Government of Nepal

Climate Change Vulnerability Mapping for Nepal

MINISTRY OF ENVIRONMENT

National Adaptation Programme of Action (NAPA) to Climate Change

September 2010

National Adaptation Programme of Action (NAPA)

Publisher:
Government of Nepal
Ministry of Environment
Singha Durbar, Kathmandu, Nepal

Tel: (977) 1 4211 641
Fax: +977 1 4211954
Web: www.moenv.gov.np

Citation:
Ministry of Environment (2010)
Climate Change Vulnerability Mapping for Nepal, Kathmandu, Nepal

Cover photo detail:
1. High altitude residence in Rasuwa district (Photo by: Naresh Sharma)
3. River with hydrological guage (Photo by: DHM)
4. Riverbank erosion in Kailali (Photo by: Gyanendra Karki)

Printed at:
Creative Link Pvt. Ltd.
Bagbazar, Kathmandu, Nepal
Tel: +977-1-4216913, 4247765

The NAPA Project was supported by the Embassy of Denmark, UK Department for International Development (DFID), Global Environment Facility (GEF), and United Nations Development Programme (UNDP) Nepal.

Government of Nepal

National Planning Commission

Singha Durbar, Kathmandu, Nepal

Office Tel: 4211694
P.O. Box: 1284
Telegram: "YOJANA"
E-mail: ddevkota@npcnepal.gov.np
Website: www.npc.gov.np

Dinesh C. Devkota, Ph. D.
Member

Message

Climate change is best addressed within a broader development context. Development can be planned in such a way that it enhances the capacity of communities to respond to climate change. Development efforts should also be undertaken in a manner that does not increase exposure to adverse impacts of climate change or exacerbate existing vulnerabilities. As the apex body responsible for overall development planning in the country, the National Planning Commission (NPC) is therefore striving to ensure that adaptation is built within our national and sectoral plans.

The effort made by Ministry of Environment (MoE)/NAPA Project in bringing this publication is timely and commendable. Findings of this study will be helpful in prioritizing most vulnerable districts for any future interventions. The role of the NPC is to create an enabling policy environment where findings from vulnerability mapping can be mainstreamed into national development planning and sectoral activities.

This study shows that there is a great deal of overlap between vulnerability to climate change impacts and poverty. This link highlights the urgency of mobilizing our development efforts towards addressing the root causes of poverty and vulnerability to climate change impacts. The NPC has been actively involved in the preparation of the NAPA document to make sure that the NAPA priorities are aligned with the broader development agenda of the country. The Approach Paper of the Three Year Interim Plan was approved by the National Development Council that ensures development projects are screened from the perspectives of climate and disaster risk reduction.

I would like to commend the valuable contribution of the MoE, College of Applied Sciences Nepal and other organizations involved in preparing vulnerability maps. As the coordinating Ministry for climate change matters in Nepal, MoE has remarkably succeeded in building the knowledge base required for adaptation. Recognizing the dynamic nature of vulnerability, I therefore encourage MoE and other concerned organizations to make vulnerability assessment a periodic exercise. The NPC will work towards ensuring that our national development plans are consistent with efforts to reduce vulnerability.

Dinesh Chandra Devkota, PhD
Member

Government of Nepal

MINISTRY OF ENVIRONMENT

Preface

Climate change has impacted almost all the development sectors of Nepal and people's livelihoods base. The climatic risks and uncertainties are exerting additional pressures to communities across Nepal. Stories about drying water sources, women traveling longer distance to collect water and firewood, declining crop productivity, or communities relying under the impacts of floods and other climate-induced disasters, highlight the urgent need to manage these adverse impacts. As a first step towards addressing the vulnerability of Nepal to climate change impacts, the National Adaptation Programme of Action (NAPA) was prepared through a country-driven and highly participatory process. The current study, Climate Change Vulnerability Assessment for Nepal, is one of the outcomes of the NAPA process, and has the objective of identifying key climatic vulnerabilities and their magnitude at the district level. The findings from community-level vulnerability assessments and stakeholder consultations guided the identification and prioritization of adaptation needs in the NAPA document. The study has provided valuable inputs to the design of the NAPA.

The role of the Ministry of Environment (MOE) is to coordinate the country's response to climate change. As we gear towards addressing the urgent and immediate adaptation needs identified in the NAPA process, this study will guide us in better targeting our adaptation interventions so as to utlize our scarce resources in a more effective way. It also provides us a baseline against which we evaluate the impacts of our adaptation programs.

I would like to thank the funding agencies of the NAPA, Embassy of Denmark, UK Department for International Development, and Global Environment Facility and the implementing partner UNDP Nepal for supporting this study. I would like to thank the experts and research assistants for generating information and thoughtful advice and suggestions. I also appreciate the efforts of Mr. Purushottam Ghimire, Joint-Secretary, MoE and National Project Director, NAPA Project for coordinating and finalizing this study.

I believe that this study will be useful to, inter alia, policymakers, researchers, and development practitioners. I further believe that its regular updates and use would be meaningful to timely address the adverse impacts of climate change in Nepal.

Ganesh R. Joshi

Ganesh Raj Joshi, Ph.D.
Secretary

Government of Nepal
Ministry of Environment

National Adaptation Programme of Action (NAPA) to Climate Change Project

Acknowledgement

This report has been prepared as a part of NAPA process. The Ministry of Environment (MoE) acknowledges the valuable support received from different individuals and organizations during the process of assessment and bringing this publication.

This report was drafted by the College of Applied Sciences Nepal (CAS-N) in consultation with the NAPA project team. Acknowledgement is due to Dr. Toran Sharma and Mr. Sujesh Shrestha of CAS-N for spearheading the preparation of this report. We are grateful to all the research assistants who helped in collecting the data for this study as well as the various agencies which made their datasets available.

The NAPA Project/MoE would like to acknowledge the Embassy of Denmark, UK Department for International Development, Global Environment Facility, and UNDP Nepal for providing financial support to this work through the NAPA project.

I am grateful to Dr. Dinesh C. Devkota, Hon'ble Member of NPC and Dr. Ganesh Raj Joshi, Secretary, MoE for their support in preparing and reviewing this document. Thank also goes to Mr. Babukaji Baniya, Undersecretary (Law) MoE and National Project Manager for NAPA, for his encouragement and support during the preparation of this report. The CAS-N experts benefited from the expertise of Mr. Ritu Pantha, Statistical Officer, MoE and National Project Officer of NAPA in statistical analysis. Mr. Gyanendra Karki, Technical Officer (Climate Change) of NAPA Project, supervised and coordinated with CAS-N in the preparation and review process of this report. His technical input to finalise this document is highly appreciated. I would also like to thank Mr. Post Bdr. Thapa, Admin & Finance Associate and Narayan Dahal, Messenger of NAPA Project for their tireless effort.

Finally, I acknowledge all the valuable contributions and supports from individuals and organizations in bringing out this report.

Purushottam Ghimire
Joint-Secretary and Chief
Environment Division
National Project Director, NAPA Project and PPCR
Focal Point for UNFCCC and UNEP

Executive Summary

This study report 'Climate Change Vulnerability Mapping for Nepal' is a suplimentary effort to the National Adaptation Programme of Action (NAPA) process in Nepal. The NAPA was mandated to assess the climatic vulnerability through out the country and also assess the impacts. This study had adopted the globally recognized process of vulnerability that the vulnerability is the function of exposure and sensitivity. The NAPA process of vulnerability assessment was not limited to the GIS based vulnerability only that it was spread from desk review to extensive public consultation and field verification. The GIS based vulnerability was taken as a tool to verify the information collected through those processes and also to add value to the available data presentation process.

This report provides information on vulnerability to climate change and its magnitude in Nepal. This assessment was carried out by overlaying climate risk/exposure maps, sensitivity maps, and adaptive capacity maps following the vulnerability assessment framework of the United Nations' Inter-governmental Panel on Climate Change (IPCC). The study used data on the spatial distribution of various climate-related risks/exposure in 75 districts of Nepal. Based on this mapping assessment, the climatically most vulnerable districts have been identified for targeting the further adaptation planning and mobilization of financial resources to implement the adaptation programs.

The data used in this study was specifically from secondary sources. The sources of data were the government agencies, UN agencies and other related organizations. As it's very difficult to compilte climate related information from different disciplines, the study has used the latest available data sets which might be seen as older to some extent.

The study was carried out in such a way that the available data sets were fit into GIS and maps were produced for district level interpretations. There were basic analyses of climate risk/exposures, human and ecological sensitivity and on the basis of that information combined maps were produced. At the same time, the adaptive capability of the system was also assessed and then after assessing vulnerability, a combined vulnerability map was produced.

This study has become able to present all 75 district's information viewed from different climatic threats which is at this stage, as an initial effort, good enough to consider for proposing urgent and immediate adaptation measures to minimize the climate change impacts.

Table of Contents

Annexes

List of Tables

List of Figures

List of Maps

1. INTRODUCTION

Cliamte change has impacted all walks of life of the earth. In Nepal, being an under-developed country, the impacts are more serious that it has hit the major livelihoods base of common people. An overwhelming body of scientific evidence now clearly indicates that climate change is a serious and urgent issue (Stern, 2007). The IPCC/AR4 (2007) concludes that the warming of the climate system is unequivocal. IPCC Special Report on Emission Scenarios (SRES) 2000 predicts an average global warming of about 0.2°C per decade for the next two decades for a range of emission scenarios.

Nepal prepared its National Adaptation Programme of Action (NAPA) according to the decision 29/CP7 of the UNFCCC. The Nepal NAPA explored ample opportunities to mainstream cliamte change into national development agenda and maximise the opportunities posed by climate change. On the other hand, being a basic document to act on climate change NAPA was supposed to be accumulate the information related to climate change specifically the sensitivity, exposure vulnerabilities and impacts associated with climate chnage. On the basis of those information, NAPA has proposed urgent and immediate adaptation actions with the assumptions that by the implementation of those options, the impacts of cl.imate change could be reduced and teh livelihoods base of the vulnerable communities will be protected.

Vulnerability projection under A2 emission scenerio in 2050 places Nepal under significant vulnerablility category for static adaptation capacity (Gary et al, 2006). With the enhancement of the 25 percent adaptive capacity the climate change vulnerability is predicted to improve from significant to moderate vulnerability category. This indicates the need of intervention to enhance adaptive capacities of the Nepalese communities.

Nationwide adapatation intervention will require high investment. As Nepal is a poor landlocked country, its capacity to mobilize internal resources for nationwide adaptation intervention is very limited. Available external resource mobilization (transfer of resources from rich to poor), at this juncture, has shortcomings due to lack of common shared vision based on scientific foundations. The external funding agencies will invariably like to ensure the measurable output for every dime input. In this context judicious adaptation intervention is required to those geographical areas and communities who are really vulnerable to climate change. Therefore, identification and characterization of the vulnerable regions, communities and sectors is a priority concern for addressing the climate change adaptation in Nepal. This is an attempt to addresses such concerns in Nepal at least at the geographical limits of the districts.

This effort to produce climate vulnerabilities map is first of this nature for Nepal. Therefore the information and data used in the analisys are acquired from secondary sources.

2. OBJECTIVE

The primary objective of this study was to supplement the NAPA process in Nepal by sypplying the climatic information and identifying different vulnerabilities at district level. The specific objectives of the study are:

- To support NAPA process by identifying key climatic vulnerabilities and triangulating the vulnaribilities assessed through Transect Appraisal Exercise (TAE) and desk reviews in Nepal
- To identify the magnitude of vulnerabilities at districts of Nepal (depending on the availability of the data)
- To show these vulnerable districts in a map for ease of reference

Primarily the the findings of the study is envisaged to assist the NAPA process and secondly the policy makers, development agencies, INGOs and NGOs supporting to climate change adaptation to target the most needy districts in their future support programs.

3. CONCEPT, AND METHODOLOGICAL FRAMEWORK

3.1 Concept

Vulnerability assessment differs from traditional approaches of impact assessments in a number of important ways (Johnson Nkem et.al, 2007). In essence, climate change impact assessment selects a particular environmental stress of concern and seeks to identify its most important consequences for a variety of social or ecosystem properties. Vulnerability assessment in contrast selects a particular group or unit of concern (e.g. geographical area, communities, natural ecosystem, man made ecosystem etc) and seeks to determine the risk of specific adverse outcomes for that unit in the face of a variety of climate related stresses and identifies a range of factors that may reduce response capacity and adaptation to the climatic stressors.

The IPCC TAR defined vulnerability as "the degree to which a system is susceptible to, or unable to cope with the adverse effects of climate change, including climate variability and extremes". Thus Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity" (IPCC 2001, p.995). In other words vulnerability can be defined as a function of exposure, sensitivity, and adaptive capacity, or:

Vulnerability = f (exposure, sensitivity, adaptive capacity)

where:

Exposure	as defined by IPCC is "the nature and degree to which a system is exposed to significant climatic variations"
Sensitivity	as defined by IPCC is "the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli"
Adaptive Capacity	as defined by IPCC is "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate the potential damage from it, to take advantage of its opportunities, or to cope with its consequences".

Thus there are three dimensions that must be integrated in the vulnerability assessment irrespective of the differences that may exist in the levels or intensities. Therefore it requires a framework for selecting indicator criteria that characterizes the vulnerability of the coupled human-environment system.

3.2 Methodological Framework

The general methodology adopted in this study is that of the Yusuf & Francisco (2009) applied for the vulnerability mapping of Southeast Asia.

The study identifies sets of direct indicators or proxy indicators or indices from existing secondary national database basket at the district level (Annex 1) to evaluate the exposure, sensitivity, and adaptive capacity (Table 1).

Table 1. List of indicators/indices selected for Assessment of the districts

Particulars	Direct Indicators/Indices	Proxy Indicators/Indices
Sensitivity		
Human		Population
		Area
Ecology		Protected area coverage
		Forest Area coverage
		Area
Exposure/Risk		
Temperature and Rain fall	Mean annual temperature trend	
	Annual rainfall trend	
Landslide and Flood (Hill & Mountain Ecological Zone)	Occurrences	
	Death	
	Injured	
	Property losses	
	Positive rainfall trend	
Flood (Terai Ecological Zone)	Occurrence	
	Death	
	Injured	
	Property losses	
	Positive annual rainfall trend	
Drought	Negative annual rainfall trend	Food Production
	Mean Annual temperature trend	Food Requirement
		Population at risk due to food shortages
GLOF	Location of potential GLOF	Distance from GLOF potential lake
Ecology		Population pressure on forest land
		Human Poverty Index
		Motorable access

Particulars	Direct Indicators/Indices	Proxy Indicators/Indices
Adaptation		
Socio-economic	Human Development Index	
	Human Poverty Index	
	Gender Development Index	
	Human Empowerment Index	
Infrastructure	Road length	
	Area	
	Landline Phone numbers	
	Population	
Technology	Irrigation coverage	
	Area	

To construct the sub-indices and combined/multiple indices for exposure, sensitivity and adaptation capacities, following methodological steps were followed.

- Each indicators/indices, as required, were aggregated and averaged and normalized to a scale of 0 to 1 range following the UNDP procedures adopted for HDI (UNDP, 2007).

$$Z_{i,j} = \frac{X_{i,j} - X_i^{MIN}}{X_i^{MIN} - X_i^{MIN}}$$

Where $Z_{i,j}$ is the standardized indicator/sub indices/index of type i of region j; $X_{i,j}$ is the unstandardized indicator/sub indices/index of type i of region j; X_i^{MAX} is the maximum value of the indicator/sub indices/index over region j, and X_i^{MIN} is the minimum value of the indicator/sub indices/index over region j.

- Each of the normalizezd indicators/ indices in a set was given weight based on expert judgment. The weighted score were then added and normalized again to generate sub-indices for each type of exposure, sensitivity and adaptation.
- Each of the sub-indices so generated were again given weight based on expert judgment, added and again normalized to generate combined/ multiple index for exposure, sensitivity and adaptation.

The sensitivity, exposure and adaptation sub-indices and index were integrated to generate exposure specific vulnerability index and combined vulnerability index applying following procedures:

- Each of the exposure sub-index, combined/multiple sensitivity and adaptation index were assigned equal weight, added and normalized to generate exposure specific vulnerability index.
- Combined/multiple exposure, sensitivity, and adaptation index were assigned equal weight, added and normalized to generate combined/multiple vulnerability index.

Methodological steps for the construction of sub-index, and combined/multiple index, exposure vulnerability index and combined vulnerability index are further explained diagrammatically in sections 4, 5, 6 and 7.

The weight to different indicators, index, sub-index and combined/multiple index in the above methodological framework is a subject of arguments and counter arguments. The author's expert judgment has been used in assigning the weight, however, was based on the literature review of similar type of studies elsewhere (Yusuf & Francisco, 2009; Ursula et.al, 1999; Yale Center for Environmental Law & Policy, 2008). This is and will be one of the limitations of the study, however, could be refined through brainstorming of the experts involved in the various scientific disciplines. It is therefore, the study should be taken as a first step in developing map based vulnerability assessment for Nepal. As the database broadens and understanding of the indicators in characterizing the specific sensitivity, exposure and adapatation capacity unfolds, the vulnerability maps could be refined objectively.

For the preparation of various GIS maps, the sub-indices and combined indices are imported in the shape file of Nepal by using ArcGIS 9.3.

This map based vulnerability analysis is envisaged to provide a quick snapshot of the current vulnerability at the district level for various end uses; such as further research and development in the identified vulnerable districts, allocating adaptation funds, and planning for adaptation etc. This study is based on the secondary data of the historical past of exposure/risks, social and economical status of the communities, spatial distribution of man made environment and natural environment, recorded trends of temperature and rainfall. Obviously, the study has limitation on the projection of future climate related impacts vis a vis social and economic trends. Conversely, this approach has strength as well. The historical indicators and index selected for the study, particularly, the exposure indicators represents the database of the recent events. In other words, these are the mirror image of the consequences of the ongoing climate change. As stressed in the available body of literatures and current studies, the current vulnerability status will be worsened more than the improvements in the future, could be taken as the precursors of the future vulnerability. Nevertheless, there is a room to fine tune the vulnerability maps with the availability of scientifically acceptable projections on future climate change impacts as well as projected changes in socio-economic conditions.

4. SENSITIVITY

According to the IPCC third and fourth reports, the change in temperature and hydrological system due to climate change affects the functioning of man made and natural ecosystem positively as well as negatively. As man made and natural ecosystems are sensitive to the subtle change in climate (temperature and hydrology) not only register the change but also react concomitantly to adjust to the changing conditions such that the ecosystem functions either are enhanced or slow down as to the degree of the change. These changes in ecosystem functions affect the thriving human population as well as the natural biodiversity. It is therefore human population and natural ecosystems (the forest) within the geographical limits of the districts have been taken as the indicators for sensitivity analysis in this study.

4.1 Human Sensitivity

Principle element of man made ecosystem is the people themselves who by the virtue of traditional experience of ancestor or by technological innovations have exploited the surrounding components of the ecosystem functions for their benefit. As the driver of the man made ecosystem function is the climate, the change in climate will beneficially or adversely affect the people. Larger the human population in the geographical area experiencing climate change, the greater will be the effect of the climate change. This concept was used to quantify the human sensitivity of a geographical area.

For the construction of the human sensitivity sub-index, district population and district area was used to derive the human density per unit area as a measure of the human sensitivity at the district level. The human sensitivity sub indices of the districts were plotted in the GIS map to produce human sensitivity map (Map 1).

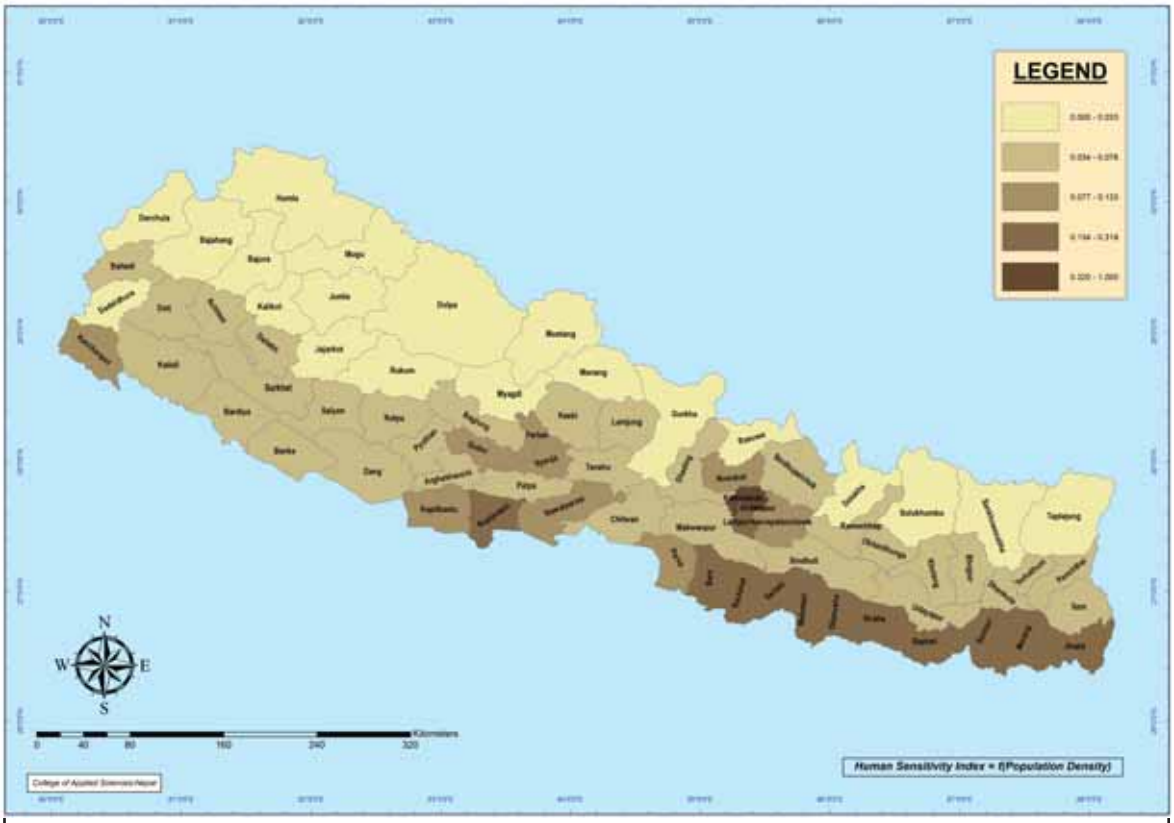
From human population perspective, including the urban centers of Kathmandu Valley (Hill Ecological Zone), the districts of eastern Terai Ecological Zone are more sensitive to climate change. Relatively less sensitive to climate change are the districts of Mountain Ecological Zone. The sensitivity ranking of the districts from human perspective is presented in *(Table 2 and Annex 2)*.

Table 2. District Ranks – Human Sensitivity Sub-indices

Human Sensitivity	Districts
Very High (0.320-1)	Kathmandu, Bhaktapur
High (0.134-0.319)	Lalitpur, Dhanusha, Mahottari, Rupandehi, Sarlahi, Sunsari, Rautahat, Siraha, Bara, Morang, Jhapa, Saptari
Moderate (0.07-0.133)	Parsa, Parbat, Kavrepalanchowk, Kapilbastu, Syangja, Nawalparasi, Nuwakot, Gulmi, Kanchanpur
Low (0.034-0.076)	Chitwan, Tanahu, Palpa, Kailali, Bardiya, Kaski, Dhankuta, Dhading, Arghakhanchi, Terhathum, Ilam, Banke, Panchthar, Pyuthan, Makwanpur, Dang, Baitadi, Baglung, Dailekh, Salyan, Okhaldhunga, Khotang, Udayapur, Achham, Ramechhap, Bhojpur, Sindhupalchok, Surkhet, Sindhuli, Rolpa, Lamjung, Doti
Very Low (0-0.033)	Dolakha, Dadeldhura, Gorkha, Rukum, Kalikot, Jajarkot, Darchula, Myagdi, Bajura, Bajahang, Sankhuwasabha, Taplejung, Jumla, Solukhumbu, Rasuwa, Mugu, Humla, Manang, Mustang, Dolpa

Map 1

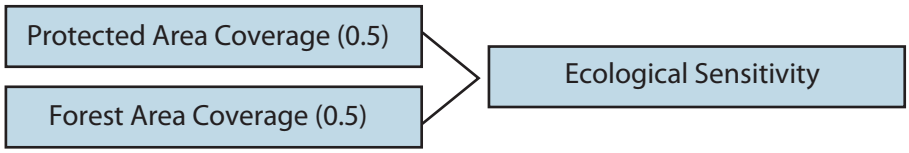
HUMAN SENSITIVITY (Population Density) MAP OF NEPAL



4.2 Ecological Sensitivity

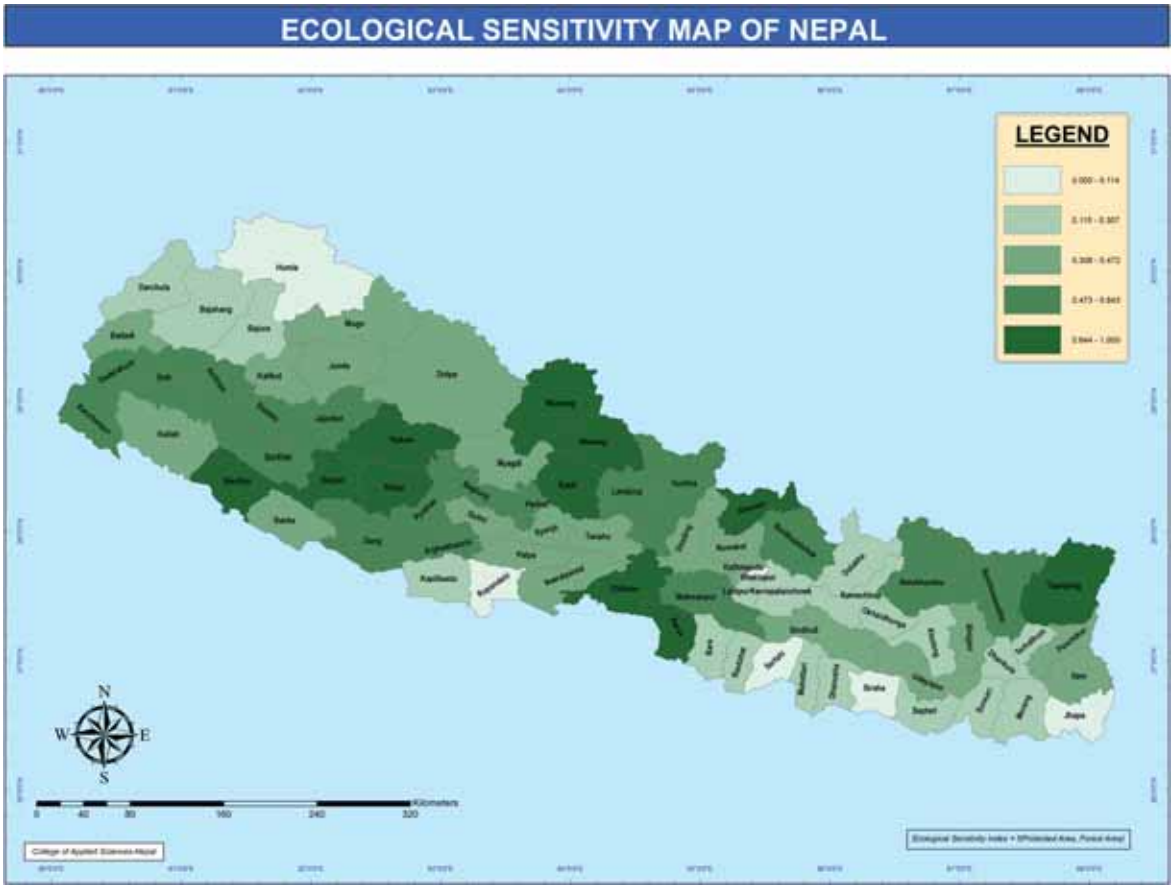
The natural ecosystem comprises of forest ecosystem, grass land ecosystem, wetland ecosystem etc. The existing database in Nepal is not disaggregated at the district level in terms of types of forest, grassland, or wetland. Information with regard to the biodiversity characteristics is also rudimentary at the district level. The only comparable information available at the district level is the forest cover area and area of the national parks (including forest land and other ecosystems). Hence for the analysis of the ecological sensitivity, this study has taken the forest cover and the national park /conservation area cover as a proxy of the ecological sensitivity *(Figure 1)*. The concept implies, larger the proportion of the coverage of forest protected area, larger is the ecological sensitivity of the district. The sub-indices so derived were then used for the generation of ecological sensitivity map *(Map 2)*

Figure 1. Methodological Steps for the Ecological Sensitivity Sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

Map 2



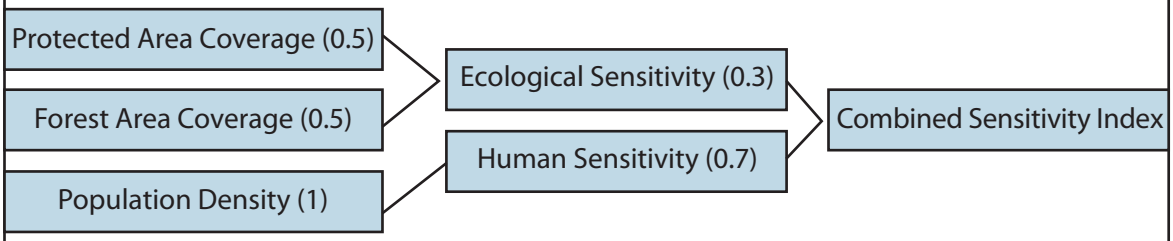
From the ecological sensitivity consideration, the districts of Nepal are ranked as under *(Table 3, Annex 3)*. Districts of Far-western and Midwestern Hill Ecological Zone and districts of Western and Central Mountain Ecological Zone are relatively more sensitive compared to the other districts. In the Terai Ecological Zone, the districts with National Parks such as Parsa, Chitwan, and Bardiaya are highly sensitive.

Table 3. District Ranks – Ecological Sensitivity Sub-indices	
Ecological Sensitivity	**Districts**
Very High (0.62-1)	Kaski, Salyan, Mustang, Bardiya, Chitwan, Parsa, Rasuwa, Rukum, Taplejung, Rolpa, Manang
High (0.38-0.61)	Doti, Lamjung, Sankhuwasabha, Solukhumbu, Gorkha, Pyuthan,Dadeldhura, Jajarkot, Baglung, Surkhet, Sindhupalchok, Achham, Parbat, Kanchanpur, Makwanpur, Dailekh, Arghakhanchi, Dang
Moderate (0.17-0.37)	Myagdi, Kathmandu, Sindhuli, Udayapur, Palpa, Kailali, Nuwakot, Kalikot, Mugu, Baitadi, Tanahu, Nawalparasi, Gulmi, Banke, Jumla, Syangja, Panchthar, Ilam, Dhading, Bhojpur, Dolpa
Low (0.06-0.16)	Khotang, Lalitpur, Dolakha, Kapilbastu, Bajura, Kavrepalanchowk, Bara, Ramechhap, Okhaldhunga, Dhankuta, Terhathum, Bajahang, Saptari, Rautahat, Darchula, Sunsari, Mahottari, Morang, Dhanusha
Very Low (0.05-0)	Sarlahi, Siraha, Rupandehi, Jhapa, Humla, Bhaktapur

4.3 Combined/Multiple Sensitivity

Combined Sensitivity Index was constructed by the addition of weighted standardized human and ecological sensitivity sub indices of the districts *(Figure 2)*. The combined indices so derived were then used for the generation of combined/multiple sensitivity map *(Map 3)*.

Figure 2. Methodological Steps for the Construction of Combined/Multiple Sensitivity Index



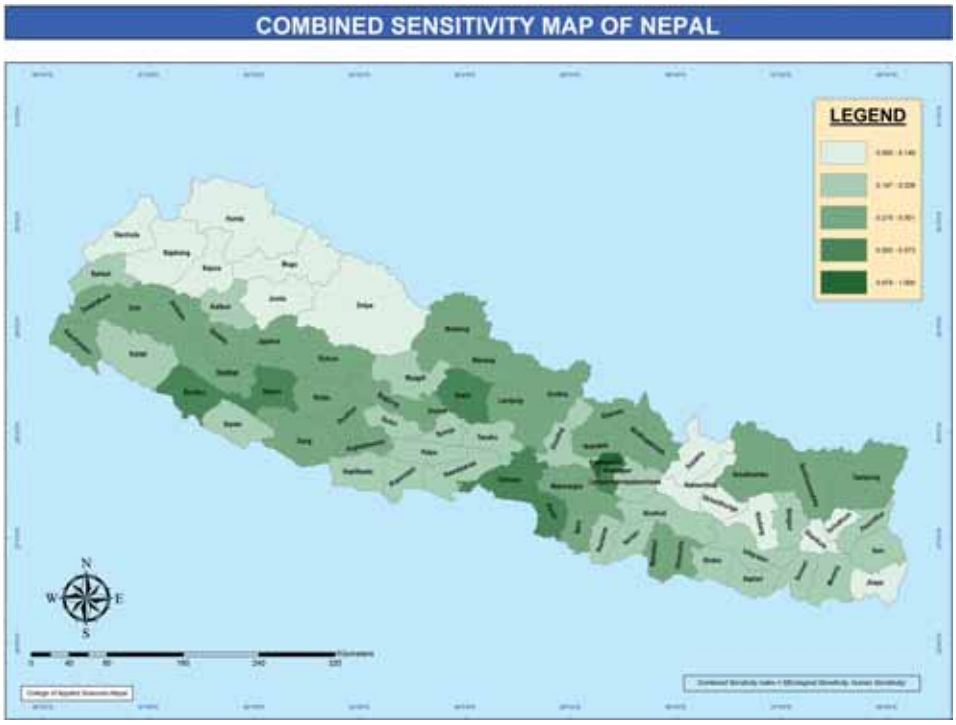
Note: Numbers in parenthesis are the weightage given to each of the indices

From the Combined/Multiple Sensitivity Index consideration the districts of Nepal are ranked as presented in the *Table 4, Annex 4*. The districts of high population concentrations such as districts of Kathmandu Valley and the districts with higher proportion of National Parks/Conservation area and forest (Parsa, Bardiya, Chitwan, Kaski and Sallyan) show higher sensitivity to climate change. In general, district of Far-western, Mid-western Hill Ecological Zone, districts of Mountain Ecological Zone of Western, Central and Eastern Nepal, and districts of Terai Ecological Zone of Central Nepal are more sensitive compared to the other districts.

Table 4. District Ranks – Combined/Multiple Sensitivity Index

Combined Sensitivity	Districts
Very High (0.574-1)	Kathmandu
High (0.302-0.573)	Bhaktapur, Kaski, Parsa, Lalitpur, Salyan, Bardiya, Chitwan
Moderate (0.210-0.301)	Mustang, Rukum, Parbat, Rasuwa, Rolpa, Taplejung, Pyuthan, Doti, Lamjung, Kanchanpur, Baglung, Manang, Gorkha, Sankhuwasabha, Dadeldhura, Makwanpur, Bara, Mahottari, Surkhet, Solukhumbu, Arghakhanchi, Dhanusha, Nuwakot, Achham, Sindhupalchok, Jajarkot, Dailekh, Dang
Low (0.147-0.209)	Palpa, Rautahat, Sunsari, Kailali, Nawalparasi, Syangja, Gulmi, Saptari, Udayapur, Morang, Tanahu, Sindhuli, Sarlahi, Rupandehi, Baitadi, Siraha, Myagdi, Kapilbastu, Banke, Kavrepalanchowk, Panchthar, Ilam, Dhading, Kalikot, Bhojpur
Very Low (0.00-146)	Khotang, Mugu, Jhapa, Jumla, Dhankuta, Terhathum, Dolakha, Ramechhap, Okhaldhunga, Dolpa, Bajura, Bajahang, Darchula, Humla

Map 3



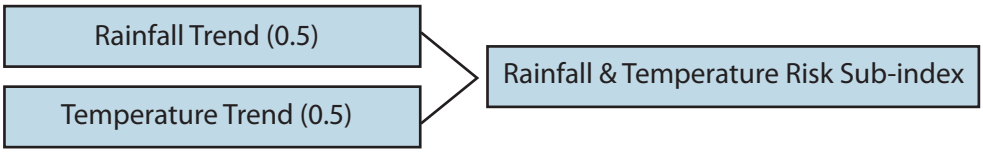
5. CLIMATE RISK/EXPOSURE

In the context of Nepal the main climate risks/exposure envisaged are annual temperature and rainfall trends, ecology, landslide and floods in the Mountain and Hill Ecological Zone, Floods in the Terai Ecological Zone, droughts and the Glacier Lake Outburst Floods (GLOF). It is therefore the records or potentials of the risks/exposure have been used for the construction of different climate risk sub-indices and combined/Multiple climate risk index.

5.1 Temperature and Rainfall Risk/Exposure

Practical Action (2009), after the analysis of monthly precipitation data from 166 stations and monthly temperature records from 44 stations for the period of 30 years (1976-2005), has published maps showing seasonal and annual spatial variation of temperature and rainfall trends for Nepal. For the construction of temperature and rainfall risk/exposure map the annual mean temperature trend map and the annual rainfall trend map of Practical Action 2009 were used. The annual mean temperature indicators and annual rainfall indicators for the districts were derived by calculating the area covered by each trend signatory and averaging the trends as a function of percentage of district area coverage. Equal weight is assigned for the temperature and rainfall trend indices to generate the temperature and rainfall exposure sub-indices *(Figure 3)*. The derived sub-indices were plotted in the GIS Map to prepare temperature and rainfall risk/exposure map *(Map 4)*.

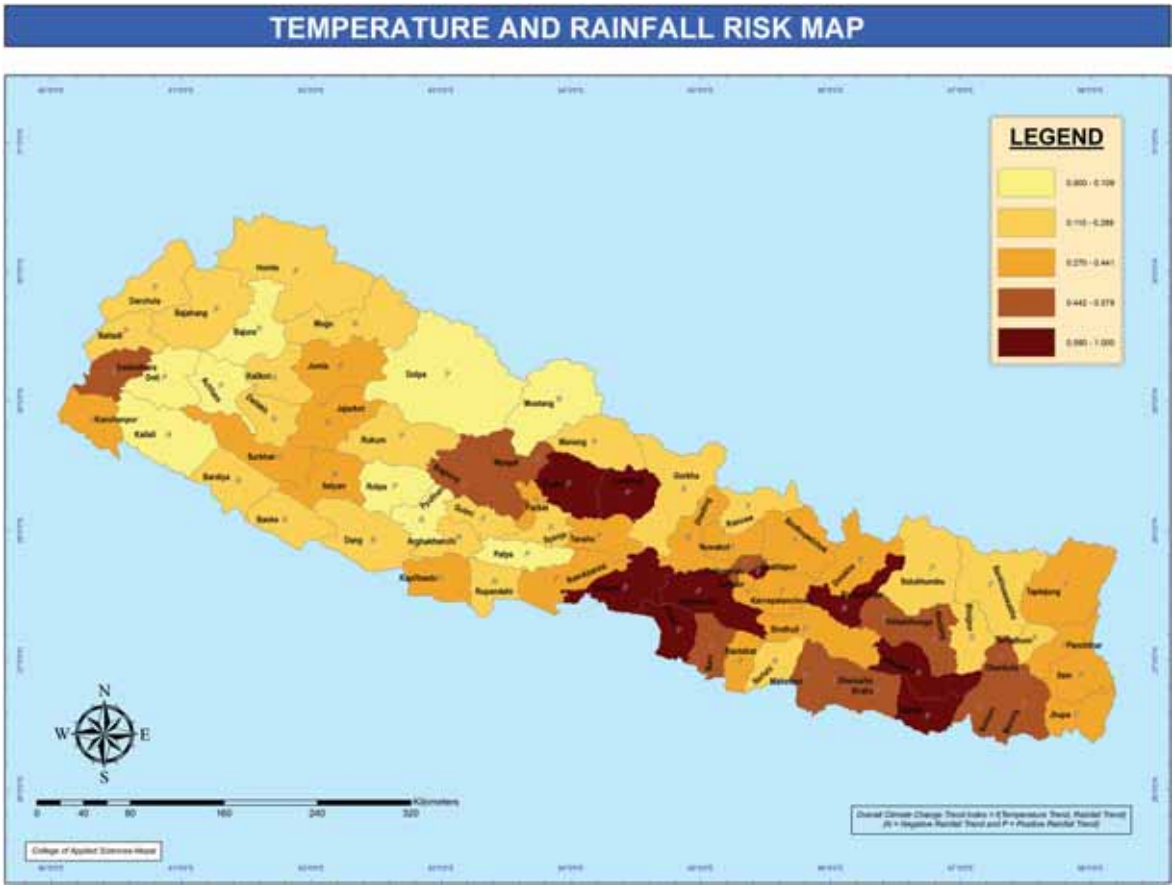
Figure 3: Methodological Steps for the Construction of Rainfall Temperature Risk/exposure Sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

In general, the temperature over Nepal show increasing trend with few pockets of decreasing trends, which have been discarded as outliers for the purpose of analysis. In case of rainfall there are areas of positive and negative trends. Such rainfall trends are depicted as P for rainfall positive and N for rainfall negative in the risk map.

Map 4



The ranking of the district from temperature and rainfall risks consideration is presented in *Table 5, and Annex 5*. Districts of Hill and Terai Ecological Zone of Eastern and Central Nepal and Mountain Ecological Zone districts of Western Nepal show higher exposure potential in terms of temperature and rainfall trends.

Table 5. District Ranks – Temperature and Rainfall Risk Sub-indices

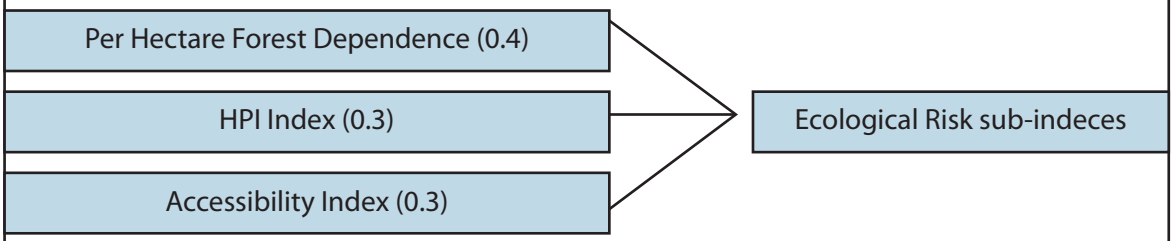
Overall Climate Change Trend	Districts
Very High (0.580-1.000)	Lamjung (P), Ramechhap (N), Saptari (P), Makwanpur (P), Chitwan (P), Parsa (P), Kaski (P), Udayapur (P), Bhaktapur (P)
High (0.442-0.579)	Morang (P), Bara (P), Kathmandu (P), Mahottari (P), Dhanusha (P), Dhankuta (P), Okhaldhunga (P), Myagdi (P), Dadeldhura (N) Khotang (P), Siraha (P), Baglung (P), Sunsari (P)

Overall Climate Change Trend	Districts
Moderate (0.270-0.441)	Parbat (P), Kapilbastu (N), Taplejung (P), Lalitpur (P), Jhapa (P), Panchthar (P), Jajarkot (N), Kanchanpur (N), Tanahu (P), Ilam (P), Jumla (N), Sindhupalchok (P), Kavrepalanchowk (P), Nuwakot (P), Dhading (N), Surkhet (P), Dolakha (N), Nawalparasi (P), Rautahat (P), Sindhuli (P), Salyan (N)
Low (0.110-0.269)	Mugu (N), Manang (P), Terhathum (P), Kalikot (N), Dailekh (N), Baitadi (P), Darchula (P), Rupandehi (N), Sarlahi (N), Solukhumbu (P), Bhojpur (N), Gorkha (N), Sankhuwasabha (P), Gulmi (P), Syangja (P), Banke (N), Rasuwa (P), Bardiya (N), Humla (N), Arghakhanchi (N), Dang (N), Rukum (P), Bajahang (P)
Very Low (0.000-0.109)	Kailali (N), Doti (P), Achham (P), Dolpa (P), Mustang (N), Rolpa (P), Bajura (N), Palpa (P), Pyuthan (N)

5.2 Ecological Risk/Exposure

The measurable risk records on the ecological resources are very scarce. The existing literature (MoFSC, 2002; MPFS, 1989) reveals the risks to the natural ecological resources as a function of population. Higher the number of population over the given natural ecological system, higher is the risk to such system. Likewise, the dependency to the forest ecological system is linked with the poverty level of the surrounding areas. Higher the level of poverty, the pressure to the ecological resources is known to increases correspondingly (MoFSC, 2002). Apart from above, accessibility, particularly motorable accessibility, is the other factor influencing the rapid illegal extraction of the forest resources. Hence, to construct the ecological risk sub-indices and map *(Map 5),* the population pressure per unit of the forest area, human poverty index, and motorable accessibility (length of the motorable road per unit of the land area) have been taken as proxy indicators *(Figure 4)*.

Figure 4. Methodological Steps for the Construction of Ecological Risk/Exposure Sub-indices



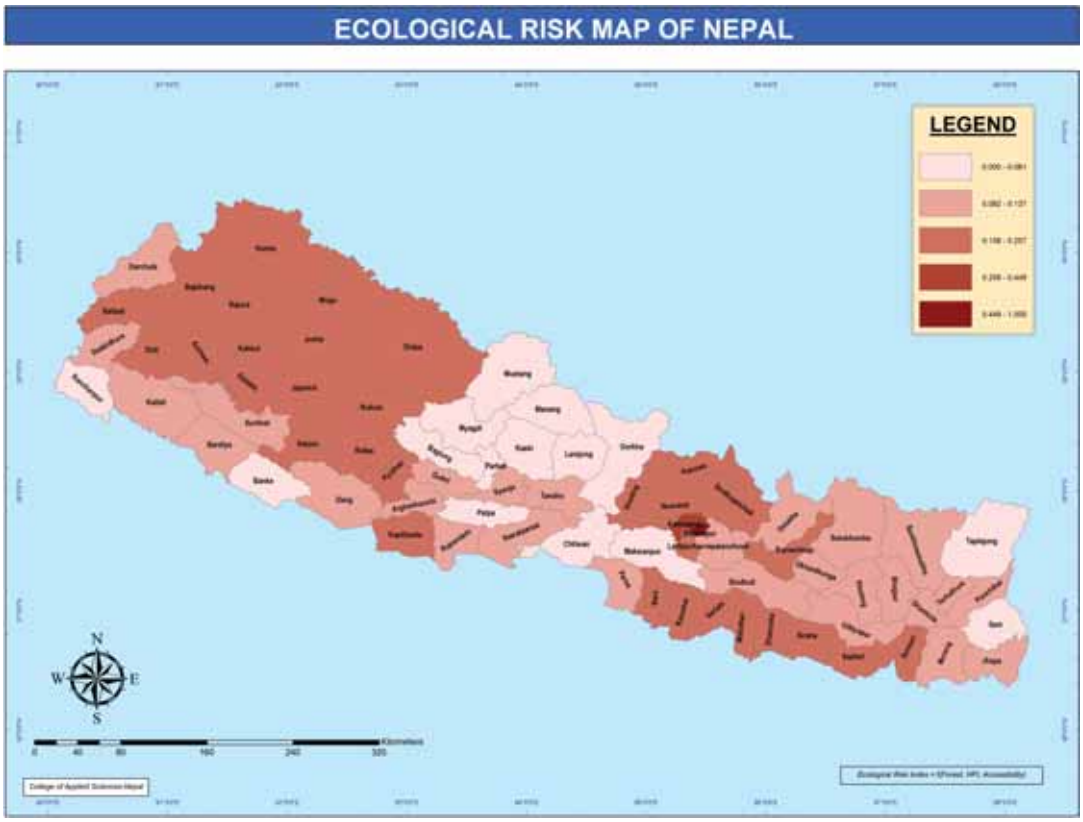
Note: Numbers in parenthesis are the weightage given to each of the indices

Including Kathmandu and Bhaktapur, the districts of the Hill and Mountain Ecological Zone of Far-western and Mid-western and Central Development Region and the districts of Terai Ecological Zone of Central and Eastern Development Region show higher degree of ecological risk. The district ranking from the ecological risk is presented in *Table 6 and Annex 6.*

Table 6. District Ranks –Ecological Risk/Exposure sub-indices

Ecological Risk/Exposure	Districts
Very High (0.449-1.000)	Bhaktapur
High (0.258-0.448)	Kathmandu
Moderate (0.138-0.257)	Mahottari, Sarlahi, Achham, Humla, Siraha, Dolpa, Bajahang, Kalikot,
	Mugu, Dhanusha, Rautahat, Dailekh, Kapilbastu, Rolpa, Bara, Jajarkot, Doti, Ramechhap, Jumla, Bajura, Rasuwa, Pyuthan, Baitadi, Sindhupalchok, Salyan, Saptari, Rukum, Lalitpur, Nuwakot, Dhading
Low (0.082-0.137)	Dadeldhura, Surkhet, Sindhuli, Jhapa, Panchthar, Sunsari, Bardiya, Tanahu, Dang, Okhaldhunga, Parsa, Dolakha, Morang, Darchula, Gulmi, Arghakhanchi, Nawalparasi, Bhojpur, Khotang, Solukhumbu, Dhankuta, Udayapur, Kailali, Terhathum, Rupandehi, Syangja, Kavrepalanchowk, Sankhuwasabha
Very Low (0.000-0.081)	Gorkha, Ilam, Makwanpur, Kanchanpur, Mustang, Parbat, Banke, Myagdi, Chitwan, Palpa, Lamjung, Baglung, Taplejung, Manang, Kaski

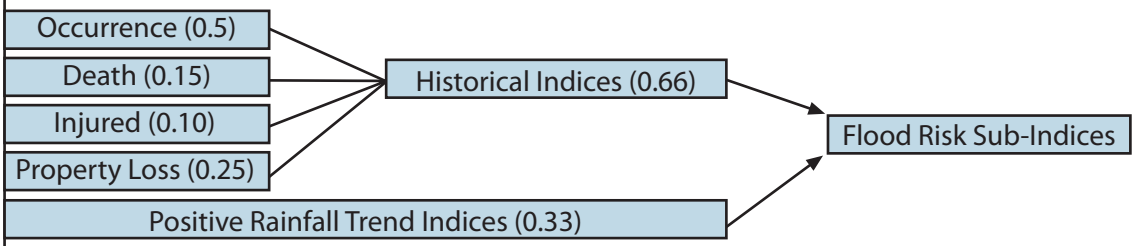
Map 5



5.3 Landslide/Exposure

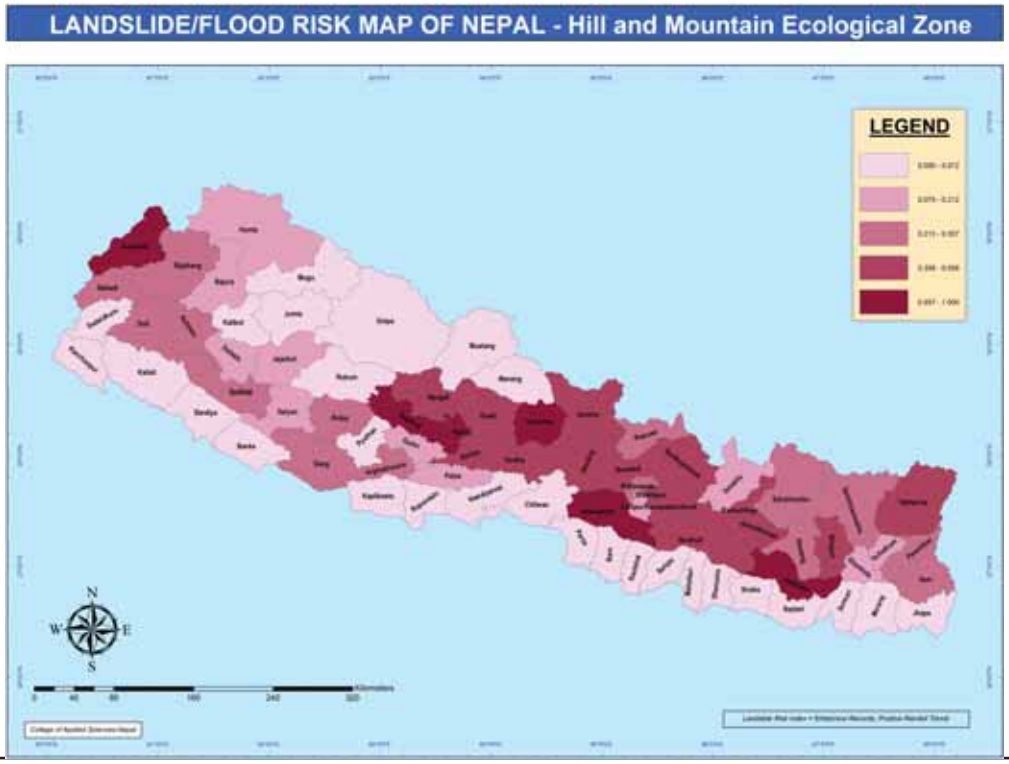
Database on the landslide/flood in the Hill and Mountain Ecological Zone since 1975 is available at the Ministry of Home Affairs (MoHA, 2010). Recent nine year database have followed a compatible format for variables such as occurrence, number of people dead, number of people injured and the property loss while recording of the landslide/flood events. These variable indicators (Annex 1) along with the positive annual rainfall trend have been used *(Figure 5)* for the construction of the landslide/flood risk sub-indices for the Hill and Mountain Ecological Zone *(Map 6)*. The positive annual rainfall trend is incorporated for the analysis because this gives a measure of increasing rainfall over the years and is the primary causative factor for the landslide/flood incidents in Nepal.

Figure 5. Methodological Steps for the Construction of Landslide Risk/Exposure Sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

Map 6



From the landslide/llood risk consideration, the districts of Nepal are ranked as presented in the *Table 7* and *Annex 7*. In general the district of Hill Ecological Zone of Eastern, Central, Western Development Region are comparatively more landslide risk prone than other districts.

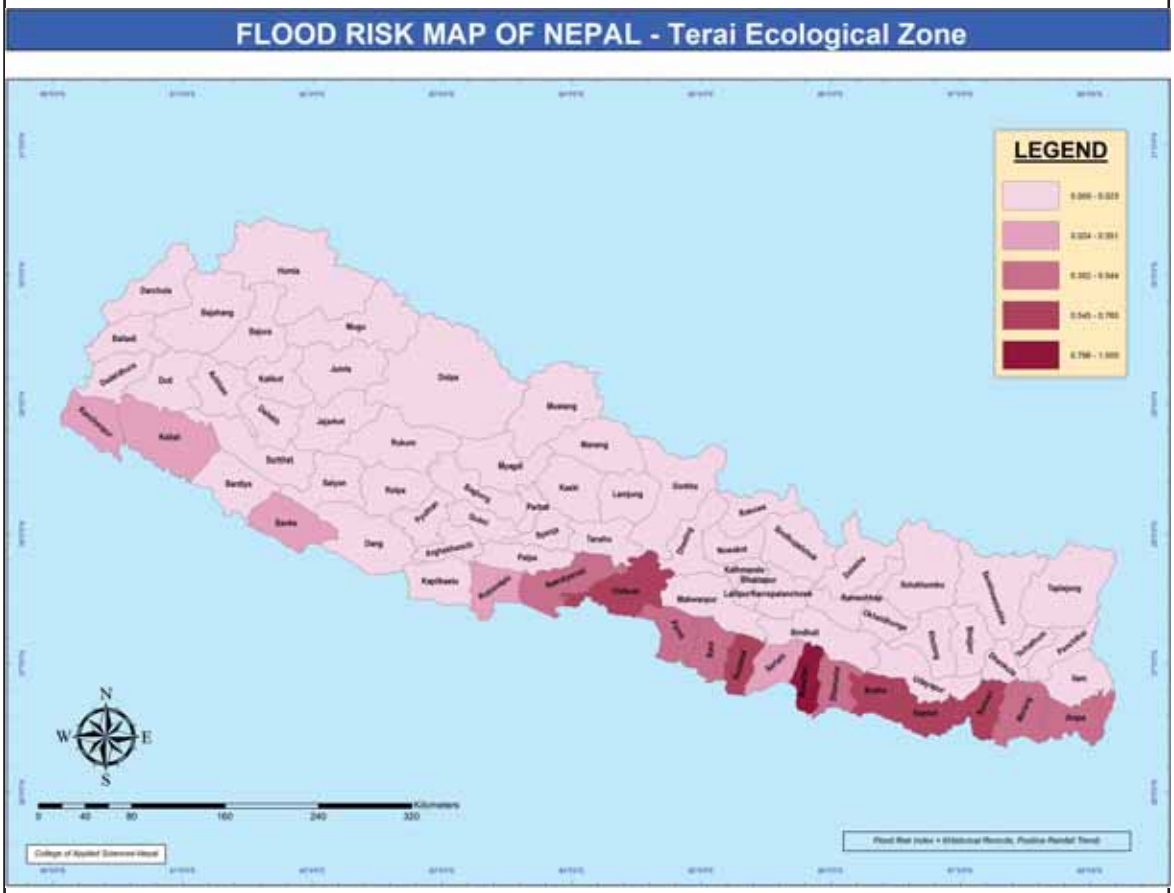
Table 7. District Ranks – Landslide/Flood Risk/Exposure Sub-indices

Landslide Risk/Exposure	Districts
Very High (0.557-1.000)	Udayapur, Darchula, Lamjung, Baglung, Makwanpur, Parbat
High (0.358-0.0.556)	Kaski, Myagdi, Ramechhap, Kavrepalanchowk, Okhaldhunga, Syangja, Taplejung, Sindhuli, Gorkha, Nuwakot, Tanahu, Bhojpur, Sindhupalchok, Dhading, Bhaktapur
Moderate (0.213-0.357)	Sankhuwasabha, Baitadi, Solukhumbu, Bajahang, Ilam, Kathmandu, Arghakhanchi, Rasuwa, Doti, Dang, Khotang, Achham, Surkhet, Rolpa, Panchthar
Low (0.073-0.212)	Gulmi, Salyan, Terhathum, Bajura, Jajarkot, Dhankuta, Dailekh, Lalitpur, Palpa, Dolakha, Humla
Very Low (0.000-0.072)	Dadeldhura, Rukum, Manang, Pyuthan, Mustang, Dolpa, Mugu, Jumla, Kalikot, Rupandehi, Morang, Chitwan,Jhapa, Sunsari, Banke,Kanchanpur,Nawalparasi, Kailali, Saptari, Parsa, Dhanusha, Bara, Bardiya, Kapilbastu, Siraha, Sarlahi, Rautahat, Mahottar

5.4 Flood Risk/Exposure

Recent nine years flood records particularly frequency of occurrence, number of people dead, number of people injured and the property loss were derived from MoHA (2010) for the Terai Ecological Zone (Annex 1). Construction of flood risk/exposure sub-indices and map *(Map 7)* follows the same steps as for the landslide sub-indices and maps for Hill and Mountain Ecological Zone.

Map 7



From the flood risk consideration the Terai Ecological Zone districts are ranked as under *(Table 8,* and *Annex 8)*. In general the Terai Ecological Zone of Western, Central and Eastern Development Region are more Flood Prone compared to the other districts and ecological zones.

Table 8. District Ranks – Flood Risk/Exposure Sub-indices

Flood Risk/Exposure	Districts
Very High (0.766-1.000)	Mahottari
High (0.545-0.0.765)	Chitwan, Saptari, Rautahat, Sunsari, Siraha
Moderate (0.352-0.544)	Jhapa, Dhanusha, Parsa, Bara, Morang, Nawalparasi
Low (0.024-0.351)	Kailali, Sarlahi

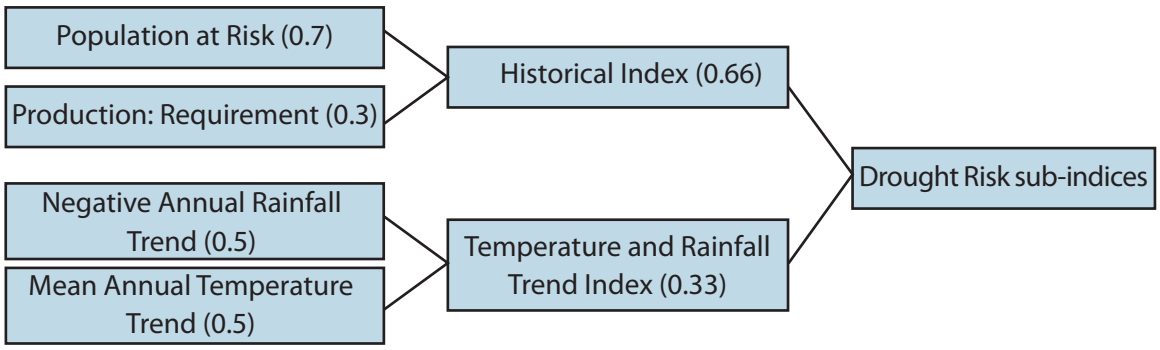
Table 8. District Ranks – Flood Risk/Exposure Sub-indices

Flood Risk/Exposure	Districts
Very Low (0.000-0.023)	Kanchanpur, Banke, Rupandehi, Kapilbastu, Bardiya, Kalikot, Jumla, Mugu, Dolpa, Mustang, Pyuthan, Manang, Rukum, Dadeldhura, Humla, Dolakha, Palpa, Lalitpur, Dailekh, Dhankuta, Jajarkot, Bajura, Terhathum, Salyan, Gulmi, Panchthar, Rolpa, Surkhet, Achham, Khotang, Dang, Doti, Rasuwa, Arghakhanchi, Kathmandu, Ilam, Bajahang, Solukhumbu, Baitadi, Sankhuwasabha, Bhaktapur, Dhading, Sindhupalchok, Bhojpur, Tanahu, Nuwakot, Gorkha, Sindhuli, Taplejung, Syangja, Okhaldhunga, Kavrepalanchowk, Ramechhap, Myagdi, Kaski, Parbat, Makwanpur, Baglung, Lamjung, Darchula, Udayapur

5.5 Drought Risk/Exposure

Indicators and variables measuring the drought status directly are very limited in Nepal. It is therefore proxy indicators which reflect the situation of drought have been selected to prepare the drought risk sub-indices and maps. For this purpose recent four years records at the district level on food production, requirement and deficiency and population under risk of serious food shortages were derived from the published records of Ministry of Agriculture and Cooperatives, Department of Agriculture, and World Food Programme Nepal *(Annex 1)*. The above indicators along with the mean annual temperature trend and negative rainfall trend were used *(Figure 6)* as proxy indicators to construct the drought risk map sub-indices and drought risk map (Map 8). The temperature trends and the negative rainfall trends were used because the rise in temperature and decrease in rainfall enhance the likelihood of drought like situation.

Figure 6. Methodological Steps for the Construction of Drought Risk /Exposure sub-indices



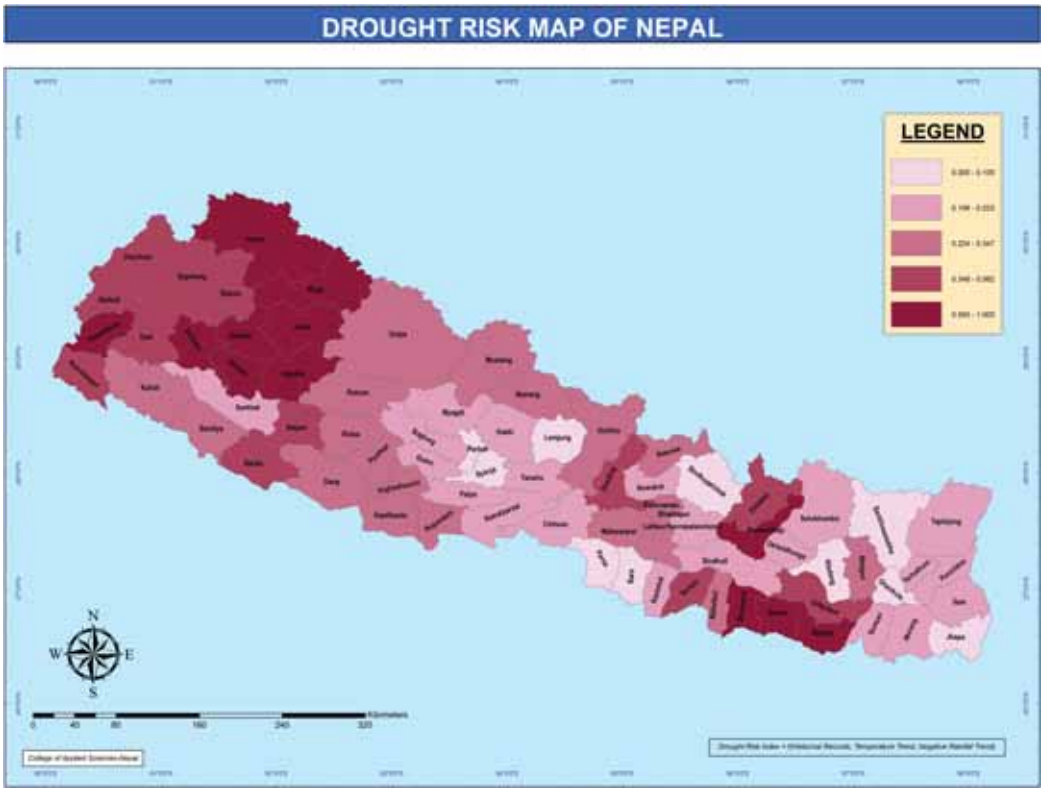
Note: Numbers in parenthesis are the weightage given to each of the indices

From the drought risk consideration the districts of Nepal are ranked as presented in the *Table 9* and *Annex 9*. Districts of Hill and Mountain Ecological Zone of Far-western and Mid-western Development Region and Terai Ecological Zone of Eastern Development Region are prone to drought risk/exposure. Despite positive rainfall trends in the Terai Ecological Zone of Eastern Development Region, the historical records show potential of drought in the region. This might be due to variation of inter-annual rainfall pattern.

Table 9. District Ranks – Drought Risk/Exposure sub-indices

Drought Risk/Exposure	Districts
Very High (0.563-1.000)	Saptari, Jajarkot, Siraha, Kalikot, Dailekh, Dadeldhura, Humla, Dhanusha, Jumla, Ramechhap, Achham, Mugu
High (0.348-0.562)	Bajahang, Bajura, Dolakha, Dhading, Doti, Kanchanpur, Sarlahi, Udayapur, Salyan, Darchula, Banke, Baitadi
Moderate (0.24-0.347)	Kathmandu, Kapilbastu, Bardiya, Rolpa, Dolpa, Manang, Rukum, Gorkha, Mustang, Pyuthan, Bhojpur, Lalitpur, Bhaktapur, Arghakhanchi, Rupandehi, Kailali, Dang, Rasuwa, Makwanpur, Mahottari
Low (0.106-0.223)	Rautahat, Panchthar, Sindhuli, Gulmi, Kavrepalanchowk, Sunsari, Kaski, Chitwan, Palpa, Ilam, Nawalparasi, Nuwakot, Okhaldhunga, Baglung, Surkhet, Tanahu, Morang, Taplejung, Terhathum, Solukhumbu, Myagdi
Very Low (0.000-0.105)	Sankhuwasabha, Sindhupalchok, Parbat, Parsa, Khotang, Bara, Lamjung, Dhankuta, Jhapa, Syangja

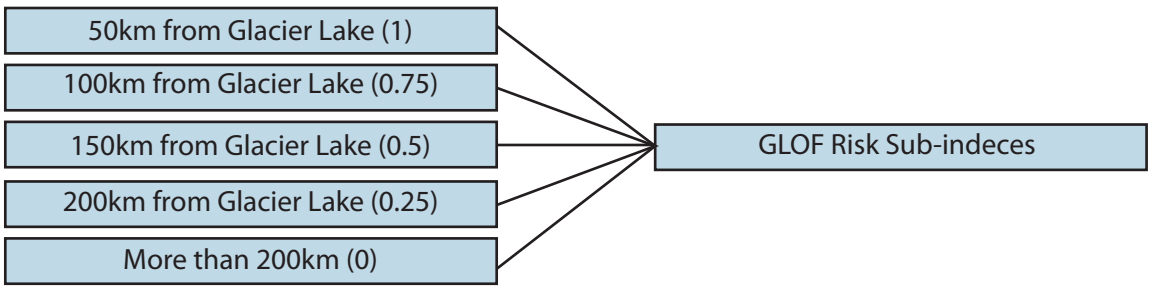
Map 8



5.6 GLOF Risk/Exposure

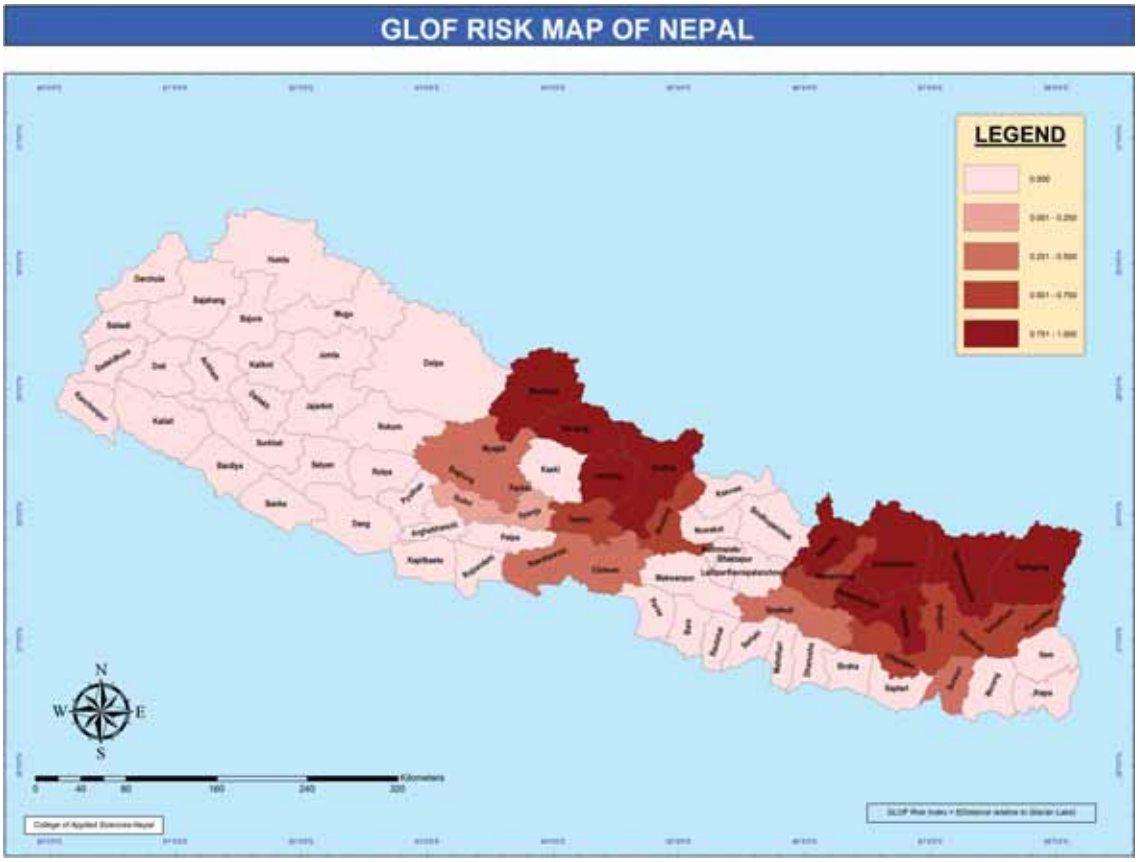
Twenty glacier lakes have been identified as the most potential for Glacier Lake Outburst Flood (Bajracharya et.al, 2001). The drainage lines of these lakes are the risk areas in the event of the lake outburst. The valley bottom areas immediately downstream of the lake has higher risk of the GLOF and the risk potential gradually declines as the distance increases from the glacier lake location. This concept has been taken as a proxy for the glacier lake outburst risk *(Figure 7)* in order to construct of the GLOF risk/exposure sub-indices and GLOF risk/exposure map *(Map 9)*.

Figure 7. Methodological Steps for the Construction of GLOF Risk/exposure sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

Map 9



From the GLOF risk/exposure consideration, the districts of Nepal are ranked which is presented in *Table 10* and *Annex 10*). In general, districts draining rivers of Sapta Gandaki and Sapta Kosi in the Mountain and Hill Ecological Zone in Western, Central and Eastern Development Region are more prone to GLOF risk than others.

Table 10. District Ranks – GLOF Risk /Exposure sub-indices

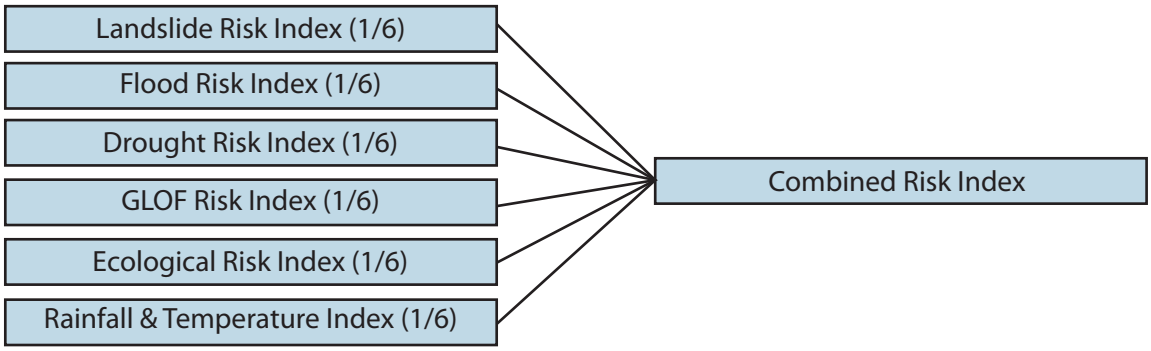
GLOF Risk	Districts
Very High (0.751-1.00)	Lamjung, Khotang, Sankhuwasabha, Gorkha, Solukhumbu, Taplejung, Okhaldhunga, Mustang, Dolakha, Manang
High (0.501-0.750)	Dhankuta, Bhojpur, Ramechhap, Terhathum, Tanahu, Panchthar, Dhading, Udayapur
Moderate (0.251-0.500)	Parbat, Myagdi, Baglung, Nawalparasi, Chitwan, Sunsari, Sindhuli
Low (0.001-0.250)	Syanja, Gulmi

GLOF Risk	Districts
No/Very Low (0.000)	Jhapa, Bara, Parsa, Sindhupalchok, Kanchanpur, Kapilbastu, Salyan, Morang, Rupandehi, Surkhet, Nuwakot, Dang, Ilam, Kailali, Palpa, Kaski, Arghakhanchi, Bardiya, Kavrepalanchowk, Sarlahi, Rautahat, Mahottari, Makwanpur, Rasuwa, Banke, Bhaktapur, Lalitpur, Dadeldhura, Pyuthan, Jumla, Rukum, Dolpa, Rolpa, Kathmandu, Baitadi, Darchula, Mugu, Doti, Bajura, Bajahang, Jajarkot, Dailekh, Humla, Achham, Kalikot, Dhanusha, Siraha, Saptari

5.7 Combined /Multiple Risk/Exposure

The combined/multiple risk/exposure map (Map 10) was integrated based on the weighted combination of the ecological, landslide, flood, drought and GLOF risk/exposure sub-indices (*Figure 8*).

Figure 8. Methodological Steps for the Construction of Combined/Multiple Risk/Exposure Index



Note: Numbers in parenthesis are the weightage given to each of the indice

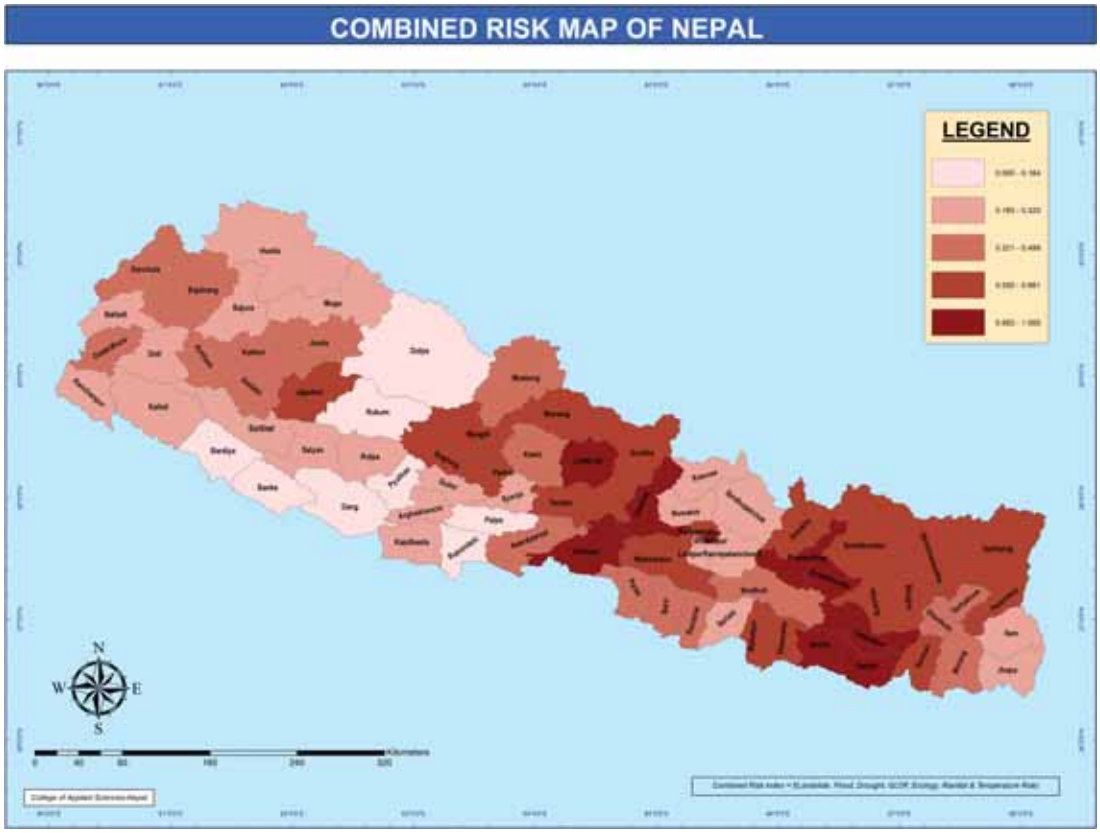
From the combined/multiple risk/exposure Index consideration, the districts of Nepal are ranked as under (*Table 11, Annex 11*).

Table 11. District Ranks – Combined/Multiple Risk/Exposure Index

Combined Risk/Exposure	Districts
Very High (0.682-1.000)	Udayapur, Ramechhap, Lamjung, Saptari, Bhaktapur, Okhaldhunga, Chitwan, Siraha, Dhading
High (0.500-0.681)	Dolakha, Taplejung, Mahottari, Gorkha, Sunsari, Dhanusha, Khotang, Tanahu, Baglung, Solukhumbu, Panchthar, Bhojpur, Sankhuwasabha, Parbat, Kathmandu, Manang, Jajarkot, Makwanpur, Myagdi

Combined Risk/Exposure	Districts
Moderate (0.321-0.499)	Sindhuli, Dhankuta, Nawalparasi, Mustang, Parsa, Kaski, Terhathum, Dadeldhura, Rautahat, Dailekh, Darchula, Bara, Kalikot, Morang, Jumla, Bajahang, Achham
Low (0.165-0.320)	Sarlahi, Humla, Kanchanpur, Kavrepalanchowk, Mugu, Baitadi, Jhapa, Nuwakot, Sindhupalchok, Salyan, Doti, Lalitpur, Kapilbastu, Ilam, Syanja, Gulmi, Bajura, Surkhet, Rasuwa, Arghakhanchi, Rolpa, Kailali
Very Low (0.000-0.164)	Dang, Banke, Rupandehi, Rukum, Dolpa, Bardiya, Pyuthan, Palpa

Map 10



6. Adaptive Capacity

Adaptive capacity or adaptation capability is defined as the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (IPCC 2001). Adaptation capability here is defined as the function of socio-economic, technology and infrastructures factors and is represented as under:

Adaptation capability = f (socio-economic, technology, infrastructure factors)

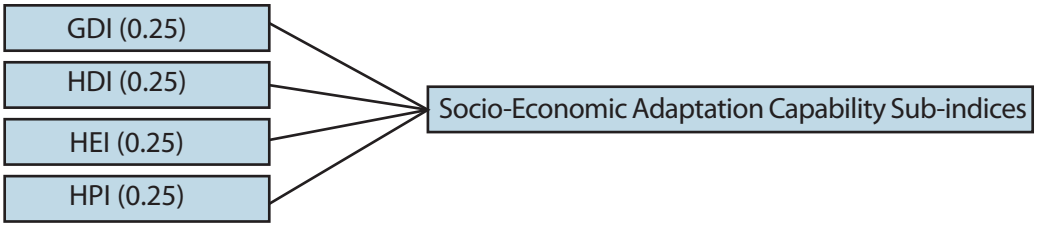
The study derived socio-economic indices, technology indicators, and infrastructure indicators for all districts of Nepal from the available district level information. These were used to construct socio-economic, technology and infrastructure adaptation capability maps separately and by combining them into a combined/ multiple adaptation capability map.

6.1 Socio-economic Adaptation Capability

The socio-economic adaptation capability sub-indices were constructed from the published database of UNDP on Human Development Index (HDI), Gender Development Index (GDI), Human

Poverty Index (HDI) and Human Empowerment Index (HEI) (UNDP, 2004). Equal weight was assigned to each of the indices (*Figure 9*) and added to derive the Socio-economic adaptation capacity sub-indices. So derived sub-indices were then standardized and socio-economic adaptation capacity map was prepared (*Map 11*).

Figure 9. Methodological Steps for the Construction of Socio-economic Adaptation Capability Sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

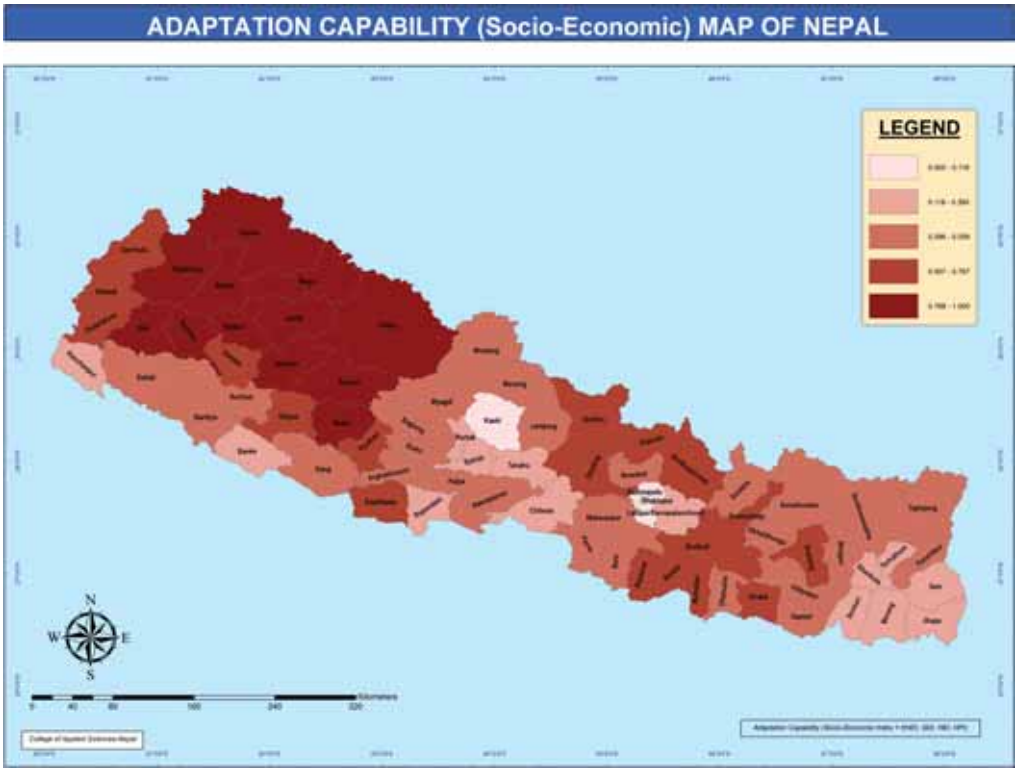
From the socio-economic adaptation capability consideration, the districts of Nepal are ranked as presented in the Table 12 and Annex 12.

Table 12. District Ranks – Socio-economic Adaptation Capability Sub-indices

Adaptation Capability (Socio-economic)	Districts
Very High (0.000-0.118)	Kathmandu, Kaski, Lalitpur, Bhaktapur
High (0.119-0.395)	Rupandehi, Morang, Chitwan, Jhapa, Kavrepalanchowk, Dhankuta, Sunsari, Ilam, Syangja, Banke, Parbat, Terhathum, Tanahu, Kanchanpur
Moderate (0.396-0.556)	Palpa, Nawalparasi, Makwanpur, Baglung, Lamjung, Udayapur, Mustang, Manang, Arghakhanchi, Myagdi, Panchthar, Surkhet, Sankhuwasabha, Saptari, Kailali, Nuwakot, Okhaldhunga, Taplejung, Gulmi, Dhanusha, Dang, Parsa, Solukhumbu, Bardiya, Bara, Dolakha, Bhojpur

Adaptation Capability (Socio-economic)	Districts
Low (0.557-0.767)	Gorkha, Kapilbastu, Khotang, Dadeldhura, Siraha, Sindhuli, Sindhupalchok, Dhading, Pyuthan, Darchula, Sarlahi, Mahottari, Rautahat, Ramechhap, Rasuwa, Salyan, Baitadi, Dailekh
Very Low (0.768-1.000)	Doti, Rukum, Jumla, Rolpa, Jajarkot, Achham, Dolpa, Humla, Bajura, Bajahang, Kalikot, Mugu

Map 11



6.2 Technology Adaptation Capability Map

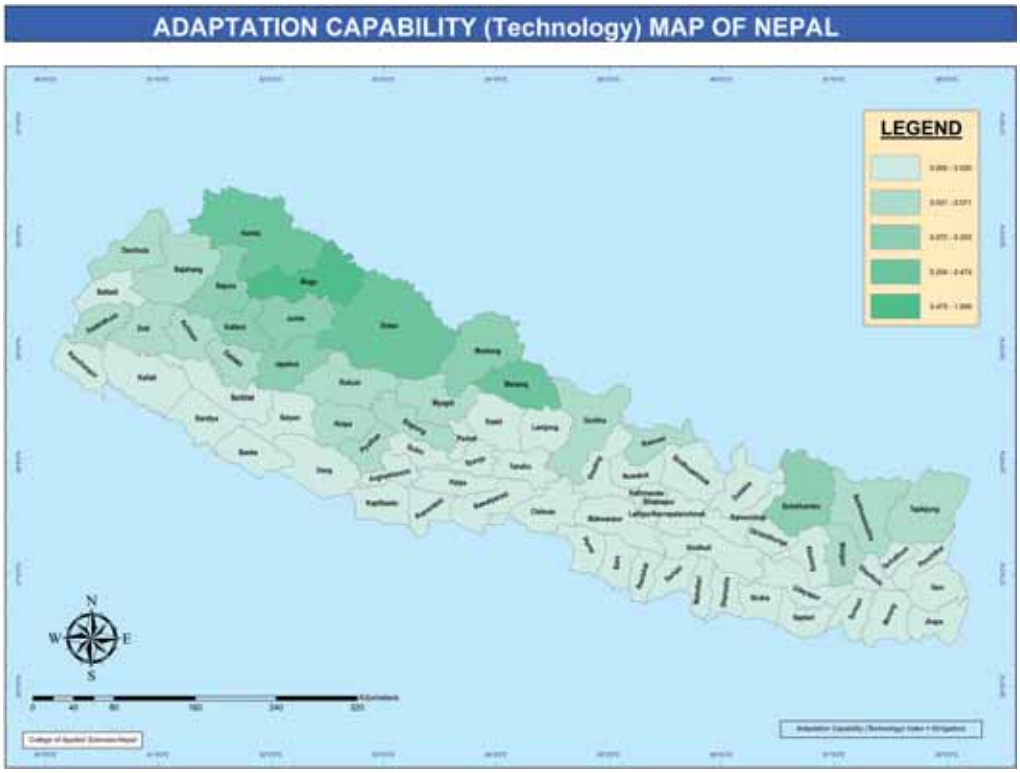
Irrigation is one of the key technologies for increasing agricultural production in a dominantly agriculture dependent communities of Nepal. It is therefore irrigation coverage is selected as a proxy for technology to develop the adaptation capability sub-indices. The irrigation area for each of the district was derived from the published data of Department of Agriculture (*Annex 1*). The irrigation coverage as percentage of the district agricultural area was calculated. The values thus calculated for each of the district were standardized to come up with the technology adaptation capability sub-index (*Map 12*).

From the technology adaptation capability consideration, the districts of Nepal are ranked as presented in the *Table 13 and Annex 13.*

Table 13. District Ranks – Technology Adaptation Capability Sub-index

Adaptation Capability (Technology)	Districts
Very High (0.000-0.030)	Morang, Saptari, Bhaktapur, Rupandehi, Sarlahi, Parsa, Jhapa, Bara, Rautahat, Sunsari, Siraha, Dhanusha, Bardiya, Kanchanpur, Nawalparasi, Lalitpur, Kapilbastu, Chitwan, Mahottari, Kathmandu, Kailali, Banke, Dang, Ilam, Parbat, Terhathum, Nuwakot, Dhankuta, Kaski, Syangja, Surkhet, Kavrepalanchowk, Dhading, Lamjung, Sindhupalchok, Ramechhap, Panchthar, Tanahu, Palpa, Gulmi, Okhaldhunga, Khotang, Arghakhanchi, Baitadi, Udayapur, Sindhuli, Makwanpur, Dolakha, Salyan
High (0.031-0.071)	Bajahang, Dadeldhura, Baglung, Pyuthan, Gorkha, Sankhuwasabha, Darchula, Bhojpur, Taplejung, Rukum, Doti, Rolpa, Rasuwa, Achham, Dailekh, Myagdi
Moderate (0.072-0.203)	Kalikot, Solukhumbu, Jajarkot, Bajura, Mustang, Jumla
Low (0.204-0.474)	Humla, Manang, Dolpa
Very Low (0.475-1.000)	Mugu

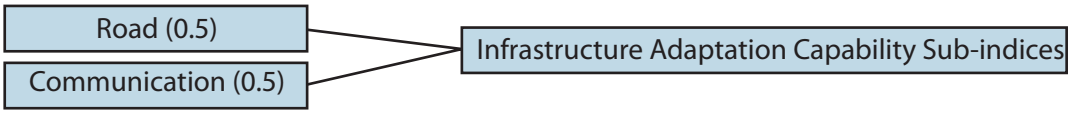
Map 12



6.3 Infrastructure Adaptation Capability Map

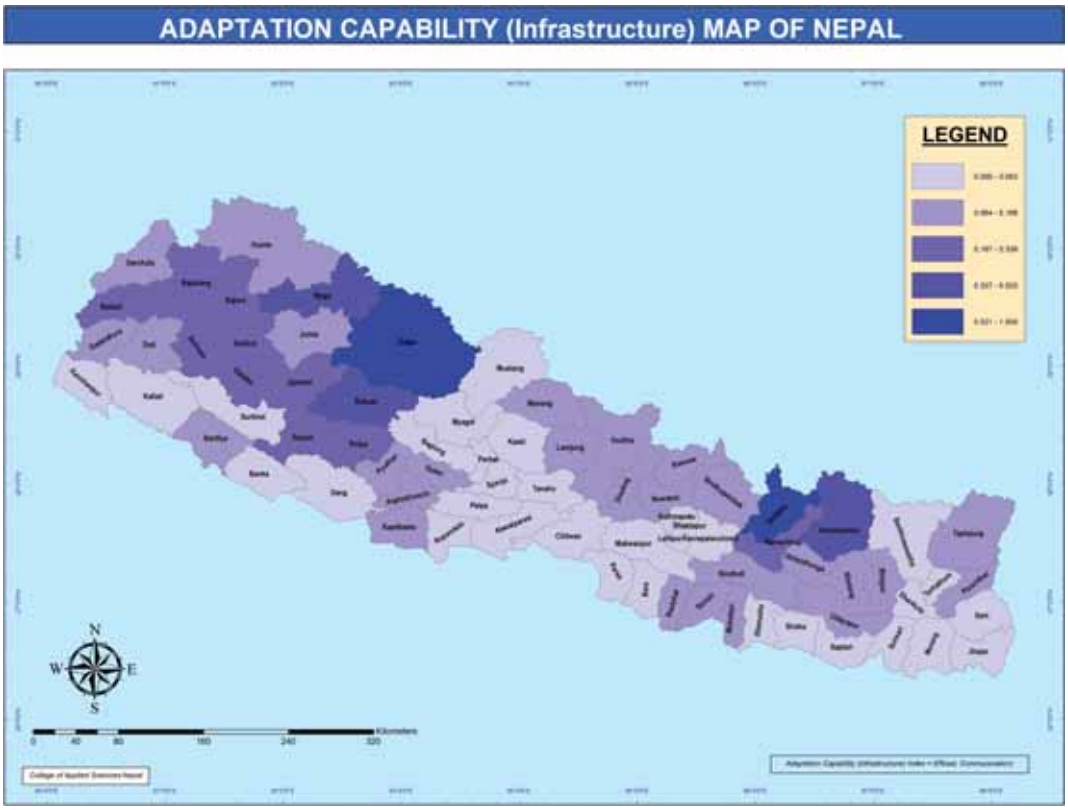
Road and communication are important infrastructure related to people's adaptation capacity. It is therefore road and communication infrastructures were selected as the indicators of infrastructure related to adaptation capacity. The information on road length and the number of the landline telephone (PSTN) were derived from the publication of Department of Roads, and Nepal Telecom (Annex 1). To construct the infrastructure adaptation capability sub-indices, density of the road and coverage of landline telephone in the districts were calculated. Equal weight was given for the road density and communication coverage (*Figure 10*). The value obtained were standardized and used for the preparation of infrastructure adaptation capability map (*Map 13*).

Figure 10. Methodological Steps for the Construction of Infrastructure Adaptation Capability Sub-indices



Note: Numbers in parenthesis are the weightage given to each of the indices

Map 13



From the infrastructure adaptation capability consideration, the districts of Nepal are ranked as presented in the *Table 14* and *Annex 14*.

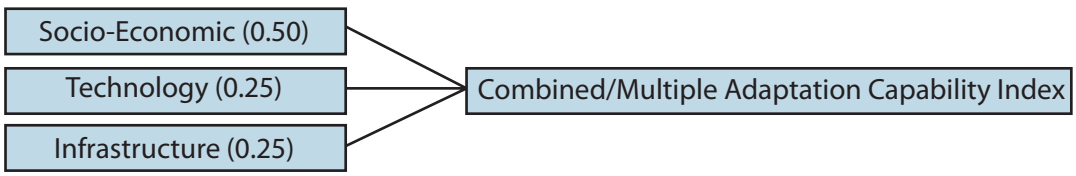
Table 14. District Ranks – Infrastructure Adaptation Capability Sub-indices

Adaptation Capability (Infrastructure)	Districts
Very High (0.000-0.063)	Kathmandu, Lalitpur, Bhaktapur, Kaski, Chitwan, Sunsari, Rupandehi, Morang, Banke, Parsa, Jhapa, Surkhet, Makwanpur, Kailali, Kanchanpur, Dang, Kavrepalanchowk, Tanahu, Dhanusha, Dhankuta, Palpa, Baglung, Mustang, Saptari, Ilam, Nawalparasi, Sankhuwasabha, Myagdi, Parbat, Bara, Siraha, Syangja, Terhathum
High (0.064-0.166)	Nuwakot, Manang, Kapilbastu, Gorkha, Udayapur, Dadeldhura, Doti, Sarlahi, Jumla, Bardiya, Lamjung, Rautahat, Okhaldhunga, Darchula, Arghakhanchi, Taplejung, Humla, Pyuthan, Rasuwa, Mahottari, Sindhuli, Gulmi, Sindhupalchok, Dhading, Panchthar, Bhojpur, Khotang
Moderate (0.167-0.336)	Baitadi, Ramechhap, Kalikot, Dailekh, Bajahang, Salyan, Rolpa, Bajura, Jajarkot, Achham
Low (0.337-0.520)	Rukum, Solukhumbu, Mugu
Very Low (0.521-1.000)	Dolakha, Dolpa

6.4 Combined/Multiple Adaptation Capability

The combined /multiple adaptation capability map was prepared by adding the weighted values of socio-economic, technology and infrastructure sub-indices. Weight to the different indices was assigned based on expert judgment considering the significance of the indicators for enhancing adaptation capacity (*Figure 11*). The obtained values were then standardized to arrive at combined/multiple adaptation capability sub-indices, which were used for the preparation of combined/multiple adaptation capability map (*Map 14*).

Figure 11. Methodological Steps for the Construction of Combined/Multiple Adoption Capability Index

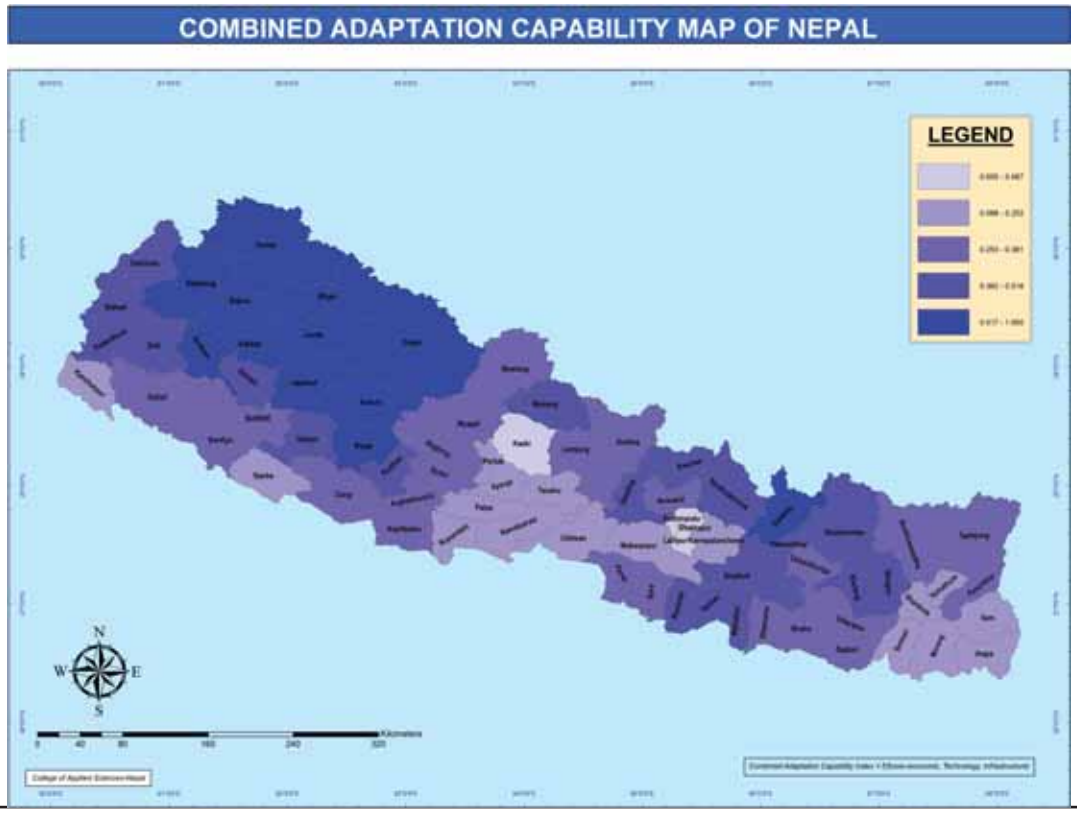


Note: Numbers in parenthesis are the weightage given to each of the indices

From the combined/multiple adaptation capability index consideration the districts of Nepal were ranked as presented in the *Table 15 and Annex 15.*

Table 15. District Ranks – Combined/Multiple Adaptation Capability Index	
Combined Adaptation Capability	**Districts**
Very High (0.000-0.063)	Kathmandu, Kaski, Lalitpur
High (0.064-0.166)	Bhaktapur, Rupandehi, Morang, Chitwan, Jhapa
Moderate (0.167-0.336)	Kavrepalanchowk, Sunsari, Dhankuta, Ilam, Banke, Syangja, Parbat, Terhathum, Kanchanpur, Tanahu, Nawalparasi, Makwanpur, Palpa, Baglung, Lamjung, Udayapur, Surkhet, Kailali, Saptari, Parsa, Dhanusha, Dang, Sankhuwasabha, Arghakhanchi, Myagdi, Nuwakot, Mustang, Bara, Panchthar, Okhaldhunga, Bardiya, Gulmi, Taplejung
Low (0.337-0.520)	Kapilbastu, Gorkha, Siraha, Bhojpur, Dadeldhura, Sindhuli, Khotang, Manang, Sarlahi, Sindhupalchok, Dhading, Pyuthan, Rautahat, Darchula, Mahottari, Rasuwa, Ramechhap, Solukhumbu, Baitadi, Salyan, Doti, Dailekh
Very Low (0.521-1.000)	Jumla, Dolakha, Rolpa, Bajahang, Achham, Jajarkot, Kalikot, Rukum, Bajura, Humla, Dolpa, Mugu

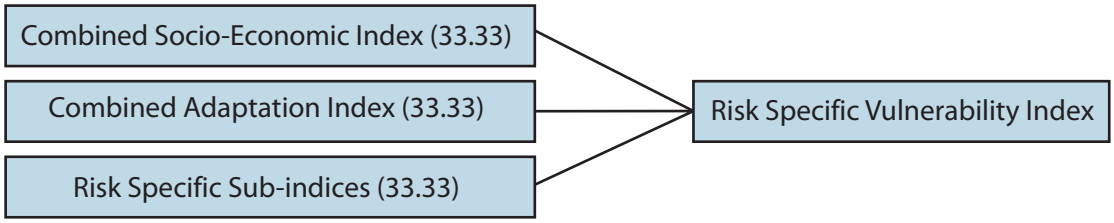
Map 14



7. VULNERABILITY ASSESSMENT

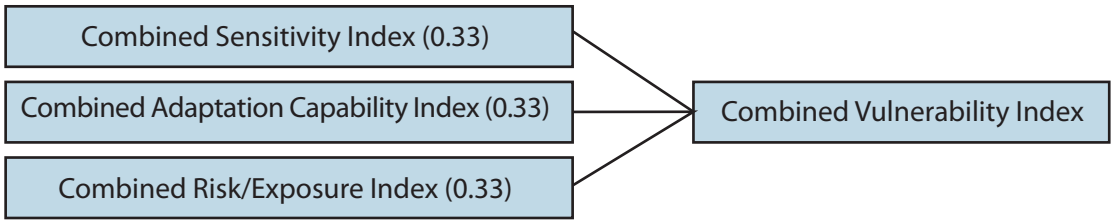
The sub-indices and combined or multiple index of three components of the vulnerability i.e. sensitivity, adaptation capability and exposure were integrated as explained in the methodological framework for the construction of risk specific climate change vulnerability index (*Figure 12*) and combined or multiple vulnerability index (*Figure 13*). The weights of 33.33% is assigned to specific risk/exposure, combined sensitivity, and combined adaptation capability indices to construct temperature and rainfall, ecology, landslide, flood, drought and GLOF vulnerability maps (*Map 15, 16, 17, 18, 19 and 20*), while for overall/combined vulnerability map (*Map 21*) equal weightage is given for combined risk/exposure, combined sensitivity, and combined adaptation capability indices. The ranking of the districts according to vulnerability indices for temperature and rainfall, ecology, landslide, flood, drought, GLOF and overall/combined vulnerability is presented *Table 16, 17, 18, 19, 20, 21 and 22 and Annex 16, 17, 18, 19, 20, 21 and 22.*

Figure 12. Methodological Steps for the Construction of Risk Specific Vulnerability Index



Note: Numbers in parenthesis are the weightage given to each of the indices

Figure 13. Methodological Steps for the Construction of Combined or Multiple Vulnerability Index



Note: Numbers in parenthesis are the weightage given to each of the indices

Map 15

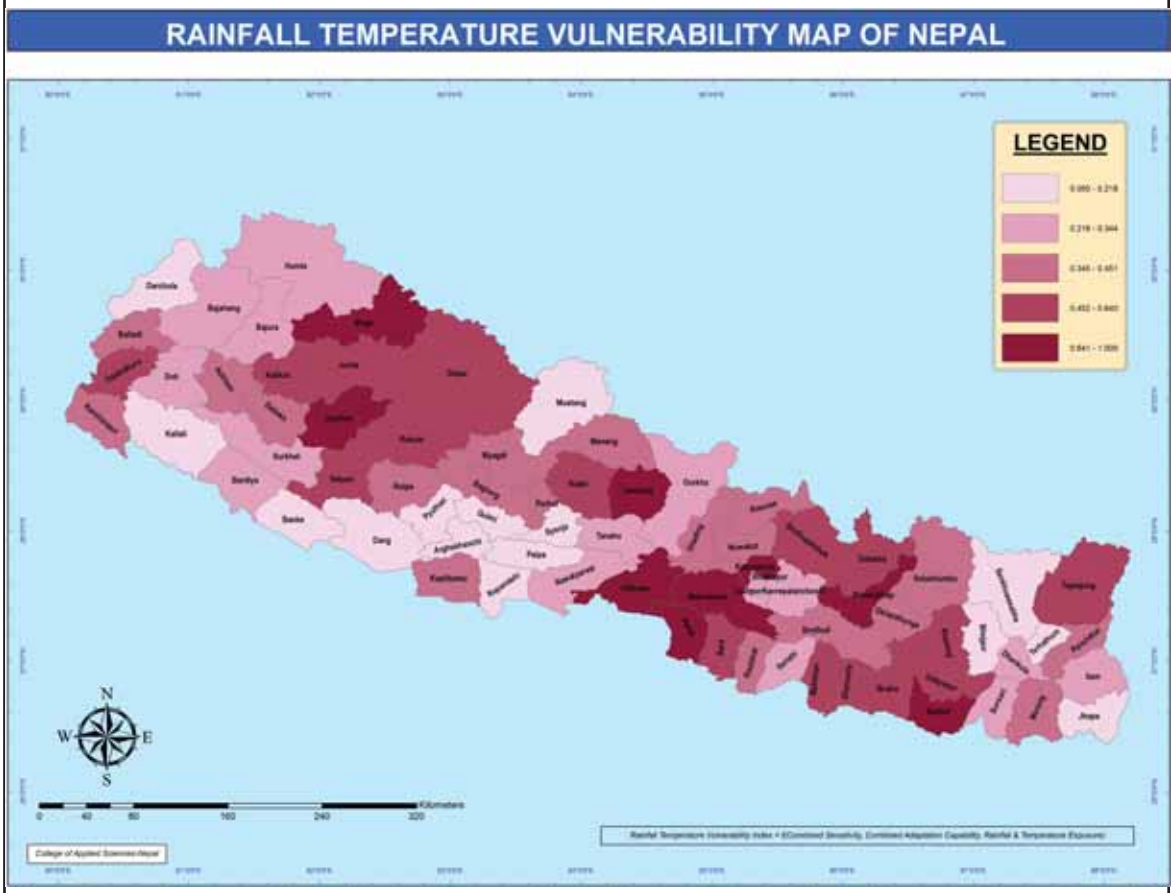


Table 16. District Ranks –Rainfall Temperature Vulnerability Index

Ecological Vulnerability	Districts
Very High 0.641-1.000)	Kathmandu, Lamjung, Mugu, Parsa, Ramechhap, Bhaktapur, Jajarkot, Saptari, Chitwan, Makwanpur
High (0.452-0.640)	Mahottari, Udayapur, Kaski, Salyan, Bara, Jumla, Dolpa, Dadeldhura, Dhanusha, Dolakha, Rukum, Kalikot, Taplejung, Khotang, Siraha, Sindhupalchok
Moderate (0.345-0.451)	Baglung, Myagdi, Dailekh, Okhaldhunga, Kapilbastu, Rautahat, Parbat, Dhading, Achham, Morang, Rolpa, Panchthar, Nuwakot, Kanchanpur, Manang, Sindhuli, Solukhumbu, Baitadi, Rasuwa

Ecological Vulnerability	Districts
Low (0.219-0.344)	Doti, Surkhet, Dhankuta, Lalitpur, Sunsari, Tanahu, Bardiya, Bajahang, Humla, Nawalparasi, Sarlahi, Bajura, Gorkha, Ilam, Kavrepalanchowk
Very Low (0.000-0.218)	Jhapa, Bhojpur, Sankhuwasabha, Darchula, Gulmi, Mustang, Arghakhanchi, Pyuthan, Dang, Terhathum, Kailali, Syanja, Banke, Rupandehi, Palpa

Map 16

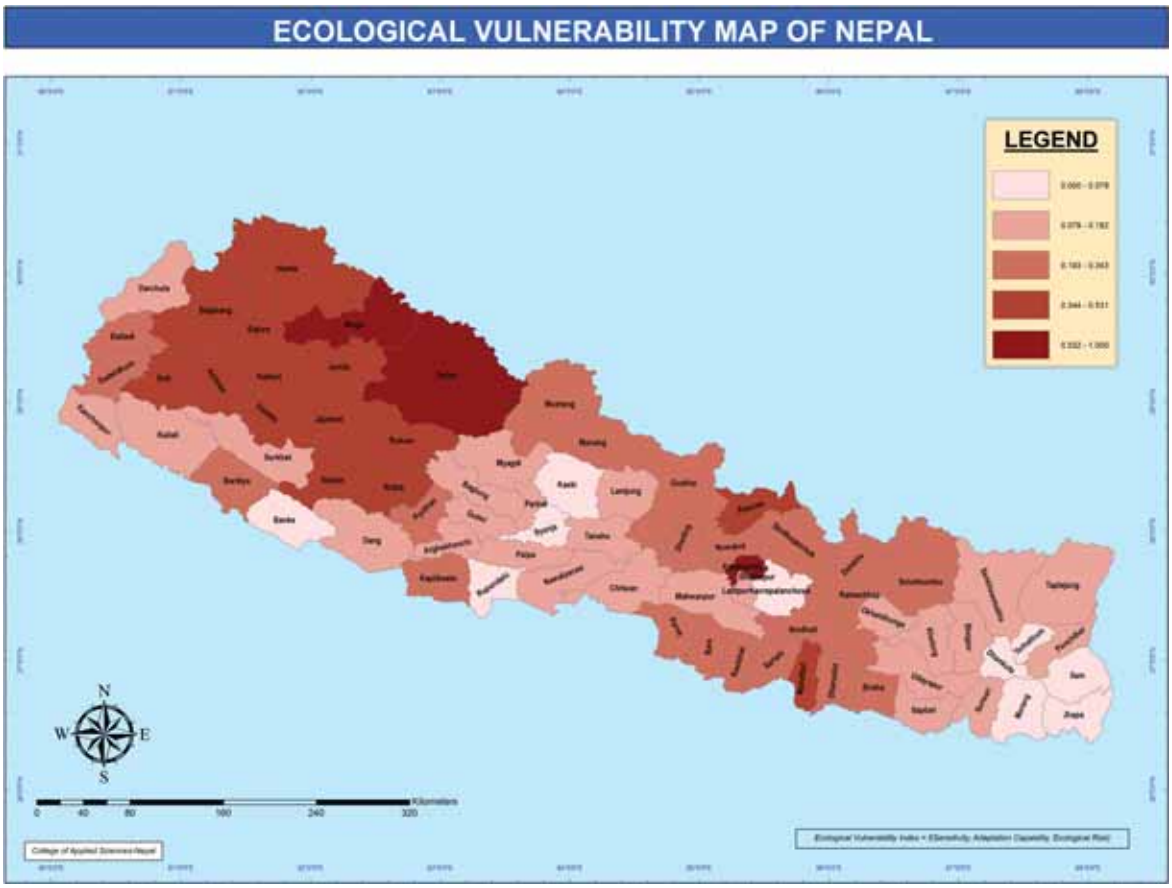


Table 17. District Ranks –Ecological Vulnerability Index

Ecological Vulnerability	Districts
Very High (0.532-1.000)	Bhaktapur, Kathmandu, Mugu, Dolpa
High (0.344-0.531)	Rukum, Achham, Rolpa, Jajarkot, Salyan, Kalikot, Doti, Dailekh, Bajura, Mahottari, Rasuwa, Bajahang, Jumla, Humla

Ecological Vulnerability	Districts
Moderate (0.193-0.343)	Pyuthan, Baitadi, Sarlahi, Rautahat, Dolakha, Parsa, Bardiya, Sindhupalchok, Solukhumbu, Ramechhap, Siraha, Dadeldhura, Bara, Dhanusha, Dhading, Sindhuli, Kapilbastu, Mustang, Manang, Gorkha, Nuwakot
Low (0.079-0.192)	Saptari, Taplejung, Surkhet, Gulmi, Dang, Khotang, Arghakhanchi, Sankhuwasabha, Bhojpur, Panchthar, Darchula, Lamjung, Kailali, Lalitpur, Udayapur, Baglung, Parbat, Okhaldhunga, Nawalparasi, Chitwan, Makwanpur, Kanchanpur, Tanahu, Myagdi, Sunsari, Palpa
Very Low (0.000-0.078)	Syangja, Kaski, Morang, Ilam, Terhathum, Banke, Kavrepalanchowk, Jhapa, Dhankuta, Rupandehi

Map 17

LANDSLIDE VULNERABILITY MAP OF NEPAL - Hill and Mountain Ecological Zone

Table 18. District Ranks – Landslide Vulnerability Index

Landslide Vulnerability	Districts
Very High (0.787-1.000)	Udayapur, Kathmandu, Mugu, Lamjung
High (0.630-0.786)	Darchula, Baglung, Rolpa, Achham, Makwanpur, Dolpa, Parbat, Taplejung, Ramechhap, Gorkha, Salyan, Doti, Bajahang, Sindhuli, Bhaktapur, Solukhumbu, Baitadi, Kaski, Rasuwa, Sindhupalchok, Jajarkot, Rukum, Nuwakot, Dhading, Myagdi
Moderate (0.47-0.629)	Bajura, Bhojpur, Okhaldhunga, Sankhuwasabha, Syangja, Dailekh, Arghakhanchi, Tanahu, Kalikot, Kavrepalanchowk, Dolakha, Khotang, Dang, Surkhet, Humla, Gulmi, Jumla, Panchthar, Pyuthan
Low (0.001-0.476)	Ilam, Manang, Dadeldhura, Mustang, Palpa, Terhathum, Lalitpur, Dhankuta
Very Low (0.000)	Saptari, Siraha, Chitwan, Mahottari, Sunsari, Dhanusha, Nawalparasi, Rautahat, Sarlahi, Bara, Kanchanpur, Parsa, Morang, Kailali, Jhapa, Banke, Kapilbastu, Rupandehi, Bardiya

Map 18

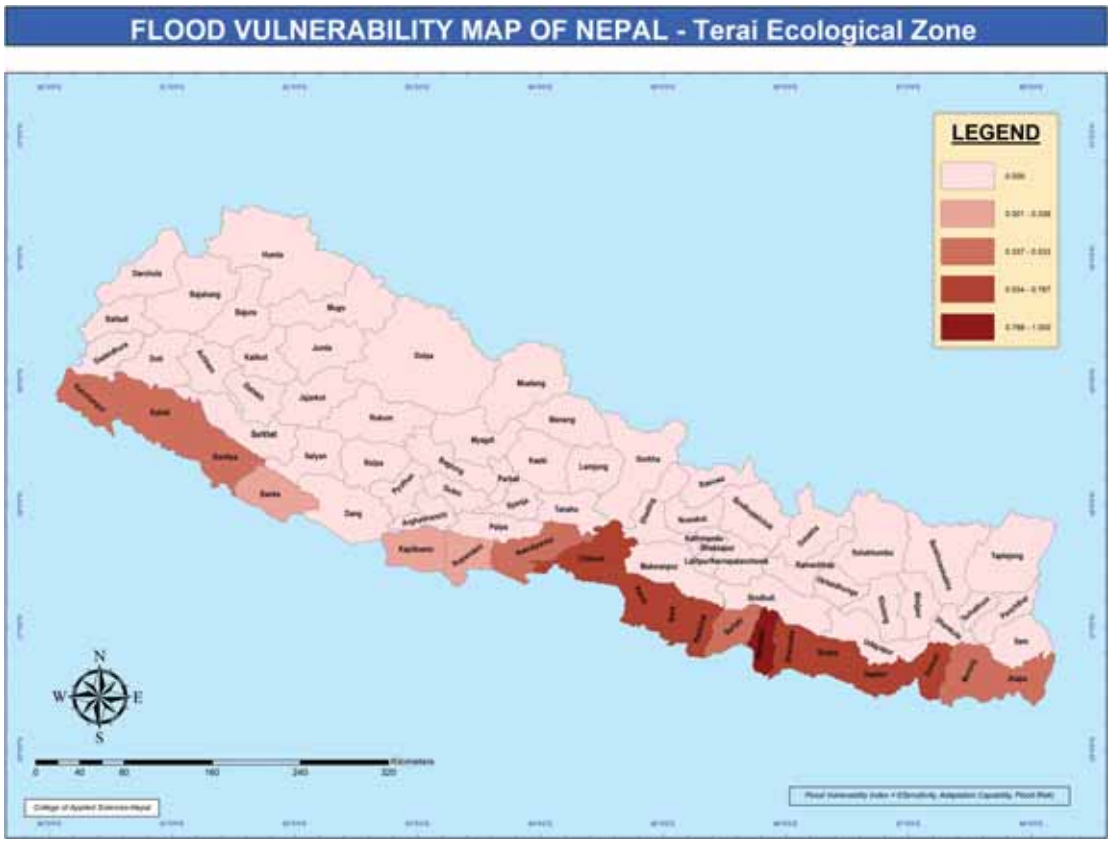


Table 19. District Ranks – Flood Vulnerability Index	
Flood Vulnerability	**Districts**
Very High (0.788-1.000)	Mahottari
High (0.534-0.787)	Rautahat, Chitwan, Parsa, Saptari, Siraha, Sunsari, Dhanusha, Bara
Moderate (0.337-0.533)	Sarlahi, Nawalparasi, Kailali, Jhapa, Morang, Kanchanpur, Bardiya
Low (0.001-0.336)	Banke, Kapilbastu, Rupandehi
Very Low (0.000)	Achham, Arghakhanchi, Baglung, Baitadi, Bajahang, Bajura, Bhaktapur, Bhojpur, Dadeldhura, Dailekh, Dang, Darchula, Dhading, Dhankuta, Dolakha, Dolpa, Doti, Gorkha, Gulmi, Humla, Ilam, Jajarkot, Jumla, Kalikot, Kaski, Kathmandu, Kavrepalanchowk, Khotang, Lalitpur, Lamjung, Makwanpur, Manang, Mugu, Mustang, Myagdi, Nuwakot, Okhaldhunga, Palpa, Panchthar, Parbat, Pyuthan, Ramechhap, Rasuwa, Rolpa, Rukum, Salyan, Sankhuwasabha, Sindhuli, Sindhupalchok, Solukhumbu, Surkhet, Syangja, Tanahu, Taplejung, Terhathum, Udayapur

Map 19

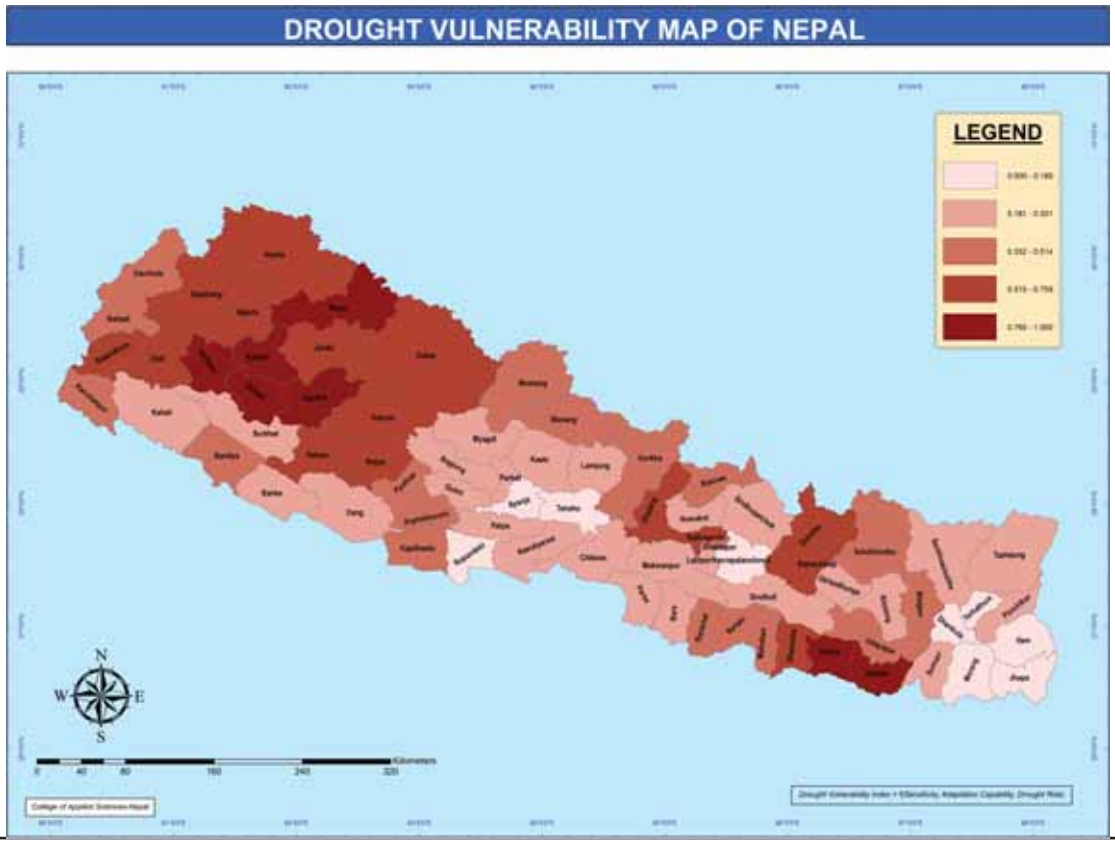


Table 20. District Ranks – Drought Vulnerability Index

Flood Vulnerability	Districts
Very High (0.760-1.000)	Jajarkot, Mugu, Kalikot, Dailekh, Saptari, Achham, Siraha
High (0.515-0.759)	Dolpa, Humla, Kathmandu, Jumla, Dadeldhura, Bajura, Bajahang, Rukum, Salyan, Dolakha, Rolpa, Ramechhap, Doti, Dhanusha, Dhading
Moderate (0.332-0.514)	Baitadi, Sarlahi, Bardiya, Pyuthan, Rasuwa, Manang, Kanchanpur, Mustang, Bhaktapur, Gorkha, Mahottari, Udayapur, Kapilbastu, Darchula, Rautahat, Bhojpur, Solukhumbu, Arghakhanchi
Low (0.181-0.331)	Sindhuli, Parsa, Dang, Banke, Kailali, Gulmi, Taplejung, Sindhupalchok, Lalitpur, Makwanpur, Panchthar, Nuwakot, Chitwan, Baglung, Surkhet, Sankhuwasabha, Kaski, Palpa, Khotang, Nawalparasi, Bara, Myagdi, Parbat, Okhaldhunga
Very Low (0.000-0.180)	Lamjung, Sunsari, Rupandehi, Tanahu, Kavrepalanchowk, Ilam, Terhathum, Morang, Syangja, Dhankuta, Jhapa

Map 20

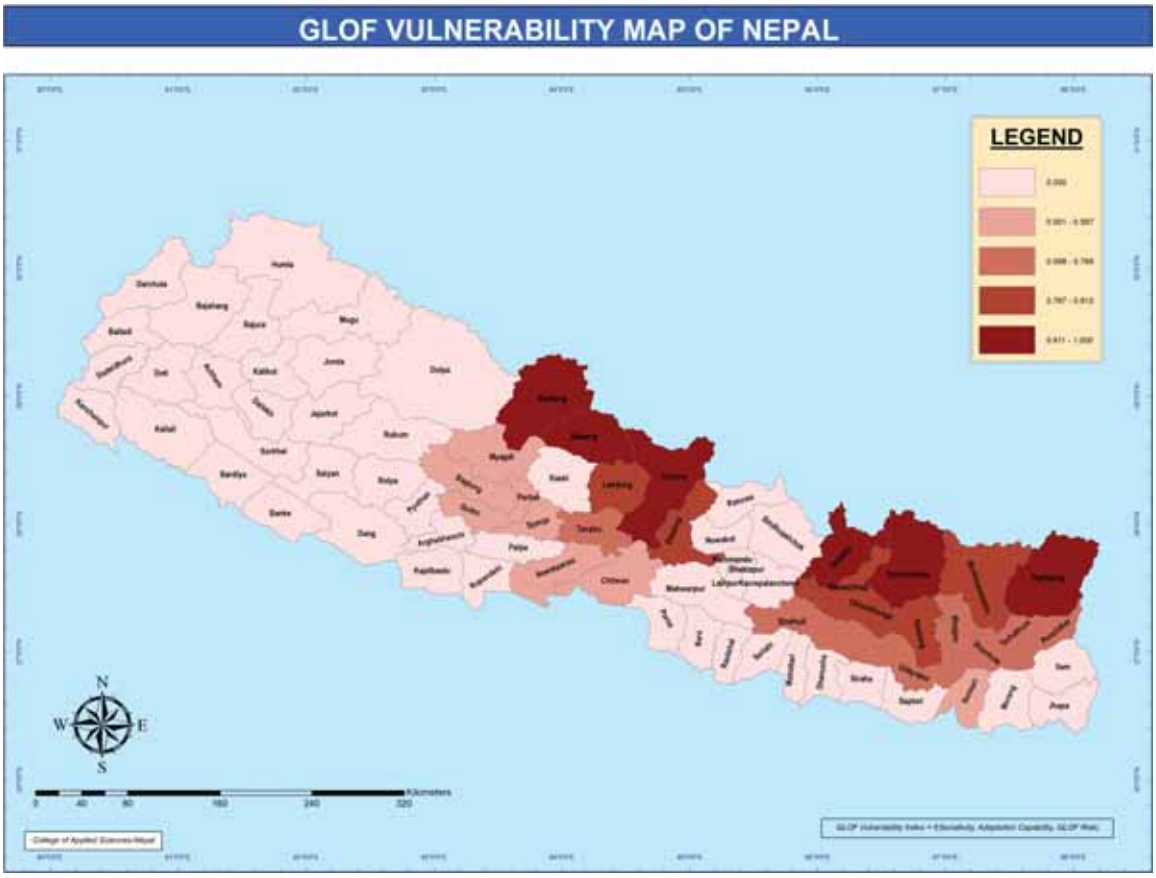


Table 21. District Ranks – GLOF Vulnerability Index	
GLOF Vulnerability	**Districts**
Very High (0.911-1.000)	Dolakha, Solukhumbu, Manang, Mustang, Taplejung, Gorkha
High (0.767-0.910)	Khotang, Sankhuwasabha, Lamjung, Okhaldhunga, Ramechhap, Dhading
Moderate (0.598-0.766)	Bhojpur, Panchthar, Udayapur, Tanahu, Terhathum, Sindhuli, Dhankuta
Low (0.001-0.597)	Baglung, Chitwan, Parbat, Myagdi, Nawalparasi, Sunsari, Gulmi, Syangja
Very Low (0.000)	Jajarkot, Mugu, Kalikot, Dailekh, Saptari, Achham, Siraha, Dolpa, Humla, Kathmandu, Jumla, Dadeldhura, Bajura, Bajahang, Rukum, Salyan, Rolpa, Doti, Dhanusha, Baitadi, Sarlahi, Bardiya, Pyuthan, Rasuwa, Kanchanpur, Bhaktapur, Mahottari, Kapilbastu, Darchula, Rautahat, Arghakhanchi, Parsa, Dang, Banke, Kailali, Sindhupalchok, Lalitpur, Makwanpur, Nuwakot, Surkhet, Kaski, Palpa, Bara, Rupandehi, Kavrepalanchowk, Ilam, Morang, Jhapa

Map 21

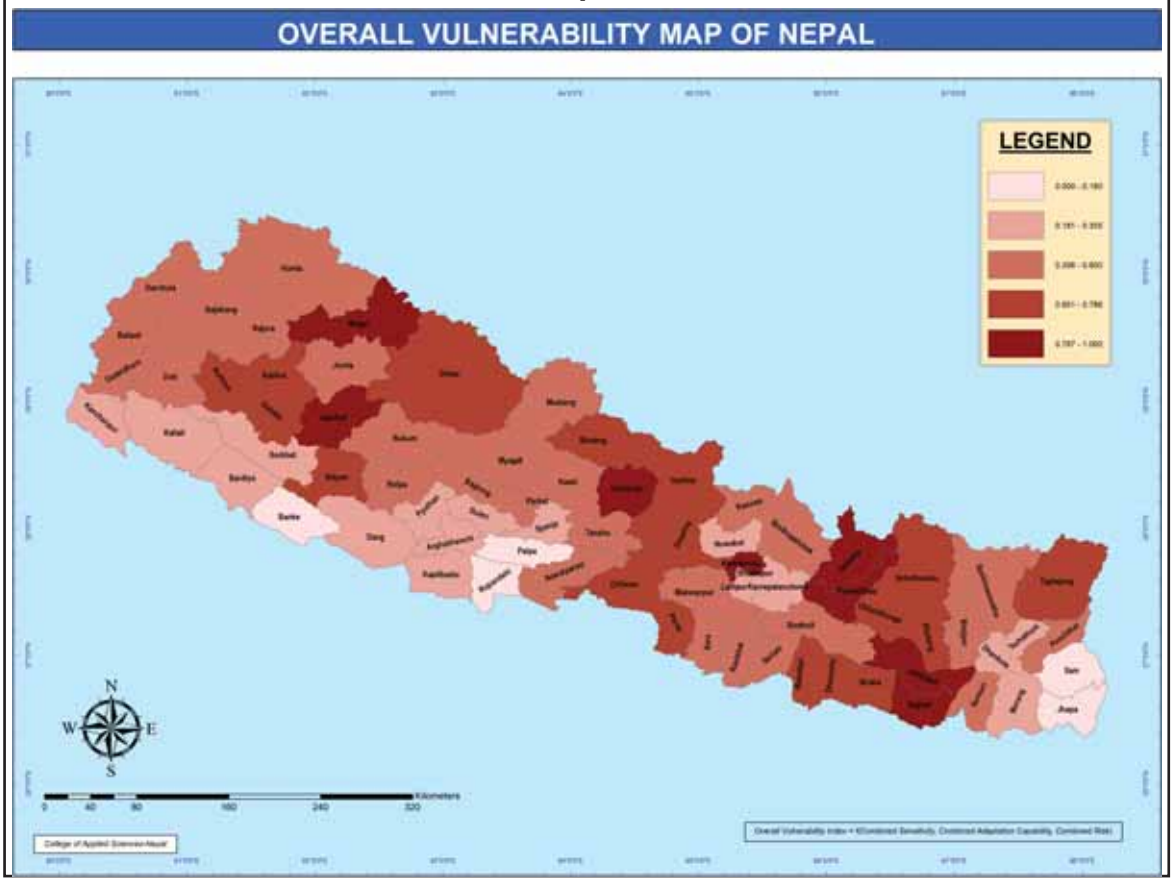


Table 22. District Ranks – Overall Vulnerability Index

Combined Vulnerability	Districts
Very High (0.787-1.000)	Kathmandu, Ramechhap, Udayapur, Lamjung, Mugu, Bhaktapur, Dolakha, Saptari, Jajarkot
High (0.601-0.786)	Mahottari, Dhading, Taplejung, Siraha, Gorkha, Solukhumbu, Chitwan, Okhaldhunga, Achham, Manang, Dolpa, Kalikot, Khotang, Dhanusha, Dailekh, Parsa, Salyan
Moderate (0.356-0.600)	Sankhuwasabha, Baglung, Sindhuli, Bhojpur, Jumla, Mustang, Rolpa, Bajahang, Rukum, Rautahat, Panchthar, Parbat, Dadeldhura, Sunsari, Doti, Tanahu, Makwanpur, Myagdi, Humla, Bajura, Baitadi, Bara, Rasuwa, Nawalparasi, Sarlahi, Sindhupalchok, Darchula, Kaski
Low (0.181-0.355)	Nuwakot, Dhankuta, Kanchanpur, Bardiya, Kapilbastu, Terhathum, Gulmi, Pyuthan, Surkhet, Arghakhanchi, Morang, Dang, Lalitpur, Kailali, Syanja, Kavrepalanchowk
Very Low (0.000-0.180)	Ilam, Jhapa, Banke, Palpa, Rupandehi

8. CONCLUSIONS

One of the key issues in the adaptation policy formulation and planning is identification of the vulnerable areas such that the adaptation programs and activities could be started at once to respond the impacts of climate change on priority basis. This study is an attempt to address to this need at the district level in Nepal. Because of the data limitation and the expert judgment particularly in assigning weighatge to the various climatic indicators was practiced. There is always room for the improvement of the sensitivity, risk/exposure, and adaptation capability indices and consequently the maps prepared on the basis of the above indices. Despite these limitation and possibilities of improvements, this study has been able to come up with the outputs which are expected to be useful for the government agencies and development partners in better targeting financial resources towards adaptation measures undertaken in Nepal.

9. RECOMMENDATIONS

The vulnerability maps derived based on the integration of combined sensitivity, combined adaptation capacity and specific and combined risk exposures help in identifying the geographical areas at the district that needs urgent and immediate adaptation interventions. The districts having very high and high vulnerability status obviously are the first choice to initiate immediate adaptation planning.

Kathmandu, Bhaktapur, and Lalitpur districts rank very high to high in most of the risk specific and combined vulnerability maps. The district area (small compared to the other districts of Nepal), the urbanized character, and limited forest cover area in these districts are the reasons for very high to high combined sensitivity sub-indices score compared to other districts. As a result despite very high score in the combined adaptation capacity indices, these districts score very high to high in the risk specific and combined vulnerability maps. Obviously these three districts are the outliers in the vulnerability analysis. These districts located within the Kathmandu valley, the

capital of Nepal, have been enjoying the larger share of national development budgets and very likely will continue to enjoy the same status in future. It is therefore, these districts should be disregarded while planning for dedicated adaptation interventions. But this notation never argues that these districts are not vulnerable. As huge population reside in these districts, the change in natural system and livelihood services will have huge impacts on it. Therefore considering the higher adaptive capacity and higher vulnerability as well, the future adaptation interventions should be planned.

Adaptation planning, in the context of Nepal, should be based on the risk specific exposure issues related to climate change. Such a strategy is envisaged to strengthen people or community capacities for adaptation to the recurring risks like flood, landslides, drought and GLOF. The study recommends prioritizing the following districts for adaptation planning considering specific climate change exposures (Table 23).

Table 23. Prioritized Districts for Adaptation Planning

Risk/ Exposures	Prioritized Districts for Adaptation Planning	
	First Phase	Second Phase
Ecological	Mugu, Dolpa, Rukum, Achham, Rolpa, Jajarkot,	Salyan, Kalikot, Doti, Dailekh, Bajura, Mahottari, Rasuwa, Bajahang, Jumla, Humla
Landslide	Udayapur, Mugu, Lamjung, Darchula, Baglung, Rolpa	Achham, Makwanpur, Parbat, Taplejung, Ramechhap, Gorkha, Salyan, Doti, Bajahang, Sindhuli, Solukhumbu, Baitadi, Kaski, Rasuwa, Sindhupalchok,
		Jajarkot, Rukum, Nuwakot, Dhading, Myagdi
Flood	Mahottari, Rautahat, Chitwan, Parsa, Saptari, Siraha	Sunsari, Dhanusha, Bara, Sarlahi, Nawalparasi, Kailali,
Draught	Jajarkot, Mugu, Kalikot, Dailekh, Saptari, Achham, Siraha	Dolpa, Humla, Jumla, Dadeldhura, Bajura, Bajahang, Rukum, Salyan, Dolakha, Rolpa, Ramechhap, Doti, Dhanusha, Dhading
GLOF	Dolakha, Solukhumbu, Manang, Mustang, Taplejung, Gorkha	Khotang, Sankhuwasabha, Lamjung, Okhaldhunga, Ramechhap, Dhading

As adaptation planning should be focused to the communities exposed to the risks, further analysis of the district is necessary for targeting the vulnerable communities requiring adaptation assistance. Since each communities exposed to the risk have a different set of capabilities and weaknesses, specific adaptation measures could only be developed with the understanding of the community in question. In other words, there is no single adaptation prescription which could be employed in all the areas experiencing same sets of risks. It is largely dependent upon the capacity of the communities, which need to be understood and analyzed to develop a pragmatic community specific adaptation strategy.

REFERENCES

Arief Anshory Yusuf & Herminia A. Francisco. 2009. Climate Change Vulnerability Mapping for Southeast Asia. Economy and Environment Program for Southeast Asia, http://www.eepsea.org

Bajracharya. S.R; Mool.P.R; and Joshi. S.P, 2001. Spatial database development of glaciers and glacial lakes in the identification of potentially dangerous glacial lakes of Nepal using remote sensing and geographic information systems.

CBS. 2001. Population Census of Nepal. CBS, 2001, Kathmandu, Nepal

Department of Forest. 2001. Information System Development Project for the Management of Tropical Forest; Activity Report of Wide Area and Tropical Forest Resource Survey, March, 2001

Department of National Park and Wildlife Conservation. 2010. http://www.dnpwc.gov.np

Department of Roads, Road Statistics 2006/2007(http://www.dor.gov.np/road_statistics.php)

FAO/WFP. 2007. Special Report, WFP Food Security Assessment Mission to Nepal, 25 july 2007. Kathmandu, Nepal

Gary Yohe, Elizabeth Malone, Antoinette Brenkert, Michæl Schlesinger, Henk Meij, Xiaoshi Xing (2006). Global Distributions of Vulnerability to Climate Change. The Integrated Assessment Journal Br idg ing S c i enc e s & Po l i c y, Vol. 6, Iss. 3 (2006), Pp. 35–44.

HMGN/ADB/FINNIDA, 1989. Master Plan for Forestry Sector Nepal (Main Report). His Majesty's Government of Nepal (HMGN), Ministry of Forests and Soil Conservation, Asian Development Bank (ADB) and Finnish International Development Agency (FINNIDA), Kathmandu.

IPCC, 2001. J. McCarthy; O. Canziani; N. Leary; D. Dokken; and K. White (eds) In Climate Change 2001: Impacts, Adaptation, and Vulnerability. Cambridge University Press. Cambridge.

IPCC, 2007. Climate Change 2007: Synthesis Report, Intergovernmental Panel for Climate Change/ Fourth Assessment Report

ISRC. 2008. Village Development Committee Profile of Nepal, A Socio-Economic Development Database of Nepal, Kathmandu, Nepal

Johnson Nkem et. al., 2007. Methodological Framework for Vulnerability Assessment of Climate Change Impacts on Forest-based Development Sectors, Second Year Annual Report

MoFSC, 2002. Nepal Biodiversity Strategy (NBS). His Majesty's Government of Nepal, Ministry of Forest and Soil Conservation, Kathmandu.

MoHA, 2010. Unpublished records on landslides, and floods, Ministry of Home Affairs, Disaster Preparedness Network, Documentation Center, Kathmandu, Nepal

MOAC. 2006. National Crop and Food Supply Assessment Mission Results, December, 2006. Kathmandu, Nepal

MoAC/ABPSD. 2006. Statistical Information on Nepalese Agriculture 2005/2006, Kathmandu, Nepal

MoAC/ABPSD. 2007. Statistical Information on Nepalese Agriculture 2006/2007, Kathmandu, Nepal

MoAC/ABPSD. 2008. Statistical Information on Nepalese Agriculture 2007/2008, Kathmandu, Nepal

MOAC/WFP. 2008. Report on Rapid Emergency Food Security Assessment (EFSA) Far and Mid West Hills and Mountains, Nepal July 200. Kathmandu Nepal

MOAC/WFP/FAO. 2009. Crop and Food Security Assessment Joint Assessment Report - May 2009. Kathmandu, Nepal.

Nepal Telecom. 2010. Management Information System (MIS). Nepal Doorsanchar Company Limited, Operation & Maintenance Department, 2010.

Practical Action Nepal Office, 2009. Temporal and Spatial Variability of Climate Change voer Nepal (1976 -2005). Practical Action Nepal Office, 2009; ISBN: 978-9937-8135-2-5

Stern, Nicholas. 2007: The Stern Review on the Economics of Climate Change. Available at http://www.hmtreasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm, Cambridge, UK: Cambridge University Press.

UNDP (2004), Human Development Report, United Nations Development Programme, New York, USA

UNDP. 2004. Nepal Human Development Report 2004, Empowerment and Poverty Reduction. UNDP, Pulchowk, Kathmandu, Nepal.

Ursula Kaly, Lino Briguglio, Helena McLeod, Susana Schmall, Craig Pratt3 and Reginald Pal, (2006). Environmental Vulnerability Index (EVI) to summarise national environmental vulnerability profiles. South Pacific Applied Geoscience Commission, Technical Report 275.

Yale Center for Environmental Law and Policy (YCELP), Yale University; Center for International Earth Science Information Network (CIESIN), Columbia University; World Economic Forum (WEF); Joint Research Centre (JRC), European Commission 2008. 2008 Environmental Performance Index (EPI) New Haven, CT: YCELP, Yale University. Available at:

ANNEX 1

BASELINE DATA FOR ANALYSIS

DISTRICT AREA, POPULATION, % OF PROTECTED AREA (PA) COVERAGE, TOTAL ROAD LENGTH, NUMBER OF PSTN FACILITY, TOTAL IRRIGATED LAND, HUMAND DEVELOPMENT INDEX (HDI), GENDER DEVELOPMENT INDEX (GDI), HUMAN POVERTY INDEX (HPI), AND HUMAN EMPOWERMENT INDEX (HEI)

S.N.	Districts	District Area (km2)[1]	Population[2]	Forest Area (ha)[3]	Protected Area[4] (ha)	Total Length of Road km[5]	Number of PSTN Facility[6]	Total Irrigated Land Ha[7]	HDI[8]	GDI[9]	HPI[10]	HEI[11]	Mean Annual Temperature Trend[12]	Annual Rainfall Trend[13]
1	Achham	1680.00	231285	99144	4562	140.5	275	1088	0.35	0.314	59.2	0.305	0.01	3.37
2	Arghakhanchi	1193.00	208391	69961	0	190.91	780	2169.3	0.471	0.463	40.5	0.459	0.01	-3.85
3	Baglung	1784.00	268937	91505	28256	135.13	2702	1787.8	0.492	0.481	35.7	0.414	0.01	11.95
4	Baitadi	1519.00	234418	72020	0	198.86	504	2680.9	0.391	0.361	48.7	0.309	0.03	0.89
5	Bajahang	3422.00	167026	92391	7171	108	309	4051	0.331	0.289	59.9	0.28	0.00	5.00
6	Bajura	2188.00	108781	72507	520	17	164	788	0.31	0.277	56.4	0.279	0.01	-1.93
7	Banke	2337.00	385840	104269	0	384.01	10537	19695.9	0.479	0.463	34.4	0.579	0.01	-3.41
8	Bara	1190.00	559135	37974	0	303.13	4168	34432	0.465	0.42	45.5	0.472	0.02	12.85
9	Bardiya	2025.00	382649	99364	96800	310.32	1728	47856.3	0.429	0.411	43.2	0.505	0.02	-0.84
10	Bhaktapur	119.00	225461	583	0	254.34	20097	5525.65	0.595	0.578	29.9	0.645	0.05	5.93
11	Bhojpur	1507.00	203018	61448	0	51	526	1371.7	0.472	0.457	43.6	0.357	0.03	-0.34
12	Chitwan	2218.00	472048	132746	73540	790.19	23526	30988	0.518	0.505	31.9	0.591	0.04	11.34
13	Dadeldhura	1538.00	126162	105937	0	183.15	677	1712	0.434	0.396	46.2	0.419	0.04	-4.99
14	Dailekh	1502.00	225201	88699	0	222.9	422	929	0.381	0.358	52.5	0.335	0.03	-2.15
15	Dang	2955.00	462380	170124	0	590.78	6550	24639.9	0.409	0.388	41.4	0.556	0.01	-3.59
16	Darchula	2322.00	121996	58177	0	72.42	474	2224.5	0.424	0.394	45.4	0.334	0.01	4.44
17	Dhading	1926.00	338658	79205	0	263.88	1029	5147	0.41	0.394	47.7	0.427	0.03	-5.23
18	Dhankuta	891.00	166479	26324	0	240.84	1876	3408	0.507	0.493	34.4	0.561	0.05	2.00
19	Dhanusha	1180.00	671364	25773	0	655.21	8446	28113.88	0.449	0.416	41.4	0.475	0.03	8.35
20	Dolakha	2191.00	204229	78111	0	247.48	87	3211.5	0.45	0.425	44	0.457	0.01	-7.83
21	Dolpa	7889.00	29545	60603	271648	1	182	733.5	0.371	0.341	61.9	0.255	0.01	0.95

S.N.	Districts	District Area (km2)[1]	Population[2]	Forest Area (ha)[3]	Protected Area[4] (ha)	Total Length of Road km[5]	Number of PSTN Facility[6]	Total Irrigated Land Ha[7]	HDI[8]	GDI[9]	HPI[10]	HEI[11]	Mean Annual Temperature Trend[12]	Annual Rainfall Trend[13]
22	Doti	2025.00	207066	141848	10247	190.21	1113	1471.6	0.402	0.368	53.4	0.229	0.01	4.13
23	Gorkha	3610.00	288134	101158	166300	163.34	1703	3582.35	0.454	0.445	41.7	0.334	0.03	-0.03
24	Gulmi	1149.00	296654	51649	0	213.54	932	2445.4	0.467	0.457	39.4	0.384	0.01	4.49
25	Humla	5655.00	40595	41051	0	31	184	672.5	0.367	0.337	63.8	0.264	0.01	-3.87
26	Ilam	1703.00	282806	72214	0	396.95	2510	8231.35	0.521	0.513	33.7	0.497	0.03	5.00
27	Jajarkot	2230.00	134868	151306	0	35	184	833.1	0.343	0.328	57.2	0.281	0.03	-5.19
28	Jhapa	1606.00	688109	13239	0	603.6	17728	50805.65	0.494	0.482	29.2	0.578	0.03	5.42
29	Jumla	2531.00	89427	110531	2475	37	471	549.8	0.348	0.316	56.8	0.304	0.03	-5.00
30	Kailali	3235.00	616697	169708	0	452.5	10209	40544.05	0.442	0.428	39.5	0.486	0.01	-2.09
31	Kalikot	1741.00	105580	87165	0	65	201	816.8	0.332	0.274	58.9	0.273	0.02	-5.00
32	Kanchanpur	1610.00	377899	84420	15179	233.82	5700	37531.3	0.463	0.442	35.2	0.554	0.03	-5.00
33	Kapilbastu	1738.00	481976	60500	0	355.97	2810	24854.5	0.437	0.407	48.5	0.478	0.01	-11.17
34	Kaski	2017.00	380527	89087	148194	646.36	26211	6734.8	0.593	0.578	24.9	0.656	0.03	11.65
35	Kathmandu	395.00	1081845	12680	9659	944.3	220275	5273	0.652	0.635	25.8	0.66	0.05	4.71
36	Kavrepalanchowk	1396.00	385672	46448	0	569.5	5377	4181.55	0.543	0.527	33.5	0.51	0.03	4.39
37	Khotang	1591.00	231385	61039	0	72	561	2991.5	0.442	0.425	42.8	0.356	0.04	3.22
38	Lalitpur	385.00	337785	14620	0	358.11	53435	5749.5	0.588	0.569	25	0.657	0.05	1.09
39	Lamjung	1692.00	177149	87552	40226	130.27	796	4281.3	0.492	0.48	37.5	0.427	0.06	13.25
40	Mahottari	1002.00	553481	24086	0	465.29	1863	13801.4	0.407	0.368	50.6	0.421	0.03	8.43
41	Makwanpur	2426.00	392604	137220	11046	398.04	6522	3741.6	0.479	0.468	35.3	0.467	0.04	10.60
42	Manang	2246.00	9587	11760	175813	19	70	253	0.502	0.495	37.9	0.356	0.03	1.95
43	Morang	1855.00	843220	43814	0	650.6	23436	111927.6	0.531	0.511	34.4	0.625	0.03	9.04
44	Mugu	3535.00	43937	87312	91977	1	172	156	0.304	0.263	61.1	0.249	0.02	-5.00
45	Mustang	3573.00	14981	16723	353464	44	188	1007	0.482	0.47	41.5	0.475	0.01	-1.71
46	Myagdi	2297.00	114447	67898	64712	50	1013	1411.8	0.498	0.486	40.3	0.388	0.01	12.41
47	Nawalparasi	2162.00	562870	89635	8614	224.33	4722	34754.16	0.482	0.466	40.2	0.532	0.01	8.44
48	Nuwakot	1121.00	288478	42916	14583	287.81	1693	4313.6	0.463	0.445	43.8	0.487	0.02	7.45

S.N.	Districts	District Area (km2)[1]	Population[2]	Forest Area (ha)[3]	Protected Area[4] (ha)	Total Length of Road km[5]	Number of PSTN Facility[6]	Total Irrigated Land Ha[7]	HDI[8]	GDI[9]	HPI[10]	HEI[11]	Mean Annual Temperature Trend[12]	Annual Rainfall Trend[13]
49	Okhaldhunga	1074.00	156702	32363	0	48	674	2127.5	0.481	0.461	46	0.458	0.05	3.89
50	Palpa	1373.00	268558	72607	0	291.84	2703	2993.8	0.486	0.478	33	0.419	0.01	0.68
51	Panchthar	1241.00	202056	53182	0	193.4	539	2805.75	0.484	0.472	42.1	0.442	0.03	5.05
52	Parbat	494.00	157826	26189	4432	70.61	1190	2370.7	0.504	0.492	35.5	0.525	0.02	9.65
53	Parsa	1353.00	497219	73131	49900	285.12	13039	48922.5	0.448	0.429	44.4	0.5	0.02	14.43
54	Pyuthan	1309.00	212484	93042	0	227	777	1301.8	0.416	0.399	47.9	0.41	0.01	-0.15
55	Ramechhap	1546.00	212408	48477	0	145	450	3560	0.434	0.414	53.4	0.348	0.03	-14.78
56	Rasuwa	1544.00	44731	47494	92821	97.5	155	1013	0.394	0.376	54.5	0.439	0.00	5.72
57	Rautahat	1126.00	545132	29076	0	203.33	2355	32274.3	0.409	0.384	51	0.398	0.02	5.02
58	Rolpa	1879.00	210004	150095	0	179.79	301	1356.5	0.384	0.357	53.1	0.144	0.01	0.37
59	Rukum	2877.00	188438	174725	80302	53.4	180	2289.5	0.386	0.364	53.7	0.178	0.02	0.63
60	Rupandehi	1360.00	708419	19897	0	362.41	23345	62958.97	0.546	0.527	29.2	0.555	0.01	-5.49
61	Salyan	1462.00	213500	143786	0	216.2	314	2071.1	0.399	0.382	48.2	0.336	0.03	-2.78
62	Sankhuwasabha	3480.00	159203	159872	102941	77.7	1407	3403.95	0.481	0.467	43.5	0.457	0.00	7.24
63	Saptari	1363.00	570282	30286	8800	334	5264	68920.6	0.453	0.416	40.2	0.502	0.03	13.67
64	Sarlahi	1259.00	635701	21786	0	452.32	3342	53884.12	0.408	0.377	49.8	0.427	0.03	-0.59
65	Sindhuli	2491.00	279821	136302	0	154.7	921	4023.05	0.469	0.453	48.3	0.33	0.03	1.63
66	Sindhupalchok	2542.00	305857	92955	69836	242.25	964	6362.22	0.414	0.401	51.1	0.467	0.03	5.95
67	Siraha	1188.00	572399	20202	0	305.93	4228	30609.5	0.427	0.388	47.1	0.445	0.03	6.33
68	Solukhumbu	3312.00	107686	86002	161859	1	846	1442	0.479	0.462	45.8	0.42	0.02	3.33
69	Sunsari	1257.00	625633	21304	9587	478.03	20883	35611.85	0.5	0.478	32.2	0.554	0.03	6.99
70	Surkhet	2451.00	288527	157687	0	407.14	4832	7476.4	0.486	0.475	44.6	0.459	0.02	5.40
71	Syanja	1164.00	317320	51214	0	278.74	1999	3697.3	0.535	0.518	35.3	0.479	0.01	4.33
72	Tanahu	1546.00	315237	71949	0	423.61	4167	3390	0.524	0.516	42	0.493	0.03	5.90
73	Taplejung	3646.00	134698	112256	203500	37.1	558	2963.5	0.467	0.451	38.4	0.384	0.02	9.72
74	Terhathum	679.00	113111	20033	0	63.475	711	2738	0.523	0.504	40.9	0.539	0.02	5.09
75	Udayapur	2063.00	287689	109404	0	214.86	1605	3542.6	0.488	0.474	40	0.457	0.05	7.76

Source:

1 = District Area -

2 = Population – CBS. 2001. *Population Census of Nepal. CBS, 2001,* Kathmandu, Nepal

3= Forest Area - Department of Forest. 2001. Information System Development Project for the Management of Tropical Forest; Activity Report of Wide Area and Tropical Forest Resource Survey, March, 2001

4= Protected Area - Department of National Park and Wildlife Conservation (,)

5= Total Length of Road – Department of Roads, Road Statistics 2006/2007(http://www.dor.gov.np/road_statistics.php)

6= Number of PSTN Facility - Nepal Telecom. 2010.

7= Total Irrigated Land- MoAC/ABPSD. 2008. *Statistical Information on Nepalese Agriculture 2007/2008*, Kathmandu, Nepal

8= HDI - UNDP. 2004. *Nepal Human Development Report 2004, Empowerment and Poverty Reduction.* UNDP, Pulchowk, Kathmandu, Nepal.

9= GDI- UNDP. 2004. *Nepal Human Development Report 2004, Empowerment and Poverty Reduction.* UNDP, Pulchowk, Kathmandu, Nepal.

10= HPI - UNDP. 2004. *Nepal Human Development Report 2004, Empowerment and Poverty Reduction.* UNDP, Pulchowk, Kathmandu, Nepal.

11= HEI- UNDP. 2004. *Nepal Human Development Report 2004, Empowerment and Poverty Reduction.* UNDP, Pulchowk, Kathmandu, Nepal.

12= Mean Annual Temperature Trend – Practical Action Nepal Office, 2009. *Temporal and Spatial Variability of Climate Change over Nepal (1976 -2005).* Practical Action Nepal Office, 2009; ISBN: 978-9937-8135-2-5.

13= Annual Rainfall Trend - Practical Action Nepal Office, 2009. *Temporal and Spatial Variability of Climate Change over Nepal (1976 -2005).* Practical Action Nepal Office, 2009; ISBN: 978-9937-8135-2-5.

POPULATION AT RISK DUE TO FOOD SCARCITY

S.N.	District	Population at Risk			
		2005/06	2006/07	2007/08	2008/09
1	Achham	0	0	85400	23800
2	Arghakhanchi	0	0	0	0
3	Baglung	0	0	0	0
4	Baitadi	8425	0	0	15500
5	Bajhang	15000	0	0	78600
6	Bajura	16200	2700	36200	23000
7	Banke	33380	0	0	0
8	Bara	0	0	0	0
9	Bardiya	32890	0	0	0
10	Bhaktapur	0	0	0	0
11	Bhojpur	0	0	0	0
12	Chitwan	0	0	0	0
13	Dadeldhura	0	0	0	20000
14	Dailekh	29350	14324	22800	61800
15	Dang	15300	0	0	0
16	Darchula	1200	0	0	41700
17	Dhading	0	0	0	0
18	Dhankuta	0	0	0	0
19	Dhanusha	158000	0	0	0
20	Dolakha	0	0	0	0
21	Dolpa	10000	6036	5200	7600
22	Doti	0	0	0	56300
23	Gorkha	0	0	0	0
24	Gulmi	0	0	0	0
25	Humla	15000	15000	18800	42700
26	Illam	0	0	0	0
27	Jajarkot	0	72450	48000	13000
28	Jhapa	0	0	0	0
29	Jumla	6700	0	0	20700
30	Kailali	0	0	0	0
31	Kalikot	7840	28954	42400	38700
32	Kanchanpur	0	0	0	0

S.N.	District	Population at Risk			
		2005/06	2006/07	2007/08	2008/09
33	Kapilbastu	0	0	0	0
34	Kaski	0	0	0	0
35	Kathmandu	0	0	0	0
36	Kavrepalanchowk	2800	0	0	0
37	Khotang	0	0	0	0
38	Lalitpur	0	0	0	0
39	Lamjung	0	0	0	0
40	Mahottari	0	0	0	0
41	Makwanpur	0	0	0	0
42	Manang	0	0	0	0
43	Morang	0	0	0	0
44	Mugu	1100	4650	14300	31400
45	Mustang	0	0	0	0
46	Myagdi	0	0	0	0
47	Nawalparasi	0	0	0	0
48	Nuwakot	7500	0	0	0
49	Okhaldhunga	0	0	0	0
50	Palpa	0	0	0	0
51	Panchthar	0	0	0	0
52	Parbat	0	0	0	0
53	Parsa	3000	0	0	0
54	Pyuthan	20250	0	0	0
55	Ramechhap	0	0	0	0
56	Rasuwa	0	0	0	0
57	Rautahat	0	0	0	0
58	Rolpa	10000	0	0	15100
59	Rukum	12000	10150	13700	13000
60	Rupandehi	0	0	0	0
61	Salyan	0	0	0	0
62	Sankhuwasabha	0	0	0	0
63	Saptari	270000	3500	0	0
64	Sarlahi	0	0	0	0
65	Sindhuli	0	0	0	0
66	Sindhupalchowk	0	0	0	0

S.N.	District	Population at Risk			
		2005/06	2006/07	2007/08	2008/09
67	Siraha	230000	5000	0	0
68	Solukhumbu	0	0	0	0
69	Sunsari	0	0	0	0
70	Surkhet	1230	0	0	0
71	Syangja	0	0	0	0
72	Tanahu	0	0	0	0
73	Taplejung	0	0	0	0
74	Terhathum	0	0	0	0
75	Udayapur	10100	49538	0	0

Source:

MOAC, National Crop and Food Supply Assessment Mission Results December, 2006; FAO/WFP, Special Report, WFP Food Security Assessment Mission to Nepal, 25 July 2007; MOAC/WFP, Report on Rapid Emergency Food Security Assessment (EFSA) Far and Mid West Hills and Mountains, Nepal July 2008; MOAC/WFP/FAO Crop and Food Security Assessment Joint Assessment Report - May 2009.

LANDSLIDE AND FLOOD DISASTER

S.N.	Districts	2057				20 58				2059			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
1	Achham	19	0	0	2696000	7	0	0	545900	0	0	0	0
2	Arghakhanchi	32	8	0	3060420	9	11	12	27936200	0	0	0	0
3	Baglung	25	1	0	1815260	8	18	6	20250000	9	1	0	3168000
4	Baitadi	76	5	0	14273530	0	0	0	0	0	0	0	0
5	Bajahang	41	5	0	1360940	1	0	0	91500	0	0	0	0
6	Bajura	16	9	2	767250	3	2	0	5922000	0	0	0	0
7	Banke	5	0	0	0	1	1	0	0	0	0	0	0
8	Bara	1	1	0	0	0	0	0	0	5	0	0	3100000
9	Bardiya	1	0	0	31950	0	0	0	0	0	0	0	0
10	Bhaktapur	37	3	0	5175000	0	0	0	0	18	0	0	0
11	Bhojpur	20	0	0	978300	2	0	0	160000	5	14	6	2033650
12	Chitwan	8	0	2	0	14	1	0	36886000	20	39	147	0
13	Dadeldhura	2	0	0	1139500	0	0	0	0	0	0	0	0
14	Dailekh	3	14	0	210000	5	8	0	211400	12	1	0	11026000
15	Dang	36	4	0	4836540	17	4	3	1067400	0	0	0	0
16	Darchula	72	6	0	7768500	33	0	0	1337700	0	0	0	0
17	Dhading	54	3	0	10617870	11	32	1	895400	17	8	3	1052000
18	Dhankuta	5	1	0	245000	4	0	0	189200	6	11	1	43000
19	Dhanusha	4	0	1	0	22	1	0	6895400	23	0	0	42646400
20	Dolakha	4	8	0	0	4	20	4	0	2	4	0	0
21	Dolpa	3	0	0	394250	0	0	0	0	0	0	0	0
22	Doti	24	3	0	22341864	0	0		0	2	0		0
23	Gorkha	30	1	0	2504200	20	2	0	2088200	25	8	6	4763600
24	Gulmi	2	1	0	0	4	12	9	511000	4	1	0	190000
25	Humla	6	4	0	2047200	2	0	0	1226400	0	0	0	0

S.N.	Districts	2057				20 58				2059			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
26	Ilam	10	10	0	7240900	4	1	0	117000	16	2	0	7115200
27	Jajarkot	22	17	0	1573700	8	1	1	5799500	3	2	1	477800
28	Jhapa	19	0	0	155883920	4	2	0	9870000	11	0	0	800000
29	Jumla	3	2	0	420000	0	0	0	0	0	0	0	0
30	Kailali	10	3	0	6697500	0	0	0	0	0	0	0	0
31	Kalikot	3	0	1	1464000	0	0	0	0	0	0	0	0
32	Kanchanpur	18	0	0	10882225	9	0	0	1123900	2	1	0	2849800
33	Kapilbastu	1	3	0	0	0	0	0	0	0	0	0	0
34	Kaski	6	16	0	182000	4	6	7	157500	8	6	1	967000
35	Kathmandu	23	24	1	2809000	2	1	4	0	4	19	0	13611800
36	Kavrepalanchowk	40	4	0	6841750	1	0	0	0	32	48	17	0
37	Khotang	3	0	0	155200	1	0	0	52500	4	17	2	12872500
38	Lalitpur	1	0	0	30000	1	0	0	150000	19	1	1	8448200
39	Lamjung	20	13	0	5170900	18	5	0	439500	12	0	0	21258500
40	Mahottari	21	0	0	12566500	6	0	0	1384400	10	112	34	3536500
41	Makwanpur	3	3	0	70000	3	1	0	238000	22	4	1	161000
42	Manang	0	0	0	0	0	0	0	0	0	0	0	0
43	Morang	13	1	0	35635000	6	2	0	9150000	7	1	1	0
44	Mugu	7	0	0	146800	2	0	0	352000	1	0	0	3156000
45	Mustang	0	0	0	0	1	1	0	0	2	4	0	1535000
46	Myagdi	1	0	0	0	8	26	1	43168100	5	1	0	0
47	Nawalparasi	5	2	0	450500	8	4	3	1875900	2	6	0	1600000
48	Nuwakot	27	5	3	4763580	3	0	0	100000	14	6	1	13172200
49	Okhaldhunga	26	0	0	3756400	6	21	7	745000	16	1	0	5624000
50	Palpa	19	0	0	2293200	1	0	0	210000	0	0	0	0

S.N.	Districts	2057				20 58				2059			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
51	Panchthar	1	2	0	0	1	1	0	0	14	0	0	893000
52	Parbat	38	2	0	19954700	21	0	0	1193000	10	0	0	406000
53	Parsa	5	0	0	767000	5	1	0	131000	8	0	0	0
54	Pyuthan	1	4	0	0	0	0	0	0	1	44	0	10530000
55	Ramechhap	50	1	4	5036700	8	1	6	3629600	1	3	4	0
56	Rasuwa	5	0	0	1010000	3	0	0	0	8	3	1	10669000
57	Rautahat	4	0	0	0	3	3	0	0	48	0	0	7654400
58	Rolpa	49	8	0	17537886	4	0	0	578000	0	0	0	0
59	Rukum	6	16	0	1527500	0	0	0	0	1	0	0	6408000
60	Rupandehi	1	0	0	35000	2	2	2	4509800	0	0	0	0
61	Salyan	31	1	100	6993270	1	0	0	9000	0	0	0	0
62	Sankhuwasabha	4	5	0	790000	6	24	9	12811000	5	1	0	8774000
63	Saptari	20	0	0	23664100	0	0	0	0	29	1	0	110442900
64	Sarlahi	5	0	2	1000000	6	0	0	12943700	28	3	0	13986000
65	Sindhuli	30	7	0	272366680	1	10	0	0	7	8	10	820000
66	Sindhupalchok	18	0	0	1639825	14	7	1	17807500	6	0	0	9216000
67	Siraha	13	1	0	1277000	11	0	12	3059900	41	4	1	4305200
68	Solukhumbu	30	4	0	9850270	9	3	0	7655000	12	4	1	784200
69	Sunsari	2	0	0	0	3	0	0	268090	16	9	5	3475600
70	Surkhet	19	6	1	1504600	0	0	0	0	0	0	0	0
71	Syanja	25	1	0	2542000	40	3	0	4277400	10	1	0	0
72	Tanahu	8	20	0	35776000	3	0	0	231000	3	27	8	40395480
73	Taplejung	6	0	0	2468000	4	0	0	356000	6	9	4	0
74	Terhathum	0	0	0	0	2	1	0	0	6	3	0	24948000
75	Udayapur	34	5	3	172147780	2	2	0	300000	14	462	265	416915930

Source : Ministry of Home Affairs, Disaster Preparedness Network, Documentation Center, 2010

LANDSLIDE AND FLOOD DISASTER

S.N.	Districts	2060				20 61				2062			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
1	Achham	1	0	0	11115000	4	3	0	0	1	1	0	0
2	Arghakhanchi	12	0	0	1805000	1	2	4	456000	12	0	0	8202200
3	Baglung	2	0	0	17000000	1	0	0	100000	2	0	0	1355000
4	Baitadi	2	0	0	140000	0	0	0	0	0	0	0	0
5	Bajahang	0	0	0	0	0	0	0	0	3	0	2	1019500
6	Bajura	3	6	3	1047900	0	0	0	0	10	1	0	3434900
7	Banke	1	0	0	0	0	0	0	0	0	0	0	0
8	Bara	12	8	1	7824000	10	5	0	864000	0	0	0	0
9	Bardiya	0	0	0	0	0	0	0	0	0	0	0	0
10	Bhaktapur	0	0	0	0	0	0	0	0	0	0	0	0
11	Bhojpur	0	0	0	0	0	0	0	0	0	0	0	0
12	Chitwan	7	31	5	4045000	1	1	0	0	0	0	0	0
13	Dadeldhura	0	0	0	0	1	0	0	0	7	33	1	13445900
14	Dailekh	5	0	0	2544100	0	0	0	0	0	0	0	0
15	Dang	6	7	1	3025000	2	6	0	0	4	2	1	5497700
16	Darchula	1	5	0	150000	0	0	0	0	14	0	0	871300
17	Dhading	8	4	0	2693000	0	0	0	0	0	0	0	0
18	Dhankuta	0	0	0	0	1	0	0	0	4	0	0	2094000
19	Dhanusha	5	7	0	0	10	5	0	1279600	0	0	0	0
20	Dolakha	1	1	3	0	2	0	0	90000	0	0	0	0
21	Dolpa	0	0	0	0	0	0	0	0	1	0	0	130000
22	Doti	3	4	0	0	1	0	0	0	1	0	0	178000
23	Gorkha	25	27	4	1408000	0	0	0	0	0	0	0	0
24	Gulmi	4	10	1	4880000	0	0	0	0	0	0	0	0
25	Humla	9	2	0	4787200	0	0	0	0	2	11	4	543000

S.N.	Districts	2060				20 61				2062			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
26	Ilam	9	0	0	13763600	1	1	0	0	3	5	0	105000
27	Jajarkot	2	0	0	780000	0	0	0	0				
28	Jhapa	27	3	0	1749500	8	2	0	89000	4	4	0	435000
29	Jumla	2	1	2	0	1	2	0	0	1	1	0	0
30	Kailali	9	4	0	0	2	0	0	3132000	1	0	0	236965
31	Kalikot	0	0	0	0	1	0	0	0	0	0	0	0
32	Kanchanpur	8	0	0	2769000	2	0	0	214000	2	0	0	5000000
33	Kapilbastu	0	0	0	0	0	0	0	0	1	39	0	0
34	Kaski	12	9	7	10516900	2	0	0	50000	1	10	12	0
35	Kathmandu	7	2	2	250000	3	0	0	35000	2	1	0	425000
36	Kavrepalanchowk	0	0	0	0	2	2	2	0	4	3	0	183000
37	Khotang	0	0	0	0	13	4	0	5713000	12	0	1	3837000
38	Lalitpur	1	1	0	0	1	0	0	187200	0	0	0	0
39	Lamjung	7	4	2	1681100	0	0	0	0	2	0	0	5583200
40	Mahottari	16	1	0	2124500	70	6	4	49530200	5	7	5	782000
41	Makwanpur	15	8	3	17894000	22	24	2	55000	2	1	0	87000
42	Manang	1	0	0	71500	0	0	0	0	0	0	0	0
43	Morang	10	4	0	3677000	5	1	0	0	2	0	0	0
44	Mugu	0	0	0	0	0	0	0	0	0	0	0	0
45	Mustang	0	0	0	0	0	0	0	0	1	0	0	200000
46	Myagdi	6	7	2	360000	0	0	0	0	1	0	0	25000
47	Nawalparasi	7	10	7	2000000	1	0	0	0	0	0	0	0
48	Nuwakot	1	0	0	0	1	0	0	2810000	3	5	1	0
49	Okhaldhunga	2	1	0	162000	21	21	7	2674000	4	3	0	145000
50	Palpa	1	1	2	15000	0	0	0	0	0	0	0	0

S.N.	Districts	2060				20 61				2062			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
51	Panchthar	4	0	0	1898800	2	0	0	0	1	1	1	0
52	Parbat	3	0	0	230000	0	0	0	0	2	0	0	50000
53	Parsa	8	0	0	3340600	1	0	0	343000	1	2	0	0
54	Pyuthan	1	7	0	0	1	3	0	0	2	2	0	466000
55	Ramechhap	2	4	2	0	40	5	1	128599800	2	3	1	0
56	Rasuwa	7	25	3	215400	0	0	0	0	0	0	0	0
57	Rautahat	40	1	0	68777050	15	7	0	582600	2	9	2	40000
58	Rolpa	2	12	1	19936000	0	0	0	0	2	0	0	447500
59	Rukum	1	1	0	0	0	0	0	0	0	0	0	0
60	Rupandehi	2	2	0	0	0	0	0	0	0	0	0	0
61	Salyan	2	0	1	350000	1	0	0	1018000	2	0	0	135000
62	Sankhuwasabha	9	0	0	2532800	2	2	0	324000	1	0	0	105000
63	Saptari	3	0	0	1418250	8	0	0	874200	1	0	0	0
64	Sarlahi	1	1	0	0	12	16	0	55000	4	2	0	678500
65	Sindhuli	20	1	3	1793400	15	8	0	10188160	8	0	0	1509600
66	Sindhupalchok	2	3	2	100000	3	0	3	355000	8	1	0	970600
67	Siraha	4	2	1	0	13	7	0	5100000				
68	Solukhumbu	1	4	0	150000	1	0	0	120000	3	2	0	3214400
69	Sunsari	4	1	0	212000	7	2	0	0	4	1	0	64580000
70	Surkhet	0	0	0	0	0	0	0	0	0	0	0	0
71	Syanja	3	0	0	1069000	2	0	0	720000	0	0	0	0
72	Tanahu	18	29	5	1270000	0	0	0	0	0	0	0	0
73	Taplejung	11	18	8	302000	5	1	0	731000	3	0	0	163500
74	Terhathum	1	0	0	0	0	0	0	0	1	0	0	30000
75	Udayapur	16	11	5	10911100	17	6	1	3000000	7	11	0	5355650

Source : Ministry of Home Affairs, Disaster Preparedness Network, Documentation Center, 2010

LANDSLIDE AND FLOOD DISASTER

S.N.	Districts	2063				20 64				2065			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
1	Achham	1	8	8	19690000	1	1	0		0	0	0	0
2	Arghakhanchi	2	1	0	182883	1	3	0	4405600	1	1	0	0
3	Baglung	2	12	6	0	1	46	0	1174000	9	0	0	5944200
4	Baitadi	1	10	3	700000	1	8	0	23340045	0	0	0	0
5	Bajahang	2	0	0	5655000	1	3	0	22813225	0	0	0	0
6	Bajura	1	0	0	0	1	5	0	10456208	3	16	4	44
7	Banke	1	7	12	200524127	1	32	0	0	0	0	0	0
8	Bara	0	0	0	0	3	2	0	103	0	0	0	0
9	Bardiya	1	5	0	0	0	0	0	0	1	0	0	0
10	Bhaktapur	0	0	0	0	0	0	0	0	0	0	0	0
11	Bhojpur	0	0	0	0	1	24		1070490025	1	3	0	0
12	Chitwan	1	4	0	0	0	0	0	0	2	0		815000
13	Dadeldhura	0	0	0	0	1	1	0	10458832	4	4		1055750
14	Dailekh	0	0	0	0	0	0	0	0	0	0	0	0
15	Dang	0	0	0	0	0	0	0	0	0	0	0	0
16	Darchula	1	1	1	0	1	26	0	19208600	8	6	2	0
17	Dhading	0	0	0	0	1	3	0	956300	2	10	4	106500
18	Dhankuta	1	0	0	150000	1	0	0	887400	0	0	0	0
19	Dhanusha	0	0	0	0	0	0	0	0	0	0	0	0
20	Dolakha	2	6	2	0	0	0	0	0	0	0	0	0
21	Dolpa	1	0			0	0	0	0	2	2	0	0
22	Doti	1	2	0	51646400	1	0	0	7503630	2	5	0	1722900
23	Gorkha	5	0	0	350000	1	0	0	5297940	1	0	0	0
24	Gulmi	0	0	0	0	1	15	0	11218000	1	2	0	0
25	Humla	1	2	0	0	1	0	0	1230500	0	0	0	0

S.N.	Districts	2063				20 64				2065			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
26	Ilam	0	0	0	0	1	6		7582000	0	0	0	0
27	Jajarkot	1	3	0	0	1	3	0	0	1	9	0	105000
28	Jhapa	0	0	0	0	1	4	0	0	1	0	0	0
29	Jumla	1	0	0	0	0	0	0	0	1	2	0	0
30	Kailali	0	0	0	0	1	2	0	0	3	16	0	642900000
31	Kalikot	1	1	0	70382	2	2	0	0	1	6	0	0
32	Kanchanpur	0	0	0	0	1	0	0	1708350	1	16	0	0
33	Kapilbastu	0	0	0	0	1	0	0	600000	0	0	0	0
34	Kaski	1	30	0	7100000	5	16	4	29781300	1	4	0	0
35	Kathmandu	1	0	0	0	1	0	0	11027500	0	0	0	0
36	Kavrepalanchowk	0	0	0	0	1	1	0	0	0	0	0	0
37	Khotang	0	0	0	0	3	24	0	5615902	0	0	0	0
38	Lalitpur	0	0	0	0	0	0	0	0	0	0	0	0
39	Lamjung	0	0	0	0	2	3	0	1400000	1	0	0	0
40	Mahottari	1	0	0	0	0	0	0	0	0	0	0	0
41	Makwanpur	1	5	0	0	1	7	0	8410000	0	0	0	0
42	Manang	1	1	0	0	1	0	0	215000	1	0	0	0
43	Morang	0	0	0	0	1	4	0	0	0	0	0	0
44	Mugu	0	0	0	0	0	0	0	0	1	0	0	700000
45	Mustang	1	9	7	0	5	1	0	7091200	0	0	0	0
46	Myagdi	0	0	0	0	1	0	0	1150300	0	0	0	0
47	Nawalparasi	1	3	0	562900	1	4	0	28280318	1	0	0	0
48	Nuwakot	1	3	0	0	1	0	0	6860000	2	4	2	0
49	Okhaldhunga	0	0	0	0	1	32	21	7680500	3	7	0	0
50	Palpa	0	0	0	0	1	2	0	32100000	0	0	0	0

S.N.	Districts	2063				20 64				2065			
		Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)	Occurrence	Death	Injured	Property Loss (NRs)
51	Panchthar	0	0	0	0	1	7	0	7863600	0	0	0	0
52	Parbat	0	0	0	0	1	0	0	15249000	2	0	1	0
53	Parsa	0	0	0	0	2	0	0	0	2	1	0	0
54	Pyuthan	0	0	0	0	1	6	0	40000	0	0	0	0
55	Ramechhap	0	0	0	0	1	2	0	4411700	0	0	0	0
56	Rasuwa	1	10	0	150000	1	5	2	5756500	1	1	0	0
57	Rautahat	1	2	0	0	0	0	0	0	0	0	0	0
58	Rolpa	0	0	0	0	1	0	0	61000	0	0	0	0
59	Rukum	0	0	0	0	1	3	2	3539000	3	5	0	0
60	Rupandehi	0	0	0	0	1	1	0	147631000	18	2	1	2381800
61	Salyan	0	0	0	0	0	0	0	0	3	4	0	0
62	Sankhuwasabha	0	0	0	0	1	0	0	16817000	1	0	0	0
63	Saptari	0	0	0	0	1	3	0	22825900	1	0	0	0
64	Sarlahi	2	1	0	200000	0	0	0	0	0	0	0	0
65	Sindhuli	3	1	0	101200	0	0	0	0	0	0	0	0
66	Sindhupalchok	2	6	0	208000	0	0	0	0	0	0	0	0
67	Siraha	0	0	0	0	1	5	0	125685400	0	0	0	0
68	Solukhumbu	0	0	0	0	2	4	1	61395100	1	3	0	0
69	Sunsari	0	0	0	0	1	6	0	31500000	1	2	0	881700000
70	Surkhet	1	0	0	1291662	1	6	0	0	0	0	0	0
71	Syanja	0	0	0	0	1	6	0	16429861	0	0	0	0
72	Tanahu	2	8	0	45000	5	6	5	6869199	3	0	0	290000
73	Taplejung	1	3	0	0	1	0	0	3424500	1	1	2	0
74	Terhathum	0	0	0	0	1	26	0	42000	0	0	0	0
75	Udayapur	0	0	0	0	1	38	0	23063720	0	0	0	0

Source : Ministry of Home Affairs, Disaster Preparedness Network, Documentation Center, 2010

TOTAL EDIBLE PRODUCTION OF CEREAL CROPS AND REQUIREMENT

S.N.	District	2005/06			2006/07		
		Total Edible Production	Requirement	Surplus/Deficit	Total Edible Production	Requirement	Surplus/Deficit
1	Accham	19469	49998	-30529	20970	50813	-29843
2	Arghakhanchi	38826	44691	-5865	41369	45339	-3970
3	Baglung	54848	57650	-2802	69592	58480	11112
4	Baitadi	21723	50564	-28841	20569	51362	-30793
5	Bajhang	17901	34647	-16746	17185	35288	-18103
6	Bajura	10391	22386	-11995	9825	22760	-12935
7	Banke	79171	80341	-1170	76488	82880	-6392
8	Bara	178156	115260	62896	178080	118638	59442
9	Bardiya	113941	78397	35544	109296	80584	28712
10	Bhaktapur	26491	51121	-24630	28933	52507	-23574
11	Bhojpur	55898	41398	14500	57322	41530	15792
12	Chitwan	78266	96925	-18659	92845	99678	-6833
13	Dadeldhura	22513	27614	-5101	21568	28141	-6573
14	Dailekh	35873	49247	-13374	44464	50177	-5713
15	Dang	123214	94235	28979	116965	96751	20214
16	Darchula	15457	25261	-9804	18067	25718	-7651
17	Dhading	69303	74320	-5017	55849	75784	-19935
18	Dhankuta	55119	35371	19748	54311	35810	18501
19	Dhanusha	126089	134856	-8767	109146	138012	-28866
20	Dolakha	18169	42028	-23859	18148	42730	-24582
21	Dolpa	2616	6088	-3472	4302	6191	-1889
22	Doti	25809	45966	-20157	23732	46991	-23259
23	Gorkha	80708	61437	19271	78942	62248	16694
24	Gulmi	57748	62637	-4889	56739	63326	-6587
25	Humla	1684	8365	-6681	1863	8507	-6644
26	Illam	60774	62420	-1646	61844	63731	-1887
27	Jajarkot	27366	29116	-1750	26663	29582	-2919
28	Jhapa	238518	133300	105218	209395	135326	74069
29	Jumla	12282	18379	-6097	13756	18680	-4924
30	Kailali	136308	132790	3518	145773	138009	7764
31	Kalikot	8116	21804	-13688	8534	22186	-13652
32	Kanchanpur	107263	81265	25998	119916	84435	35481
33	Kapilbastu	122561	98099	24462	128637	100689	27948
34	Kaski	82998	86009	-3011	81428	88280	-6852
35	Kathmandu	46068	268831	-222763	48078	281789	-233711
36	Kavrepalanchowk	82919	83707	-788	78384	85146	-6762
37	Khotang	64129	48056	16073	62768	48407	14361
38	Lalitpur	39788	76549	-36761	33766	78616	-44850

S.N.	District	2005/06			2006/07		
		Total Edible Production	Requirement	Surplus/Deficit	Total Edible Production	Requirement	Surplus/Deficit
39	Lamjung	67383	37957	29426	59651	38500	21151
40	Mahottari	79936	110981	-31045	68443	113534	-45091
41	Makwanpur	60649	86769	-26120	67347	88617	-21270
42	Manang	722	2352	-1630	759	2486	-1727
43	Morang	222065	168558	53507	187119	172317	14802
44	Mugu	6003	9146	-3143	4621	9323	-4702
45	Mustang	1439	2887	-1448	1578	2893	-1315
46	Myagdi	30191	24457	5734	29526	24792	4734
47	Nawalparasi	119227	114062	5165	115914	116959	-1045
48	Nuwakot	74060	62252	11808	71423	63242	8181
49	Okhaldhunga	37841	33146	4695	34547	33524	1023
50	Palpa	54294	57085	-2791	53462	57798	-4336
51	Panchthar	38182	43332	-5150	35358	43961	-8603
52	Parbat	42688	33117	9571	43858	33435	10423
53	Parsa	146424	102094	44330	149697	104993	44704
54	Pyuthan	33941	46527	-12586	31795	47421	-15626
55	Ramechhap	52544	45089	7455	57360	45639	11721
56	Rasuwa	6688	9303	-2615	6552	9481	-2929
57	Rautahat	79432	111687	-32255	85354	114803	-29449
58	Rolpa	28395	45338	-16943	26559	46063	-19504
59	Rukum	43478	41189	2289	41183	41964	-781
60	Rupandehi	147252	146290	962	160573	150634	9939
61	Salyan	59885	46154	13731	58001	46906	11095
62	Sankhuwasabha	40330	32057	8273	39572	32435	7137
63	Saptari	109995	113597	-3602	82501	116039	-33538
64	Sarlahi	109178	129388	-20210	106559	132804	-26245
65	Sindhuli	54517	62144	-7627	53626	63536	-9910
66	Sindhupalchowk	83496	62718	20778	84610	63715	20895
67	Siraha	131159	114119	17040	92581	116595	-24014
68	Solukhumbu	22675	21549	1126	23565	21773	1792
69	Sunsari	138404	129590	8814	129811	133530	-3719
70	Surkhet	71092	64701	6391	84678	66292	18386
71	Syangja	119412	66022	53390	117932	66530	51402
72	Tanahu	79942	68207	11735	78804	69333	9471
73	Taplejung	31714	27157	4557	30873	27485	3388
74	Terhathum	31888	23819	8069	32202	24067	8135
75	Udayapur	54448	65025	-10577	43713	66742	-23029

Source: MoAC/ABPSD (Statistical Information on Nepalese Agriculture 2005/2006, 2006/2007, 2007/2008), Ministry of Agriculture and Cooperatives (MoAC)

TOTAL EDIBLE PRODUCTION OF CEREAL CROPS AND REQUIREMENT

S.N.	District	2007/08			2008/09		
		Total Edible Production	Requirement	Surplus/Deficit	Total Edible Production	Requirement	Surplus/Deficit
1	Accham	20525	51642	-31117	19313	52534	-33221
2	Arghakhanchi	41199	45996	-4797	45731	46888	-1157
3	Baglung	69682	59322	10360	77930	60702	17228
4	Baitadi	22088	52174	-30086	19840	53288	-33448
5	Bajhang	16564	35940	-19376	14764	36883	-22119
6	Bajura	10359	23139	-12780	7583	23721	-16138
7	Banke	91234	85499	5735	97998	88536	9462
8	Bara	191931	122114	69817	190106	127804	62302
9	Bardiya	115046	82833	32213	107985	86114	21871
10	Bhaktapur	29395	53930	-24535	28815	55865	-27050
11	Bhojpur	57252	41663	15589	56145	41497	14648
12	Chitwan	109570	102509	7061	108206	107062	1144
13	Dadeldhura	19408	28678	-9270	17829	29410	-11581
14	Dailekh	42556	51126	-8570	41051	52374	-11323
15	Dang	129541	99334	30207	125552	103249	22303
16	Darchula	19899	26184	-6285	15441	26918	-11477
17	Dhading	60505	77277	-16772	60624	79568	-18944
18	Dhankuta	63965	36254	27711	65136	37076	28060
19	Dhanusha	141383	141241	142	142088	143609	-1521
20	Dolakha	18335	43443	-25108	17435	44464	-27029
21	Dolpa	5332	6297	-965	4604	6443	-1839
22	Doti	25329	48039	-22710	21898	49303	-27405
23	Gorkha	80692	63069	17623	79207	64321	14886
24	Gulmi	59202	64023	-4821	54025	64978	-10953
25	Humla	1776	8652	-6876	1514	9021	-7507
26	Illam	72053	65069	6984	74880	67126	7754
27	Jajarkot	28702	30056	-1354	25169	30973	-5804
28	Jhapa	249832	137383	112449	247372	140081	107291
29	Jumla	13944	18986	-5042	12882	19439	-6557
30	Kailali	143059	143433	-374	142435	151475	-9040
31	Kalikot	10946	22574	-11628	8579	23132	-14553
32	Kanchanpur	121005	87727	33278	107748	92321	15427

S.N.	District	2007/08			2008/09		
		Total Edible Production	Requirement	Surplus/Deficit	Total Edible Production	Requirement	Surplus/Deficit
33	Kapilbastu	138517	103347	35170	150984	107123	43861
34	Kaski	83770	90610	-6840	92674	94067	-1393
35	Kathmandu	51174	295371	-244197	50376	314244	-263868
36	Kavrepalanchowk	81635	86611	-4976	79950	88921	-8971
37	Khotang	76277	48760	27517	75680	49139	26541
38	Lalitpur	34724	80739	-46015	34588	84220	-49632
39	Lamjung	60291	39050	21241	61451	39859	21592
40	Mahottari	102814	116145	-13331	86331	120073	-33742
41	Makwanpur	65611	90505	-24894	66406	94067	-27661
42	Manang	782	2628	-1846	678	2877	-2199
43	Morang	212832	176159	36673	210929	182073	28856
44	Mugu	4628	9503	-4875	4068	9748	-5680
45	Mustang	1928	2899	-971	1500	2971	-1471
46	Myagdi	32060	25132	6928	33746	25488	8258
47	Nawalparasi	136021	119930	16091	141034	124615	16419
48	Nuwakot	75589	64247	11342	81040	65939	15101
49	Okhaldhunga	37366	33906	3460	37204	34569	2635
50	Palpa	60895	58521	2374	59969	59762	207
51	Panchthar	36071	44598	-8527	36461	45499	-9038
52	Parbat	44008	33756	10252	49010	34216	14794
53	Parsa	161726	107975	53751	161284	113035	48249
54	Pyuthan	35941	48331	-12390	31850	49689	-17839
55	Ramechhap	57390	46196	11194	56045	47043	9002
56	Rasuwa	6853	9662	-2809	6918	9987	-3069
57	Rautahat	93455	118006	-24551	94332	122584	-28252
58	Rolpa	29286	46800	-17514	26089	47775	-21686
59	Rukum	43163	42752	411	38471	44100	-5629
60	Rupandehi	197003	155108	41895	211885	163062	48823
61	Salyan	57913	47671	10242	51694	48762	2932
62	Sankhuwasabha	45188	32818	12370	46853	33321	13532
63	Saptari	114371	118534	-4163	122240	121225	1015
64	Sarlahi	109229	136310	-27081	105091	140740	-35649

S.N.	District	2007/08			2008/09		
		Total Edible Production	Requirement	Surplus/Deficit	Total Edible Production	Requirement	Surplus/Deficit
65	Sindhuli	53683	64959	-11276	52616	67097	-14481
66	Sindhupalchowk	85011	64729	20282	87968	66276	21692
67	Siraha	113865	119126	-5261	114562	123017	-8455
68	Solukhumbu	30594	21999	8595	30386	22308	8078
69	Sunsari	130270	137589	-7319	114973	143449	-28476
70	Surkhet	81467	67923	13544	79865	70385	9480
71	Syangja	122983	67042	55941	123547	67872	55675
72	Tanahu	82659	70476	12183	84794	72055	12739
73	Taplejung	34849	27818	7031	35337	28192	7145
74	Terhathum	26454	24317	2137	26583	24522	2061
75	Udayapur	54737	68504	-13767	63053	71173	-8120

Source: MoAC/ABPSD (Statistical Information on Nepalese Agriculture 2005/2006, 2006/2007, 2007/2008), Ministry of Agriculture and Cooperatives (MoAC)

20 POTENTIALLY DANGEROUS GLACIAL LAKES

S.N.	Glacier Lake	District	Altitude m	Area Sq m
1	Lower barun	Sankhuwasabha	4550	
2	Lumding Tsho	Solukhumbu	4846	104943
3	Dig Tsho	Solukhumbu	4364	143249
4	Imja Tsho	Solukhumbu	5023	48811
5	Tam Pokhari	Solukhumbu	4431	138846
6	Dudh Pokhari	Solukhumbu	4760	274296
7	Unnamed 1	Solukhumbu	5266	133752
8	Unnamed 2	Solukhumbu	5056	112398
9	Hungu	Solukhumbu	5181	198905
10	East Hungu 1	Solukhumbu	5379	78760
11	East Hungu 2	Solukhumbu	5483	211877
12	Unnamed 3	Solukhumbu	5205	349396
13	West Chamjang	Solukhumbu	4983	6446
14	Tsho Rolpa	Dolakha	4556	231693
15	Unnamed 4	Taplejung	4876	179820
16	Nagma Pokhari	Taplejung	4907	18971
17	Unnamed 5	Gorkha	3590	81520
18	Unnamed 6	Mustang	5419	149544
19	Unnamed 7	Mustang	5452	1015173
20	Thulagi	Manang	3825	223385

Source: Bajracharya. S.R; Mool.P.R; and Joshi. S.P, 2001. *Spatial database development of glaciers and glacial lakes in the identification of potentially dangerous glacial lakes of Nepal using remote sensing and geographic information systems.*

ANNEX 2

District Ranks-Human Sensitvity Sub-index Score

Rank	District	Score	Group
1	Kathmandu	1.000	Very High
2	Bhaktapur	0.691	Very High
3	Lalitpur	0.319	HIgh
4	Dhanusha	0.207	HIgh
5	Mahottari	0.201	HIgh
6	Rupandehi	0.189	HIgh
7	Sarlahi	0.183	HIgh
8	Sunsari	0.181	HIgh
9	Rautahat	0.176	HIgh
10	Siraha	0.175	HIgh
11	Bara	0.170	HIgh
12	Morang	0.165	HIgh
13	Jhapa	0.155	HIgh
14	Saptari	0.152	HIgh
15	Parsa	0.133	Moderate
16	Parbat	0.115	Moderate
17	Kavrepalanchowk	0.100	Moderate
18	Kapilbastu	0.100	Moderate
19	Syanja	0.098	Moderate
20	Nawalparasi	0.094	Moderate
21	Nuwakot	0.093	Moderate
22	Gulmi	0.093	Moderate
23	Kanchanpur	0.084	Moderate
24	Chitwan	0.076	Low
25	Tanahu	0.073	Low
26	Palpa	0.070	Low
27	Kailali	0.068	Low
28	Bardiya	0.068	Low
29	Kaski	0.068	Low
30	Dhankuta	0.067	Low
31	Dhading	0.063	Low
32	Arghakhanchi	0.062	Low
33	Terhathum	0.060	Low
34	Ilam	0.059	Low
35	Banke	0.059	Low
36	Panchthar	0.058	Low
37	Pyuthan	0.058	Low
38	Makwanpur	0.058	Low

Rank	District	Score	Group
39	Dang	0.056	Low
40	Baitadi	0.055	Low
41	Baglung	0.054	Low
42	Dailekh	0.053	Low
43	Salyan	0.052	Low
44	Okhaldhunga	0.052	Low
45	Khotang	0.052	Low
46	Udayapur	0.050	Low
47	Achham	0.049	Low
48	Ramechhap	0.049	Low
49	Bhojpur	0.048	Low
50	Sindhupalchok	0.043	Low
51	Surkhet	0.042	Low
52	Sindhuli	0.040	Low
53	Rolpa	0.039	Low
54	Lamjung	0.037	Low
55	Doti	0.036	Low
56	Dolakha	0.033	Very Low
57	Dadeldhura	0.029	Very Low
58	Gorkha	0.028	Very Low
59	Rukum	0.023	Very Low
60	Kalikot	0.021	Very Low
61	Jajarkot	0.021	Very Low
62	Darchula	0.018	Very Low
63	Myagdi	0.017	Very Low
64	Bajura	0.017	Very Low
65	Bajahang	0.016	Very Low
66	Sankhuwasabha	0.015	Very Low
67	Taplejung	0.012	Very Low
68	Jumla	0.012	Very Low
69	Solukhumbu	0.011	Very Low
70	Rasuwa	0.009	Very Low
71	Mugu	0.003	Very Low
72	Humla	0.001	Very Low
73	Manang	0.000	Very Low
74	Mustang	0.000	Very Low
75	Dolpa	0.000	Very Low

ANNEX 3

District Ranks – Ecological Sensitvity Sub-indices

Rank	District	Score	Group
1	Kaski	1.000	Very High
2	Salyan	0.859	Very High
3	Mustang	0.859	Very High
4	Bardiya	0.822	Very High
5	Chitwan	0.793	Very High
6	Parsa	0.772	Very High
7	Rasuwa	0.761	Very High
8	Rukum	0.756	Very High
9	Taplejung	0.723	Very High
10	Rolpa	0.689	Very High
11	Manang	0.684	Very High
12	Doti	0.643	High
13	Lamjung	0.637	High
14	Sankhuwasabha	0.634	High
15	Solukhumbu	0.619	High
16	Gorkha	0.613	High
17	Pyuthan	0.608	High
18	Dadeldhura	0.588	High
19	Jajarkot	0.578	High
20	Baglung	0.564	High
21	Surkhet	0.546	High
22	Sindhupalchok	0.530	High
23	Achham	0.521	High
24	Parbat	0.520	High
25	Kanchanpur	0.519	High
26	Makwanpur	0.514	High
27	Dailekh	0.498	High
28	Arghakhanchi	0.494	High
29	Dang	0.484	High
30	Myagdi	0.472	Moderate
31	Kathmandu	0.463	Moderate
32	Sindhuli	0.458	Moderate
33	Udayapur	0.442	Moderate
34	Palpa	0.441	Moderate
35	Kailali	0.437	Moderate
36	Nuwakot	0.420	Moderate
37	Kalikot	0.415	Moderate
38	Mugu	0.408	Moderate
39	Baitadi	0.391	Moderate
40	Tanahu	0.383	Moderate
41	Nawalparasi	0.371	Moderate
42	Gulmi	0.368	Moderate
43	Banke	0.365	Moderate
44	Jumla	0.365	Moderate
45	Syanja	0.359	Moderate
46	Panchthar	0.349	Moderate
47	Ilam	0.345	Moderate
48	Dhading	0.333	Moderate
49	Bhojpur	0.330	Moderate
50	Dolpa	0.325	Moderate
51	Khotang	0.307	Low
52	Lalitpur	0.304	Low
53	Dolakha	0.283	Low
54	Kapilbastu	0.275	Low
55	Bajura	0.262	Low
56	Kavrepalanchowk	0.261	Low
57	Bara	0.248	Low
58	Ramechhap	0.243	Low
59	Okhaldhunga	0.232	Low
60	Dhankuta	0.226	Low
61	Terhathum	0.226	Low
62	Bajahang	0.221	Low
63	Saptari	0.215	Low
64	Rautahat	0.192	Low
65	Darchula	0.185	Low
66	Sunsari	0.177	Low
67	Mahottari	0.176	Low
68	Morang	0.172	Low
69	Dhanusha	0.156	Low
70	Sarlahi	0.114	Very Low
71	Siraha	0.111	Very Low
72	Rupandehi	0.089	Very Low
73	Jhapa	0.031	Very Low
74	Humla	0.022	Very Low
75	Bhaktapur	0.000	Very Low

ANNEX 4

District Ranks–Combined Sensitvity Index

Rank	District	Score	Group
1	Kathmandu	1.000	Very High
2	Bhaktapur	0.573	High
3	Kaski	0.409	
4	Parsa	0.382	
5	Lalitpur	0.370	
6	Salyan	0.345	
7	Bardiya	0.345	
8	Chitwan	0.342	
9	Mustang	0.301	Moderate
10	Rukum	0.283	
11	Parbat	0.276	
12	Rasuwa	0.273	
13	Rolpa	0.273	
14	Taplejung	0.262	
15	Pyuthan	0.259	
16	Doti	0.253	
17	Lamjung	0.252	
18	Kanchanpur	0.249	
19	Baglung	0.240	
20	Manang	0.238	
21	Gorkha	0.236	
22	Sankhuwasabha	0.233	
23	Dadeldhura	0.227	
24	Makwanpur	0.225	
25	Bara	0.224	
26	Mahottari	0.223	
27	Surkhet	0.223	
28	Solukhumbu	0.223	
29	Arghakhanchi	0.222	
30	Dhanusha	0.221	
31	Nuwakot	0.221	
32	Achham	0.220	
33	Sindhupalchok	0.218	
34	Jajarkot	0.217	
35	Dailekh	0.216	
36	Dang	0.213	
37	Palpa	0.209	Low
38	Rautahat	0.208	
39	Sunsari	0.207	
40	Kailali	0.206	
41	Nawalparasi	0.204	
42	Syanja	0.204	
43	Gulmi	0.202	
44	Saptari	0.196	
45	Udayapur	0.192	
46	Morang	0.192	
47	Tanahu	0.191	
48	Sindhuli	0.190	
49	Sarlahi	0.187	
50	Rupandehi	0.183	
51	Baitadi	0.178	
52	Siraha	0.178	
53	Myagdi	0.175	
54	Kapilbastu	0.174	
55	Banke	0.172	
56	Kavrepalanchowk	0.169	
57	Panchthar	0.166	
58	Ilam	0.165	
59	Dhading	0.164	
60	Kalikot	0.158	
61	Bhojpur	0.150	
62	Khotang	0.146	Very Low
63	Mugu	0.141	
64	Jhapa	0.133	
65	Jumla	0.132	
66	Dhankuta	0.129	
67	Terhathum	0.123	
68	Dolakha	0.121	
69	Ramechhap	0.120	
70	Okhaldhunga	0.119	
71	Dolpa	0.108	
72	Bajura	0.100	
73	Bajahang	0.085	
74	Darchula	0.073	
75	Humla	0.000	

ANNEX 5

District Ranks-Temperature and Rainfall Risk/Exposure Sub-indices

Rank	District	Rain fall Trend	Score	Group
1	Lamjung	P	1.000	Very High
2	Ramechhap	N	0.757	
3	Saptari	P	0.756	
4	Makwanpur	P	0.747	
5	Chitwan	P	0.730	
6	Parsa	P	0.705	
7	Kaski	P	0.689	
8	Udayapur	P	0.682	
9	Bhaktapur	P	0.647	
10	Morang	P	0.579	High
11	Bara	P	0.578	
12	Kathmandu	P	0.576	
13	Mahottari	P	0.540	
14	Dhanusha	P	0.537	
15	Dhankuta	P	0.534	
16	Okhaldhunga	P	0.526	
17	Myagdi	P	0.494	
18	Dadeldhura	N	0.493	
19	Khotang	P	0.489	
20	Siraha	P	0.477	
21	Baglung	P	0.467	
22	Sunsari	P	0.458	
23	Parbat	P	0.441	Moderate
24	Kapilbastu	N	0.436	
25	Taplejung	P	0.433	
26	Lalitpur	P	0.433	
27	Jhapa	P	0.421	
28	Panchthar	P	0.415	
29	Jajarkot	N	0.412	
30	Kanchanpur	N	0.410	
31	Tanahu	P	0.407	
32	Ilam	P	0.405	
33	Jumla	N	0.401	
34	Sindhupalchok	P	0.400	
35	Kavrepalanchowk	P	0.395	
36	Nuwakot	P	0.367	
37	Dhading	N	0.365	
38	Surkhet	P	0.350	
39	Dolakha	N	0.348	
40	Nawalparasi	P	0.343	
41	Rautahat	P	0.312	
42	Sindhuli	P	0.305	
43	Salyan	N	0.299	
44	Mugu	N	0.269	Low
45	Manang	P	0.253	
46	Terhathum	P	0.253	
47	Kalikot	N	0.253	
48	Dailekh	N	0.239	
49	Baitadi	P	0.222	
50	Darchula	P	0.217	
51	Rupandehi	N	0.211	
52	Sarlahi	N	0.207	
53	Solukhumbu	P	0.205	
54	Bhojpur	N	0.195	
55	Gorkha	N	0.180	
56	Sankhuwasabha	P	0.179	
57	Gulmi	P	0.172	
58	Syanja	P	0.171	
59	Banke	N	0.161	
60	Rasuwa	P	0.152	
61	Bardiya	N	0.150	
62	Humla	N	0.147	
63	Arghakhanchi	N	0.146	
64	Dang	N	0.140	
65	Rukum	P	0.133	
66	Bajahang	P	0.129	
67	Kailali	N	0.109	Very Low
68	Doti	P	0.105	
69	Achham	P	0.088	
70	Dolpa	P	0.064	
71	Mustang	N	0.062	
72	Rolpa	P	0.049	
73	Bajura	N	0.043	
74	Palpa	P	0.021	
75	Pyuthan	N	0.000	

ANNEX 6

District Ranks-Ecological Risk/Exposure Sub-indices

Rank	District	Score	Group
1	Bhaktapur	1.000	Very High
2	Kathmandu	0.448	High
3	Mahottari	0.257	Moderate
4	Sarlahi	0.239	
5	Achham	0.221	
6	Humla	0.219	
7	Siraha	0.204	
8	Dolpa	0.203	
9	Bajahang	0.201	
10	Kalikot	0.199	
11	Mugu	0.198	
12	Dhanusha	0.198	
13	Rautahat	0.196	
14	Dailekh	0.192	
15	Kapilbastu	0.181	
16	Rolpa	0.179	
17	Bara	0.178	
18	Jajarkot	0.178	
19	Doti	0.177	
20	Ramechhap	0.175	
21	Jumla	0.175	
22	Bajura	0.170	
23	Rasuwa	0.169	
24	Pyuthan	0.167	
25	Baitadi	0.167	
26	Sindhupalchok	0.162	
27	Salyan	0.160	
28	Saptari	0.160	
29	Rukum	0.156	
30	Lalitpur	0.154	
31	Nuwakot	0.149	
32	Dhading	0.148	
33	Dadeldhura	0.137	Low
34	Surkhet	0.131	
35	Sindhuli	0.130	
36	Jhapa	0.127	
37	Panchthar	0.124	
38	Sunsari	0.124	
39	Bardiya	0.124	
40	Tanahu	0.123	
41	Dang	0.122	
42	Okhaldhunga	0.119	
43	Parsa	0.119	
44	Dolakha	0.114	
45	Morang	0.109	
46	Darchula	0.106	
47	Gulmi	0.104	
48	Arghakhanchi	0.102	
49	Nawalparasi	0.101	
50	Bhojpur	0.096	
51	Khotang	0.096	
52	Solukhumbu	0.095	
53	Dhankuta	0.094	
54	Udayapur	0.094	
55	Kailali	0.094	
56	Terhathum	0.091	
57	Rupandehi	0.091	
58	Syanja	0.088	
59	Kavrepalanchowk	0.088	
60	Sankhuwasabha	0.088	
61	Gorkha	0.081	Very Low
62	Ilam	0.078	
63	Makwanpur	0.076	
64	Kanchanpur	0.070	
65	Mustang	0.070	
66	Parbat	0.067	
67	Banke	0.065	
68	Myagdi	0.063	
69	Chitwan	0.059	
70	Palpa	0.058	
71	Lamjung	0.057	
72	Baglung	0.053	
73	Taplejung	0.047	
74	Manang	0.044	
75	Kaski	0.000	

ANNEX 7

District Ranks-Landslide Risk/Exposure Sub-indices

Rank	District	Score	Group
1	Udayapur	1.000	Very High
2	Darchula	0.664	
3	Lamjung	0.649	
4	Baglung	0.633	
5	Makwanpur	0.612	
6	Parbat	0.592	
7	Kaski	0.556	High
8	Myagdi	0.471	
9	Ramechhap	0.468	
10	Kavrepalanchowk	0.461	
11	Okhaldhunga	0.459	
12	Syanja	0.458	
13	Taplejung	0.455	
14	Sindhuli	0.452	
15	Gorkha	0.439	
16	Nuwakot	0.436	
17	Tanahu	0.395	
18	Bhojpur	0.392	
19	Sindhupalchok	0.391	
20	Dhading	0.390	
21	Bhaktapur	0.386	
22	Sankhuwasabha	0.357	Moderate
23	Baitadi	0.352	
24	Solukhumbu	0.348	
25	Bajahang	0.343	
26	Ilam	0.333	
27	Kathmandu	0.323	
28	Arghakhanchi	0.300	
29	Rasuwa	0.287	
30	Doti	0.280	
31	Dang	0.275	
32	Khotang	0.257	
33	Achham	0.257	
34	Surkhet	0.247	
35	Rolpa	0.243	
36	Panchthar	0.241	
37	Gulmi	0.212	Low
38	Salyan	0.203	
39	Terhathum	0.201	
40	Bajura	0.173	
41	Jajarkot	0.166	
42	Dhankuta	0.140	
43	Dailekh	0.128	
44	Lalitpur	0.115	
45	Palpa	0.111	
46	Dolakha	0.098	
47	Humla	0.089	
48	Dadeldhura	0.072	Very Low
49	Rukum	0.066	
50	Manang	0.064	
51	Pyuthan	0.049	
52	Mustang	0.048	
53	Dolpa	0.046	
54	Mugu	0.044	
55	Jumla	0.038	
56	Kalikot	0.035	
57	Rupandehi	0.000	
58	Morang	0.000	
59	Chitwan	0.000	
60	Jhapa	0.000	
61	Sunsari	0.000	
62	Banke	0.000	
63	Kanchanpur	0.000	
64	Nawalparasi	0.000	
65	Kailali	0.000	
66	Saptari	0.000	
67	Parsa	0.000	
68	Dhanusha	0.000	
69	Bara	0.000	
70	Bardiya	0.000	
71	Kapilbastu	0.000	
72	Siraha	0.000	
73	Sarlahi	0.000	
74	Rautahat	0.000	
75	Mahottari	0.000	

ANNEX 8

District Ranks – Flood Risk/Exposure Sub-indices

Rank	District	Score	Group
1	Mahottari	1.000	Very High
2	Chitwan	0.765	High
3	Saptari	0.693	
4	Rautahat	0.668	
5	Sunsari	0.666	
6	Siraha	0.629	
7	Jhapa	0.544	Moderate
8	Dhanusha	0.533	
9	Parsa	0.530	
10	Bara	0.505	
11	Morang	0.466	
12	Nawalparasi	0.398	
13	Kailali	0.351	Low
14	Sarlahi	0.288	
15	Kanchanpur	0.228	Very Low
16	Banke	0.173	
17	Rupandehi	0.169	
18	Kapilbastu	0.023	
19	Bardiya	0.020	
20	Kalikot	0.000	
21	Jumla	0.000	
22	Mugu	0.000	
23	Dolpa	0.000	
24	Mustang	0.000	
25	Pyuthan	0.000	
26	Manang	0.000	
27	Rukum	0.000	
28	Dadeldhura	0.000	
29	Humla	0.000	
30	Dolakha	0.000	
31	Palpa	0.000	
32	Lalitpur	0.000	
33	Dailekh	0.000	
34	Dhankuta	0.000	
35	Jajarkot	0.000	
36	Bajura	0.000	
37	Terhathum	0.000	
38	Salyan	0.000	

Rank	District	Score	Group
39	Gulmi	0.000	
40	Panchthar	0.000	
41	Rolpa	0.000	
42	Surkhet	0.000	
43	Achham	0.000	
44	Khotang	0.000	
45	Dang	0.000	
46	Doti	0.000	
47	Rasuwa	0.000	
48	Arghakhanchi	0.000	
49	Kathmandu	0.000	
50	Ilam	0.000	
51	Bajahang	0.000	
52	Solukhumbu	0.000	
53	Baitadi	0.000	
54	Sankhuwasabha	0.000	
55	Bhaktapur	0.000	
56	Dhading	0.000	
57	Sindhupalchok	0.000	
58	Bhojpur	0.000	
59	Tanahu	0.000	
60	Nuwakot	0.000	
61	Gorkha	0.000	
62	Sindhuli	0.000	
63	Taplejung	0.000	
64	Syanja	0.000	
65	Okhaldhunga	0.000	
66	Kavrepalanchowk	0.000	
67	Ramechhap	0.000	
68	Myagdi	0.000	
69	Kaski	0.000	
70	Parbat	0.000	
71	Makwanpur	0.000	
72	Baglung	0.000	
73	Lamjung	0.000	
74	Darchula	0.000	
75	Udayapur	0.000	

ANNEX 9

District Ranks – Flood Risk/Exposure Sub-indices

Rank	District	Score	Group
1	Saptari	1.000	Very High
2	Jajarkot	0.918	
3	Siraha	0.877	
4	Kalikot	0.815	
5	Dailekh	0.803	
6	Dadeldhura	0.710	
7	Humla	0.692	
8	Dhanusha	0.654	
9	Jumla	0.639	
10	Ramechhap	0.626	
11	Achham	0.624	
12	Mugu	0.611	
13	Bajahang	0.562	High
14	Bajura	0.536	
15	Dolakha	0.506	
16	Dhading	0.494	
17	Doti	0.442	
18	Kanchanpur	0.436	
19	Sarlahi	0.422	
20	Udayapur	0.392	
21	Salyan	0.389	
22	Darchula	0.370	
23	Banke	0.369	
24	Baitadi	0.368	
25	Kathmandu	0.347	Moderate
26	Kapilbastu	0.340	
27	Bardiya	0.335	
28	Rolpa	0.332	
29	Dolpa	0.326	
30	Manang	0.322	
31	Rukum	0.320	
32	Gorkha	0.305	
33	Mustang	0.299	
34	Pyuthan	0.296	
35	Bhojpur	0.295	
36	Lalitpur	0.288	
37	Bhaktapur	0.270	
38	Arghakhanchi	0.269	
39	Rupandehi	0.252	
40	Kailali	0.245	
41	Dang	0.240	
42	Rasuwa	0.234	
43	Makwanpur	0.230	
44	Mahottari	0.228	
45	Rautahat	0.223	Low
46	Panchthar	0.209	
47	Sindhuli	0.207	
48	Gulmi	0.194	
49	Kavrepalanchowk	0.193	
50	Sunsari	0.182	
51	Kaski	0.182	
52	Chitwan	0.181	
53	Palpa	0.176	
54	Ilam	0.162	
55	Nawalparasi	0.155	
56	Nuwakot	0.155	
57	Okhaldhunga	0.153	
58	Baglung	0.140	
59	Surkhet	0.137	
60	Tanahu	0.136	
61	Morang	0.131	
62	Taplejung	0.129	
63	Terhathum	0.126	
64	Solukhumbu	0.124	
65	Myagdi	0.117	
66	Sankhuwasabha	0.105	Very Low
67	Sindhupalchok	0.102	
68	Parbat	0.101	
69	Parsa	0.086	
70	Khotang	0.079	
71	Bara	0.060	
72	Lamjung	0.044	
73	Dhankuta	0.034	
74	Jhapa	0.017	
75	Syangja	0.000	

ANNEX 10

District Ranks – GLOF Risk/Exposure Sub-indices

Rank	District	Score	Group
1	Lamjung	1.000	Very High
2	Okhaldhunga	1.000	
3	Taplejung	1.000	
4	Gorkha	1.000	
5	Sankhuwasabha	1.000	
6	Solukhumbu	1.000	
7	Khotang	1.000	
8	Dolakha	1.000	
9	Manang	1.000	
10	Mustang	1.000	
11	Udayapur	0.750	High
12	Ramechhap	0.750	
13	Tanahu	0.750	
14	Bhojpur	0.750	
15	Dhading	0.750	
16	Panchthar	0.750	
17	Terhathum	0.750	
18	Dhankuta	0.750	
19	Baglung	0.500	Moderate
20	Parbat	0.500	
21	Myagdi	0.500	
22	Sindhuli	0.500	
23	Chitwan	0.500	
24	Sunsari	0.500	
25	Nawalparasi	0.500	
26	Syanja	0.250	Low
27	Gulmi	0.250	
28	Darchula	0.000	Very Low
29	Makwanpur	0.000	
30	Kaski	0.000	
31	Kavrepalanchowk	0.000	
32	Nuwakot	0.000	
33	Sindhupalchok	0.000	
34	Bhaktapur	0.000	
35	Baitadi	0.000	
36	Bajahang	0.000	
37	Ilam	0.000	
38	Kathmandu	0.000	

Rank	District	Score	Group
39	Arghakhanchi	0.000	
40	Rasuwa	0.000	
41	Doti	0.000	
42	Dang	0.000	
43	Achham	0.000	
44	Surkhet	0.000	
45	Rolpa	0.000	
46	Salyan	0.000	
47	Bajura	0.000	
48	Jajarkot	0.000	
49	Dailekh	0.000	
50	Lalitpur	0.000	
51	Palpa	0.000	
52	Humla	0.000	
53	Dadeldhura	0.000	
54	Rukum	0.000	
55	Pyuthan	0.000	
56	Dolpa	0.000	
57	Mugu	0.000	
58	Jumla	0.000	
59	Kalikot	0.000	
60	Rupandehi	0.000	
61	Morang	0.000	
62	Jhapa	0.000	
63	Banke	0.000	
64	Kanchanpur	0.000	
65	Kailali	0.000	
66	Saptari	0.000	
67	Parsa	0.000	
68	Dhanusha	0.000	
69	Bara	0.000	
70	Bardiya	0.000	
71	Kapilbastu	0.000	
72	Siraha	0.000	
73	Sarlahi	0.000	
74	Rautahat	0.000	
75	Mahottari	0.000	

ANNEX 11

District Ranks – Combined Risk/Exposure Index

Rank	District	Score	Group
1	Udayapur	1.000	Very High
2	Ramechhap	0.945	
3	Lamjung	0.934	
4	Saptari	0.879	
5	Bhaktapur	0.759	
6	Okhaldhunga	0.741	
7	Chitwan	0.733	
8	Siraha	0.714	
9	Dhading	0.698	
10	Dolakha	0.666	High
11	Taplejung	0.666	
12	Mahottari	0.650	
13	Gorkha	0.643	
14	Sunsari	0.613	
15	Dhanusha	0.610	
16	Khotang	0.610	
17	Tanahu	0.567	
18	Baglung	0.559	
19	Solukhumbu	0.552	
20	Panchthar	0.538	
21	Bhojpur	0.534	
22	Sankhuwasabha	0.534	
23	Parbat	0.524	
24	Kathmandu	0.521	
25	Manang	0.516	
26	Jajarkot	0.513	
27	Makwanpur	0.509	
28	Myagdi	0.502	
29	Sindhuli	0.481	Moderate
30	Dhankuta	0.465	
31	Nawalparasi	0.444	
32	Mustang	0.436	
33	Parsa	0.421	
34	Kaski	0.416	
35	Terhathum	0.414	
36	Dadeldhura	0.410	
37	Rautahat	0.405	
38	Dailekh	0.390	
39	Darchula	0.389	
40	Bara	0.374	
41	Kalikot	0.367	
42	Morang	0.360	
43	Jumla	0.348	
44	Bajahang	0.341	
45	Achham	0.323	
46	Sarlahi	0.310	Low
47	Humla	0.306	
48	Kanchanpur	0.306	
49	Kavrepalanchowk	0.302	
50	Mugu	0.297	
51	Baitadi	0.291	
52	Jhapa	0.291	
53	Nuwakot	0.291	
54	Sindhupalchok	0.270	
55	Salyan	0.268	
56	Doti	0.250	
57	Lalitpur	0.245	
58	Kapilbastu	0.241	
59	Ilam	0.240	
60	Syanja	0.235	
61	Gulmi	0.222	
62	Bajura	0.218	
63	Surkhet	0.196	
64	Rasuwa	0.187	
65	Arghakhanchi	0.177	
66	Rolpa	0.171	
67	Kailali	0.169	
68	Dang	0.161	Very Low
69	Banke	0.158	
70	Rupandehi	0.140	
71	Rukum	0.121	
72	Dolpa	0.107	
73	Bardiya	0.103	
74	Pyuthan	0.057	
75	Palpa	0.000	

ANNEX 12

District Ranks - Adaptation Capability (Socioeconomic) Sub-indices

Rank	District	Score	Group
1	Kathmandu	0.000	Very High
2	Kaski	0.075	
3	Lalitpur	0.085	
4	Bhaktapur	0.118	
5	Rupandehi	0.233	High
6	Morang	0.254	
7	Chitwan	0.267	
8	Jhapa	0.286	
9	Kavrepalanchowk	0.294	
10	Dhankuta	0.320	
11	Sunsari	0.322	
12	Ilam	0.328	
13	Syanja	0.337	
14	Banke	0.349	
15	Parbat	0.352	
16	Terhathum	0.364	
17	Tanahu	0.390	
18	Kanchanpur	0.395	
19	Palpa	0.415	Moderate
20	Nawalparasi	0.416	
21	Makwanpur	0.417	
22	Baglung	0.432	
23	Lamjung	0.439	
24	Udayapur	0.448	
25	Mustang	0.456	
26	Manang	0.466	
27	Arghakhanchi	0.470	
28	Myagdi	0.475	
29	Panchthar	0.477	
30	Surkhet	0.483	
31	Sankhuwasabha	0.485	
32	Saptari	0.487	
33	Kailali	0.491	
34	Nuwakot	0.497	
35	Okhaldhunga	0.508	
36	Taplejung	0.508	
37	Gulmi	0.512	
38	Dhanusha	0.515	
39	Dang	0.515	
40	Parsa	0.516	
41	Solukhumbu	0.528	
42	Bardiya	0.529	
43	Bara	0.534	
44	Dolakha	0.539	
45	Bhojpur	0.556	
46	Gorkha	0.575	Low
47	Kapilbastu	0.582	
48	Khotang	0.593	
49	Dadeldhura	0.608	
50	Siraha	0.610	
51	Sindhuli	0.612	
52	Sindhupalchok	0.629	
53	Dhading	0.633	
54	Pyuthan	0.637	
55	Darchula	0.659	
56	Sarlahi	0.662	
57	Mahottari	0.678	
58	Rautahat	0.682	
59	Ramechhap	0.692	
60	Rasuwa	0.702	
61	Salyan	0.705	
62	Baitadi	0.744	
63	Dailekh	0.767	
64	Doti	0.813	Very Low
65	Rukum	0.859	
66	Jumla	0.869	
67	Rolpa	0.880	
68	Jajarkot	0.881	
69	Achham	0.887	
70	Dolpa	0.904	
71	Humla	0.918	
72	Bajura	0.933	
73	Bajahang	0.937	
74	Kalikot	0.942	
75	Mugu	1.000	

ANNEX 13

District Ranks – Technology Adaptation Capability Index

Rank	District	Score	Group
1	Morang	0.000	Very High
2	Saptari	0.000	
3	Bhaktapur	0.000	
4	Rupandehi	0.000	
5	Sarlahi	0.000	
6	Parsa	0.000	
7	Jhapa	0.001	
8	Bara	0.001	
9	Rautahat	0.001	
10	Sunsari	0.001	
11	Siraha	0.001	
12	Dhanusha	0.001	
13	Bardiya	0.001	
14	Kanchanpur	0.001	
15	Nawalparasi	0.002	
16	Lalitpur	0.002	
17	Kapilbastu	0.002	
18	Chitwan	0.002	
19	Mahottari	0.002	
20	Kathmandu	0.003	
21	Kailali	0.003	
22	Banke	0.005	
23	Dang	0.005	
24	Ilam	0.008	
25	Parbat	0.008	
26	Terhathum	0.010	
27	Nuwakot	0.011	
28	Dhankuta	0.011	
29	Kaski	0.012	
30	Syanja	0.013	
31	Surkhet	0.014	
32	Kavrepalanchowk	0.014	
33	Dhading	0.016	
34	Lamjung	0.017	
35	Sindhupalchok	0.017	
36	Ramechhap	0.018	
37	Panchthar	0.019	
38	Tanahu	0.019	
39	Palpa	0.020	
40	Gulmi	0.020	
41	Okhaldhunga	0.022	
42	Khotang	0.023	
43	Arghakhanchi	0.024	
44	Baitadi	0.024	
45	Udayapur	0.025	
46	Sindhuli	0.027	
47	Makwanpur	0.028	
48	Dolakha	0.029	
49	Salyan	0.030	
50	Bajahang	0.037	High
51	Dadeldhura	0.039	
52	Baglung	0.043	
53	Pyuthan	0.044	
54	Gorkha	0.044	
55	Sankhuwasabha	0.044	
56	Darchula	0.045	
57	Bhojpur	0.048	
58	Taplejung	0.054	
59	Rukum	0.055	
60	Doti	0.060	
61	Rolpa	0.060	
62	Rasuwa	0.067	
63	Achham	0.067	
64	Dailekh	0.071	
65	Myagdi	0.071	
66	Kalikot	0.093	Moderate
67	Solukhumbu	0.101	
68	Jajarkot	0.117	
69	Bajura	0.122	
70	Mustang	0.156	
71	Jumla	0.203	
72	Humla	0.371	Low
73	Manang	0.391	
74	Dolpa	0.474	
75	Mugu	1.000	Very Low

ANNEX 14

District Ranks – Infrastructure Adaptation Capability Index

Rank	District	Score	Group
1	Kathmandu	0.000	Very High
2	Lalitpur	0.001	
3	Bhaktapur	0.003	
4	Kaski	0.004	
5	Chitwan	0.006	
6	Sunsari	0.010	
7	Rupandehi	0.011	
8	Morang	0.013	
9	Banke	0.013	
10	Parsa	0.014	
11	Jhapa	0.014	
12	Surkhet	0.023	
13	Makwanpur	0.023	
14	Kailali	0.023	
15	Kanchanpur	0.025	
16	Dang	0.027	
17	Kavrepalanchowk	0.027	
18	Tanahu	0.029	
19	Dhanusha	0.030	
20	Dhankuta	0.034	
21	Palpa	0.038	
22	Baglung	0.039	
23	Mustang	0.040	
24	Saptari	0.042	
25	Ilam	0.044	
26	Nawalparasi	0.047	
27	Sankhuwasabha	0.049	
28	Myagdi	0.049	
29	Parbat	0.052	
30	Bara	0.052	
31	Siraha	0.053	
32	Syanja	0.062	
33	Terhathum	0.063	
34	Nuwakot	0.067	High
35	Manang	0.067	
36	Kapilbastu	0.067	
37	Gorkha	0.068	
38	Udayapur	0.071	
39	Dadeldhura	0.074	
40	Doti	0.074	
41	Sarlahi	0.074	
42	Jumla	0.082	
43	Bardiya	0.087	
44	Lamjung	0.089	
45	Rautahat	0.091	
46	Okhaldhunga	0.094	
47	Darchula	0.105	
48	Arghakhanchi	0.106	
49	Taplejung	0.106	
50	Humla	0.108	
51	Pyuthan	0.108	
52	Rasuwa	0.115	
53	Mahottari	0.117	
54	Sindhuli	0.121	
55	Gulmi	0.126	
56	Sindhupalchok	0.126	
57	Dhading	0.130	
58	Panchthar	0.149	
59	Bhojpur	0.156	
60	Khotang	0.166	
61	Baitadi	0.185	Moderate
62	Ramechhap	0.188	
63	Kalikot	0.211	
64	Dailekh	0.212	
65	Bajahang	0.218	
66	Salyan	0.271	
67	Rolpa	0.278	
68	Bajura	0.279	
69	Jajarkot	0.299	
70	Achham	0.336	
71	Rukum	0.423	Low
72	Solukhumbu	0.442	
73	Mugu	0.520	
74	Dolakha	0.938	Very Low
75	Dolpa	1.000	

ANNEX 15

District Ranks – Combined Adaptation Capability Index

Rank	District	Score	Group
1	Kathmandu	0.000	Very High
2	Kaski	0.047	
3	Lalitpur	0.048	
4	Bhaktapur	0.067	High
5	Rupandehi	0.135	
6	Morang	0.147	
7	Chitwan	0.154	
8	Jhapa	0.166	
9	Kavrepalanchowk	0.178	Moderate
10	Sunsari	0.185	
11	Dhankuta	0.194	
12	Ilam	0.200	
13	Banke	0.203	
14	Syanja	0.212	
15	Parbat	0.216	
16	Terhathum	0.227	
17	Kanchanpur	0.231	
18	Tanahu	0.235	
19	Nawalparasi	0.250	
20	Makwanpur	0.251	
21	Palpa	0.252	
22	Baglung	0.269	
23	Lamjung	0.279	
24	Udayapur	0.281	
25	Surkhet	0.284	
26	Kailali	0.286	
27	Saptari	0.288	
28	Parsa	0.297	
29	Dhanusha	0.301	
30	Dang	0.301	
31	Sankhuwasabha	0.301	
32	Arghakhanchi	0.303	
33	Myagdi	0.303	
34	Nuwakot	0.304	
35	Mustang	0.314	
36	Bara	0.318	
37	Panchthar	0.318	
38	Okhaldhunga	0.321	
39	Bardiya	0.325	
40	Gulmi	0.332	
41	Taplejung	0.334	
42	Kapilbastu	0.350	Low
43	Gorkha	0.358	
44	Siraha	0.361	
45	Bhojpur	0.373	
46	Dadeldhura	0.377	
47	Sindhuli	0.390	
48	Khotang	0.390	
49	Manang	0.395	
50	Sarlahi	0.397	
51	Sindhupalchok	0.397	
52	Dhading	0.401	
53	Pyuthan	0.404	
54	Rautahat	0.413	
55	Darchula	0.416	
56	Mahottari	0.419	
57	Rasuwa	0.450	
58	Ramechhap	0.451	
59	Solukhumbu	0.454	
60	Baitadi	0.482	
61	Salyan	0.486	
62	Doti	0.500	
63	Dailekh	0.516	
64	Jumla	0.574	Very Low
65	Dolakha	0.580	
66	Rolpa	0.596	
67	Bajahang	0.604	
68	Achham	0.618	
69	Jajarkot	0.618	
70	Kalikot	0.622	
71	Rukum	0.623	
72	Bajura	0.644	
73	Humla	0.658	
74	Dolpa	0.932	
75	Mugu	1.000	

ANNEX 16

District Ranks – Rainfall Temperature Vulnerability Index

Rank	District	Score	Group
1	Kathmandu	1.000	Very High
2	Lamjung	0.959	
3	Mugu	0.848	
4	Parsa	0.824	
5	Ramechhap	0.773	
6	Bhaktapur	0.736	
7	Jajarkot	0.700	
8	Saptari	0.693	
9	Chitwan	0.680	
10	Makwanpur	0.677	
11	Mahottari	0.640	High
12	Udayapur	0.615	
13	Kaski	0.606	
14	Salyan	0.591	
15	Bara	0.583	
16	Jumla	0.572	
17	Dolpa	0.569	
18	Dadeldhura	0.562	
19	Dhanusha	0.528	
20	Dolakha	0.518	
21	Rukum	0.509	
22	Kalikot	0.504	
23	Taplejung	0.500	
24	Khotang	0.496	
25	Siraha	0.489	
26	Sindhupalchok	0.488	
27	Baglung	0.451	Moderate
28	Myagdi	0.448	
29	Dailekh	0.447	
30	Okhaldhunga	0.442	
31	Kapilbastu	0.437	
32	Rautahat	0.413	
33	Parbat	0.413	
34	Dhading	0.410	
35	Achham	0.406	
36	Morang	0.399	
37	Rolpa	0.398	
38	Panchthar	0.381	
39	Nuwakot	0.374	
40	Kanchanpur	0.374	
41	Manang	0.369	
42	Sindhuli	0.368	
43	Solukhumbu	0.366	
44	Baitadi	0.365	
45	Rasuwa	0.359	
46	Doti	0.344	Low
47	Surkhet	0.343	
48	Dhankuta	0.342	
49	Lalitpur	0.337	
50	Sunsari	0.336	
51	Tanahu	0.320	
52	Bardiya	0.308	
53	Bajahang	0.307	
54	Humla	0.295	
55	Nawalparasi	0.288	
56	Sarlahi	0.282	
57	Bajura	0.278	
58	Gorkha	0.267	
59	Ilam	0.264	
60	Kavrepalanchowk	0.238	
61	Jhapa	0.218	Very Low
62	Bhojpur	0.217	
63	Sankhuwasabha	0.211	
64	Darchula	0.205	
65	Gulmi	0.204	
66	Mustang	0.178	
67	Arghakhanchi	0.173	
68	Pyuthan	0.166	
69	Dang	0.157	
70	Terhathum	0.111	
71	Kailali	0.108	
72	Syanja	0.095	
73	Banke	0.050	
74	Rupandehi	0.043	
75	Palpa	0.000	

ANNEX 17

District Ranks – Ecological Vulnerability Index

Rank	District	Score	Group
1	Bhaktapur	1.000	Very High
2	Kathmandu	0.844	
3	Mugu	0.756	
4	Dolpa	0.678	
5	Rukum	0.531	High
6	Achham	0.529	
7	Rolpa	0.519	
8	Jajarkot	0.492	
9	Salyan	0.473	
10	Kalikot	0.463	
11	Doti	0.424	
12	Dailekh	0.418	
13	Bajura	0.410	
14	Mahottari	0.399	
15	Rasuwa	0.393	
16	Bajahang	0.391	
17	Jumla	0.384	
18	Humla	0.380	
19	Pyuthan	0.343	Moderate
20	Baitadi	0.340	
21	Sarlahi	0.336	
22	Rautahat	0.333	
23	Dolakha	0.330	
24	Parsa	0.316	
25	Bardiya	0.313	
26	Sindhupalchok	0.300	
27	Solukhumbu	0.296	
28	Ramechhap	0.274	
29	Siraha	0.272	
30	Dadeldhura	0.270	
31	Bara	0.254	
32	Dhanusha	0.253	
33	Dhading	0.247	
34	Sindhuli	0.244	
35	Kapilbastu	0.242	
36	Mustang	0.225	
37	Manang	0.218	
38	Gorkha	0.216	
39	Nuwakot	0.216	
40	Saptari	0.192	Low
41	Taplejung	0.191	
42	Surkhet	0.187	
43	Gulmi	0.186	
44	Dang	0.185	
45	Khotang	0.182	
46	Arghakhanchi	0.178	
47	Sankhuwasabha	0.174	
48	Bhojpur	0.172	
49	Panchthar	0.162	
50	Darchula	0.152	
51	Lamjung	0.146	
52	Kailali	0.144	
53	Lalitpur	0.133	
54	Udayapur	0.130	
55	Baglung	0.125	
56	Parbat	0.123	
57	Okhaldhunga	0.122	
58	Nawalparasi	0.119	
59	Chitwan	0.119	
60	Makwanpur	0.117	
61	Kanchanpur	0.116	
62	Tanahu	0.114	
63	Myagdi	0.109	
64	Sunsari	0.100	
65	Palpa	0.090	
66	Syanja	0.078	Very Low
67	Kaski	0.039	
68	Morang	0.033	
69	Ilam	0.029	
70	Terhathum	0.027	
71	Banke	0.026	
72	Kavrepalanchowk	0.022	
73	Jhapa	0.015	
74	Dhankuta	0.008	
75	Rupandehi	0.000	

ANNEX 18

District Ranks – Landslide Vulnerability Index

Rank	District	Score	Group
1	Udayapur	1.000	Very High
2	Kathmandu	0.898	
3	Mugu	0.804	
4	Lamjung	0.801	
5	Darchula	0.783	High
6	Baglung	0.775	
7	Rolpa	0.755	
8	Achham	0.743	
9	Makwanpur	0.738	
10	Dolpa	0.737	
11	Parbat	0.736	
12	Taplejung	0.713	
13	Ramechhap	0.705	
14	Gorkha	0.701	
15	Salyan	0.701	
16	Doti	0.701	
17	Bajahang	0.700	
18	Sindhuli	0.700	
19	Bhaktapur	0.696	
20	Solukhumbu	0.696	
21	Baitadi	0.687	
22	Kaski	0.686	
23	Rasuwa	0.686	
24	Sindhupalchok	0.683	
25	Jajarkot	0.680	
26	Rukum	0.660	
27	Nuwakot	0.652	
28	Dhading	0.648	
29	Myagdi	0.645	
30	Bajura	0.622	Moderate
31	Bhojpur	0.621	
32	Okhaldhunga	0.610	
33	Sankhuwasabha	0.604	
34	Syanja	0.593	
35	Dailekh	0.583	
36	Arghakhanchi	0.560	
37	Tanahu	0.557	
38	Kalikot	0.553	
39	Kavrepalanchowk	0.548	
40	Dolakha	0.542	
41	Khotang	0.538	
42	Dang	0.535	
43	Surkhet	0.512	
44	Humla	0.506	
45	Gulmi	0.506	
46	Jumla	0.506	
47	Panchthar	0.492	
48	Pyuthan	0.484	
49	Ilam	0.474	Low
50	Manang	0.473	
51	Dadeldhura	0.458	
52	Mustang	0.450	
53	Palpa	0.388	
54	Terhathum	0.373	
55	Lalitpur	0.362	
56	Dhankuta	0.314	
57	Saptari	0.000	Very Low
58	Siraha	0.000	
59	Chitwan	0.000	
60	Mahottari	0.000	
61	Sunsari	0.000	
62	Dhanusha	0.000	
63	Nawalparasi	0.000	
64	Rautahat	0.000	
65	Sarlahi	0.000	
66	Bara	0.000	
67	Kanchanpur	0.000	
68	Parsa	0.000	
69	Morang	0.000	
70	Kailali	0.000	
71	Jhapa	0.000	
72	Banke	0.000	
73	Kapilbastu	0.000	
74	Rupandehi	0.000	
75	Bardiya	0.000	

ANNEX 19

District Ranks – Flood Vulnerability Index

Rank	District	Score	Group
1	Mahottari	1.000	Very High
2	Rautahat	0.786	High
3	Chitwan	0.768	
4	Parsa	0.736	
5	Saptari	0.717	
6	Siraha	0.712	
7	Sunsari	0.644	
8	Dhanusha	0.643	
9	Bara	0.637	
10	Sarlahi	0.531	Moderate
11	Nawalparasi	0.519	
12	Kailali	0.513	
13	Jhapa	0.513	
14	Morang	0.490	
15	Kanchanpur	0.432	
16	Bardiya	0.420	
17	Banke	0.334	Low
18	Kapilbastu	0.333	
19	Rupandehi	0.296	
20	Achham	0.000	Very Low
21	Arghakhanchi	0.000	
22	Baglung	0.000	
23	Baitadi	0.000	
24	Bajahang	0.000	
25	Bajura	0.000	
26	Bhaktapur	0.000	
27	Bhojpur	0.000	
28	Dadeldhura	0.000	
29	Dailekh	0.000	
30	Dang	0.000	
31	Darchula	0.000	
32	Dhading	0.000	
33	Dhankuta	0.000	
34	Dolakha	0.000	
35	Dolpa	0.000	
36	Doti	0.000	
37	Gorkha	0.000	
38	Gulmi	0.000	
39	Humla	0.000	
40	Ilam	0.000	
41	Jajarkot	0.000	
42	Jumla	0.000	
43	Kalikot	0.000	
44	Kaski	0.000	
45	Kathmandu	0.000	
46	Kavrepalanchowk	0.000	
47	Khotang	0.000	
48	Lalitpur	0.000	
49	Lamjung	0.000	
50	Makwanpur	0.000	
51	Manang	0.000	
52	Mugu	0.000	
53	Mustang	0.000	
54	Myagdi	0.000	
55	Nuwakot	0.000	
56	Okhaldhunga	0.000	
57	Palpa	0.000	
58	Panchthar	0.000	
59	Parbat	0.000	
60	Pyuthan	0.000	
61	Ramechhap	0.000	
62	Rasuwa	0.000	
63	Rolpa	0.000	
64	Rukum	0.000	
65	Salyan	0.000	
66	Sankhuwasabha	0.000	
67	Sindhuli	0.000	
68	Sindhupalchok	0.000	
69	Solukhumbu	0.000	
70	Surkhet	0.000	
71	Syanja	0.000	
72	Tanahu	0.000	
73	Taplejung	0.000	
74	Terhathum	0.000	
75	Udayapur	0.000	

ANNEX 20

District Ranks – Drought Vulnerability Index

Rank	District	Score	Group
1	Jajarkot	1.000	Very High
2	Mugu	0.999	
3	Kalikot	0.889	
4	Dailekh	0.847	
5	Saptari	0.813	
6	Achham	0.797	
7	Siraha	0.765	
8	Dolpa	0.731	High
9	Humla	0.719	
10	Kathmandu	0.717	
11	Jumla	0.716	
12	Dadeldhura	0.694	
13	Bajura	0.670	
14	Bajahang	0.650	
15	Rukum	0.633	
16	Salyan	0.628	
17	Dolakha	0.619	
18	Rolpa	0.615	
19	Ramechhap	0.613	
20	Doti	0.611	
21	Dhanusha	0.598	
22	Dhading	0.517	
23	Baitadi	0.495	Moderate
24	Sarlahi	0.480	
25	Bardiya	0.479	
26	Pyuthan	0.447	
27	Rasuwa	0.446	
28	Manang	0.444	
29	Kanchanpur	0.418	
30	Mustang	0.416	
31	Bhaktapur	0.414	
32	Gorkha	0.405	
33	Mahottari	0.386	
34	Udayapur	0.382	
35	Kapilbastu	0.381	
36	Darchula	0.378	
37	Rautahat	0.368	
38	Bhojpur	0.350	
39	Solukhumbu	0.338	
40	Arghakhanchi	0.333	
41	Sindhuli	0.327	Low
42	Parsa	0.312	
43	Dang	0.305	
44	Banke	0.298	
45	Kailali	0.293	
46	Gulmi	0.286	
47	Taplejung	0.284	
48	Sindhupalchok	0.280	
49	Lalitpur	0.271	
50	Makwanpur	0.271	
51	Panchthar	0.262	
52	Nuwakot	0.253	
53	Chitwan	0.251	
54	Baglung	0.231	
55	Surkhet	0.229	
56	Sankhuwasabha	0.225	
57	Kaski	0.224	
58	Palpa	0.223	
59	Khotang	0.208	
60	Nawalparasi	0.204	
61	Bara	0.199	
62	Myagdi	0.195	
63	Parbat	0.193	
64	Okhaldhunga	0.192	
65	Lamjung	0.180	Very Low
66	Sunsari	0.180	
67	Rupandehi	0.176	
68	Tanahu	0.171	
69	Kavrepalanchowk	0.156	
70	Ilam	0.148	
71	Terhathum	0.111	
72	Morang	0.107	
73	Syanja	0.070	
74	Dhankuta	0.028	
75	Jhapa	0.000	

ANNEX 21

District Ranks – GLOF Vulnerability Index

Rank	District	Score	Group
1	Dolakha	1.000	Very High
2	Solukhumbu	0.986	
3	Manang	0.960	
4	Mustang	0.950	
5	Taplejung	0.938	
6	Gorkha	0.937	
7	Khotang	0.903	High
8	Sankhuwasabha	0.902	
9	Lamjung	0.900	
10	Okhaldhunga	0.846	
11	Ramechhap	0.777	
12	Dhading	0.773	
13	Bhojpur	0.749	Moderate
14	Panchthar	0.726	
15	Udayapur	0.719	
16	Tanahu	0.691	
17	Terhathum	0.646	
18	Sindhuli	0.634	
19	Dhankuta	0.631	
20	Baglung	0.593	Low
21	Chitwan	0.585	
22	Parbat	0.583	
23	Myagdi	0.575	
24	Nawalparasi	0.561	
25	Sunsari	0.525	
26	Gulmi	0.461	
27	Syanja	0.391	
28	Jajarkot	0.000	Very Low
29	Mugu	0.000	
30	Kalikot	0.000	
31	Dailekh	0.000	
32	Saptari	0.000	
33	Achham	0.000	
34	Siraha	0.000	
35	Dolpa	0.000	
36	Humla	0.000	
37	Kathmandu	0.000	
38	Jumla	0.000	
39	Dadeldhura	0.000	
40	Bajura	0.000	
41	Bajahang	0.000	
42	Rukum	0.000	
43	Salyan	0.000	
44	Rolpa	0.000	
45	Doti	0.000	
46	Dhanusha	0.000	
47	Baitadi	0.000	
48	Sarlahi	0.000	
49	Bardiya	0.000	
50	Pyuthan	0.000	
51	Rasuwa	0.000	
52	Kanchanpur	0.000	
53	Bhaktapur	0.000	
54	Mahottari	0.000	
55	Kapilbastu	0.000	
56	Darchula	0.000	
57	Rautahat	0.000	
58	Arghakhanchi	0.000	
59	Parsa	0.000	
60	Dang	0.000	
61	Banke	0.000	
62	Kailali	0.000	
63	Sindhupalchok	0.000	
64	Lalitpur	0.000	
65	Makwanpur	0.000	
66	Nuwakot	0.000	
67	Surkhet	0.000	
68	Kaski	0.000	
69	Palpa	0.000	
70	Bara	0.000	
71	Rupandehi	0.000	
72	Kavrepalanchowk	0.000	
73	Ilam	0.000	
74	Morang	0.000	
75	Jhapa	0.000	

ANNEX 22

District Ranks – Combined Vulnerability Index

Rank	District	Score	Group
1	Kathmandu	1.000	Very High
2	Ramechhap	0.995	
3	Udayapur	0.956	
4	Lamjung	0.948	
5	Mugu	0.922	
6	Bhaktapur	0.886	
7	Dolakha	0.855	
8	Saptari	0.852	
9	Jajarkot	0.838	
10	Mahottari	0.785	High
11	Dhading	0.758	
12	Taplejung	0.756	
13	Siraha	0.749	
14	Gorkha	0.733	
15	Solukhumbu	0.725	
16	Chitwan	0.725	
17	Okhaldhunga	0.680	
18	Achham	0.662	
19	Manang	0.650	
20	Dolpa	0.649	
21	Kalikot	0.648	
22	Khotang	0.647	
23	Dhanusha	0.635	
24	Dailekh	0.625	
25	Parsa	0.604	
26	Salyan	0.603	
27	Sankhuwasabha	0.574	Moderate
28	Baglung	0.574	
29	Sindhuli	0.567	
30	Bhojpur	0.565	
31	Jumla	0.562	
32	Mustang	0.559	
33	Rolpa	0.548	
34	Bajahang	0.538	
35	Rukum	0.536	
36	Rautahat	0.536	
37	Panchthar	0.531	
38	Parbat	0.525	
39	Dadeldhura	0.523	
40	Sunsari	0.515	
41	Doti	0.513	
42	Tanahu	0.503	
43	Makwanpur	0.496	
44	Myagdi	0.492	
45	Humla	0.476	
46	Bajura	0.474	
47	Baitadi	0.464	
48	Bara	0.432	
49	Rasuwa	0.426	
50	Nawalparasi	0.414	
51	Sarlahi	0.410	
52	Sindhupalchok	0.403	
53	Darchula	0.395	
54	Kaski	0.389	
55	Nuwakot	0.337	Low
56	Dhankuta	0.311	
57	Kanchanpur	0.309	
58	Bardiya	0.296	
59	Kapilbastu	0.290	
60	Terhathum	0.288	
61	Gulmi	0.280	
62	Pyuthan	0.248	
63	Surkhet	0.231	
64	Arghakhanchi	0.230	
65	Morang	0.228	
66	Dang	0.205	
67	Lalitpur	0.193	
68	Kailali	0.192	
69	Syanja	0.182	
70	Kavrepalanchowk	0.180	
71	Ilam	0.140	Very Low
72	Jhapa	0.125	
73	Banke	0.071	
74	Palpa	0.003	
75	Rupandehi	0.000	

Flood damaging agriculture land and rood in Udayapur (Photo by: Gyanendra Karki)

Government of Nepal
National Adaptation Programme of Action (NAPA) to Climate Change

Ministry of Environment
Singha Durbar, Kathmandu, NEPAL
Phone: +977 1 42 11 641
Fax: +977 1 42 11954
Website: www.napanepal.gov.np | www.moenv.gov.np