spending in this area. In the case of Nepal, as already noted, available evidence suggests that there is insufficient funding for disaster risk reduction. Both the GoN and the international community need to be encouraged to invest further resources in this area and create related

funding mechanisms. Indeed the new National Strategy on Disaster Risk Management includes the development and promotion of alternative and innovative financial instruments for disaster risk reduction as one of its 29 strategic activities. Enhanced information on the socio-economic benefits of risk reduction initiatives and their contribution to broader government objectives could help in this regard, influencing allocations of budgetary resources (Box 11). A particular effort should be taken to establish a budgetary mechanism that can be used to encourage more collaborative, inter-ministerial programmes around disaster risk reduction – for instance, between DWIDP and DoSCWM. This could take the form of a dedicated disaster risk reduction budget head accessible by all relevant line agencies and including mechanisms to encourage collaborative, inter-ministerial programmes around disaster risk reduction. This budget head could be administered by the proposed new National Authority for Disaster Risk Management (see Section 5.2.1) and potentially linked to a multi-donor trust fund for disaster risk reduction or climate change adaptation (see Section 4.2.3.4).

Box 11: The annual budget allocation and release process in Nepal

A resource committee comprised of senior members of the NPC, MoF and NRB determines total development budgetary resources available for the forthcoming year, including anticipated external assistance flows. Ministries are then informed of their individual development budget ceilings, given some guidelines on the preparation of their detailed budgets and asked to develop their individual plans. Line agency plans are subsequently reviewed by the relevant section officer in NPC before passing to the full house of the NPC where cross-cutting issues are discussed and line agency plans and resource allocations tentatively agreed. Projects are classified as first, second or third priority (see above). This whole process takes around two months.

When the subsequent annual budget is announced by the Prime Minister, line ministries can immediately request a sixth of their allocation, based on statements of expenditure for the previous year. The release of a further two months' funding is also subsequently permitted, based on submission of statements of expenditure for the first two months in the year. Meanwhile, the budget approval process. All projects are forwarded to the NPC who scrutinises the second and third priority projects in detail, returning its verdict on each project to Parliament. Priority 1 projects are free from scrutiny, instead automatically receiving the budgetary resources requested. Allocations for individual projects are then finalised and the budget approved by Parliament. Following approval, funding for the remaining eight months of the year can be released, again in two month tranches following submission of statements of expenditure for the two preceding months.

Although ceilings for individual line agencies are in part based on historical trends and political commitments and declarations, institutional and personal capabilities and relationships and the ability to link work plans to key government objectives, such as poverty reduction and employment generation, also play a role. As such, individual line agencies may be able to influence their budgetary

Box 11: The annual budget allocation and release process in Nepal cont'd...

allocations by carefully arguing their case. By implication, if line agencies are armed with strong arguments and associated evidence on the links between various aspects of disaster risk reduction and key government objectives, this could help support their greater consideration in the budget process. Line agencies often submit a package of projects in excess of their budgetary ceiling in the hope of securing additional resources. However, any success incurs penalties for less politically astute line agencies, who may find that their ceilings cut.

Individual line agencies are similarly expected to identify linkages between their sector-specific objectives, strategies, policies and programmes and pre-determined overarching GoN objectives in preparing their respective sectoral chapters for the periodic plan. This again implies some scope for strengthening the attention paid to disaster risk reduction by enhancing understanding and associated evidence on the links between various aspects of disaster risk reduction and key government socio-economic objectives.

The amendment of existing work guidelines laid out by the GoN for each ministry to detail explicit disaster risk reduction roles and duties as part of their sectoral responsibilities would further strengthen attention to disaster risk concerns both in the budgetary allocation process and in the design of individual programmes and projects.

An option in support of greater investment by local bodies could, similarly, involve the creation of a central government disaster risk reduction fund under the MoLD that local bodies, perhaps limited to VDCs, could access if they put up matching fund. This matching funding could be provided by the local government itself, by the resulting beneficiaries or by both, again perhaps under a second matching funding arrangement. Beneficiaries could perhaps meet their contribution in kind, through the provision of labour and locally available resources (e.g., stones). Related advocacy efforts would be required to strengthen local understanding of the potential importance and long-term benefits of investments in this area and, thus, to encourage use of the facility. Some technical guidance would also be needed as there is very limited disaster risk reduction capacity in most local bodies. Alternatively, conditional (tied) grants could be targeted specifically on more vulnerable VDCs. An interviewee at the MoLD suggested a relatively modest conditional grant of NRS 100,000 per VDC for this purpose.

MoLD itself has already begun to explore potential financial incentives for improved disaster risk management practice at the local level and is now in the process of establishing a new general development grant fund for

municipal bodies, additional to funding provided under the block allocation system, which will only be available to municipals that have established relief and recovery funds, as recently made mandatory (see Section 4.2.1.1). Many municipals have yet to set up such a fund.

Government regulations could also be altered to require local bodies down to the VDC level to meet a certain, pre-defined level of relief and recovery costs themselves each year, regardless of the scale of disaster experienced. Such requirements are important in capturing local attention around the need for disaster risk reduction and encouraging better practice at this most critical level, where much development is implemented. In view of Nepal's considerable budgetary constraints, however, it is unlikely to be particularly cost-effective to tie up significant budgetary resources in this way, in full knowledge of the fact that some local bodies would have unutilised resources remaining at the end of the fiscal year.

It was suggested by several people met over the course of the study that there could be an additional opportunity to secure increased investment in risk reduction by local bodies at the current time because many local bodies

are experiencing difficulties spending their budgetary allocations owing both to security issues and lack of elected officials.⁴¹ The delay in approval of the FY 2008/09 budget has further slowed spending. As of late March 2009, some NRS 33 bn of local body funding for FY 2008/09 remained unused, including funding from both the MoLD and other ministries' allocations for local bodies (Himalayan News Service, 2009). Disaster risk reduction is a relatively non-political form of expenditure which could possibly proceed despite these problems. Indeed, Oxfam-UK reports some progress in getting VDCs to fund their own disaster risk reduction initiatives, during this broader spending hiatus. Advocacy work in support of such spending could therefore be extremely beneficial at the current time.

Finally, in exploring possible mechanisms for risk reduction financing and related funding requirements, there would be some merit in taking into account an on-going UNDP initiative to assess investment and financial flows required to address climate change in Nepal (and twelve other countries) over the next 20-30 years. This study will focus on up to three sectors of the economy, most likely forestry, agriculture and water resources in the case of Nepal.⁴²

4.2.3.3 Establishment of a system to track disaster-related expenditure

A tracking system should be established to monitor all disaster-related expenditure in Nepal, covering both risk reduction and response and including any disaster response activities financed via budgetary reallocations. This is important in ensuring that there is adequate transparency and that any funding gaps are clearly visible.

This tracking system would facilitate a comparison of ex ante disaster risk reduction and ex post disaster response expenditure. There are no hard and fast rules on the appropriate balance between these two areas of spending because, as already noted, the extent and effectiveness of disaster risk reduction initiatives are not directly correlated with levels of expenditure. Nevertheless, a comparison is useful in ascertaining whether the current

balance and nature of expenditure is broadly appropriate and, if necessary, building a case for greater investment in disaster risk reduction.

A tracking system is also important in monitoring the implementation of the new National Strategy on Disaster Risk Management and the related plan of action. The very existence of this strategy is itself critical to the tracking system as such systems are far more useful in influencing programming decisions if tied to clear, well-formulated objectives and to more specific outputs and goals under individual projects. For similar reasons, the system should also linked to a comprehensive database on disaster losses, placing disaster-response spending in the context of actual losses, providing clarity and an underlying rationale around disaster relief and recovery spending decisions.

The GoN has already established systems for tracking gender and pro-poor expenditure and, from 2009-2010, will also begin tracking social inclusion spending (Box 12). The various tracking systems should cover both central and local government spending but, in practice, have only focused on the former to date.

In theory a similar system could be introduced for disaster risk reduction, for instance categorising spending as follows:

- ❑ Explicit disaster risk reduction expenditure (e.g., river training; research on hazard-resilient crops)
- ❑ Spending that incorporates disaster risk reduction features at some cost (e.g., construction of seismically strengthened schools, hospitals and other infrastructure; construction of roads that have been designed to minimize risk of landslides)
- ❑ Spending that contributes to disaster risk reduction at no additional cost (e.g., irrigation)
- ❑ Other spending

The objective of the final two categories would be not so much to generate a final figure on disaster risk reduction spending as to draw up lists of investments that are and are not hazard-proofed. Further, detailed work would be required to develop these categories more

⁴¹ Some 40% of local bodies current lack any elected officials.

⁴² For further information see <http://www.undp.org/climatechange/capacity-development.html>.

Box 12: Tracking expenditure on cross-cutting objectives: experience with gender and pro-poor spending in Nepal

The GoN's gender tracking system has been in place for four years. Individual line agencies are required to review their spending and sort it according to three groupings:-

- Directly gender supportive, with more than 50% of the budget directly benefitting women and/or girls (e.g., an access road to water springs).
- Indirectly gender supportive, with 20-50% of the budget directly benefitting women and/or girls.
- Neutral, with less than 20% of the budget benefitting women and/or girls (MoF, 2008).

These groupings, in turn, are determined according to five indicators, each carrying a weight of 20%:-

- Women's capacity development.
- Women's participation in the formulation and implementation of a programme.
- Women's share in benefits.
- Support to the employment and income-generating capacity of women.
- Quality reform in time consumption and measures to minimize the work load of women.

The resulting categorisation is then reviewed by NPC before finalisation.

The pro-poor tracking system requires line agencies to split their spending across two categories:-

- Spending that directly supports poverty reduction
- Spending that indirectly supports poverty reduction

The GoN has drawn up a list of eight indicators for use in classifying spending in this way: investment in the rural sector; income-generating projects in rural areas; capacity enhancement programmes in rural areas; budgetary allocations for social mobilisation; investment in social sectors, particularly education and health; social security programmes; local body grants; and expenditure focusing on poverty reduction.

fully and to provide comprehensive and clear indicators guiding categorisation.

However, before moving forward on this recommendation, it is important to recognise that the establishment of a disaster-related expenditure tracking system would be very costly. The existing gender and pro-poor expenditure tracking systems in Nepal have required considerable training of line agency staff and involve a lengthy, annual process of classification, placing additional burdens on government officials. As such, the case for the establishment of such a system and related setting up and running costs need to be very carefully determined. It should also be noted that no other country in the world has yet established a system for tracking disaster risk reduction spending. However, the importance of such systems has been recognised and several

initiatives are underway to devise one, including by the World Bank and (UN) International Strategy for Disaster Reduction (ISDR). If a Nepali system could be established that also covered climate change adaptation expenditure then it could be particularly beneficial.

Even the introduction of new budget codes to track explicit disaster risk reduction projects would constitute a significant step forward. Unfortunately, a small window of opportunity to do precisely this has just been missed. Budgetary codes have just been revised by the GoN under a DFID-supported Public Financial Management Project and approved for FY 2009/2010. However, there may be an opportunity for further adjustment in FY 2010/2011. An initiative recently begun by MoHA and UNDP to compile an annual list of GoN disaster risk reduction activities in the

country could help support this process by providing a ready-made list of explicit disaster risk reduction activities. The first annual National Disaster Report is due out shortly.

Finally, with specific regard to the tracking of post-disaster reallocations, the reallocation or virement of funding between budget lines requires MoF and NPC approval, as already noted. This information would simply need to be entered into the central disaster expenditure database together with other disaster-related spending. However, it should be recognised that it could prove more difficult to track funding movements within budget lines (e.g., from routine maintenance to post-disaster repairs).

4.2.3.4 Garnering greater international support for disaster risk management

The international community, as well as the GoN, needs to be encouraged to pay far greater consideration to both disaster risk reduction and climate change adaptation concerns. A number of international development agencies are already engaged in disaster risk reduction in Nepal, including the Disaster Preparedness European Commission Humanitarian Aid Department (DipECHO), JICA, UNDP, the Office of U.S. Foreign Disaster Assistance (USAID-OFDA) and the World Bank as well as a number of INGOs. UNDP, for instance, has a wide-ranging programme of support, including an initiative on mainstreaming (Box 13). However, several other of the above agencies treat disaster risk reduction as, in effect, a

sector, rather than mainstreaming disaster risk reduction concerns into their broader development programmes. Many others pay even less regard to disaster risk reduction whilst none have engaged much, as yet, in the climate change adaptation arena.

Development agencies typically take a lead from the GoN in developing their country programmes, aligning them with key government objectives as outlined in the periodic plan. According to an interviewee from the Foreign Aid and Coordination Division of the MoF, the GoN is beginning to try to guide donors into sectoral/thematic and geographical specialisation to reduce duplication. Climate change adaptation will apparently feature in this endeavour and disaster risk reduction will presumably as well, to the extent that it is covered in the periodic plan. However, the periodic plan outlines a largely segmented approach to disaster risk reduction rather than actively encouraging its mainstreaming into broader development and says little on the subject of climate change adaptation. As such, it is insufficient in itself to encourage donor engagement in either area (see Section 5.1.1).

The GoN, in turn, is influenced by donor concerns and, as the GoN shortly embarks on the preparation of its next periodic plan, there is an opportunity for the international community to sway government policy in the area of disaster risk management, in turn encouraging greater commitment of other donors to

Box 13: UNDP disaster risk reduction activities in Nepal

UNDP has been engaged in disaster risk management activities in Nepal for over a decade. Its mainstreaming activities focus on the implementation of the Hyogo Framework for Action (HFA) (see Section 1.1), covering capacity building, the provision of training and equipment and monitoring arrangements around the HFA. They have included the establishment of disaster risk reduction focal points in key government agencies (see Section 1.1) and provision of financial support to each focal point to implement a US\$20,000 – 30,000 mainstreaming project.

Other activities include a community-based disaster management initiative, targeting 50 communities and supporting them in areas of capacity building, risk assessment, the construction of community infrastructure and risk reduction activities, such as river training, environmental protection and school safety. UNDP is also supporting the introduction of the DesInventar database in Nepal, to date providing related training to eight districts (see Section 4.3.1).

this agenda. Elements of the international community are already working closely with concerned government ministries to develop a joint government-donor framework of action to implement the new National Strategy on Disaster Risk Management and other donors will hopefully be drawn into this process as concrete, cohesive plans are finalised. This plan of action should be reflected in next periodic plan.

Several donors are also beginning to engage in the issue of climate change adaptation, linking their efforts to the development of the GoN's NAPA as well as their own country strategies, a number of which are shortly up for renewal. NGOs are similarly beginning to explore the issue and a tight donor partnership is emerging around climate change.⁴³ Finalisation of the NAPA and the related identification of priority climate change adaptation projects for the country will hopefully lead to more substantial national and international financial support in this area. It has already been determined that the NAPA will include climate-induced disaster risk reduction as one of its five thematic areas and so will also help secure greater support for disaster risk reduction, complementing efforts to implement the National Strategy on Disaster Risk Management.

Financial incentives are likely to be important in furthering government interest in both disaster risk reduction and climate change adaptation, as already noted. In this regard, the donor community could consider the establishment of a multi-donor trust fund for disaster risk reduction or, perhaps more viably in terms of donor interest, climate change adaptation, as has recently been established in Bangladesh.⁴⁴ Such a fund could play an important role in ensuring that aid flows for this purpose are coordinated, predictable and aligned with the GoN's own policies and priorities, as these develop. However, before proceeding, it would be beneficial to examine experience to date

with the Nepal Peace Trust Fund, which was established in February 2007 as a mechanism for interested donors to contribute to the peace process through direct contributions to the Government.

A multi-donor trust fund could also play a potentially important role in bringing the disaster risk management and climate change adaptation communities closer together. GoN/UNDP (2008: 2) reports that

'... Climate Change and Disaster Management actors have tried to coordination and harmonise their efforts, but due to the fact that the disaster prevention agenda in Nepal is less visible than the disaster response agenda, and due to the fact that there is insufficient awareness on how climate change can increase disaster risk in the future, this coordination has not resulted in tangible progress.'

Considerable effort is needed to secure much stronger coordination, in part to ensure initiatives to mainstream joint concerns into government policies, strategies, action plans and individual projects. The new National Strategy on Disaster Risk Management identifies the need to understand the impacts of climate change on natural hazards in Nepal but does not attempt to foster synergies between the climate change adaptation and disaster risk management communities nor propose joint programmes of work. This is an unfortunate shortcoming which needs to be addressed immediately, whilst plans of action are still being developed around both issues.

4.3 Disaster loss data

4.3.1 Gaps/challenges

There is only partial and somewhat disparate historical information available on direct disaster losses in Nepal and official loss figures almost certainly under-report the scale of damage. These

⁴³ For instance, Oxfam is beginning some climate change work, starting by documenting community perceptions on climate change and existing adaptation strategies. Once this initial scoping exercise is complete, it intends to develop a climate change adaptation programme.

⁴⁴ There may also be some scope for the creation of a multi-donor trust fund for disaster recovery, building on the international community's increasing interest in early recovery and linked both to a coherent recovery strategy and risk reduction principles in reconstruction. However, disaster response is a difficult area for pooling of resources as many development agencies have detailed – and differing – policies and regulations on the use of funding in an emergency context, relating to issues such as procurement and financial management arrangements.

data deficiencies hamper efforts to analyse the wider macro-economic impacts of disasters and to assess the appropriateness and adequacy of disaster-related spending. Moreover, the under-reporting of losses reduces any sense of urgency of the need to address disaster risk concerns in policy and programming decisions.

MoHA maintains a database on disaster losses but this database only covers loss of life, injuries, affected households, animal losses, damage to housing and cattle sheds and loss of land.⁴⁵ This focus reflects MoHA's humanitarian relief mandate and the related payment of compensation according to standardised norms for particular categories of loss (see Section 4.2.2). The MoHA database also includes information on estimated losses in monetary terms, as reported to MoHA by individual districts. However, there are no guidelines in place for valuing losses and the accuracy of such data may vary substantially.

Meanwhile, information on damage to public infrastructure is highly disparate and much of it apparently extremely difficult to access. The MoHA database contains some partial data on such losses, where included in the damage assessment reports received from the district level. More complete – although, as MoHA (2008) itself acknowledges, sometimes contradictory – information is reported to individual line agencies by their local representatives. However, MoAC was the only line agency that was able to share its information on disaster-related losses for the purposes of this study. No other line agencies apparently maintain this information in database form, instead typically keeping any records in hard copies only.⁴⁶ Moreover, their records typically do not capture relatively minor damage that is dealt with at the local level.

The enormity of the problem is illustrated by a simple comparison of official data and line agency estimates of annual losses. For instance, according to existing official figures, total

estimated losses as a consequence of floods, landslides and avalanches over the five-year period 2002-2006 averaged NRS 301 m (in constant 2006 prices). Yet the Department of Roads estimates that in a good year, of lower losses, the cost of damage to central roads alone totals around NRS 200m. The Department of Water Supply and Sewerage reports further minimum damage of NRS 100m each year, together totalling NRS 300m – the supposed figure on total losses.

The current situation could improve with the GoN's on-going introduction of the DesInventar approach, with financial support from UNDP. The DesInventar approach is designed to record impacts of highly localised, small scale events and was originally created for use in Latin America and the Caribbean. The approach is based on the principle that the cumulative impact of localised hazards can be relatively substantial, making it important to monitor such events in a standardised, consolidated forum.⁴⁷ In fact, a historical DesInventar database already exists for Nepal at the district level. This database was established in 2005 by NSET, also with financial support from UNDP, and includes entries dating back to 1971, primarily based on media reports. NSET continues to maintain this database at its own cost.

The new DesInventar venture will allow district officials to enter damage information directly into a national web-based database. To date, eight districts have received training in the use of this database under an initial pilot project which has focused on data entry. However, in March 2009 MoHA requested funding from UNDP to allow some of these districts to access the internet, indicating that there could be potential obstacles in implementation.

In the meantime, a comparison over the period 1983-2006⁴⁸ between the MoHA and NSET DesInventar databases and a third, global database that also contains data on Nepal, the EM-DAT, indicates considerable disparities

⁴⁵ The Department of Health also maintains records on loss of life, injury and disease resulting as a consequence of epidemics, including those triggered by natural hazard events. In the aftermath of a disaster it takes out three types of assessment: a rapid health assessment, a detailed health assessment and syndromic surveillance (to monitor the outbreak of disease in communities affected by disaster).

⁴⁶ The DoR is working to provide information on disaster-related damage in electronic form. However, this initiative is intended to provide real-time information to the general public on the state of the roads and potential travel delays.

⁴⁷ For further information see <http://www.desinventar.org/en/>

⁴⁸ MoHA data is only readily available from 1983.

in records on historical losses. In theory, one would expect DesInventar figures to indicate similar losses to those recorded in the MoHA database whilst the EM-DAT figures, which only capture medium and large-scale disaster events, would indicate lower losses.⁴⁹ In reality, even the figures on deaths – the least ambiguous form of disaster loss - indicate a very different reality (Figure 4).⁵⁰ Until 1992, MoHA figures on natural hazard-related deaths were consistently the highest. This most likely reflects the fact that DesInventar data are largely based on media reports and that there was less complete media reporting of disasters in these earlier years. In contrast, in later years DesInventar figures are generally higher, suggesting that MoHA data may not capture the full extent of disaster losses in either these later or earlier years. The figures on deaths resulting as a consequence of floods, landslides and avalanches alone show a similar pattern, with MoHA data exceeding DesInventar figures until 1992 and then the latter overtaking in most years more recently (Figure

5). It is also interesting to note that, under both comparisons, EM-DAT figures exceeded MoHA and DesInventar statistics in 1996, 2004 and, in the case of deaths resulting as a consequence of floods, landslides and avalanches alone, 2005 as well. Again, this would suggest some problems with the data in one or several of the databases as, in theory, EM-DAT data should be consistently lower.

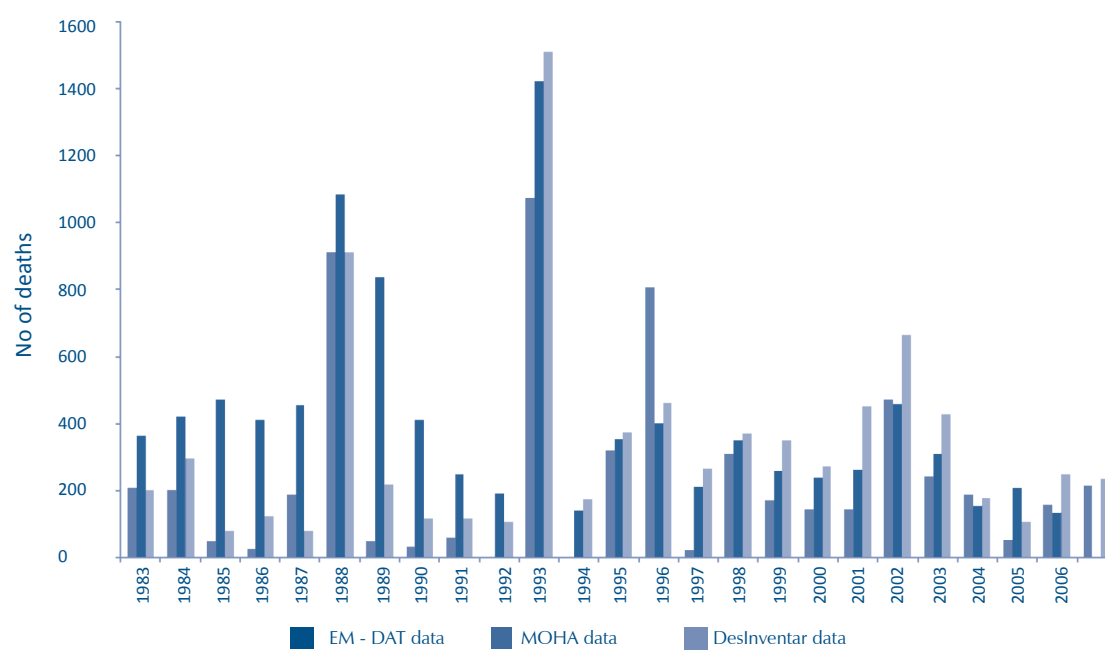
A comparison of figures on the monetary value of losses reveals even greater disparity between the three databases as well as considerable inter-annual fluctuations, most likely reflecting gross inadequacies in the system of loss valuation (Figure 6).

4.3.2 Recommended action

4.3.2.1 Establishment of a more comprehensive disaster database

A comprehensive, consolidated database on disasters losses needs to be established,

Figure 4: Annual natural hazard related deaths in Nepal excluding epidemics, 1983 - 2006



⁴⁵ The global Emergency Events Database (EM-DAT) is maintained by the Centre for Research on the Epidemiology of Disasters (CRED) of the University of Louvain, Belgium, covering disasters that cause at least 10 deaths, affect at least 100 people, result in the declaration of a state of emergency or result in an international appeal for assistance. The EM-DAT database is based on information collated from various sources including UN agencies, NGOs, insurance companies, research institutes and press agencies.

⁵⁰ Deaths occurring as a consequence of epidemics are not included in this figure as the databases do not indicate how many of these deaths occurred as a consequence of epidemics linked to natural hazard events. This may imply that the level of hazard-related deaths is significantly under-reported in this figure.

Figure 5: Flood, landslide and avalanche related deaths in Nepal, 1983 - 2006

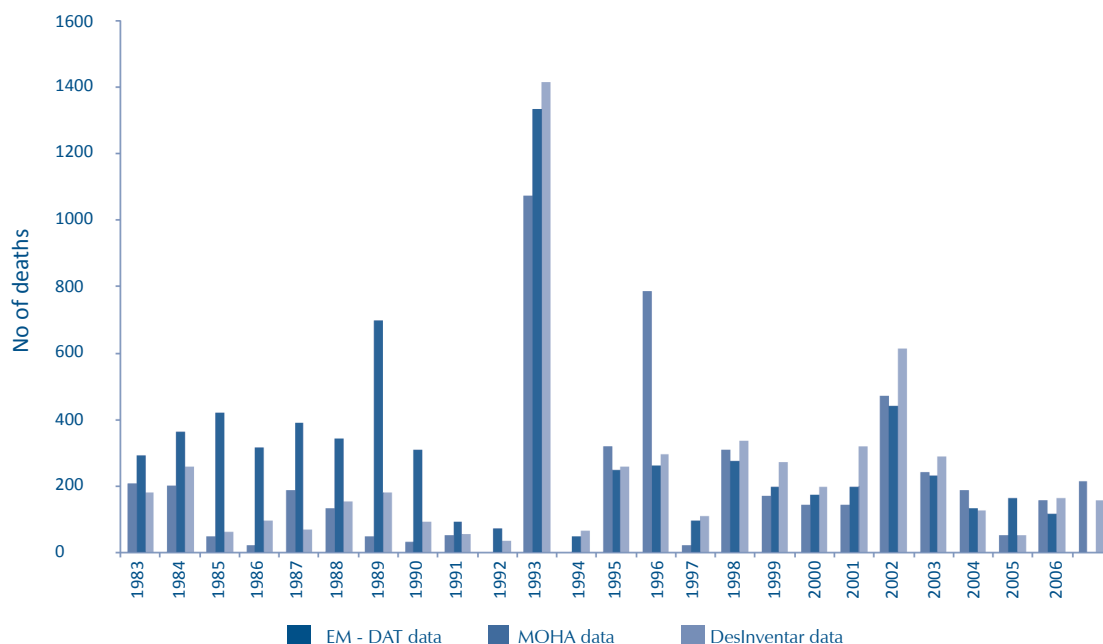
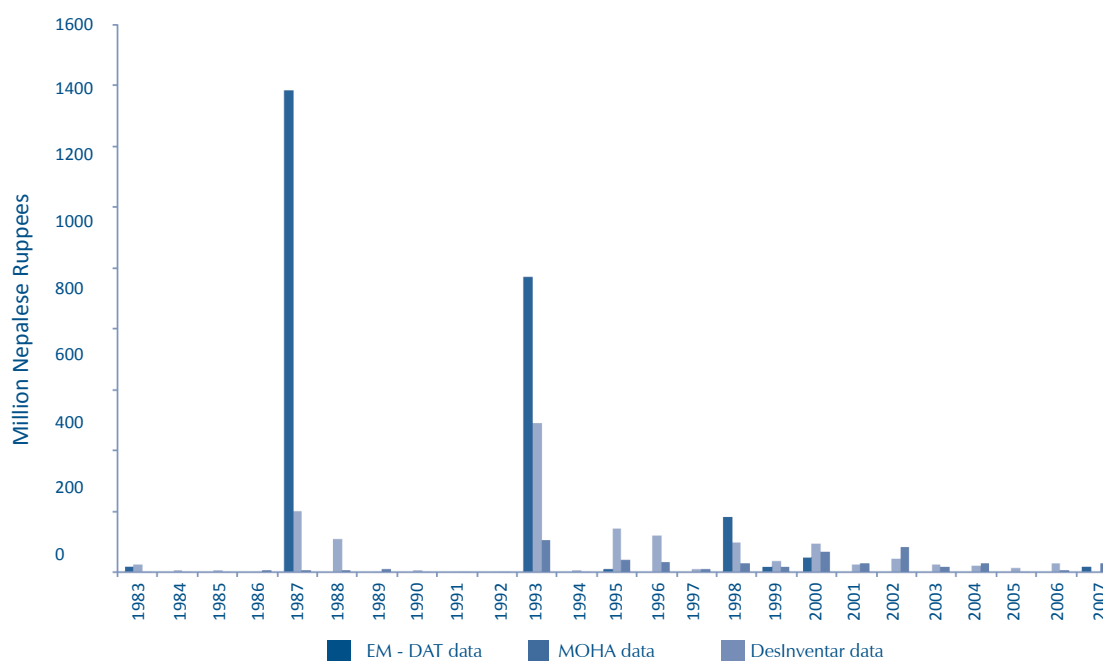


Figure 6: Reported 'economic' losses occurring as a consequence of floods, landslides and avalanches in Nepal, 1983-2007



detailing the full extent of damage arising as a consequence of natural hazards. Enhanced loss data would support the identification of gaps in disaster risk reduction initiatives, contribute to clarification around the nature and level of importance of disasters as economic and financial issues and help support enhanced financial planning for disaster events. This database should be linked into a disaster expenditure tracking system, as outlined above (see Section 4.2.3.3).

The new DesInventar venture could potentially provide a comprehensive and consolidated record of losses, particularly if data collected by sectoral line agencies is also fed into the same database. However, potential problems in implementation need to be identified and resolved at the earliest possible stage. Moreover, the nationwide introduction of the database must be accompanied by improvements in the underlying damage assessment process and efforts to ensure that entries are comprehensive, covering all types of disaster and all forms of loss (see Section 4.4). Even in the Latin American and Caribbean context, an examination of the DesInventar database concluded that whilst data on deaths, destruction of housing and numbers affected are reasonably reliable and that relatively complete information also exists on the number of injured and homeless and damage to housing and crops, data on impacts in other sectors – namely, infrastructure, industry and services – are not sufficiently complete or reliable (IDEA, 2004).

4.4 Damage assessment procedures

4.4.1 Gaps/challenges

Loss data limitations in part reflect current shortcomings in damage assessment procedures in Nepal. Damage assessments are undertaken by VDCs, with losses reported up to the DDRC level. The DDRCs then forward assessments to the national level. Damage assessment teams include representatives of various line agencies at the local level. Local branches of the Nepal Red Cross are also heavily engaged in the process. Individual line agencies have additional reporting systems, relaying information on

damage from their local representatives directly to their respective national agencies. For instance, MoAC collects data on the area affected by disasters, the volume and monetary value of crop losses and the scale of damage to agricultural land; on death and injury (including disaster-related disease) of livestock; on damage to aquaculture, covering both the area damaged and volume of fish losses; and on loss of stored food, in volume terms. The initial data is collected by agriculture service stations⁵¹ in the affected areas, then passed up to the district and then national level where MoAC enters it into a national database on losses aggregated by district.

In practice, GoN data on disaster losses are inconsistent and, on occasion, unreliable. MoHA has developed a standardised format for reporting losses. This form covers information on the scale and value of crop and livestock losses and damage to roads, bridges, power and water supply infrastructure, communications networks and education facilities. In practice, however, the form is often not used. Moreover, there are no accompanying damage assessment guidelines; and information on the extent of losses is only occasionally verified by MoHA and rarely revised. Some training has been provided on damage assessment techniques but, to date, this training has been very nominal according to MoHA. In consequence, for instance, WFP et al (2007) report that definitions of flood-affectedness in Nepal vary across sources and also – inevitably – that some level of data inflation is to be expected due to political pressures and expectations for relief support by affected households. Figures on the monetary value of losses are likely to be particularly unreliable in the absence of clear assessment guidelines or sufficient training.

MoAC has similarly developed a damage assessment form for use by agricultural and livestock extension workers in the field but current reporting practices are somewhat haphazard. In particular, although data on the estimated volume of production losses are reported, they are not recorded in MoAC's national database on losses because of measurement difficulties, in turn reflecting

⁵¹ Each service station covers three to four VDCs.

broader limitations in the crop production estimation process. The GoN provides no training at all in crop estimation techniques, let alone more specifically in post-disaster damage assessment. Instead, the crop assessment system relies on the inter-generational transfer of skills, a system that is being eroded with societal change and increasing migration.

Other line agencies interviewed for the purposes of this study provide no guidelines, training or reporting formats relating to damage assessment.

The Nepal Red Cross has partly filled this void, providing training to its volunteers on immediate humanitarian relief needs assessments, covering loss of life and injuries, damage to housing and water resources and providing related reporting templates and formats. Volunteers in all 75 districts of the country have received some such training. Nepal Red Cross volunteers undertake their needs assessments as members of the DDRC damage assessment team (see above).

In the case of a major event, the international community may also become involved in the damage and needs assessment as well, in collaboration with the GoN. Most notably, from an economic perspective, ADB used the Economic Commission for Latin America and the Caribbean (ECLAC) methodology to assess damage following the 2008 Koshi flood. The ECLAC methodology is the most definitive tool available worldwide for the measuring direct, indirect and secondary economic impacts of disasters, guiding a detailed and comprehensive analysis.

4.4.2 Recommended action

4.4.2.1 Improved damage assessment methodology

Accurate, comprehensive information on the damage arising as a consequence of a natural hazard event is a critical component in ensuring an adequate and appropriate relief and rehabilitation response, in making the case for investment in risk reduction and in informing the development of a related strategies and action plans.

To help address existing inadequacies, UN-OCHA is currently working to harmonise the

initial needs assessment with the introduction of a common assessment format. Under an FAO project (see Section 5.1.1), efforts are also underway to standardise the reporting of agricultural losses. Further initiatives are required to improve the damage assessment process more broadly, ensuring the use of comprehensive, standardised damage assessment methodologies across all sectors and areas of the country. All concerned government departments (including MWR, MoAC, MoLD, MoHP and MoES as well as MoHA) should be involved in a unified assessment and related training process, with a view to undertaking fully coordinated damage assessments in the future.

Existing ECLAC guidelines provide a potential blueprint from which simplified but comprehensive damage assessment guidelines could be developed for Nepal. The World Bank Institute has developed training modules based on the ECLAC methodology which could provide the basis for related training. The ECLAC methodology can also be used to measure the indirect and secondary impacts of disaster events, filling a methodological gap noted by the Nepal Rastra Bank during an interview for the purposes of this study.

The 2006 SAARC Comprehensive Framework on Disaster Management in South Asia also includes the development and standardization of damage, loss and impact assessment procedures under its priorities for action (SAARC, 2006). The SAARC Disaster Management Centre is planning a related workshop on the development of a standard damage and needs assessment system in South Asia in September 2009.

Finally, there may be some opportunity for lesson learning from the Ministry of Peace and Reconstruction (MoPR). The MoPR has established a database on the impact of Nepal's decade-long conflict, covering damage to public and private infrastructure and assets as well as seized assets, internally displaced persons and the war wounded. Much of the information in this database is highly classified but it is the methodology, rather than resulting data, that is of particular interest in supporting enhanced natural hazard related damage assessment procedures. The MoPR database

is based on information provided by Chief District Officers, as the main representative of central government at the local level, and line ministries, the latter covering damage to national infrastructure. Reporting formats were developed for the purpose of data collection, requiring information on damage in both physical and monetary terms. The Ministry itself has subsequently calculated the cost of reconstruction of each damaged item. Some related training has also been provided but this has focused on MoPR staff, supporting them in the management and running of the database, rather than damage assessors on the ground. The MoPR notes that the data collection system was poor in parts and that the information is still being fine tuned.

4.5 Project appraisal and evaluation guidelines

4.5.1 Gaps/challenges

Economic appraisals of certain disaster risk reduction projects are required in Nepal but existing government guidelines provide no specific guidance on how to assess such projects, to assess the potential risk reduction benefits of other projects or to explore the potential risks posed by hazard events to development projects. Consideration of disaster risk concerns as part of the economic appraisal process is an essential step in ensuring that development gains from individual projects are sustainable in hazard-prone countries, in ensuring that potential disaster risk reduction benefits both of dedicated disaster risk reduction projects and other development projects are adequately examined and in highlighting related issues of responsibility and accountability (Benson, 2007). Moreover, the incorporation of disaster risk reduction concerns into the cost benefit analysis of development projects can create important economic incentives for risk reduction, particularly in highly-resource constrained countries where any spending carries a high opportunity cost.

In the case of Nepal, NPC assesses projects according to a list of some 30 criteria and

related information, covering cost, employment generation, duration of the project and so forth. This list includes some financial and economic data relating to the pay-back period, cost benefit ratio, internal rate of return (IRR), net present value and cost effectiveness. The importance of the IRR was re-emphasised in the TYIP, which stated that 'resource allocation will be strictly guided by the program's returns' (NPC, 2007: 48). However, in line with acceptable practice in other countries, only proposals for larger infrastructure projects – in Nepal, defined as costing over NRS 5m – are required to include information on the IRR, cost benefit ratio and so on. NPC generally requires approved projects to generate an IRR of at least 12%.⁵² However, in poorer areas of the country, an IRR of 10% – and even much lower on occasion – is acceptable while projects in Kathmandu are expected to have an IRR of at least 15%.

According to NPC, there are related set guidelines on cost benefit analysis.⁵³ However, DWIDP indicated during an interview for the purposes of this study that these are more in the form of approved norms and, moreover, that they contain no specific guidance on the analysis of disaster risk related concerns. Such guidance is important because this analysis raises a number of particular challenges:

- ❑ The flow of benefits from disaster risk reduction measures are necessarily probabilistic, with the actual level of benefits realised dependent on the degree of severity of hazard events – if any – occurring over the life of a project.
- ❑ Little related information may be available on the frequency and intensity of the hazard under investigation, raising issues of uncertainty that need to be handled in the analysis.
- ❑ Many of the benefits of disaster risk reduction measures relate to direct and indirect losses that will *not* ensue should the related hazard occur, rather than to expected streams of positive benefits that *will* ensue, as would be the case for other investments.
- ❑ Some costs and benefits can be difficult to measure in monetary terms.

⁵² For instance, DWIDP, which is responsible for flood control investments, reported that it is required to demonstrate an IRR of at least 12%. DoI also reported that it is required to demonstrate an IRR of at least 12% for all new irrigation projects. Central road projects are similarly required to show an IRR of at least 12%, except in poorer areas of the country where lower rates are acceptable.

⁵³ NPC was unable to provide a copy of these guidelines to the researchers for the purpose of this study.

- ❑ Levels and forms of vulnerability may change considerably over the life of a project, particularly in countries undergoing rapid socioeconomic change or high rates of demographic growth or environmental degradation. These changes, several of which are relevant in Nepal, need to be considered.
- ❑ Predicted impacts of global warming on the frequency and intensity of natural hazards over the life of a project need to be taken into account (Benson, 2007).

For instance, during an interview for the purposes of this study, DWIDP noted difficulties in measuring the benefits of disaster risk reduction, particularly with regard to averted loss of life and reclaimed land. To overcome these problems, it simply excludes some benefits from its analysis, in turn reducing the resulting benefit to cost ratio. Meanwhile, DoI assumes normal average rainfall in its economic analysis, rather than variable rainfall as might be the case if a more disaster-sensitive method of analysis was followed. This average rainfall assumption potentially under-values the benefits of investment in irrigation during drought years.

None of the other existing project approval criteria as required by the NPC relate directly to disaster-related issues. The Tenth Plan (NPC, 2002: Chapter 22) did indicate a plan to make 'natural disaster appraisal studies' compulsory prior to the implementation of physical infrastructure projects but this was never enforced due to cost considerations. Some aspects of disaster risk management should also be covered by the environmental assessment process. The physical/chemical aspects of the assessment include, for instance, analysis of the soil stability and drainage/watershed implications of proposed investments. In practice, however, the environmental assessment process is apparently only loosely applied, particularly by local governments, and resulting recommendations are not necessarily implemented. Moreover, as regards natural

hazards, assessments focus only on the impact of a proposed project on the environment rather than of the environment – in this case in the form of a hazard event – on the project as well. The World Bank (2008a) also comments that because government screening criteria determining the extent of environmental assessment required are primarily based on scale thresholds, small projects with significant adverse impacts can be implemented without environmental assessment studies and the incorporation of environmental mitigation measures.⁵⁴ In addition, the World Bank draws attention to inadequacies in the alternative analysis format, which, as it stands, focuses on the assessment of alternative raw materials, alternative operation schedules and alternative energy. The World Bank points out that this format is geared towards analysis of industry and is less relevant to other sectors. As regards disaster risk reduction concerns, the alternative analysis should ideally cover issues such as alternative construction design, alternative construction technology and alternative location as well.

4.5.2 Recommended action

4.5.2.1 Incorporation of guidance on the analysis of disaster risk related concerns into NPC project preparation guidelines

Existing NPC project preparation guidelines should be revised to include guidance on the analysis of disaster risk-related and longer-term climate change concerns, both within economic and other forms of project feasibility analysis and detailed design processes. Vulnerability to natural hazards is complex and multi-faceted, requiring consideration from all angles - environmental, social, institutional and technical, as well as economic - and incorporation into broader planning tools such as logical framework analysis and results-based management frameworks. Ideally, the amendments should include guidance both on the analysis of disaster risk reduction projects and on how disaster risk concerns and benefits can be taken into account in the analysis of other

⁵⁴ The level of environmental assessment required is determined according to the cost of the proposed project; its location (namely whether or not it will be sited in a sensitive area); and, for specific categories of project, physical scale (e.g., capacity of a proposed hydro-electric power instalment; length of a proposed road or segment of river covered by river training infrastructure; population served by a drinking water project; area of land covered by an irrigation project). According to the cost criteria, projects under NRS 50m require no assessment, projects costing between NRS 50m and NRS 250m require an Initial Environment Examination and projects costing in excess of NRS 250m require a full environmental impact assessment. The assessment covers four areas: socio-economic, cultural, physical/chemical and biological.

projects, where relevant, in turn influencing project design. Such amendments would help enhance the hazard-proofing of development projects and support the sound analysis of disaster risk reduction investments. In parallel, indicators for monitoring and evaluating disaster risk reduction impacts and outcomes need to be further developed (see Section 5.1.2). More generally, existing work guidelines laid out by the GoN for each government ministry should also be amended to include explicit disaster risk reduction roles and duties under ministerial responsibilities, again helping to ensure that disaster risk concerns are adequately considered in the design and preparation of individual projects (see Box11).

There is a small immediate window of opportunity for at least partial change. The Water and Energy Commission Secretariat (WECS) has recently been given the mandate for technical and economic clearance of all

water-related projects. This mandate has yet to be realised but will involve the development of related guidelines. WECS plans to include a chapter on disaster impact assessment as part of the environmental assessment guideline, covering economic and financial analysis within this chapter as well. This analysis will help enhance the hazard-proofing of all water sector projects as well as support the sound analysis of explicit disaster risk reduction investments. In the longer term, such analysis should ideally be extended to projects in other areas as well.

ProVention's *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations* (Benson and Twigg, 2007) and ISDR/UNDP's document on *Integrating Disaster Risk Reduction into CCA and UNDAF* (ISDR/UNDP, 2006) provide useful additional guidance materials on how to integrate disaster risk related concerns into project appraisal and evaluation methodologies.

Potential role of economic data, tools and analysis in overcoming other disaster risk management gaps and challenges

There are a number of other non-economic gaps and challenges to be overcome in strengthening disaster risk management in Nepal, pertaining to the mainstreaming of disaster risk reduction concerns into national development and sectoral policies, implementation of the new National Strategy on Disaster Risk Management and investment in disaster risk reduction initiatives. Many of these gaps and challenges are already well recognised and plans are underfoot to tackle some of them. The potential contribution of economic and financial tools, analysis and data in furthering progress is discussed below and summarised in Table 2 (above).

5.1 Mainstreaming disaster risk reduction concerns into national development policy

5.1.1 Gaps/challenges

There have been some preliminary endeavours to mainstream disaster risk reduction concerns into broader development policy in Nepal. Further effort is required to ensure that these endeavours are sustained and, most importantly, translated into practical action. This requires buy-in and commitment across government, particularly from NPC and MoF but also from a wide range of line agencies and from local government, reflecting the cross-cutting nature of disaster risk management (Box 14).

Planned development was originally begun in Nepal in the mid-1950s, with the launch of the first five year plan (1956-61). There has been a long succession of periodic plans since that date and poverty reduction has been the central goal of government since the Seventh Plan (1985-90) (NSET, 2008). The topic of environmental management, in turn linked to the prevention of soil erosion, floods and landslides and forest conservation, has been included since the 1970s (NPC, 2007). Successive periodic plans have also covered structural flood control and disaster response. However, the Tenth Plan marked a notable change in approach, outlining steps which, if implemented, would begin to shift the country from, in effect, a sectoral approach to disaster risk reduction towards its mainstreaming into broader development, in particular by requiring natural disaster assessments prior to the implementation of infrastructure projects. For the first time, disaster risk management was elevated to explicit mention in a chapter heading, in a chapter on 'Population, environment and natural disaster management'. Reflecting growing awareness of the importance of disaster risk management for sustainable development both nationally and internationally, and related pressure from the disaster risk management community within Nepal to tackle the issue in the periodic plan, the current TYIP, 2007-2010, went a step

Box 14: Principles in mainstreaming disaster risk reduction into development

Since the late 1990s, there has been increasing recognition both by governments and donors around the world of the need to ‘mainstream’ disaster risk reduction into development – that is, to consider and address risks emanating from natural hazards in medium-term strategic development frameworks, in legislation and institutional structures, in sectoral strategies and policies, in budgetary processes, in the design and implementation of individual projects and in monitoring and evaluating all of the above. Mainstreaming requires analysis both of how potential hazard events could affect the performance of policies, programmes and projects and of the impact of those policies, programmes and projects, in turn, on vulnerability to natural hazards. This analysis should lead to the adoption of measures required to reduce vulnerability, treating risk reduction as an integral part of the development process, rather than as an end in itself (Benson and Twigg, 2007). It does not require a re-working of government objectives: instead, mainstreaming seeks to help ensure that these objectives are both attainable and sustainable.

This integral approach is considered essential in view of the fact that development initiatives do not necessarily reduce vulnerability to natural hazards but, instead, can unwittingly create new forms of vulnerability or exacerbate existing ones. ‘Win-win’ solutions for securing sustainable development, reducing poverty and strengthening hazard resilience need to be explicitly and actively sought, particularly as climate change looks set to increase the incidence of droughts and floods and the intensity of windstorms (ibid). Indeed, the mainstreaming process should take account of the impact of climate change on the intensity and frequency of hydro-meteorological events in the future, as well as historical hazard records. Within this longer-term framework, disaster risk reduction interventions hopefully constitute a ‘no-regrets’ minimum level of adaptation to climate risk. However, even this cannot be guaranteed.⁵⁵

further again, this time including a chapter specifically, and exclusively, on ‘natural disaster management’, be it the shortest chapter in the Plan. This chapter is located within the social development section of the plan. In common with the Tenth Plan, the TYIP also includes a section on water-induced disaster prevention under the chapter on irrigation.

However, in practice, implementation of successive periodic plans with regard to disaster risk management intentions has been relatively weak. For instance, progress with successive plans’ calls for hazard mapping, an essential pre-requisite in mainstreaming disaster risk concerns into physical planning, has been limited whilst the GoN has yet to introduce the national disaster assessments envisaged in the Tenth Plan.

More fundamentally, disaster risk reduction has yet to be dealt with as a truly cross-cutting

theme across the periodic plan. For instance, successive periodic plans have focused on increased agricultural productivity and greater commercialisation of the agricultural sector, substituting high-value commodities for low value ones, as a central component of the country’s growth strategy. There has been widespread ex-post recognition within the plans of the role that climatological hazards have played in hampering gains in agricultural productivity. The TYIP, for example, attributed below-target agricultural GDP growth over the period of the Tenth Plan, reported at only 2.7% per annum against the target level of 4.1%, to ‘adverse climatic conditions’ as well as lower than expected investment and political instability (NPC, 2007: 141). However, successive periodic plans have failed to include any explicit initiatives to enhance the sector’s resilience to climatic variability, despite the existence of a wide range of proven such measures, including low-cost interventions, in other

⁵⁵ For instance, investments in structural flood defences are intended to encourage development of flood prone areas. However, if these defences are designed according to current flood exceedance probabilities but future floods reach even greater heights, these defences could effectively increase future losses precisely by encouraging development today. Thus, it is important to take climate change predictions into account in current-day decision making as well as in longer-term planning.

countries, growing belief that climate change is already affecting agricultural performance in Nepal, and a series of related suggestions and recommendations in the country's Initial National Communication on Climate Change.⁵⁶ In the case of the TYIP's chapter on agriculture, there was no further mention of natural hazards beyond their adverse impact on past performance until the end of the chapter, where extreme weather conditions were identified as a potential risk factor in achieving the new plan's agricultural goals.

MoAC itself has very little knowledge or expertise in the area of disaster risk reduction. Even projects with potential resilience-enhancing benefits, such as a sustainable soil management initiative undertaken in conjunction with the Ministry of Forests and Land Conservation and the Ministry of Land Reform and Management, do not draw out such links nor seek to maximize them. This problem is arguably compounded in the case of inter-ministerial initiatives where it can be particularly hard to keep hold of secondary objectives. MoAC has also been overlooked in the creation of an inter-ministerial committee to oversee the preparation of Nepal's NAPA (see Section 2.2).

Urgent efforts are required to address this shortcoming in the agricultural sector. As WFP and NDRI (2008a) note, growth in agricultural output has declined over the years, the annual rate of increase is only slightly above the population growth rate and it is unlikely that production levels can be raised in the short term by bringing more area under cultivation due to limited irrigation facilities. However, there is potential scope for increasing productivity by enhancing resilience to natural hazards. Moreover, there are a number of entry points for so doing in the strategies and policies already outlined in the TYIP, including

in the production of necessary breeders and foundation seeds, which could include the production of hazard resilient seeds; in investments in irrigation, which could both alleviate impacts of drought and delayed onset of the monsoon⁵⁷ and support better management of floods by facilitating changes in cropping calendars; in the development of water resource conservation technology, which has clear drought-related benefits; in the protection of traditional knowledge, practice and seed varieties, which is likely to include some indigenous measures for coping with natural hazards⁵⁸; in the strengthening of agricultural extension services, which could help support dissemination of information on enhanced hazard resilience techniques; and in measures to strengthen provision of rural credit, which could incorporate measures to address particular problems faced by borrowers in meeting existing lending repayment obligations and accessing fresh credit for recovery in the aftermath of disasters. These opportunities urgently need to be acted upon.

More positively, the first explicit pilot project to enhance disaster risk management and climate change adaptation capacity in the agricultural sector has recently been begun, with financial support from FAO and UNDP (Box 15). This project could lead to the development of a broader programme of government-led work across the country. The World Bank and MoAC are also investigating the feasibility of agricultural insurance in Nepal, identified as a priority under the Tenth Plan, including against climatic risks (World Bank, 2008b). Current provision is very limited. Some NGOs have indicated an interest in disaster risk management and climate change adaptation too and at least one, Practical Action, is actively supporting communities to select crops appropriate to local climatic factors. In the case of one community

⁵⁶ The Initial National Communication on Climate Change (MoPE, 2004) suggested several adaptation measures for the agricultural sector – namely, the development of genetically adaptive crop varieties, in part to enhance resilience to drought; crop diversification to spread risk to extreme climatic events; adjustments in sowing dates and crop varieties to enhance hazard resilience; and the development of a hailstone warning system. It also recommended that research should be undertaken on the development of drought tolerant crop varieties; on the probability of drought in different agricultural seasons and geographical areas as a consequence of climate change; on the impacts of climate variability and climate change on river flow regimes, the ground water table and the snow covered area; and on effective measures to manage and mitigate water induced disasters.

⁵⁷ For instance, in June 2009 it was reported that rice planting in Banke District would be delayed due to lack of rainfall, with implied delays in transplanting and an expected subsequent decline in yields. Agronomists recommend that seeds should be planted before the first week of Jestha (mid May) to achieve higher yields (The Himalayan Times, 2009).

⁵⁸ MoPE (2004) reports that many local crop varieties have good tolerance to stress conditions such as drought as well as heat, insects and disease.

Box 15: Enhancing resilience to natural hazards in the agricultural sector

The first government initiative explicitly to enhance capacity for disaster risk management and climate change adaptation in the agricultural sector has recently been begun on a pilot basis, with US\$0.5 m financial support from FAO, focusing on three VDCs in each of four districts in Nepal, two in the Eastern and two in the Western Region. The project includes some demonstration activities on soil conservation techniques and the cultivation of drought-resistant wheat and potato and flood-resistant rice varieties; a component at the district level on improved seed storage systems in flood prone areas; and the documentation of existing indigenous knowledge on climate risk management, on which relatively little is currently known. The project also seeks to enhance early warning systems, in conjunction with the Department of Hydrology and Meteorology, by upgrading some meteorological stations and improving rainfall forecasts for particular agro-meteorological zones; and to support the introduction of seasonal agricultural advisories to farmers. Farmers currently receive no forecast information even on the expected timing of the monsoon, instead relying on traditional methods to predict how heavy the rains will be. FAO has a further pilot project in conjunction with UNDP undertaking similar initiatives in three VDCs in each of two districts in the Mid-Far Western Region.

If these pilot projects are successful, it is hoped that MoAC will streamline them into its national programme of work. In support of this process, the FAO project will include the development of a plan of action that will feed into the NAPA, although it will be too late for the preparation of the next periodic plan. It is also intended that an economic analysis will be undertaken at end of the FAO project to explore whether it is economically feasible for farmers to adopt disaster risk management and climate change adaptation practices. This analysis could be of considerable value in securing the commitment of MoAC, NPC and MOF to a national climate risk management programme.

that experiences frequent problems of excess or deficit rainfall, rice has even been replaced with bananas. Finally, MoAC is currently being restructured and it has been suggested that, as part of this process, a new unit specifically addressing climate risk management could be established. This would be an extremely positive development.

Similarly, successive periodic plans have played little regard to the need to enhance hazard resilience as part of measures required to achieve their key central objective, poverty reduction. The country's progress in reducing poverty has, regardless, been extremely impressive, with a decline in absolute poverty from 42% in 1996/97 to 31% in 2003/04, as already noted. The latest periodic plan aims to reduce the proportion of the population living below the poverty line further still, to only 24%, primarily by increasing employment opportunities (NPC, 2007). However, further progress in poverty reduction is likely to be increasingly difficult if hazard vulnerability is not addressed, particularly if rising concerns about the impact of climate change are founded. As

GoN/UNDP (2008:1) comment 'poor people in Nepal are disproportionately affected (by natural hazards), as their livelihoods often depend on climate-sensitive natural resources, and their capacities to cope with extreme climatic events are especially weak'.

To date, there has been little formal quantitative analysis of the relationship between poverty and hazard vulnerability, and this may partly explain why vulnerability to natural hazards has not been tackled as part of efforts to reduce poverty. A recent study by NSET (2008) provides a notable exception. This analysis revealed, somewhat surprisingly, a negative correlation between the incidence of floods and levels of poverty – that is, that geographical areas that are more affected by floods have lower poverty rates. However, the authors recommend that this finding requires further investigation. This would certainly seem warranted as the findings fly in the face of more qualitative evidence. Analysis based on a more disaggregated unit of analysis could generate very different results, particularly for the Terai. The NSET analysis also revealed, more expectedly, a positive

correlation between the incidence of poverty and incidence of landslides – that is, that there are higher rates of poverty in parts of the country where more people and houses (the authors' definition of the impact of disasters) have been affected by landslides.⁵⁹

Similarly, there is no mention of natural hazards in the 2005 Millennium Development Goal (MDG) progress report (NPC/UN, 2005) despite the fact that, as MoHA et al (2008: 6) state, 'the high levels of structural, non-structural, social and institutional vulnerabilities of the country to the various natural and human-induced hazards remain a severe impediment to reaching the goals'.⁶⁰ GoN and UNDP (2008) similarly argue that natural hazards undermine development progress in Nepal and put the achievement of the MDGs at risk. According to the MDG monitoring website, Nepal is only on track to achieve one MDG, relating to a reduction in child mortality. Achievement of most of the remainder is only considered possible if changes are made.⁶¹ Disaster events will only serve to further undermine their likelihood of achievement – for instance, with regard to reductions in poverty and hunger, improvements in child health and universal education.

More generally, disaster risk concerns are typically not mentioned in any overview discussion of challenges to development in Nepal, as for instance, illustrated by the TYIP. The TYIP includes sections on risks and assumptions for most of the sector plans but natural hazards are only included as a risk in the chapters on agriculture and irrigation, the latter in the section on water-induced disaster prevention. They are not mentioned at all in the overview chapter on challenges and opportunities of development. Instead, rugged terrain and inadequate transport, limited resource endowment and land-locked location are some of the most commonly

cited overview obstacles to development (e.g., NPC/UN; and Regmi and Adhikari, 2007). Admittedly, disaster risk management concerns have been over-shadowed by a decade of conflict. Yet, over the same period, they have begun to emerge as a significant issue on the development agenda. With the end of the conflict and related reflection both by the GoN and the international community on the future course of development in Nepal, there is an opportunity to push new issues, including the mainstreaming of disaster risk reduction and climate change adaptation concerns, firmly onto the agenda.

5.1.2 Role of economic data, tools and analysis

Mainstreaming requires analysis both of how potential hazard events could affect the performance of policies, programmes and projects and of the impact of those policies, programmes and projects, in turn, on vulnerability to natural hazards, as already noted. High macroeconomic vulnerability is by no means inevitable (see Section 3.1) and governments can take various steps to promote greater resilience, for instance in the case of Nepal by reducing the vulnerability of the agricultural sector to climatic shocks. Improved evidence on the economic and budgetary consequences of disasters, both now and in the future as the effects of climate change are felt, would support this mainstreaming process, clarifying the precise nature of importance of disasters as economic and budgetary issues and strengthening the case for mainstreaming.

Establishment of a system to track disaster-related expenditure would provide more specific support in monitoring disaster risk management measures and related spending. The chapter on Disaster Management is one of relatively few chapters in the TYIP that does not include information on quantitative targets, expected outcomes and risks and assumptions.

⁵⁹ Some country-wide disadvantaged group mapping has also been undertaken, dividing VDCs into four categories according to factors such as food security, income, access to water, the number of female-headed households, caste and ethnicity. This mapping exercise did not take natural hazards into account. However, if the information generated was superimposed on a hazard map it could provide a very valuable tool in locating communities that are particularly vulnerable to natural hazards and targeting efforts to enhance resilience.

⁶⁰ Likewise, a 2006 World Bank report on poverty and conflict (World Bank, 2006a) included no mention of natural hazards or climate change, despite including both a discussion of historic impediments to poverty reduction and strategies for reducing poverty, several of which could be significantly undermined by disaster events.

⁶¹ http://www.mdgmonitor.org/country_progress.cfm?c=NPL&cd= visited 19 Feb 2009. The website indicates that there is insufficient information to determine Nepal's progress in achieving the final MDG, relating to the development of a global partnership for development.

This was explained during an interview for the purposes of this study as a reflection of the fact that the disaster management chapter is new and that information on targets and outcomes will be developed over time. The sub-section on chapter on water-induced disasters within the chapter on irrigation also includes no quantitative targets. Ideally, quantitative targets should be outcome orientated. However, a solid base of information on actual expenditure would provide an important building block in the development and application of disaster risk reduction monitoring and evaluation indicators.

Moving beyond economic data, tools and analysis, disaster risk related screening of all new government policies should also be introduced to support the mainstreaming of disaster risk reduction into both national and sectoral development policies. The GoN has developed various guidelines on the preparation of periodic plans, project management and monitoring and evaluating.⁶² These should be reviewed to identify entry points for introducing disaster-related concerns, covering both the impacts that potential hazard events could have on the achievement of new policies and opportunities to embed disaster risk reduction principles and specific actions within them. Related training and support should also be provided to implement these new guidelines. The Asian Disaster Preparedness Centre (ADPC) already has a small initiative underway along these lines, in conjunction with MoHA, NPC, MoPPW and MoLD, focusing on the integration of disaster risk reduction concerns into the national, district, municipality and village level periodic

and annual planning guidelines. The project includes the pilot application of the revised guidelines in the preparation of the periodic plan for one hazard-prone municipality (ADPC, 2009).

Finally, although beyond the terms of scope of this current study, it is worth noting that there would be considerable merit in including some disaster-related questions in the next round of the Living Standards Survey in Nepal to help capture the consequences of disasters on levels and depths of poverty. A disaster risk-related question could also usefully be included in the National Census, the next scheduled for 2011.

5.2 Implementation of the National Strategy on Disaster Risk Management

5.2.1 Gaps/challenges

The new National Strategy on Disaster Risk Management outlines a comprehensive, holistic approach to disaster risk management, covering ex ante risk reduction and preparedness as well as post-disaster response. However, further sensitisation work around the benefits of disaster risk reduction is required, at both the national and local level. Economic and budgetary analysis could play a role both in this and in supporting the on-going process to translation the strategy into a plan of action.

Current institutional and legislative arrangements for disaster risk management in Nepal are largely orientated around a traditional, primarily response-based approach to disasters.⁶³

⁶² These include annual budgeting and programming guidelines for line agencies and district governments, guidelines on the preparation of periodic plans for central government agencies, districts, municipalities and VDCs, a project management manual and a monitoring and evaluating guideline.

⁶³ The National Water Plan of 2005 provides a notable exception, laying out ex ante measures to reduce risks relating to water-induced disasters over a 25-year period (WECS, 2005). This Plan, which was developed to implement the Water Resources Strategy of 2002, includes the prevention and mitigation of water-induced disasters as one of its eight objectives. It seeks to enhance institutional capacity to manage water-induced disasters under its short-term, five-year planning horizon; to adopt effective measures to manage water-related disasters and mitigate their adverse effects under its medium, ten-year goals; and to have an effective functioning water-induced disasters management system in place by the end of the plan in 2027, with social and economic losses due to water-induced disaster 'reduced to the levels experienced in other developed countries' (WECS, 2005: Chapter 2). The plan details seven disaster related programmes, together costing NRS 35bn over the full period of the plan:

- The formulation of a water-related Disaster Management Policy and Programme.
- A risk/vulnerability mapping and zoning programme.
- A disaster networking and information system improvement programme (including the establishment and activation of forecasting and early warning systems, covering floods, extreme precipitation and drought)
- A community-level disaster preparedness programme.
- Relief and Rehabilitation Measures.
- The activation of an Inundation Committee; and
- A flood, drought, landslides/debris flow, GLOF and avalanche mitigation programme.

WECS is also currently preparing an integrated water resource strategy, into which disaster risk reduction concerns will be mainstreamed.

However, the GoN has undertaken a considerable step forward over the past few years with the preparation of the new National Strategy on Disaster Risk Management. This strategy outlines a comprehensive, holistic approach to disaster risk management, organised around the HFA and covering ex ante risk reduction and preparedness as well as post-disaster response, taking the GoN firmly into the twenty-first century. In line with the HFA, a multi-stakeholder National Platform to advocate for and coordinate disaster risk reduction activities was also created in March 2009, chaired by the Home Secretary with secretariat support from the Disaster Preparedness Network (DP-Net). Draft legislation to replace the existing Natural Calamity (Relief) Act, 1982 and a new National Policy for Disaster Risk Management have also been prepared, broadly in line with the new strategy.

The approval of the new Strategy may not occur for another 12 months due to other, more pressing demands on government time, most importantly the drawing up of a new constitution, and on-going political tensions within the coalition administration. Nevertheless, ahead of its approval, efforts are already underway with the support of the UN and several international agencies to translate the national strategy into a three-to-five year US\$120-150m plan of action. These efforts include the refinement of the national strategy's 29 strategic activities into five core or flagship outcome areas and their financial costing. The five areas – namely, school and hospital safety, flood management, emergency preparedness and response capacity, integrated community based disaster risk reduction and institutional and policy capacity – together complement the five priorities of the HFA. However, no related economic or budgetary analysis has been undertaken to date to inform the development of this plan.

Operationalisation of the national strategy also requires the creation of a new National Authority for Disaster Risk Management, directly under the leadership of the Prime Minister. This new authority is urgently needed. Disaster risk reduction is a cross-cutting issue that needs to be owned and acted upon by all government agencies, rather than by a single body. Nevertheless, an overarching national

agency is required to provide overall leadership, to ensure multi-sectoral communication and cooperation, to monitor cross-sectoral progress in risk reduction and maintain a national database on disaster-related initiatives. Current arrangements imply that, de facto, the Department of Narcotics Control and Disaster Management (DNCDM) within MoHA would be responsible for implementing disaster risk reduction policies and strategies as it is already responsible for the management of post-disaster response. However, the DNCDM is poorly placed to play this part as it is far removed from core sustainable development and poverty reduction planning and decision making. Instead, in the words of UNDP (2005: 6), mainstreaming seems more likely to happen:

‘... if the coordination of DRM (disaster risk management) is ultimately overseen at the highest level of executive power i.e. the Prime Minister (PM) or President. National DRM offices attached to PM offices find it generally easier to take initiatives vis-à-vis Line Ministries than their colleagues operating at the sub-ministerial level who might face administrative bottlenecks even to communicate with peer agencies’.

As such, the proposed creation of the National Authority for Disaster Risk Management directly under the Prime Minister is excellent. Nevertheless, there is apparently considerable resistance to this new unit because of its implied administrative costs.

Ahead of the approval of the new strategy, work has also already begun on the sensitisation of government officials to issues around disaster risk reduction, encouraging movement away from the historically reactive orientation of disaster risk management (see Section 1.1). In addition to the appointment of disaster risk reduction focal points across a range of government agencies, the NPC is beginning to develop sectoral guidelines to sensitise policy makers to disaster-related concerns and plans to run some related workshops. However, as already noted, there is still a widespread perception that disaster risk reduction is costly. As such, more general budgetary constraints are viewed as a major impediment to practical progress. Moreover, even amongst those government officials who are now talking of the

need to mainstream, there remains a common consensus that there is relatively limited scope for risk reduction and that, as many said during interviews for the purposes of this study, ‘disasters cannot be predicted’ nor, according to them, addressed ahead of time.

Considerable sensitisation work is also required at the local level, where many of the practical disaster risk reduction measures arising from the new national strategy need to be implemented and disaster risk mainstreaming principles most critically institutionalised. UNDP and several NGOs have been involved in various disaster risk reduction endeavours at the community level, including vulnerability assessments and the implementation of small-scale risk reduction measures. Both UNDP and Oxfam report that there is burgeoning interest in risk reduction at this level as a consequence of these efforts. Communities are becoming less passive, no longer necessarily accepting natural hazards as ‘acts of God’ (Oxfam, 2009). However, local bodies have few related budgetary resources (see Section 4.2.3.2). Moreover, a large number of DDRCs still remain largely focused on disaster response and have very little knowledge of disaster risk reduction. Few districts have a disaster plan either.

5.2.2 Role of economic data, tools and analysis

Analysis of past and potential future economic and budgetary impacts of natural hazard events in Nepal would generate valuable information demonstrating the potential net benefits of disaster risk reduction and its mainstreaming into development. This would provide a key input into the sensitisation process, particularly at the level of national government, as well as help demonstrate the rationale behind the creation of a new national authority for disaster risk management at the heart of government, closely linked into development planning and budgetary decision making. Improved information on disaster losses, as provided both by improved damage assessment methodologies and more consolidated reporting, would further support this process.

Eclectic sectoral analysis could also play an important role in identifying key priorities in the translation of the strategy into a plan of action whilst enhanced project screening tools,

strengthening capacity to analyse disaster risk concerns and options for enhanced resilience, would help ensure the various components of the action plan are collectively rational, comprehensive and cohesive. Establishment of a system to track disaster-related expenditure would provide a key tool for use in monitoring progress in implementation of the strategy and action plan and their achievements.

5.3 Addressing gaps in disaster risk management

5.3.1 Gaps/challenges

Evidence on the economic benefits of individual investments in disaster risk reduction is important in securing greater financial support in this area. The results of cost benefit analyses that have been undertaken suggest that disaster risk management interventions can, yield high net benefits. However there has been relatively little such analysis, either in Nepal or in any other developing country, implying that it is not possible to draw simple heuristics – or rules of thumb – concerning the approximate net returns to investment in particular types of disaster risk management intervention.

Nepal has a long history of investment in structural flood control. The extent of other disaster risk management interventions is probably far greater than immediately apparent as a range of other development initiatives (e.g., in areas of irrigation, soil management and poverty reduction) also contribute to enhanced hazard resilience. Nevertheless, indications suggest that there could be considerable net benefits to further investment in disaster risk reduction in Nepal. Without ready access to evidence on the economic benefits of such investments, however, there is sometimes considerable reluctance to even consider such spending, particularly as the benefits may not be felt for some years to come, when the next flood, drought or earthquake occurs.

In accordance with GoN requirements, DWIDP routinely undertakes cost benefit analysis of its projects (see Section 4.5.1). However, these analyses were not immediately available for purposes of this study. There has been limited wider use of cost benefit analysis to date to explore the benefits of disaster risk reduction. Notable exceptions are recent work by Dixit et

al (2008), as part of a wider study led by the Institute for Social and Environmental Transition (ISET) to evaluate the benefits and costs of disaster risk reduction across a series of case areas in India, Nepal and Pakistan, and by the Nepal Red Cross (Cabot Venton et al, 2008). These studies generated very useful results but also highlighted the considerable challenges in undertaking such analysis in Nepal.

Dixit et al (2008) addressed the complex issue of flood control. This is an inherently difficult area. To date, embankments have been the government's primary mechanism for flood control in Nepal. As Moench et al (2008) discuss, an embankment can provide relatively high levels of flood protection immediately following construction, in turn supporting development of the protected area. However, over time, an embankment's ability to protect can decline as a consequence of increasing sedimentation and, depending on how well it is constructed and maintained, a potential deterioration in its structure. In the case of Nepal, flooding is resulting in heavy siltation in the lower reaches of the country's river network on far too large a scale for desiltation operations, in turn increasing the likelihood of breaches of the existing flood protection infrastructure if the height of embankments is not regularly raised. This problem is expected to be exacerbated as a consequence of climate change and associated increases in flow peaks and sediment loads.

Due to significant data constraints relating even to the most basic data on factors such as precipitation within the basin, river flow levels, areas of flooding, and investment in the construction of flood control structures, Dixit et al (2008) were unable to undertake a standard cost-benefit analysis. Instead, they employed a qualitative approach to assess the costs and benefits of both government-supported flood control infrastructures and alternative 'people-centered' flood risk management strategies which local populations have developed along the Bagmati River in the Terai. This approach generated many of the same insights as those that would have been derived from a more quantitative approach, laying the groundwork for the latter although not replacing it because of difficulties in comparing the magnitude of the costs and benefits identified by the qualitative study (Moench et al, 2008). Ranking exercises using a simple +/- system were undertaken along

a series of transects to assist local populations in identifying and weighting the direct and indirect costs and benefits associated with specific risk reduction measures across flood-affected areas. Indirect costs included, for instance, losses due to water logging outside embankments. Indirect benefits included the role of embankments as areas of relatively high elevation, providing points of refuge for people and assets during flooding. Each cost and benefit was weighed on a simple scale from small to medium to large. In the case of embankments, the ranking was undertaken along transects that cut across both protected and unprotected areas, the latter situated both up and downstream from the protected locations. The analysis generated a list of strategies that had either been implemented in response to floods or that contributed to the ability of individuals and communities to manage flood risks; a list of the direct and indirect benefits and costs associated with each strategy; and a weighting of those costs and benefits using the simple plus-minus system.

The authors found that the wide variety of major costs associated with embankments 'appear to overwhelm unquestionably considerable benefits' (Dixit et al, 2008:27) and that the distribution of benefits and costs was highly skewed, benefitting those in the protected areas but causing substantial costs to those on adjacent, unprotected land. In contrast, individual and community interventions, ranging from the provision of boats and flexible bridges to the construction of raised platforms, did not provide as much direct flood protection but could generate major benefits and appeared to involve far fewer trade-offs. However, the authors also noted that it is important to recognize that comparisons between the two types of intervention are somewhat misleading for several reasons: the costs and benefits are not directly comparable; some of the indirect costs associated with embankments could be reduced with better design and maintenance; and the embankments were the only intervention examined that could offer direct protection against floods. The authors concluded that 'a combination of people-centered and appropriately designed and maintained structures that help populations to live with floods is more effective than either strategy on its own' (ibid:28).

Cabot Venton et al (2008) undertook a cost benefit analysis of a Nepal Red Cross Society disaster risk reduction programme in southeast Nepal which was nearing completion. This programme had aimed to reduce the impact of natural hazards such as flooding and landslides, enhance community resilience, build knowledge and improve the Nepal Red Cross's disaster response capacity. The analysis was based on costs and benefits over the assumed 15-year lifetime of the project, focusing on five selected villages within the 15 vulnerable communities served by the project. The analysis was confined to those costs and benefits that could be quantified, using lower bound estimates of values to mitigate against variability in data quality. Components of the project included in the analysis were as follows: provision of gabion boxes, provision of income-generating loans at lower rates of interest than those available from other sources, protection of water sources and first aid training. The analysis generated a benefit to cost ratio of 18.6, assuming a discount rate of 10%. The analysis was re-run excluding the installation of gabion boxes from the analysis, generating a benefit to cost ratio of 2. Possible adverse impacts of the provision of gabion boxes on communities located on the other side of the river and downstream were explicitly excluded from the analysis. The impacts of climate change and deforestation on the scale and frequency of hazard events were also ignored due to data constraints. The authors noted problems with the quality of data on the impacts of flooding and on the disaster risk reduction programme in undertaking the analysis.

Retrospective with-without analysis provides a further tool for examining the economic benefits of disaster risk reduction. Such analysis is based on a comparison of the cost of measures required to strengthen a particular project or piece of infrastructure against a certain type of hazard and the ensuing bill faced when that same project or infrastructure is latterly damaged. This approach has been

used, for instance, in the Caribbean by the Organisation of American States.⁶⁴ The 2008 Koshi embankment breach provides an obvious example for this type of analysis in Nepal. Under a 199 year lease agreement between the Nepali and Indian governments, India is responsible for the maintenance of the relevant 1.4km section of the Koshi embankment. The 2008 breach was directly attributed to the poor condition of the embankment, which is some 50 years old and, according to DWIDP, had been in need of repair for some three to four years. The Bihar Chief Engineer estimated that US\$5.27m would have been required to repair the embankment prior to the breach, a mere fraction of the subsequent losses. ADB (2008c) calculated that the Koshi and far-west floods together caused some US\$29.2 m in direct damage and a further US\$44.8m in indirect damage, a significant share of which related to the Koshi breach. Other stretches of river embankments in Nepal are similarly weak and further breaches are possible.

5.3.2 Role of economic data, tools and analysis

Further detailed economic analysis should be undertaken of potential disaster risk management and climate change adaptation interventions that could particularly benefit Nepal. Such analysis could play an important advocacy role in securing greater government-wide and international commitment to, and funding for, this area, both at national and local levels. Indeed, the Nepal Red Cross analysis was deliberately intended for fund-raising purposes, motivated by the society's frustration at the relative ease with which it could secure funding for post-disaster response but not for risk reduction and thus it's desire to illustrate that disaster risk reduction can pay. The Nepal Red Cross may undertake further such analysis. Another of the NGOs interviewed for the purposes of this study also expressed considerable interest in cost-benefit analysis for precisely this purpose, although its programming decisions and monitoring and

⁶⁴ The OAS study demonstrated the potential benefits of structural mitigation through a retrospective analysis of public and private projects in the Caribbean that had suffered damage from tropical storms. One project examined was the deepwater port in Dominica, which had been constructed by the government to handle banana exports more efficiently and to lower the handling costs of imports. A year after completion of the facility, Hurricane David struck, causing reconstruction costs equivalent to 41% of the cost of the original port. The study estimated that had the original facility been built to a higher standard, able to resist Category 4 hurricanes (an option rejected on grounds of cost), investment costs would have been only about 12% higher and avoided subsequent indirect losses resulting from damage to the facility (Vermeiren, Stichter, and Wason 1998).

evaluation indicators are, and will remain, organised primarily around social concerns, in keeping with its mandate.

Economic analysis of risk reduction options would also support prioritisation of interventions, including under the new National Strategy on Disaster Risk Management. As already noted, the GoN does require some economic analysis itself, but only of projects for which a need has already been recognised somewhere in government and related project proposal documentation prepared.

There are several areas where cost benefit analysis could play a particularly useful role, including:-

- ❑ Community-based disaster risk reduction interventions There are a wide range of

community-based interventions that have implemented on a limited, sometimes one off, scale in Nepal (Box 16). Considerable advocacy work is now required to foster demand for enhanced resilience at the local level, where the impacts of disasters are felt most severely, and encourage their upscaling. Further cost benefit and related analysis along the lines already undertaken could play a very useful role in this process. Cost-benefit analysis could also be valuable in exploring the net benefits of traditional, indigenous risk reduction measures and supporting their maintenance and replication where appropriate.

- ❑ Seismic retrofitting Some cost benefit analysis around seismic retrofitting could be useful, focusing on the reinforcement

Box 16: Community-based disaster risk management initiatives

Various INGOs (including Oxfam-GB, various Red Cross Societies, ActionAid, Practical Action, CARE Nepal, Mercy Corps and Lutheran World Federation) and their local partners have been involved in community-based disaster risk reduction interventions in Nepal for well over a decade, in some cases with bilateral donor support. Moreover, at least one indigenous NGO has been established exclusively to strengthen disaster risk management – namely, the National Centre for Disaster Management, which is developing a range of low-cost community-based disaster risk management technologies both to strengthen infrastructure and provide hazard warnings.

As a consequence of their various efforts, a range of community and institutional level interventions have proved to be effective in managing flood, drought, landslide, earthquake and fire risks. For instance, in the context of the flood and drought-prone Terai, Oxfam (2009) reports that the following have been found to be effective through community and district level demonstration and piloting:

- The formation of community and village disaster management committees.
- The development of community, village and district disaster plans and the related institutionalisation of district and national level pre-monsoon preparedness and post-monsoon review meetings.
- The development of community preparedness and response plans and the provision of related training and equipment.
- Construction or repair of flood-resistant shelters.
- Provision of access to flood resistant seed storage facilities.
- Provision of access to improved seed varieties that, depending on the prevailing situation, are either drought resistant or both flood resistant and early maturing.
- Community structural risk reduction measures, including the construction of protection walls (integrated with strategic planting of vegetation) and spurs, improvements to drainage systems and the installation of culverts in roads, and the raising of tube wells and latrines.
- Livelihoods diversification.
- The development of people-centred early warning systems (including via DipECHO grant support to a number of NGOs (see DIPECHO, 2008)).
- The promotion of safe hygiene behaviour and practices.
- Awareness-raising on disaster risk reduction concepts and approaches through schools and at the community level.
- The development of tools and methodologies for strengthening women's leadership skills in disaster risk reduction.

Box 16: Community-based disaster risk management initiatives cont'd...

However, many of these interventions have been undertaken on a project basis, often covering only a very limited geographical area and sometimes in the form of pilot initiatives. Oxfam (2009: 2), writing of its own experience, states that the gains made 'must now be consolidated and institutionalised to ensure sustainability and wide replication beyond the project approach. This will require an increasing rights-based and advocacy approach through support for development of civil society networks and increased engagement with district and national government.' This advocacy work could utilise success stories on disaster risk management from other countries. For instance, Nepal could learn a considerable amount from Bangladesh's experience on the cultivation of chars.

of primarily economic infrastructure such as key bridges in the Kathmandu valley. There has been no reinforcement of bridges to date, potentially implying significant access problems following an earthquake, including from the airport. In fact, according to ISET, there has been no economic analysis of any seismic retrofitting initiatives in Nepal. Such analysis is particularly appropriate for primarily economic infrastructure such as bridges. In contrast, safety concerns and loss of life estimates are more paramount in the extremely urgent task to reinforce schools and hospitals.⁶⁵

- Hazard mapping High resolution hazard mapping is important in view of widely varying, highly localized, ecological, topographical and geo-physical characteristics across Nepal. Some mapping has been undertaken, including by DoMG, DWIDP and MoPPW, but progress is widely recognised to have been limited (e.g., SAARC, 2008), in large part apparently due to funding constraints, and there has been little, if any, multi-hazard mapping. DoMG has prepared a regional geological map, so far covering about two-thirds of the country, on a low resolution scale of 1:50,000 as well as some engineering-geological maps of major towns. Individual agencies are expected to undertake more detailed geological surveys for project-specific purposes but, in practice, this only happens in the case of national and

externally-funded projects (see below). The country also has only one seismic map, showing expectations on hard rock. There has been no micro-zonation, in large part due to limited seismological equipment. Meanwhile, mapping of water-induced hazards, including landslides, is apparently particularly weak although some localised mapping has been undertaken, in some cases with NGO or donor support. The DoMG has itself provided some landslide maps to DDCs and municipalities but these are not particularly high resolution and can only be used for basic overview planning purposes. Economic tools of appraisal could potentially be employed to underline the importance of improved multi-hazard mapping and their related use in physical planning, as part of a wider effort to secure greater funding for work in this area.

- Local roads Local roads represent a particular challenge as related construction methods have contributed to many landslides in the country. Local roads are typically funded out of the unconditional block allocation to local government, the use of which is only very limitedly supervised. Detailed geological investigations are rarely undertaken in the design phase of these roads and wider environmental assessment requirements, of which geological surveys are a part, are often ignored. GoN engineering norms, for instance relating to the depth

⁶⁵ Only a very limited number of schools, estimated at just six, have been retrofitted and an earthquake on a par with that experienced in 1934 would result in the collapse of some 800 of the total 1,400 schools in the Kathmandu Valley. Similarly, there has been only limited retrofitting of hospitals. According to the Department of Urban Development and Building Construction (DoUDBC) (within MoPPW), two hospitals in the Kathmandu Valley are currently being retrofitted (including a new hospital that did not adhere to the building code) and DoUDBC is working with UNDP to strengthen a third.

of gravel surfaces, are also frequently disregarded. Meanwhile, mechanized construction methods involving bulldozers and explosives are favoured over much slower, more expensive labour-intensive methods, costing some seven to eight times as much per kilometre of road. The need for some analysis around the economic benefits of more hazard-sensitive road designs and construction methods, and related investments to stabilize slopes, is particularly acute in view of the fact that considerable local resources are currently being put into road construction, in part because it supports employment generation, one of the GoN's key objectives.

- ❑ Soil conservation Efforts to redress soil degradation are another area for potential analysis, particularly since they currently receive very little funding.
- ❑ GLOF risk reduction The monitoring of glacier lakes, the development of GLOF early warning systems and related awareness building activities at the community level, in particular to convey the message that floods can occur without rain, are an additional potential area for analysis.

Improved flood and weather forecasting capabilities and related dissemination systems are further potential candidates for cost benefit analysis.⁶⁶ Both are widely acknowledged as currently very weak (e.g., SAARC, 2008). The country has a limited network of hydro-meteorological stations and real time data transmission and, according to DWIDP, some rivers are not gauged. Flood early warning systems rely primarily on observation by communities on the ground. Indeed, research identified staying awake and alert as probably the most common strategy adopted by communities in the Eastern Terai during the rainy season (Dekens, 2007). Meanwhile, there is very limited climatic forecasting, including no seasonal forecasts. However, the Department of Hydrology and Meteorology is already anticipating some support for enhanced flood forecasting capabilities under a World Bank project whilst several bilateral donors are planning to provide assistance on climatic forecasting, implying that cost benefit analysis in this area is less essential in securing funding.

⁶⁶ The World Bank has undertaken an economic analysis of this nature to explore the net benefits of a \$110 m modernisation programme of Russia's National HydroMet system. The analysis was based around the impact that an improvement in the quality and timeliness of weather forecasts would have on the level of potentially preventable losses in the main weather dependent sectors of the economy (e.g., agriculture, power and gas and water resources). The analysis found that, over a seven-year period, the Hydromet's modernization would have a benefit-cost ratio of somewhere between 5 and 10 (World Bank, 2005).

References

ADB, 2005. Nepal: Public Finance Management Assessment. Strategy and Program Assessment. Manila: Asian Development Bank, December.

ADB, 2008a. Nepal: Political and Economic Update. Manila: Asian Development Bank, September.

ADB, 2008b. Nepal: Strengthening Capacity for Macroeconomic Analysis. Technical Assistance Report. Project Number: 41126. Manila: Asian Development Bank, November.

ADB, 2008c. Nepal: The 2008 Flood Damage and Needs Assessment Report. Final Report. Manila: Asian Development Bank, December.

ADPC, 2009. Detailed Scope of Work for Priority Implementation Partnership on Mainstreaming Disaster Risk Reduction (DRR) into National Development Planning Process in Nepal. Bangkok: Asian Disaster Preparedness Centre, January.

Archarya, D and Aryal, B, 2008. A Study of Impact on Education After Koshi Flood. Co-Action Nepal, September.

Bahadur, Thir G C, undated. Mechanism and Experiences of Earthquake /Disaster Preparedness and Response in Nepal. Kathmandu: Ministry of Home Affairs, Government of Nepal. Available at [http://www.nset.org.np/nset/html/esd/2009/presentation/](http://www.nset.org.np/nset/html/esd/2009/presentation/C5_Thir%20Bh%20GC%20Machanism%20and%20expreen.pdf)

[C5_Thir%20Bh%20GC%20Machanism%20and%20expreen.pdf](http://www.nset.org.np/nset/html/esd/2009/presentation/C5_Thir%20Bh%20GC%20Machanism%20and%20expreen.pdf)

Benson, C, 2003. The Economy-wide Impact of Natural Disasters in Developing Countries. Doctoral thesis. London: University of London.

Benson, C, 2007. 'Economic analysis–Guidance Note 8'. In Benson, C and J Twigg. 2007. Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations. Geneva: ProVention Consortium.

Benson, C, 2009. Mainstreaming Disaster Risk Reduction into Development: Challenges and Experience in the Philippines. Geneva: ProVention Consortium, March. Available at <http://www.proventionconsortium.org/?pageid=37&publicationid=161#161>

Benson, C and J Twigg, 2007. Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations. Geneva: ProVention Consortium.

Benson, C and E J Clay. 2004. 'Economic and Financial Impacts of Natural Disasters: An Assessment of their Effects and Options for Mitigation.' Disaster Risk Management Series No.4. Washington, D.C.: World Bank. Available at: http://www.wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000012009_20040420135752

- Cabot Venton, Courtenay, Paul Venton and Clare Sayce, 2008. Cost Benefit Analysis of a Nepal Red Cross Society Disaster Risk Reduction Programme. Kathmandu: Nepal Red Cross Society, August.
- Dekens, Julie. 2007. The Snake and the River Don't Run Straight: Local Knowledge on Disaster Preparedness in the Eastern Terai of Nepal. Kathmandu: International Centre for Integrated Mountain Development (ICIMOD), April.
- DFID, 2007. DFID NEPAL: Interim Country Assistance Plan, November 2007- April 2009. London: (UK) Department for International Development .
- DIPECHO, 2008. Nepal DIPECHO Brief. Issue No. 2. Kathmandu: Disaster Preparedness European Commission Humanitarian Aid Department.
- Dixit A. et. al., 2007. 'Flood Disaster Impact and Responses in Nepal Tarai's Marginalised Basins'. In Moench, M and A Dixit (eds), Working with the Winds of Change. Towards Strategies for Responding to the Risks Associated with Climate Change and other Hazards. Second edition. Kathmandu: ProVention Consortium, Institute for Social and Environmental Transition and International and Institute for Social and Environmental Transition-Nepal. Available at http://www.proventionconsortium.org/themes/default/pdfs/winds_of_change.pdf
- Dixit, A, A Pokhrel, M Moench and the Risk to Resilience Study Team, 2008. 'Costs and Benefits of Flood Mitigation in the Lower Bagmati Basin: Case of Nepal Tarai and North Bihar'. From Risk to Resilience Working Paper No. 5, eds. Moench, M, E Caspari and A Pokhrel. Kathmandu: Institute for Social and Environmental Transition, International and Institute for Social and Environmental Transition-Nepal and ProVention Consortium.
- Freeman, Paul K., Leslie A. Martin, Reinhard Mechler, and Koko Warner, with Peter Hausmann. 2002. 'Catastrophes and Development: Integrating Natural Catastrophes into Development Planning'. Disaster Risk Management Working Paper Series 4. Washington, D.C: The World Bank. Available at http://www.proventionconsortium.org/files/catastrophes_complete.pdf
- Gautam, Dhruva and Katy Oswald, 2008. Child Voices: Children of Nepal Speak Out on Climate Change Adaptation. Research Report. Children in a Changing Climate, November.
- Glantz, M.H. (ed.). 1987. Drought and Hunger in Africa: Denying Famine a Future. Cambridge: Cambridge University Press.
- Gol, 2005/ 'Scheme for Constitution and Administration of the Calamity Relief Fund' Delhi: Ministry of Finance, Government of India. Available at http://finmin.nic.in/the_ministry/dept_expenditure/plan_finance/FCD/Guidelines-CRF.html
- Gol, 2007. 'Revision of Items and Norms of assistance from the Calamity Relief Fund (CRF) and the National Calamity Contingency Fund (NCCF) for the period between 2005 – 2010'. Communication No.32-34/2005-NDM-I, 27th June, 2007, to the Chief Secretaries of all States and the Relief Commissioners /Secretaries, Department of Disaster Management of all States. New Delhi: Ministry of Home Affairs (Disaster Management – I Division), Government of India, June.
- GoN, 1982. Natural Calamity (Relief) Act, 2039 (1982 A.D.) Kathmandu: Ministry of Home Affairs, His Majesty's Government of Nepal.
- GoN, 1999. Local Self-Governance Act, 2055 (1999): An Act Made to Provide for Local Self-Governance. Kathmandu: His Majesty's Government of Nepal.
- GoN and UNDP, 2008. UNDP Project Document-UNDP-GEF Enabling Activities Project: National Adaptation Programme of Action to Climate Change, PIMS no. 3958. Kathmandu: Government of Nepal and United Nations Development Programme.
- Himalayan News Service, 2009. 'Rs 33-bn budget for local bodies remains unused'. The Himalayan Times, March 26. Lalitpur: Himalayan News Service, March.
- Himalayan Times, 2009. 'Rice Planting Hit'. The Himalayan Times, June 5 2009. Lalitpur: Himalayan Times.

Hulme, M. 1995. 'Climatic Trends and Drought Risk Analysis in Sub-Saharan Africa'. Norwich: Climatic Research Unit, University of East Anglia.

IASC, 2008. Preliminary Results of the Multi-Agency Koshi River Flood Impact. Kathmandu: Emergency Preparedness and Response Cluster System, Inter-Agency Standing Committee, September.

IDEA, 2004. Results of Application of the System of Indicators on Twelve Countries of the Americas. Information and Indicators Program for Disaster Risk Management - Execution of Component II. Indicators for Disaster Risk Management Operation ATN/JF-7907-RG. Manizales and Washington, DC: Instituto de Estudios Ambientales, Universidad Nacional de Colombia and Inter-American Development Bank, Sustainable Development Department, October.

ISDR/UNDP. 2006. Integrating Disaster Risk Reduction Into CCA and UNDAF: Guidelines for Integrating Disaster Risk Reduction into CCA/UNDAF. Draft Guidance Note. Geneva: International Strategy for Disaster Reduction and United Nations Development Programme, October.

Keen, B D and M R Pakko, 2008. Monetary Policy and Natural Disasters in a DSGE Model: How Should the Fed Have Responded to Hurricane Katrina? Norman, OK and St. Louis, MO: Department of Economics, University of Oklahoma and Research Department, Federal Reserve Bank of St. Louis, September.

MacKellar, L., Paul Freeman, and T. Ermolieva, 1999. Estimating Natural Catastrophic Risk Exposure and the Benefits of Risk Transfer in Developing Countries. Laxenburg: International Institute for Applied Systems Analysis.

Moench, M and the Risk to Resilience Study Team, 2008. "Understanding the Costs and Benefits of Disaster Risk Reduction under Changing Climatic Conditions", From Risk to Resilience Working Paper No. 9, eds. Moench, M, E Caspari and A Pokhrel. Kathmandu: Institute for Social and Environmental Transition, International and Institute for Social and Environmental Transition-Nepal and ProVention Consortium.

MoF, 2006. Economic Survey: Fiscal Year 2005/2006. Kathmandu: Ministry of Finance, Government of Nepal, July.

MoF, 2008. Budget Speech of Fiscal Year 2008-09. Kathmandu: Ministry of Finance, Government of Nepal.

MoHA, 2008. Nepal Interim national progress report on the implementation of the

Hyogo Framework for Action. Kathmandu: Disaster Management Section, Ministry of Home Affairs, December. Available at <http://www.preventionweb.net/english/countries/asia/npl/>

MoHA et al, 2008. National Strategy for Disaster Risk Management in Nepal. Final draft. Kathmandu: Ministry of Home Affairs, United Nations Development Programme, Disaster Preparedness European Commission Humanitarian Aid Department (DipECHO) and National Society for Earthquake Technology, March.

MOPE, 2004. Nepal Initial National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change. Kathmandu: Ministry of Population and the Environment, His Majesty's Government of Nepal, July.

Nilsson, M, 2004. Effects of Budget Support – A Discussion of Early Evidence. UTV Working Paper 2004:4. Stockholm: Department for Evaluation and Internal Audit, Swedish International Development Cooperation Agency.

NPC, 1985. The Seventh Plan (1985-1990). Unofficial translation. Kathmandu: National Planning Commission, His Majesty's Government of Nepal, June.

NPC, 2002. The Tenth Plan (2002-2007). Unofficial translation. Kathmandu: National Planning Commission, His Majesty's Government of Nepal, March.

NPC, 2007. Three Year Interim Plan (2007/08 – 2009/10). Unofficial translation. Kathmandu: National Planning Commission, Government of Nepal, December.

- NPC/UN, 2005. Nepal Millennium Development Goals Progress Report 2005. Kathmandu: National Planning Commission, His Majesty's Government of Nepal and United Nations, September.
- NSET, 2008. ISDR Global Assessment Report on Poverty and Disaster Risk 2009: Global Assessment of Risk - Nepal Country Report. Final draft. Report prepared for United Nations Development Programme–Nepal. Kathmandu: National Society for Earthquake Technology, September.
- NSET-GHI, 1998. The Kathmandu Valley Earthquake Risk Management Action Plan: A Product of the Kathmandu Valley Earthquake Risk Management Project. Kathmandu and Palo Alto: National Society for Earthquake Technology and GeoHazards International.
- OECD. 1994. Guidelines on Aid and Environment No. 7: Guidelines for Aid Agencies on Disaster Mitigation. Paris: Development Assistance Committee, Organisation for Economic Co-operation and Development.
- Oxfam, 2009. 'Disaster Risk Reduction (River Basin) and Humanitarian Programme (DRR-HP) – Nepal'. Funding proposal, 19th March 2009. Lalitpur: Oxfam, March.
- Pathak, B, 2008. The Koshi Deluge: A History of Disaster for Nepal. Available at <http://neilsnepal.wordpress.com/2008/09/13/the-koshi-deluge-a-history-of-disaster-for-nepal/>
- Ra, Sungsup and Bipul Singh, 2005. Measuring the Economic Costs of Conflict: The Effect of Declining Development Expenditures on Nepal's Economic Growth. NRM Working Paper No. 2. Kathmandu: Nepal Resident Mission, Asian Development Bank, June.
- Regmi, Bimal R. and A. Adhikari, 2007. 'Human Development Report 2007/2008 - Fighting climate change: Human solidarity in a divided world - Country Case Study – Nepal'. Human Development Report Office Occasional Paper No 57. Kaski: Local Initiatives for Biodiversity, Research and Development, February.
- SAARC, 2006. SAARC Comprehensive Framework on Disaster Management. Kathmandu: South Asian Association for Regional Cooperation, July.
- SAARC. 2008. Mainstreaming Disaster Risk Reduction in Development, 14-15 November 2008, Colombo, Sri Lanka. Meeting organized by SAARC Disaster Management Centre, New Delhi, in collaboration with Disaster Management Centre, Government of Sri Lanka, Colombo. Delhi: Disaster Management Centre, South Asian Association for Regional Cooperation, November.
- Swiss Re, 2008. Disaster risk financing: Reducing the burden on public budget- Focus report. Zurich: Swiss Reinsurance Company (Swiss Re). Available at: <http://www.preventionweb.net/english/myprofile/entry.php?eid=3224>.
- The Economist. 2008. 'Climate change and the poor: Adapt or die'. 11 September 2008. Available at www.economist.com/world/international/displaystory.cfm?story_id=12208005.
- Twigg, J, 2007. 'Vulnerability and capacity analysis – Guidance Note 9'. In Benson, C and J Twigg. 2007. Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations. Geneva: ProVention Consortium
- UNDP, 2004. 'Strengthening Disaster Preparedness Capacities in Kathmandu Valley for His Majesty's Government of Nepal'. Kathmandu: United Nations Development Programme, June.
- UNDP, 2005. A Global Review: UNDP Support to Institutional and Legislative Systems for Disaster Risk Management - Executive Summary. Geneva: United Nations Development Programme.
- UNDP, 2007. Human Development Report 2007/2008 – Fighting Climate Change: Human Solidarity in a Divided World. New York: United Nations Development Programme.
- UN/ISDR, 2005. Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. World Conference on Disaster Reduction, 18–22

January 2005, Kobe, Hyogo, Japan. Geneva: United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction. Available at www.unisdr.org/eng/hfa/docs/Hyogo-framework-for-action-english.pdf

Upreti, Bishal Nath, 2006. The Nexus Between Natural Disasters and Development: Key Policy Issues in Meeting the Millennium Development Goals and Poverty Alleviation. Economic Policy Network Policy Paper 27. Paper prepared for Economic Policy Network and Asian Development Bank – Nepal Resident Mission. Kathmandu: Ministry of Finance, Government of Nepal and Asian Development Bank, October.

Vermeiren, Jan, Steven Stichter, and Alwyn T. Wason, 1998. Costs and Benefits of Hazard Mitigation for Building and Infrastructure Development: A Case Study in Small Island Developing States. Washington, D.C.: Caribbean Disaster Mitigation Project, Organization of American States. Available at <http://www.oas.org/en/cdmp/document/papers/tiems.htm>.

WECS, 2005. National Water Plan Nepal 2005. Kathmandu: Water and Energy Commission Secretariat.

WFP, 2007. Market Watch – 2. Issue 2. Lalitpur: Food Security Monitoring and Analysis Unit, United Nations World Food Programme, May.

WFP, 2008. 2008 Nepal Staple Food Market Review and Outlook for 2009. United Nations World Food Programme Food Security Monitoring and Analysis System. Lalitpur: Food Security Monitoring and Analysis Unit, United Nations World Food Programme.

WFP and NDRI, 2008a. Market and Price Impact Assessment: Nepal. Final report. Lalitpur: United Nations World Food Programme and Nepal Development Research Institute, July.

WFP and NDRI, 2008b. Passage to India: Migration as a Coping Strategy in Times of Crisis in Nepal – Implications for WFP Response. Lalitpur: United Nations World Food Programme and Nepal Development Research Institute, November.

WFP, UNICEF and Save the Children Alliance, 2007. Inter-Agency Rapid Flood Assessment, Nepal - August 2007. Lalitpur: United Nations World Food Programme, United Nations Children's Fund and Save the Children Alliance.

Wilhite, D.A. (ed.). 1993. Drought Assessment, Management and Planning: Theory and Case Studies. Boston, MA: Kluwer Academic Publishers.

World Bank, 2005. Project Appraisal Document on a Proposed Loan in the Amount of US\$80 million to the Russian Federation for a National Hydromet Modernization Project. Report No: 3 1465-RU. Washington, DC: Environmentally and Socially Sustainable Development Unit, Russian Federation Country Unit, Europe and Central Asia Region, The World Bank, February.

World Bank, 2006a. Nepal Resilience Amidst Conflict: An Assessment of Poverty in Nepal, 1995–96 and 2003–04. Report No. 34834-NP. Washington, DC: Poverty Reduction and Economic Management Sector Unit, South Asia Region, World Bank.

World Bank, 2006b. Ethiopia: Managing Water Resources to Maximize Sustainable Growth – A World Bank Water Resources Assistance Strategy for Ethiopia. Report No 36000-ET. Washington, DC: Agriculture and Rural Development Department, World Bank.

World Bank, 2008a. Nepal Country Environmental Analysis: Strengthening Institutions and

Management Systems for Enhanced Environmental Governance. Report No: 38984 – NP. Washington, DC: Environment and Water Resources Management Unit, Sustainable Development Department, South Asia Region, The World Bank.

World Bank, 2008b. Agricultural Insurance in Nepal: Feasibility study and options for development - Preliminary findings for discussion. Technical meeting series. Powerpoint presentation for Meeting with Government of Nepal, Kathmandu, Nepal, July 28, 2008. Washington, DC: The World Bank, July.

Annex A

List of people met over the course of the study

Ministry of Home Affairs

1. Mr. Thir Bahadur GC, Under Secretary, Disaster Management Division
2. Mr. Iswor Raj Regmi, Under Secretary, Disaster Management Division

Ministry of Finance

3. Mr. Bimal P. Wagle, Joint Secretary, Economic Affairs and Policy Analysis Division
4. Mr. Rana Bahadur Shrestha, Joint Secretary, Budget and Programme Division
5. Mr. Dhurba Panta, Under Secretary, Revenue Division
6. Mr. Mimamsu Adhakari, Section Officer, Monitoring and Evaluation Division
7. Mr. Bhuban Karki, Under Secretary, Foreign Aid Coordination Division
8. Mr. Yagya M. Bhandari, Under Secretary, Budget and Programme Division

National Planning Commission

9. Mr. Mukunda P. Ghimire, Joint Secretary, Poverty and Monitoring Division
10. Mr. Jagannath Adhakari, Under Secretary, Infrastructure Division
11. Mr. Hara Bhattari, Joint Secretary, Agriculture and Rural Development Division

12. Mrs. Neeta Pokharel, Planning Officer, Agriculture and Rural Development Division
13. Mr. Puspa Shakya, Under Secretary, Macroeconomic Management Division
14. Mr. Atma Ram Pandey, Joint Secretary, Infrastructure and Social Development Division
15. Mr. Rabi Shankar Saiju, Under Secretary, Administration Division
16. Mrs. Monaka Neupane, Planning Officer, Administration Division

Office of the Prime Minister and Council of Ministers

17. Mr. Sharada Prasad Trital, Joint Secretary
18. Mr. Toyaram Rayamajhi, Under Secretary, Accounts Division

Ministry of Water Resources

19. Er. Mahendra B. Gurung, Director General, Department of Water Induced Disaster Prevention
20. Mr. Basistha R. Adhkari, Senior Divisional Engineer, Department of Water Induced Disaster Prevention
21. Mr. Madhusudan Pokharel, Deputy Director General, Department of Irrigation

Water and Energy Commission Secretariat

22. Mr. Kishore Thapa, Acting Secretary

Ministry of Physical Planning and Works

23. Mr. Suresh P. Archarya, Joint Secretary
24. Mr. Tulasi Prasad Sitaula, Director General, Department of Roads
25. Mr. Vishwa Mani Gyawali, Deputy Director General, Drinking Water Supply and Sewerage Department
26. Mr. Khom Bahadur Subedi, Senior Engineer, Drinking Water Supply and Sewerage Department
27. Mr. Indra Bahadur Shrestha, Director General, Department of Housing Building and Urban Development

Ministry of Agriculture and Cooperatives

28. Dr. Hari Dahal, Joint Secretary, Gender Equity and Environment Division
29. Dr. Deepak Pokharel, Under Secretary, Gender Equity and Environment Division
30. Mr. Hem R. Regmi, Senior Statistical Office (Under Secretary), Agricultural Business Promotion and Statistics Division

Ministry of Industry

31. Mr. Pratap Kumar Pathak, Acting Secretary
32. Mr. Rajendra Prasad Shrestha, Director General, Department of Mines and Geology

Ministry of Local Development

33. Mr. Som Lal Subedi, Joint Secretary, Local Governance Division
34. Mr. Bishnu Nath Sharma, Joint Secretary, Municipality Management Division
35. Mr. Narayan Bdr. Thapa, Under Secretary, Municipality Management Division
36. Mr. Bhupendra Bahadur Thapa, Deputy Director General, Department of Local Infrastructure and Agricultural Roads

Ministry of Environment, Science and Technology

37. Mr. Arjun Thapa, Under Secretary, Environment Promotion Division
38. Mr. Raghu N. Mahat, Under Secretary, Environment Promotion Division
39. Mr. Vairaja Manandhar, Under Secretary, Environment Evaluation Division
40. Mr. Batu Krishna Upreti, Under Secretary
41. Dr. Kesab Sharma, Deputy Director General, Department of Hydrology and Meteorology

Ministry of Education and Sports

42. Mr. Janardan Nepal, Joint Secretary
43. Mr. Haribol Khanal, Executive Director, Curriculum Development Center
44. Mr. Mahashram Sharama, Director General, Department of Education

Ministry of Health and Population

45. Dr. Shambhu Sharan Tewari, Chief, Management Division, Department of Health Services
46. Dr. Shenendra Uprety, Chief, Epidemiology Division
47. Dr. Pranaya Updadhya, Focal Person, Epidemiology Division

Ministry of Forestry and Soil Conservation

48. Mr. Govinda Prasad Kandel, Director General, Department of Soil Conservation and Watershed Management
49. Dr. Prem Paudel, Department of Soil Conservation and Watershed Management

Ministry of Peace and Reconstruction

50. Mr. Durga Nidhi Sharma, Joint Secretary

Nepal Rastra Bank

51. Mr. Trilochan Pangen, Department Head, Research Department

Financial Comptroller General's Office

52. Mr. Dev Raj Pathak, Deputy Financial Comptroller General

House member

53. Mr. Krishna Prasad Sapkota, Kavre

Nepal Food Corporation

54. Mr. Bijaya Thapa, Deputy General Manager

Kavre Palanchok District

55. Megha Nath Kafle, Local Development Officer, District Development Committee
56. Bharat Prasad Aryal, Chief District Engineer, District Technical Office
57. Gyan Prasad Dhakal, Assistant Chief District Officer
58. Sanat Kumar Duwadi, Chief District Treasury Controller

59. Ishwar Shrestha, Treasury Controller Officers
60. Rudra Hari Sapkota, Accountant
61. Bel Prasad Shrestha, ex-Mayor, Dhulikhel Municipality

Khanalthok Village Development Committee, Kavre Palanchok District

62. Bhairab Prasad Khamal, Village Development Committee Secretary, Khanalthok
63. Tuku Man Lama, Khanalthok Village Development Committee
64. Tirtha Man Lama, Khanalthok Village Development Committee
65. Kunsang Lama, Khanalthok Village Development Committee

United Nations Development Programme

66. Mr. Robert Piper, United Nations Resident and Humanitarian Coordinator
67. Mr. Vijaya P. Singh, Assistant Resident Representative
68. Dr. Ghulam Mohyuddin Sherani, Disaster Management Portfolio Manager

United Nations Children's Fund (UNICEF)

69. Mr. Jacques Boyer, Deputy Representative
70. Mrs. Misaki Akasaka Ueda, Chief, Planning, Monitoring, Evaluation and Decentralization

UN Food and Agriculture Organisation

71. Mr. Leo Kortekaas, Emergency Coordinator/ Programming and Operations Officer
72. Mr. Abhaya Bahadur Singh, Programme Officer

UN Office for the Coordination of Humanitarian Affairs

73. Ms. Wendy Cue, Head of Office
74. Mr. Arturo Lopez-Portillo, Disaster Readiness and Response Advisor

UN World Food Programme

75. Mr. Siemon Hollema, Head, Food Security Monitoring and Analysis Unit

World Bank

76. Ms. Claudia Sadoff, Lead Economist

Asian Development Bank

77. Mr. Ki Hee Ryu, Head, Project Administration Unit
78. Mr. Yubraj Acharya, Economics Officer

UK Department for International Development

79. Mr. Simon Lucas, Climate Change and Inclusive Growth Adviser

DipECHO

80. Dominique Feron, Technical Assistant for Nepal

JICA

81. Sourab Rana, Program Officer

National Society for Earthquake Technology – Nepal

82. Mr. Amod Mani Dixit, General Secretary and Executive Director

Nepal Centre for Disaster Management

83. Prof. Dr. Jiba Raj Pokharel, President

Nepal Red Cross Society

84. Mr. Pitambar Aryan, Director, Disaster Management Department

DpNet

85. Badri Khanal, Chairperson
86. Samjhana Lamichhane, Coordinator

International Federation of the Red Cross

87. Andrea Reisinger, Federation Representative
88. Bijoy Basant Patro, Relief Delegate

Oxfam

89. Mr. Wayne Gum, Country Director

Practical Action Nepal

90. Anup G Phaiju, Senior Project Officer, Reducing Vulnerability



Government of Nepal
Ministry of Home Affairs
Singha Durbar, Kathmandu, Nepal



United Nations Development Programme
Post Office Box 107
Pulchowk
Kathmandu, Nepal

tel. 977-1-5523200
email. registry.np@undp.org
website. <http://www.undp.org.np>