Shelter Cluster Nepal
ShelterCluster.org
Coordinating Humanitarian Shelter

MONSOON PREPAREDNESS ASSESSMENT: 14 EARTHQUAKE AFFECTED PRIORITY DISTRICTS AND THE TERAI DISTRICTS

FINAL REPORT

NEPAL

2016

EXECUTIVE SUMMARY

The annual monsoon season typically occurs in Nepal during July and August, with heavy rains and winds damaging housing, roads and other infrastructure as well as bringing increased flood and landslide risk. Ahead of the 2016 monsoon, concerns were raised that destabilization in terrain conditions caused by the 2015 earthquakes could significantly increase the risk of landslides during monsoon rains, both in areas historically prone to landslides and flash floods and areas that have become susceptible following the earthquakes. Furthermore, heavy rains could trigger the movement of loose rubble accumulated by the co-seismic landslides that followed the earthquakes.[1]

In preparation for the 2016 monsoon, the Shelter Cluster was developing a contingency plan focusing on the 14 earthquake priority districts[2], along with the 22 Terai districts[3] that have in the past been affected by widespread flooding during monsoon seasons. This assessment was launched to inform this planning through a macro-level analysis secondary data to identify areas vulnerable to monsoon impacts and estimate potential caseloads; along with collection and analysis of primary data to understand expectations of assistance, level of preparation and potential coping strategies, with a specific focus on families living in emergency (tents/tarpaulin) or temporary (CGI) shelter. While addressing the assessment objectives, the study also generated findings on underlying vulnerabilities amongst populations at risk of monsoon impacts. Key findings are summarised below.

Landslide hazard and flood risk mapping

Using post 2015 earthquake landslide susceptibility data, **the Village Development Committees (VDCs)[4] across all 14 earthquake affected priority districts were classified as having low, medium or high landslide susceptibility**[5] (see Map 1). The classification was triangulated with the most comprehensive database available recording landslide events following the earthquake (around 24,000 in total); other pre and post-earthquake hazard data sources; and locations of loose rubble left behind by the 2015 earthquakes. Overall hazard areas indicated by other data sources were found to be reflected by the landslide susceptibility data; **as such these findings may serve humanitarian response planning in identifying areas at risk of landslide in forthcoming monsoons.**[6]

Data sources:

1. "Landslide susceptibility mapping of earthquake affected districts of Nepal using logistic regression model" Authors: Sudan Bikash Maharjan and Deo Raj Gurung, ICIMOD
2. "Landslide Hazard Analysis for the M7.8 Nepal 2015 Earthquake" Authors: Marin Clark, Joshua West, Kevin Roback (University of Michigan[7]

[1] Assessment of Existing and Potential Landslide Hazards Resulting from the April 25, 2015 Gorkha, Nepal Earthquake Sequence, USGS, Version 1.1, August 2015

[2] Following the 2015 earthquakes, the Government of Nepal declared 14 districts as the most affected: Bhaktapur, Dhading, Dolakha, Gorkha, Kathmandu, Kavre, Lalitpur, Makawanpur, Nuwakot, Okhaldhunga, Ramechhap, Rasuwa, Sindhuli, Sindhupalchok districts.

[3] Banke, Bara, Bardiya, Chitawan, Dang, Dhanusa, Jhapa, Kailali, Kanchanpur, Kapilbastu, Mahotari, Morang, Nawalparasi, Parsa, Rautahat, Rupandehi, Saptari, Sarlahi, Siraha, Sunsari, Surkhet and Udayapur districts.

[4] 8 VDCs in Okhaldunga had to be excluded from this analysis as they were either not covered or only partially covered by the available susceptibility dataset. One of these VDCs (Mamkha) was covered by primary data collection and found to be heavily affected by landslides (see 'Micro-level findings: Case study location analysis' section below).

[5] ICIMOD, "Landslide susceptibility raster from study "Landslide susceptibility mapping of earthquake affected districts of Nepal using logistic regression model"

[6] See 'Landslide susceptibility (hazard) analysis – 14 earthquake affected priority districts' section below for full details

[7] Shared by: Marin Clark, Associate Professor of Geological Sciences; Funding agency for study: National Science Foundation, Geomorphology and Land Use Dynamics program- RAPID award #F039659; Shared by: Marin Clark, Associate Professor of Geological

3. Nepal Hazard Risk Assessment 2010
   Published by: Asian Disaster Preparedness Center (ADPC), Norwegian Geotechnical Institute (NGI), Centre for International Studies and Cooperation (CECI)

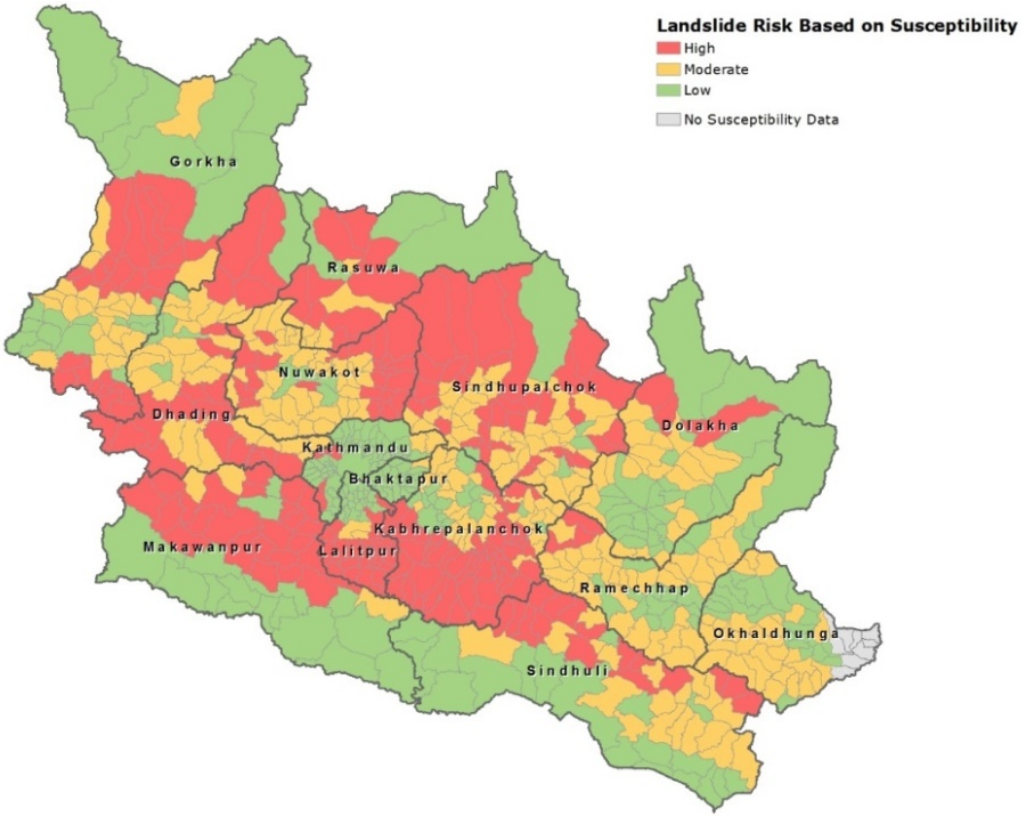
Based on triangulation of available data sources, VDCs located in the 22 Terai districts were identified as either at risk of flooding; at potential risk of flooding or at risk of flooding but not populated (such as national parks). The categorisation was based on triangulation of global flood modelling with a 100 year return period; flood prone rivers not connected with the main river network; past human impacts recorded during flood events; and District Disaster Relief Committee risk tables based on local contextual knowledge (see Map 2).[8]

Data sources:

1. List of flood prone rivers identified based on the narrative content of DDPRP reports [9]prepared by RCO GIS unit and shared with REACH
2. VDCs where recorded flood events caused death or/and shelter damage
   Data source: MoHA & RCO_Flood disaster_VDC_2005-2014 (compiled and shared by RCO: based on DesInventar and National Emergency Operational Centre (NEOC) data)
3. DDPRP Profiles
   Source: http://un.org.np/page/list/Preparedness2011/key%20document

Shared by: extracted, cleaned and complied by REACH

Map 1: VDCs by level of landslide susceptibility- 14 earthquake affected priority districts

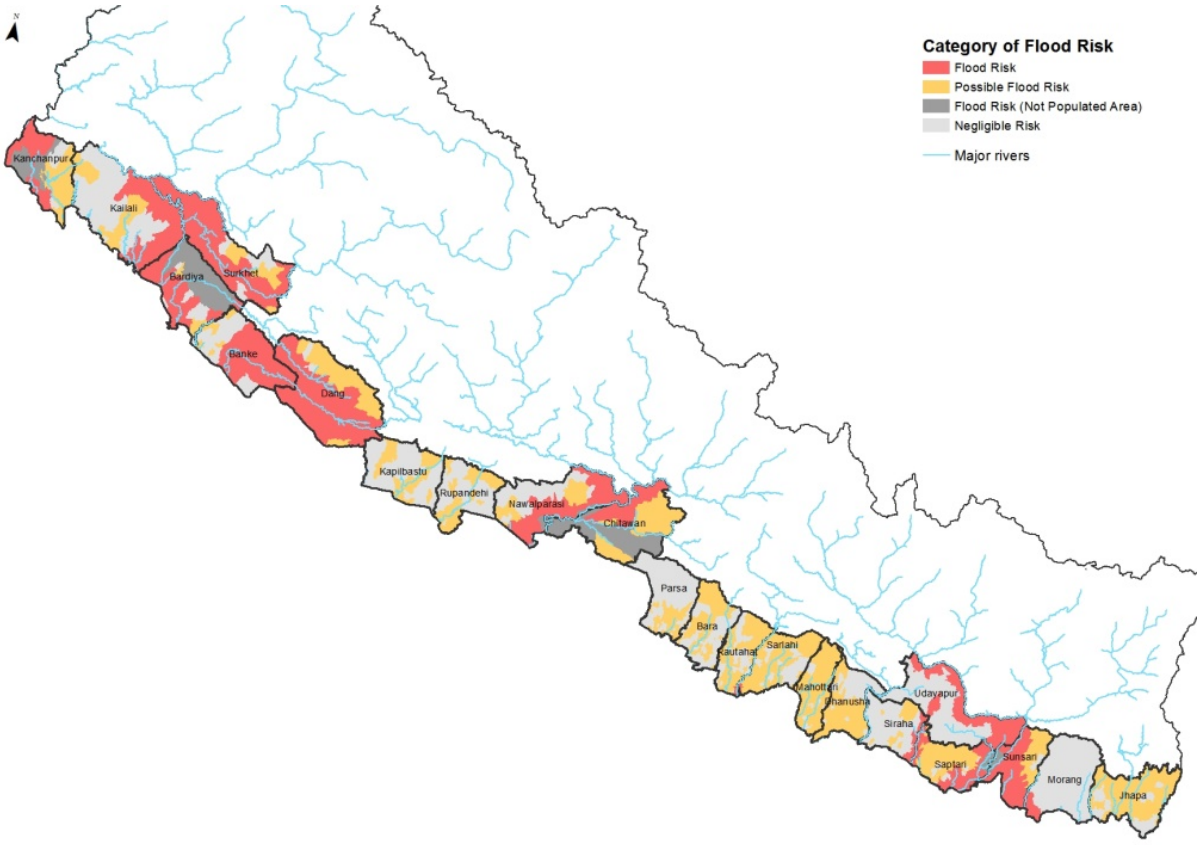


Sciences; Funding agency for study: National Science Foundation, Geomorphology and Land Use Dynamics program- RAPID award #F039659

[8] See 'Flood risk triangulation analysis – 22 Terai districts' section for full details

[9] http://un.org.np/page/list/Preparedness2011/key%20document

Map 2: VDCs by estimated level of flood risk – Terai region



Estimated caseload calculations

The estimated caseloads used by Shelter Cluster Nepal for contingency planning were:

- 334,874 individuals (66,975 households) most likely to need assistance in the event of monsoon impacts in Terai districts
- 234,471 individuals (46,894 households) most likely to need assistance in the event of monsoon impacts in the 14 earthquake affected priority districts.[10]

These estimates were generated in line with a 'top-down' approach as developed in the 'Humanitarian Population Figures' guidance produced by the IASC Information Management Working Group (April 2016). The overall idea of the top-down approach is to start with the overall population affected and disaggregate this as data becomes available, to identify the population in need. Caseload estimates using the top-down approach were hence obtained by first identifying the potential population affected (the total population in VDCs at risk) which was then disaggregated by applying vulnerability characteristics likely to place a household in need of assistance in the event of monsoon impacts. Note that a 'bottom up' approach was also used, but considered as less accurate for all areas of interest, due to the lack of available data. Further details are provided in the body of this report.

[10] Case load estimates presented by Shelter Cluster Nepal for contingency planning differ slightly for the earthquake priority districts due to 4 VDCs in Okhaldunga with partial susceptibility mapping being included in the contingency plan amounting to 57 households in the medium hazard group and 53 households in the low hazard group.

In Terai districts, the top-down approach was implemented by estimating the number of individuals living below the poverty line in VDCs with flood hazard or potential flood hazard and as such to be particularly at risk of impacts that they would have difficulties to mitigate or cope with during the approaching monsoon.

Terai districts 'top-down' approach

- ✓ Using flood risk mapping (see above) categorisation of VDCs according to confirmed level of flood hazard based on triangulation of flood hazard; flood prone rivers, DDPRP risk categorisation and past impact of floods
- ✓ Calculated proportion of population living in VDCs with flood hazard and potential flood hazard
- ✓ Calculated maximum proportion of VDCs with flood impact on shelter in each district in one year
- ✓ Applied Poverty incidence on projected district level population estimates to identify number of people living in poverty
- ✓ Applied proportion living in VDCs with flood hazard/potential flood hazard and maximum proportion of VDCs with shelter flood impact on vulnerable population number: Estimated Caseload Individuals – Flood hazard/Potential flood hazard

In the 14 earthquake affected priority districts, the top-down approach was implemented by estimating the number of individuals living below the poverty line in temporary shelters or collective sites following the 2015 earthquakes, in VDCs with high or medium susceptibility to landslides.[11]

Earthquake affected priority districts 'top-down' approach

- ✓ Using landslide hazard mapping (see above) categorisation of VDCs as high/moderate/low hazard based on the susceptibility level of the majority of VDC surface
- ✓ Calculated proportion of population living in VDCs at high/medium/low landslide hazard
- ✓ Applied Poverty incidence on projected district level population estimates to identify number of people living in poverty
- ✓ Applied proportion of population living in temporary shelters to identify number of people living in poverty and temporary shelter
- ✓ Applied proportion of population living in VDCs at high/medium low risk of landslide on number of people living in poverty and in temporary shelter: Estimated Caseload Individuals – High/Medium/Low landslide hazard

Primary data corroborated that families with fewer resources may be at greater risk of monsoon impacts, due to a multitude of factors. Findings from both Terai and earthquake affected priority district locations highlighted that poorer families in particular struggled to a greater extent to implement safe building practise when constructing or reconstructing their homes and faced difficulties when trying to access safe land, which left them living on sites where they were repeatedly affected by landslide or flooding. This indicates that the economic profile of households could be a good proxy for identifying vulnerable groups within a territory at risk of monsoon impacts.

Preparedness and coping strategies

Families were undertaking a range of mitigation measures to protect their homes from monsoon impacts. Roofs and other parts of shelter structures were being strengthened and temporary or weak shelters were being covered in plastic sheeting. People were building small barriers or canals around homes to divert water and in some cases larger barriers using gabion nets distributed by

[11] 8 VDCs in Okhaldunga district were fully mapped for susceptibility and therefore had to be excluded from both mapping and caseload estimations: Bhadaure, Mamkha, Ratmate, Tuluwa, Diyale, Kuebhire, Pokhare, Sherma

local government authorities. Early warning systems were reportedly in place at the Terai locations assessed but participants highlighted that sometimes the flood waters rose so quickly that people in charge of the system did not have time to sound the alarm before rushing to safety.

Rapidly rising floodwater had prompted family members in Terai to take turn to stay awake throughout the night during monsoon months to ensure floods were noticed in time for everyone to move to safety. Fast reconstruction of roads damaged by the monsoon was felt to be a top priority, particularly in Terai district locations, where raised roads served simultaneously as flood barriers, evacuation routes and sites. Families often relocated to a temporary site until the risk subsided, either temporarily following a specific monsoon event or throughout the monsoon season. Temporary relocations had often turned into long-term displacement, both in Terai and earthquake affected locations, where land had been permanently destroyed.

Awareness of Disaster Risk Reduction messages was generally high across all locations, with most participants indicating awareness of high risk areas and what they needed to do to ensure safety. However, many felt they were unable to implement safety measures such as moving to a safe location. Key barriers to implementing mitigation and coping strategies and DRR measures included lack of resources to buy materials to strengthen weak shelters and purchase safe land; lack of available safe land; and lack of knowledge regarding what land was safe to use.

Recommendations to provide a better understanding of monsoon risk and vulnerabilities:

- Ahead of future monsoons, the landslide hazard mapping could be strengthened further by overlaying landslide susceptibility with forecasted rainfall to identify areas with landslide hazard that are likely to be affected by heavy rains which could mobilise landslides.
- The landslide hazard mapping conducted here could be correlated with the actual rainfall and landslide or flood impacts occurring during the 2016 monsoon to assess to what extent landslides or floods occurred in areas identified as at risk and whether those events lead to impacts on populations. This analysis could help adjust the risk area mapping and caseload estimates presented here to better prepare for future monsoons.
- Caseload estimate calculations outlined in this study could be replicated ahead of future monsoons to obtain updated estimates using the latest available population figures and past events records.
- A centralised, standardised system where natural disaster events and impacts are recorded could have the potential to greatly improve the accuracy of future risk mapping and caseload estimation. Currently available sources are challenging to triangulate due to differences in database structures and unexplained discrepancies between records spanning the same time-frame.
- Similarly, a standardised methodology to guide the risk analysis conducted by the DDRC while updating their DDPRPs would enable the invaluable, contextual knowledge gathered during this exercise to be captured in a way that enables inclusion in wider analysis.

Recommendations to help increase resilience of the population at risk:

- Land surveying should be conducted in communities at risk of landslide or flooding, particularly those where risk levels have changed following the 2015 earthquakes, to identify sites that are safe for construction and other uses – and those that should be avoided.

- Construction of permanent houses for earthquake affected households must include an assessment of flood and landslide risk to ensure sites are safe to build and live on, bearing in mind the composite impact on sites from the combined load of all structures.
- Households that live on sites at risk of flooding or landslide should be offered alternative land in a safe location with access to water and other basic needs.

CONTENTS

GEOGRAPHIC CLASSIFICATIONS

District	The administrative units that make up administrative zones; Nepal contains 75 districts, 14 of which were categorized as Priority Districts by the Nepali government after the earthquakes.
Municipality/ Village Development Committee (VDC)	Lower administrative units that make up districts. A municipality can include multiple VDCs, and is defined based on population numbers and infrastructure criteria.
Ward	The lowest political-administrative unit. Each VDC contains 9 wards.
Town/Village	The lowest administrative units

ACRONYMS AND ABBREVIATIONS

ADPC	Asian Disaster Preparedness Center
CBS	Central Bureau of Statistics
CECI	Centre for International Studies and Cooperation
CGI	Corrugated Galvanised Iron
DUDBC	Department of Urban Development and Building Construction
DDPRP	District Disaster Preparedness and Response Plans
DLSA	District Lead Support Agencies
DRR	Disaster Risk Reduction
EQ	Earthquake
FGD	Focus Group Discussion
HMIS	Health Management Information Section
HRRP	Housing Recovery and Reconstruction Platform
IMU	Information Management Unit
IES	Institute for Environment and Sustainability
IASC	Inter-Agency Standing Committee
ICIMOD	International Centre for Integrated Mountain Development
IOM	International Organisation for Migration
IFRC	International Federation of Red Cross and Red Crescent Societies
JRC	Joint Research Centre
KI	Key Informant
MoHA	Ministry of Home Affairs
MOUD	Ministry of Urban Development

NEOC	National Emergency Operating Centre
NHRA	Nepal Hazard Risk Assessment
NRCS	Nepal Red Cross Society
NRRC	Nepal Risk Reduction Consortium
NPR	Nepalese Rupees
NGI	Norwegian Geotechnical Institute
PT	Permanent shelter
RCC	Reinforced Concrete Cement
RCO	Resident Coordinator
TY	Temporary shelter
USGS	U.S. Geological Survey
VDC	Village Development Committee

FIGURES, TABLES AND MAPS

CONTEXT

Even before the two major earthquakes in 2015, natural hazards caused hundreds of deaths and destroyed billions of Nepalese Rupees (NPR) worth of property, representing around six percent of the government's annual development expenditure.[12] The annual monsoon season typically occurs in Nepal during July and September, with heavy rains and winds damaging housing, roads and other infrastructure as well as bringing increased risk of landslides and flooding.

This study was conducted by REACH on behalf of Shelter Cluster Nepal to inform the cluster contingency plan for the coordination of monsoon preparedness and response 2016 monsoon. This included forming an understanding of areas of risk of flooding and landslide, specifically in the light of the geological changes brought on by the 2015 earthquakes, to help the cluster prepare to assist communities affected by the monsoon.

Landslide risk

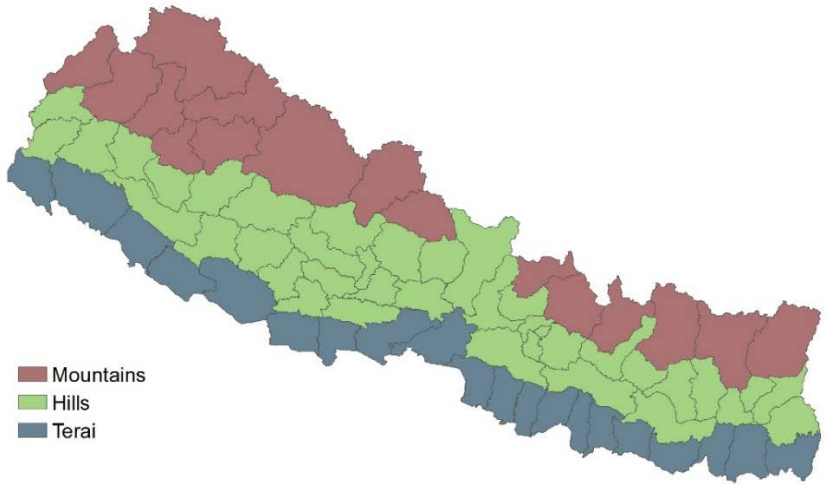
A 30-year study (1978–2005) by Durham University on landslide fatalities in Nepal indicated that landslide risk in Nepal has increased in recent decades. This phenomenon could be linked to multiple factors[13], including:

- Deforestation, which renders slopes more sensitive to landslides and makes slides more mobile once initiated.
- Urbanisation, which leads to the construction of housing on unstable slopes.
- Development of linear infrastructure including rural road building projects, which increases landslide hazard due to undercutting of slopes; and causes the relocation of families to roadside locations, thereby increasing the population at risk.

An underlying propensity for landslides in the Himalayas is partly due to the area being tectonically active and partly due to precipitation-induced landslides—a hazard across the Hill and Mountainous regions. Locations in the Middle Himalayas region (covering the Hill districts shown in Map 3 below) are estimated to be most affected by rain triggered landslides, where the level of precipitation associated with the annual monsoon is greatest and population density also is comparatively high. [14] This region includes Rasuwa district, which was the site of the Langtang debris avalanche prompted by the 2015 earthquakes—one of thousands of landslides that killed hundreds of people following the earthquakes.[15]

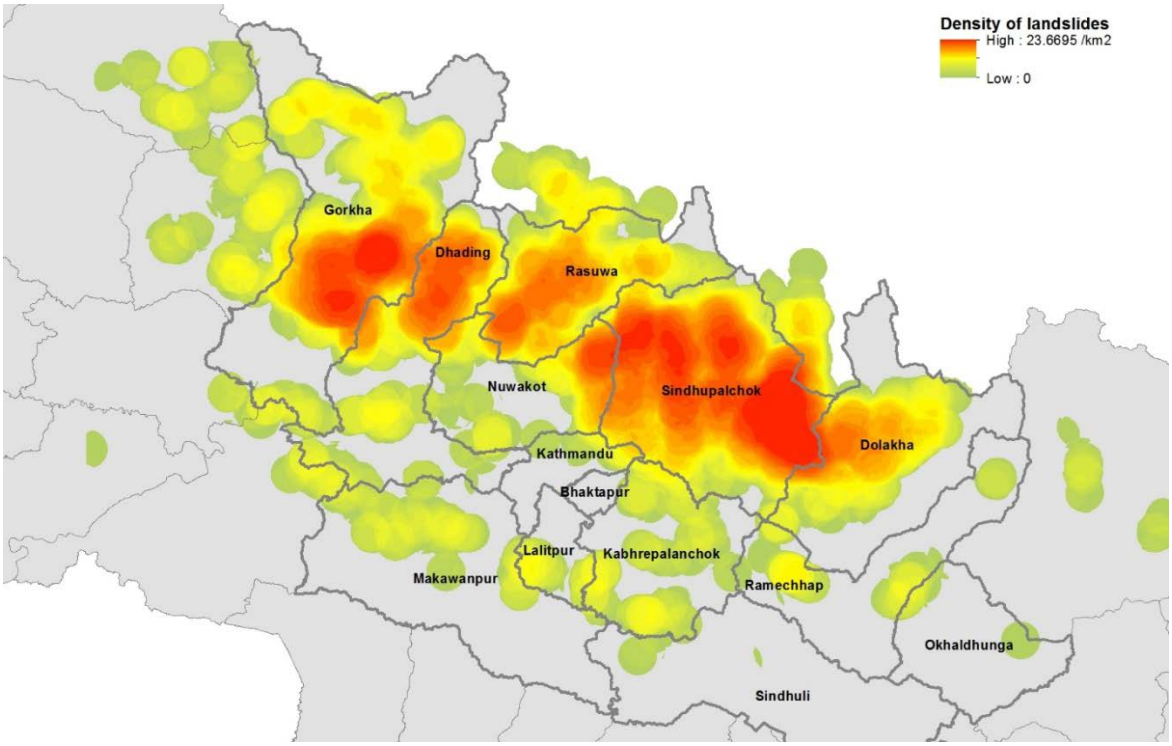
[12] Nepal Disaster Report (2015); MoHA (2010); Ministry of Home Affairs Economic Survey, 2010. Government of Nepal, Kathmandu.
[13] D. N. Petley (&) Æ N. J. Rosser Æ S. A. Dunning Æ K. Oven Æ W. A. Mitchell (2007) Trends in landslide occurrence in Nepal
[14] Ibid. and Nepal Hazard Risk Assessment (http://www.gfdrr.org/sites/gfdrr.org/files/documents/Nepal_HazardAssessment_Part1.pdf)
[15] Assessment of Existing and Potential Landslide Hazards Resulting from the April 25, 2015 Gorkha, Nepal Earthquake Sequence, USGS, Version 1.1, August 2015

Map 3: Mountain, Hill and Terai regions of Nepal



Initial studies conducted immediately after the earthquakes by the U.S. Geological Survey (USGS) estimated that several thousand landslides had been triggered across an area spanning approximately 35,000 km^2 in Nepal.[16] While an initial mapping conducted by Durham University identified 3,600 landslides,[17] a longer-term exercise using both satellite imagery and field evaluations conducted by Michigan University identified around 24,000 co-seismic landslides triggered by the earthquakes during April-June 2015. Their locations are shown on map 4 below.[18]

Map 4: Density of co-seismic landslide trigged by earthquakes April-May 2015 (number of landslide locations per km^2)



[16] Ibid.
[17] https://data.hdx.rwlabs.org/group/nepal-earthquake
[18] Marin Clark and others, Michigan University, http://meetingorganizer.copernicus.org/EGU2016/EGU2016-9361-1.pdf

Concerns have been raised that destabilization and change in terrain conditions caused by the 2015 earthquakes could increase the susceptibility of slopes and significantly increase the risk of landslides during summer monsoon rains.[19] In addition, heavy rains could trigger the movement of loose rubble accumulated by the co-seismic landslides that followed the 2015 earthquakes, both on slopes and where it has created dams in streams. Movements could cause flooding downstream where dams are dislodged and upstream where new blockages occur. [20] The monsoon in 2015 was considered less heavy than usual; therefore some sites considered at risk of landslide were not triggered by rains in 2015, yet are believed to continue to pose a risk for forthcoming monsoons.[21]

Flood risk

Floods alone have been responsible for losses of USD 130 million and almost a third of all disaster-related deaths in Nepal between 2001 and 2008.[22] In the Terai and Siwalik regions, annual precipitation is reported to range between 1,000 to 2,000 mm, rising to 2,000 to 3,000 mm in the Middle Hills.[23] River flows have been observed to increase thousand fold, causing flooding in river basins across Nepal.[24]

Concerns have been raised that current flood protection systems, although limiting the short-term risk of flooding may actually increase risk in the long-term. This is due to embankments being built with too little consideration for the rapid rate at which sediment is deposited on river beds; the need for safe failure modes; and the increasing intensity of rainfall observed over recent decades. Similar to the construction of new roads, embankments also attract populations due to development opportunities, thus increasing the risk of human impact in the case of flooding.

Institutional framework

After leading the shelter emergency response following the 2015 earthquakes, Shelter Cluster Nepal, under the joint leadership of Department of Urban Development and Building Construction (DUDBC) / Ministry of Urban Development (MOUD) and the International Federation of Red Cross and Red Crescent Societies (IFRC) / Nepal Red Cross Society (NRCS), ended its coordination function on 31 December 2015. Since then, the Housing Recovery and Reconstruction Platform (HRRP), co-led by the International Organisation for Migration (IOM) and UNHABITAT, provided coordination, strategic planning and technical guidance to agencies working with shelter recovery and reconstruction support to populations affected by the 2015 earthquakes.

In anticipation of the 2016 monsoon, Shelter Cluster Nepal developed a 'Contingency Plan for the coordination of Monsoon Preparedness and response', based on caseload estimates developed through this assessment. Efforts were focussed on 14 earthquake priority districts, which are prone to

[19] Assessment of Existing and Potential Landslide Hazards Resulting from the April 25, 2015 Gorkha, Nepal Earthquake Sequence, USGS, Version 1.1, August 2015

[20] Assessment of Existing and Potential Landslide Hazards Resulting from the April 25, 2015 Gorkha, Nepal Earthquake Sequence, USGS, Version 1.1, August 2015; http://www.ns.umich.edu/new/releases/22849-landslides-mudslides-likely-to-remain-a-significant-threat-in-nepal-for-months

[21] https://www.humanitarianresponse.info/en/system/files/documents/files/150623_monsoon_hazard_analysis_final_.pdf

[22] Ministry of Home Affairs Economic Survey, 2010. Government of Nepal, Kathmandu; DWIDP (2011). Disaster Review 2010, Annual Report. Government of Nepal, Ministry of Water Resources, Department of Water Induced Disaster Prevention (DWIDP), Kathmandu.

[23] http://lib.icimod.org/record/21557/files/c_attachment_96_779.pdf; http://lib.icimod.org/record/7580/files/Ecohydrology%20of%20High%20Mountain%20Areas.pdf

[24] Major recent flood events include the central Nepal floods in 1993; the breach of the Koshi embankment in 2008; the 2008 floods in western Nepal; the bursting of Mahakali banks in 2013; and major floods on the Karnali River in 2009, 2013 and 2014: PERC (2015) Urgent case for recovery: What we can learn from the August 2014 Karnali River floods in Nepal

landslides and flash floods, along with the 22 Terai districts that have been affected by widespread flooding during past monsoon seasons.

Overall coordination of any potential response at national and district levels, including ministries, security forces and humanitarian agencies, would be undertaken by the Government of Nepal, where the Ministry of Home Affairs (MoHA) is the lead agency for emergency preparedness and response.

The National Emergency Operating Centre (NEOC) based in Kathmandu, would lead the collection of information on affected areas to help coordinate response efforts, while District Disaster Relief Committees (DDRC) would be responsible for coordinating the response in their respective districts, supported by District Lead Support Agencies (DLSAs). At the time of writing, the DDRCs were updating their District Disaster Preparedness and Response Plans (DDPRP) that outline risk faced from monsoon impacts in each district and guides a potential response, with information management support provided by the Resident Coordinator's Information Management Unit (RCO IMU). This assessment worked in coordination with RCO IMU to provide complementary analysis, specifically with regards to triangulation of available data sources to identify areas at risk and corresponding case load estimates.

ASSESSMENT METHODOLOGY

Objectives

This assessment of areas at risk of monsoon impacts was conducted with the following overall aims:

1. To inform a potential response by Shelter Cluster Nepal when addressing impacts from the 2016 and future monsoons.
2. To understand the changes in risk from monsoon impacts faced by populations living in the 14 priority districts affected by the 2015 earthquakes.

Shelter Cluster Nepal identified information needs which provided the basis for the four research objectives of this assessment, which were designed to inform current and future contingency plans for stock positioning; community mobilization; key messaging; and technical guidance. These information needs are summarised through assessment objectives outlined in Table 1 below.

Table 1: Assessment objectives

Specific objectives[25]	Main data source
1. To complement ongoing initiatives to **identify and map districts and where possible Village Development Committees (VDCs) that are vulnerable to monsoon outcomes** (flooding, landslides etc) and impacts (displacement, destruction of shelters etc)	Secondary data
2. To complement ongoing initiatives to **identify potential caseloads** due to monsoon impacts, by district and where possible, VDC, particularly households that are living in temporary shelters following the 2015 earthquakes.	Secondary data
3. To understand **expectations of government assistance**, **level of preparation** and potential **coping strategies** including temporary displacement, amongst families including those living in emergency (tents/tarpaulin) or temporary (CGI) shelter.	Primary data
4. To identify available **building materials and respective local cost.**	Primary data

[25] See Annex 1 for a detailed list of the information needs summarised in the objectives and corresponding research questions.

Using a mixed methods approach, where secondary data analysis of available data sources was complemented with purposively sampled primary data collection and analysis, this assessment aimed to provide a quantitative and qualitative overview of monsoon vulnerabilities, working at macro level (using secondary data) and micro level (using primary data). Preliminary findings were released on 10 June to help inform the 2016 monsoon contingency planning. This report presents consolidated analysis of all data sources in greater detail, enabling a longer-term perspective and recommendations.

Area of interest

A total of 33 districts were covered by the secondary data component of the assessment, including: 22 districts in the Terai region[26] where, based on data from previous monsoons, families are most likely to be affected by floods during the forthcoming monsoon season. In addition, populations in the 14 earthquake affected priority districts[27] were deemed likely to be disproportionally affected by the monsoon due to decreased levels of community resilience and potentially increased risk of landslide and floods following the 2015 earthquakes and were therefore included in this assessment.

Overview of data collection and analysis methodology

Secondary data analysis and primary data collection and analysis were conducted simultaneously using methodologies developed to address the objectives outlined in table 1 above.

For the secondary data component, while complementing ongoing initiatives in country to identify Village Development Committees (VDCs) with high monsoon vulnerability, a mapping exercise was undertaken based on available data sources at the lowest administrative level possible (i.e. at the most detailed level to which available data is disaggregated). Consolidated indicators included in the vulnerability analysis included:

- Past monsoon impacts: houses damaged and destroyed[28]
- Landslide susceptibility following the 2015 earthquakes
- Landslide susceptibility due to precipitation
- Landslide events following the 2015 earthquakes
- Flood risk according to district level classification
- Major flood prone rivers
- Flood hazard map for the 100 year return period
- Population remaining in temporary shelters as of October 2015

Further details on the methodologies developed to guide hazard mapping and caseload estimate outputs, are outlined in detail below under the Macro-level findings section.

For the primary data collection component, twelve case study locations were selected from suggestions made by shelter agencies, based on community characteristics that are likely to affect monsoon vulnerability and preparedness.[29]

[26] Banke, Bara, Bardiya, Chitawan, Dang, Dhanusha, Jhapa, Kailali, Kanchanpur, Kapilbastu, Mahottari, Morang, Nawalparasi, Parsa, Rautahat, Rupandehi, Saptari, Sarlahi, Siraha, Sunsari, Surkhet and Udayapur districts.
[27] Following the 2015 earthquakes, the Government of Nepal declared 14 districts as the most affected: Bhaktapur, Dhading, Dolakha, Gorkha, Kathmandu, Kavrepalanchok, Lalitpur, Makawanpur, Nuwakot, Okhaldhunga, Ramechhap, Rasuwa, Sindhuli, Sindhupalchok districts.
[28] See 'Macro-level findings: mapping VDCs at risk of monsoon impacts and estimating caseloads' section for details on data sources.

Primary data was collected using qualitative methods at each case study location, including 49 community level focus group discussions with participatory mapping; and 24 key informant interviews with local officials and carpenters/builders and traders in emergency, housing and reconstruction materials. The primary data collection and analysis methodology is outlined in detail below under the Micro-level findings section.

[29] Mapping conducted through the secondary data review phase was used to triangulate the suggested case study locations and identify complementary locations.

MACRO-LEVEL FINDINGS: MAPPING VDCS AT RISK OF MONSOON IMPACTS AND ESTIMATING CASELOADS

Key findings

To help identify Village Development Committees (VDCs) at risk of monsoon impacts and estimate potential caseloads in the event of impacts, this assessment included a triangulation exercise of available secondary data sources. The triangulation steps followed during the analysis and corresponding findings are outlined below.

Landslide susceptibility (hazard) analysis – 14 earthquake affected priority districts

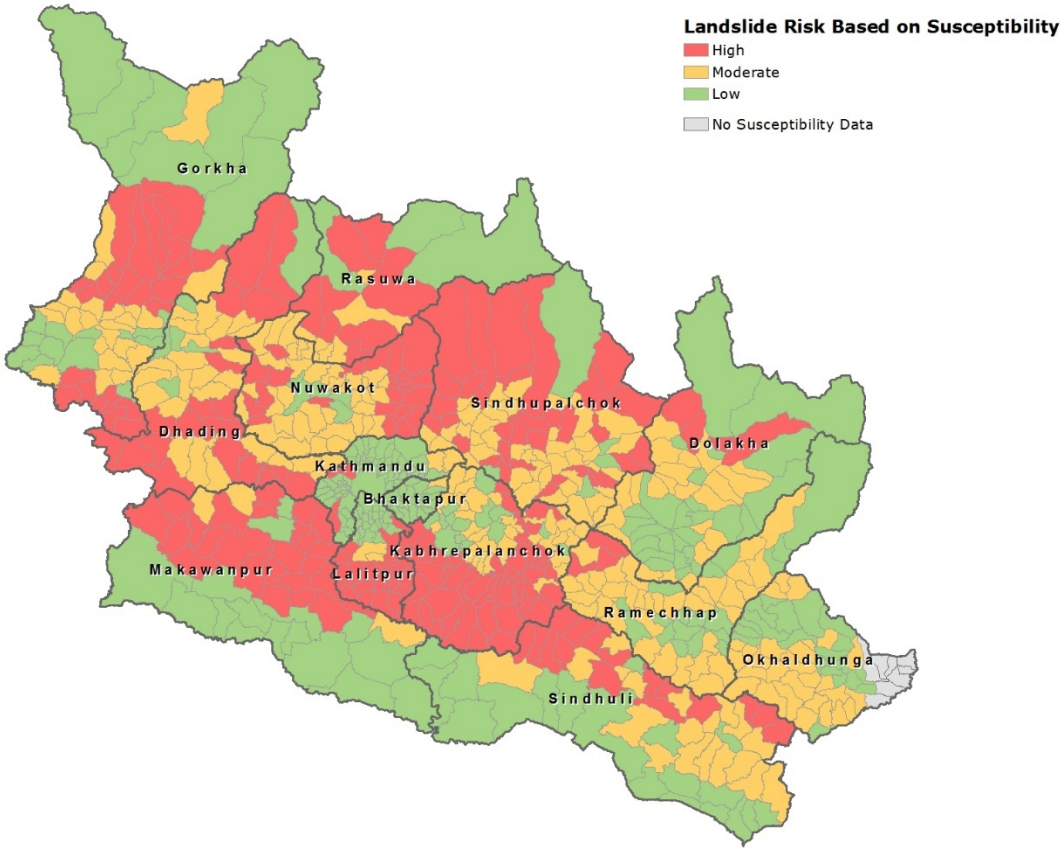
GIS analysis was conducted using landslide susceptibility data to classify VDCs according to the main level of hazard. The classification was then triangulated with other sources to test its validity. The key steps and corresponding findings are outlined below, with final categorisation shown in Map 5 below:

- ✓ Calculated size of surface area covered by each class of landslide susceptibility raster within each VDC
- ✓ Excluded VDCs where data on susceptibility where not available for whole VDC[30]
- ✓ Calculated % of total surface area in each VDC that was covered by each susceptibility class, which were aggregated, as follows:
    - Low susceptibility
    - Medium susceptibility
    - High and very high susceptibility
- ✓ Assigned overall VDC landslide hazard class to each VDC based on the susceptibility class that was found to cover most of the area, compared to each of the other classes, as follows:
    - Low susceptibility; where majority of VDC area falls into Low susceptibility class
    - Medium susceptibility; where majority of VDC area falls into Moderate susceptibility class
    - High susceptibility; where majority of VDC area falls into High or Very high susceptibility class

The study "Landslide susceptibility mapping of earthquake affected districts of Nepal using logistic regression model", which is the basis for the landslide hazard mapping conducted in this exercise, has been criticised for relying on a limited number of mapped post-earthquake landslides in producing the model for susceptibility. However, at the time of this assessment it was the only study available that aimed to estimate landslide susceptibility for the 14 priority earthquake affected districts. It has therefore been used here as a basis for classification of VDCs in terms of landslide hazard and form part of the caseload estimates presented below, using the top down approach. To mitigate against limitations in the dataset, the classification has been cross-checked with a database known to record the highest number of events, in addition to other sources as outlined below.

[30] 8 VDCs in Okhaldunga district were fully mapped for susceptibility and therefore had to be excluded from both mapping and caseload estimations: Bhadaure, Mamkha, Ratmate, Tuluwa, Diyale, Kuebhire, Pokhare, Sherma

Map 5: VDCs by aggregated level of landslide susceptibility- 14 earthquake affected priority districts[31]



- ✓ Cross-checked susceptibility categorisation with most comprehensive available database of landslide events (24,000 events) following the 2015 earthquakes

Overall, the comparison corroborated the susceptibility mapping, with 78% of recorded landslides occurring in high and very high landslide susceptibility zones; 16% in moderate and 6% in low susceptibility zones (see table 2 below).

[31] See Annex 5 for a full list of VDCs by hazard level

Table 2: Percentage of post-earthquake landslide locations[32] per district in each landslide susceptibility zone

	Landslide susceptibility zone		
DISTRICT	High/Very High	Moderate	Low
Dhading	77.28%	15.01%	7.71%
Dolakha	71.25%	20.23%	8.52%
Gorkha	78.82%	14.14%	7.04%
Kavrepalanchok	73.58%	18.40%	8.02%
Kathmandu	52.94%	45.10%	1.96%
Lalitpur	87.88%	12.12%	0.00%
Makwanpur	87.76%	10.88%	1.36%
Nuwakot	86.06%	11.63%	2.31%
Okhaldhunga*	55.56%	33.33%	11.11%
Ramechhap	77.44%	18.80%	3.76%
Rasuwa	77.69%	16.51%	5.79%
Sindhuli	80.00%	13.33%	6.67%
Sindhupalchok	78.06%	17.14%	4.80%

*Landslide susceptibility data was missing for 8 VDCs.

- ✓ Tested assignment of the overall VDC landslide hazard class against recorded landslide events

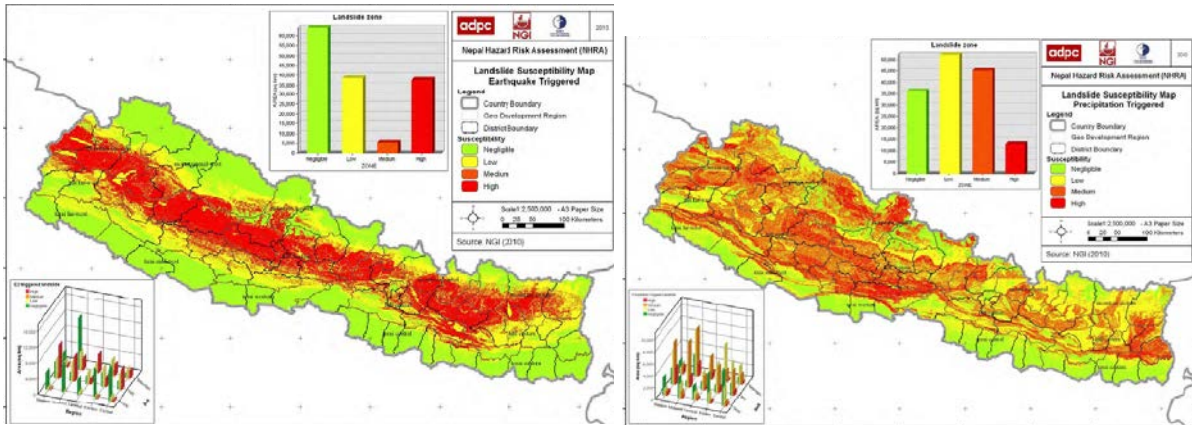
The number of landslides recorded in each VDC was compared with the assigned hazard class. This comparison shows that 54% of VDCs in the 14 priority districts had no recorded post-earthquake landslides at all; in 39% of VDCs most of the landslides occurred in areas classified as having high or very high susceptibility; while most of the landslides in remaining VDCs occurred in moderate (4%) and low (3%) susceptibility zones. The VDCs with landslides recorded in low susceptibility zones overall had lower than average numbers of recorded landslides. This indicated overall that the classification aligned relatively well with events on the ground.

- ✓ Compared locations of landslides induced by precipitation (pre-earthquake) and locations prone to landslides induced by earthquakes

Since landslides induced by precipitation and earthquakes have different characteristics[33] with the latter highly connected with the epicentre of shakes, it should be expected that areas where co-seismic landslides occur may differ from areas where landslides occur during the monsoon. The highest density of landslides trigged by the 2015 earthquakes occurred in Sindhupalchok, significant parts of Gorkha, Dhading and Rasuwa, as well as smaller areas in Nuwakot and Dolakha[34], in areas of districts that have historically not been the most affected by landslides caused by the annual monsoon (see map 6). The comparison corroborates that a larger area may be at risk of landslides during the forthcoming monsoon compared to previous monsoons, due to the change in susceptibility generated by the earthquakes.[35]

[32] Michigan University (National Science Foundation, Geomorphology and Land Use Dynamics program- RAPID award #F039659); Joshua West, USC; Kevin Roback.
[33] Nepal Hazard Risk Assessment (ADPC/NGI/CECI, 2015)
[34] Michigan University (National Science Foundation, Geomorphology and Land Use Dynamics program- RAPID award #F039659); Joshua West, USC; Kevin Roback.
[35] See Nepal Hazard Risk Assessment (ADPC/NGI/CECI, 2015) for further detail.

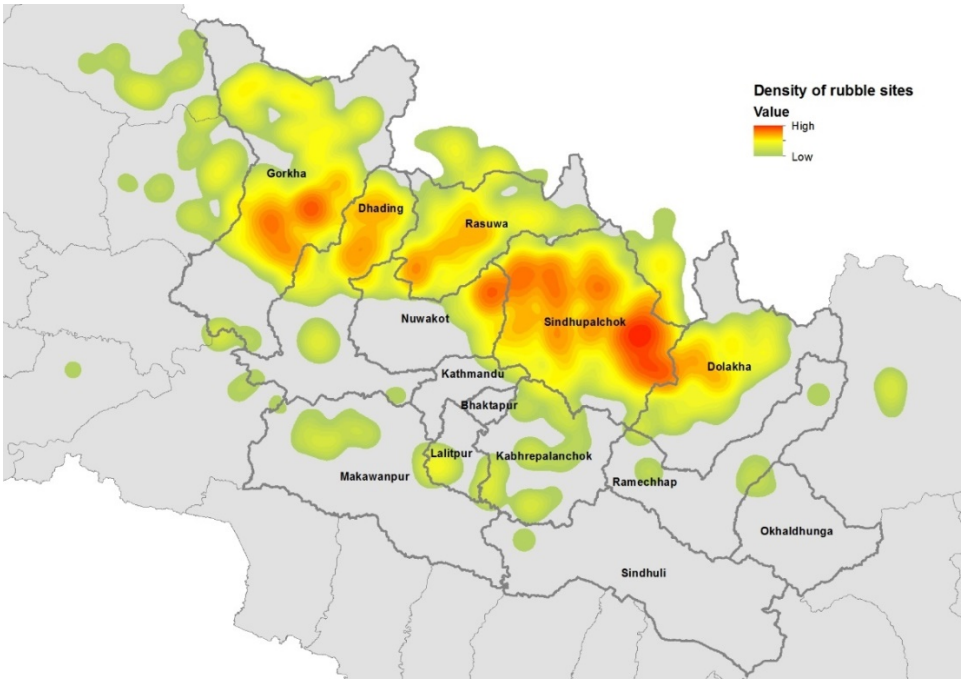
Map 6: Hazard zones for earthquake (left) and precipitation (right) induced landslides (Nepal Hazard Risk Assessment 2015)



- ✓ Mapped locations at temporary increased risk of landslides due to loose rubble left behind by 2015 earthquakes

In addition, landslides that followed the 2015 earthquakes may become mobile during the upcoming monsoon, as accumulated loose rubble is triggered by heavy rains, both on slopes and where it has created dams in streams, which could cause new slides and new blockages in streams. Map 7 below indicates hotspot areas where co-seismic landslides rubble resides close to stream channels. Since rubble consists of loose material (ground and rocks), these areas are considered at increased risk of precipitation induced landslides during the monsoon season. The increased risk posed by these locations may not be highlighted in the post-earthquake landslides susceptibility study as they may not always be in areas that have experienced a permanent change in terrain condition and hence increased susceptibility. Effectively, hotspots indicated below should be considered as areas of temporary increased risk of landslides.

Map 7: Density of rubble sites in or near stream channels created by co-seismic landslide aftermath earthquakes in April/May 2015



Data sources:

1. Landslide susceptibility raster from study "Landslide susceptibility mapping of earthquake affected districts of Nepal using logistic regression model"
   Authors: Sudan Bikash Maharjan and Deo Raj Gurung, ICIMOD
   Shared by: RCO
   Methodology: http://www.icimod.org/resource/19795
   Geographic coverage: This study was conducted for the whole of Nepal, but shared dataset covers 14 priority earthquake affected districts
   Description: Raster dataset classified terrain into four classes:
   - Low susceptibility
   - Moderate susceptibility
   - High susceptibility
   - Very high susceptibility

2. Dataset "landslide locations": Point inventory of the co-seismic landslides mapped across the earthquake-affected area based on satellite imagery acquired in April and May 2015 aftermath of 25th April Gorkha earthquake and 15th May aftershock (shapefile, kmz). Consists of 24,920 locations with attributed area of landslide.
   Dataset "landslide in streams": Point inventory of the landslide locations from Dataset 1 where the runout was deposited in a stream channel or near a stream channel (shapefile, kmz). Consist on 9944 locations.
   Datasets are part of work on update of study "Landslide Hazard Analysis for the M7.8 Nepal 2015 Earthquake"(more: https://sites.google.com/a/umich.edu/nepalearthquake/) and are not yet available publicly (available on request directly from authors, contact: marinkc@umich.edu).
   Authors: Marin Clark, Joshua West, Kevin Roback (University of Michigan)
   Shared by: Marin Clark, Associate Professor of Geological Sciences
   Funding agency for study: National Science Foundation, Geomorphology and Land Use Dynamics program- RAPID award #F039659

3. Nepal Hazard Risk Assessment 2010
   Published by: Asian Disaster Preparedness Center (ADPC), Norwegian Geotechnical Institute (NGI), Centre for International Studies and Cooperation (CECI)

Flood risk triangulation analysis – 22 Terai districts

GIS analysis was conducted where several sources were triangulated to reach a final risk categorisation. They key steps and resulting findings are outlined below:

- ✓ Identified VDCs with flood hazard according to global flood modelling

Flood hazard modelling is commonly presented for return periods e.g. 10 years, 25 years, 50 years, 100 years, 500 years etc. In general terms, the longer the return period, the worse the estimated flood scenario, because more events are included in the modelling. The global modelling data obtained for this assessment was based on a 100 year return period.

It should be noted here that flood hazard maps were developed for most frequent flood prone river basins by the "Nepal Hazard Risk Assessment 2015"; however, these do not appear to incorporate global flood modelling data, which may not have been available at the time.[36] Due to lack of available data from the NHRA beyond the pdf report outlining findings used here, it was not possible to compare the global modelling used for this assessment and the data used in the NHRA report to compare flood hazard in detail.

- ✓ Identified VDCs with flood prone rivers

A local perspective was added to the above global model to ensure flood risk was captured for rivers that were not connected to main water networks but create their own water basins and as such, pose a considerable risk at a local level. Flood prone rivers identified based on narrative content of DDPRP reports were compared with the overall global water network model. Only two rivers were identified in the DDPRP reports that lay outside the areas included in the global model. However, VDCs along these rivers had suffered impacts from previous floods, according to the fourth data source included in the triangulation (see below), highlighting the importance of triangulation across several sources to form a comprehensive understanding.

- ✓ Classified VDCs by risk level based on past impact

The MoHA & RCO dataset consolidates two sources of impact data (DesInventar and NEOC spanning 14 years (2000 – 2014). No clear methodology for the collection and validation of data could be located at the time of this assessment for either of the original sources. On district level, DesInventar figures were compared with NRCS flood impact data and show many differences (see further detail in caseload estimations section below), thus neither should be considered as an exhaustive inventory of flood events. For the Terai region, this inventory indicated flood events at least once in 446 VDCs, however floods were only reported to have caused fatalities or/and shelter damage in 9 VDCs. Remaining events either had no clear indication of type of impact or were less relevant to a shelter response, such as flooded fields or lost cattle. Nevertheless, the records were included in the triangulation to ensure that any locations that with recorded impacts that were not already indicated in other sources, were accounted for in the final classification.

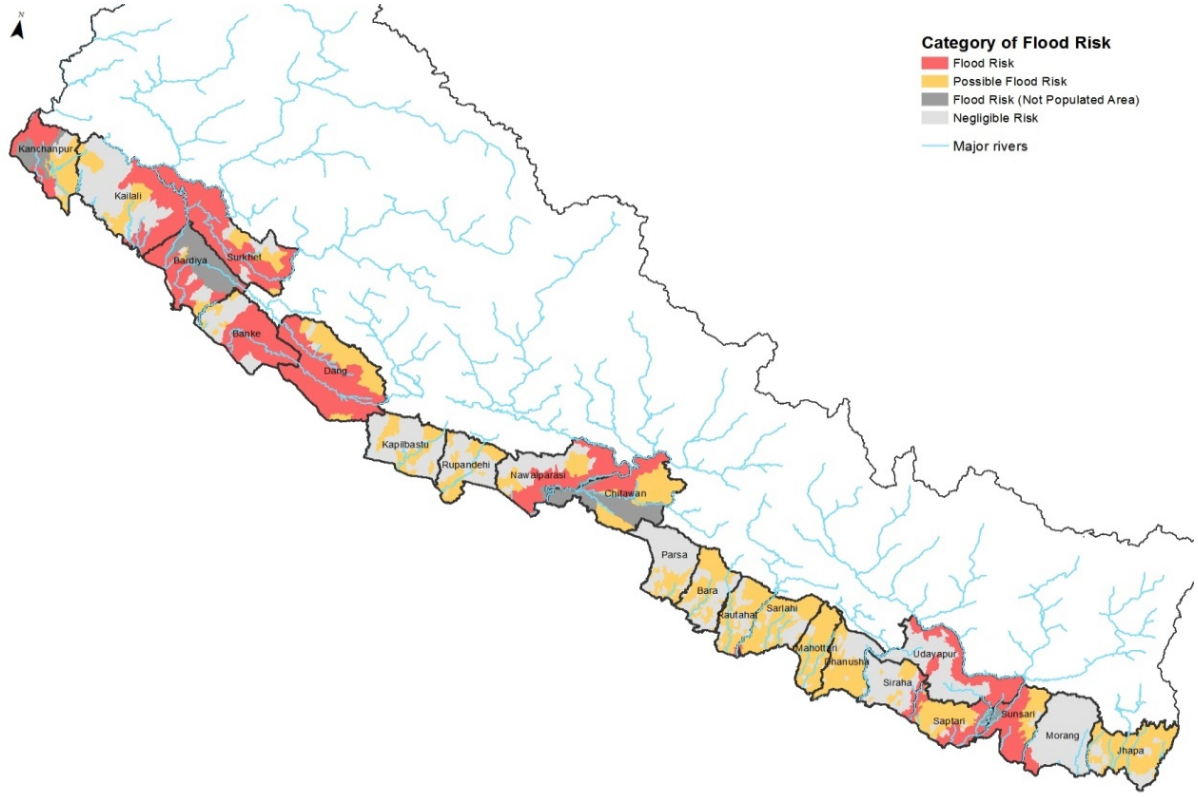
- ✓ Classified VDCs by risk level based Risk classification in DDPRP profiles [37]
  - o Including only VDCs classified as in Medium or High risk;

[36] The global flood modelling data used for this assessment originates from 2016, after the NHRA was published.
[37] http://un.org.np/page/list/Preparedness2011/key%20document

Similar to the MoHA & RCO database, no clear methodology of determining risk classification in DDPRP profiles could be located at the time of this assessment. While according to mentions of methodologies in some DDPRPs, the risk classifications included records of past events and a wider narrative, others did not outline a rationale behind classifications. Thus this classification should be considered as indicative and should be confirmed with other sources.

- ✓ Triangulated all sources and assigned final risk classes as follows:
  - Risk of flooding: All VDCs identified in GIS analysis as being in flood hazard area or/and include flood prone river
  - Possible risk of flooding: All VDCs that were not identified through GIS analysis as being in flood hazard area or/and include flood prone river, but other data sources (DDPRP profiles and/or MoHA & RCO flood events inventory) indicate occurrence of floods in the past.
  - Risk of flooding, not populated: All VDCs identified in GIS analysis as being in flood hazard area or/and include flood prone river but which were not populated according to VDC level population figures and had no evidence of past impact of floods in impact and risk datasets.

Map 8: VDCs by estimated level of flood risk – Terai region[38]



[38] See Annex 4 for a full list of VDCs by flood risk category

Data sources:

4. Raster dataset: flood hazard map for Nepal derived for the 100 year return period
   Source: Extract from global flood hazard model presented in the study "Development and evaluation of a framework for global flood hazard mapping"[39], Joint Research Centre (JRC) at Institute for Environment and Sustainability (IES), Available online since 3 May 2016: http://www.sciencedirect.com/science/article/pii/S0309170816301257
   Raster layer available on: http://globalfloods.eu/glofas-forecasting/
   Author: Francesco Dottori and others
   Shared by: Francesco Dottori (JRC)
   Description: The pixel values are local water depth (in m). The geographical projection is WGS84 and resolution is 30 arc seconds (approximately 1km).

5. Shapefile with water network for Nepal with indicated level of water lines within it (1-7)
   File: npl_watcrsl_rvr_500k_sdn_disslove.shp
   Shared by: RCO

6. List of flood prone rivers identified based on the narrative content of DDPRP reports [40]prepared by RCO GIS unit and shared with REACH

7. VDCs where recorded flood events caused death or/and shelter damage
   Data source: MoHA & RCO_Flood disaster_VDC_2005-2014 (compiled and shared by RCO: based on DesInventar and National Emergency Operational Centre (NEOC) data)

8. DDPRP Profiles
   Source: http://un.org.np/page/list/Preparedness2011/key%20document
   Shared by: extracted, cleaned and complied by REACH

[39] "Development and evaluation of a framework for global flood hazard mapping", Francesco Dottori and others, Joint Research Centre (JRC) at Institute for Environment and Sustainability (IES), Available online since 3 May 2016: http://www.sciencedirect.com/science/article/pii/S0309170816301257

[40] http://un.org.np/page/list/Preparedness2011/key%20document

Caseload estimates

For caseload estimates, the methodologies underpinning calculations presented here rested on principles outlined in the 'Humanitarian Population Figures' guidance produced by the IASC Information Management Working Group (April 2016), specifically adopting a bottom up and a top down approach for both Terai and Earthquake affected areas. The top down approach began with overall population figures for districts of interest, here based on census 2011 number projected to 2014/2015 by Health Management Information Section (HMIS) of Ministry of Health and Population in Nepal. These numbers were then narrowed down to identify the most vulnerable population in each of the risk areas. Indicators applied here to identify the most vulnerable population included poverty incidence and for earthquake priority districts, the proportion of population found to reside in temporary shelters or collective centres in September 2015. Poverty incidence was selected due to the disproportionate impact felt by poorer households from impacts of natural hazards, which has been noted globally[41] and was corroborated by primary data findings.[42] Similarly, temporary shelter residence was selected due to the lower resistance of temporary shelters against monsoon impacts. The bottom up approach on the other hand, began with actual numbers of people impacted in the past. The objective of presenting results using two methodologies was to provide Shelter Cluster and other interested humanitarian actors with figures based on both perspectives, with the figure finally adopted for planning purposes to be selected by humanitarian actors on the ground based on the approach best suited for planning needs.[43] Methodology, data sources and district level tables are outlined below, with detailed tables outlining each calculation step added in Annex 3.

Estimated caseload top down approach: Terai districts

- ✓ Categorised VDCs according to confirmed level of flood hazard based on triangulation of flood hazard; flood prone rivers, DDPRP risk categorisation and past impact of floods
- ✓ Calculated proportion of population living in VDCs with flood hazard and potential flood hazard
- ✓ Calculated maximum proportion of VDCs with flood impact on shelter in each district in one year
- ✓ Applied Poverty incidence on projected district level population estimates to identify number of people living in poverty
- ✓ Applied proportion living in VDCs with flood hazard/potential flood hazard and maximum proportion of VDCs with shelter flood impact on vulnerable population number: Estimated Caseload Individuals – Flood hazard/Potential flood hazard

[41] Wilkinson, E. and Peters, K. (Eds.) (2015) Climate extremes and resilient poverty reduction: development designed with uncertainty in mind. Overseas Development Institute, London.
[42] See 'Micro-level findings' section below.
[43] Shelter Cluster Nepal selected the top-down approach for both Terai and earthquake affected priority districts to inform their monsoon scenario for 2016.

Data sources:
- Ministry of Health: Projected population estimates 2014/2015 *(filename: hmis-target-population-2071-72)*
- CBS/World Bank: Poverty incidence 2011 *(filename: Poverty Rates on District Level, 2001-2011)*
- MOHA/RCO: Flood events and impacts 2005-2014 *(filename: Flood_disaster_2005-2014)*
- JRC[44]: Flood hazard 100 years return *(filename: Nepal_floodMap_100y)*
- RCO: Flood prone rivers *(filename: SHP with Rivers (Flood prone)*
- DDPRP: risk tables (extracted by REACH) *(filename: DPRP_Flood and Landslide Vulnerability_09062016)*

Table 3: Estimated caseload top down approach: individuals/ households living below the poverty line in Terai districts

District	Estimated Caseload Individuals: VDCs with Flood hazard	Estimated Caseload Households: VDCs with Flood hazard	Estimated Caseload Individuals: VDCs with Potential Flood hazard	Estimated Caseload Households: VDCs with Potential Flood hazard
Banke	2580	516	3257	651
Bara	0	0	5041	1008
Bardiya	16451	3290	2066	413
Chitwan	2078	416	2193	439
Dang	11643	2329	9199	1840
Dhanusha	0	0	16282	3256
Jhapa	0	0	27091	5418
Kailali	35613	7123	9914	1983
Kanchanpur	47316	9463	24629	4926
Kapilbastu	0	0	7373	1475
Mahottari	0	0	12331	2466
Morang	4426	885	0	0
Nawalparasi	5820	1164	2199	440
Parsa	0	0	2823	565
Rautahat	313	63	10006	2001
Rupandehi	0	0	10406	2081
Saptari	13095	2619	13953	2791
Sarlahi	156	31	7571	1514
Siraha	512	102	377	75
Sunsari	11437	2287	8629	1726
Surkhet	5905	1181	2156	431
Udayapur	36	7	0	0
TOTAL	157378	31476	177496	35499

[44] European Commission's science and knowledge service: Joint Research Centre

Estimated caseload bottom up approach: Terai districts

- ✓ Maximum number of HH damaged and destroyed identified for each year for each district: max year/district
- ✓ Proportion of total affected households calculated for each max year/district out of total affected if all districts were affected with maximum recorded impact at once: prop max/total max
- ✓ Proportion of total affected households per district (prop max/ total max) applied to maximum total affected households recorded across all districts in one year: num max/year = Estimated caseload households
- ✓ Estimated caseload households multiplied by 5: Estimated caseload Individuals

Data sources:

- DesInventar[45]: recorded impacts from flooding, 2000 to 2013 *(filename: DesInventar_1971-2013_Flood_Landslide)*
- NRCS: recorded impacts from flooding, 2000 to 2015 *(filenames: History of Disaster Situation2000-2014; NRCS Situation Update 7th September, 2015; Flood and landslide -sitrep- 22 May,2016)*

Table 4: Estimated caseload bottom up approach: Terai districts

District	Estimated Caseload Households *(households with destroyed or damaged homes)*	Estimated Caseload Individuals *(assuming HH size=5 and each house destroyed/damaged representing one household)*	District	Estimated Caseload Households *(households with destroyed or damaged homes)*	Estimated Caseload Individuals *(assuming HH size=5 and each house destroyed/damaged representing one household)*
Banke	6076	30381	Morang	685	3424
Bara	1839	9197	Nawalparasi	509	2543
Bardiya	9810	49048	Parsa	2872	14359
Chitwan	554	2772	Rautahat	1785	8923
Dang	492	2461	Rupandehi	163	816
Dhanusha	6535	32673	Saptari	1741	8705
Jhapa	399	1996	Sarlahi	9368	46841
Kailali	2297	11483	Siraha	5758	28792
Kanchanpur	565	2823	Sunsari	699	3497
Kapilbastu	35	175	Surkhet	1751	8753
Mahottari	8468	42341	Udayapur	638	3190
			TOTAL	63039	315195

[45] Inventory system of the effects of disaster: http://www.desinventar.org/

Estimated caseload top down approach: Priority earthquake affected districts

- ✓ Categorised VDCs as high/moderate/low landslide hazard based on the susceptibility level of the majority of VDC surface
- ✓ Calculated proportion of population living in VDCs at high/medium/low landslide hazard
- ✓ Applied Poverty incidence on projected district level population estimates to identify number of people living in poverty
- ✓ Applied proportion of population living in temporary shelters to identify number of people living in poverty and temporary shelter
- ✓ Applied proportion of population living in VDCs at high/medium low risk of landslide on number of people living in poverty and in temporary shelter: Estimated Caseload Individuals – High/Medium/Low landslide hazard

Data sources:

- Ministry of Health: Projected population estimates 2014/2015 *(filename: hmis-target-population-2071-72)*
- CBS/World Bank: Poverty incidence 2011 *(filename: Poverty Rates on District Level, 2001-2011)*
- Shelter Cluster/REACH: Earthquake Recovery Monitoring Assessment 2015 *(REACH_Nepal_SC_ERMA_Data_Share)*
- ICIMOD: Landslides susceptibility 2015 *(filename: prop_is_pt_r_color; see description in chapter* Landslide susceptibility (hazard) analysis – 14 earthquake affected priority districts *)*

Table 5: Estimated caseload top down approach: Earthquake priority districts[46]

District	Estimated Caseload Individuals - High landslide hazard	Estimated Caseload Households - High landslide hazard	Estimated Caseload Individuals - Moderate landslide hazard	Estimated Caseload Households - Moderate landslide hazard	Estimated Caseload Individuals - Low landslide hazard	Estimated Caseload Households - Low landslide hazard
Bhaktapur	0	0	240	48	15511	3102
Dhading	17923	3585	20610	4122	3123	625
Dolakha	2067	413	16965	3393	24497	4899
Gorkha	14071	2814	14478	2896	17242	3448
Kathmandu	207	41	64	13	10227	2045
Kavrepalanchok	12044	2409	8286	1657	11385	2277
Lalitpur	537	107	117	23	4390	878
Makwanpur	5761	1152	770	154	13500	2700
Nuwakot	299	60	682	136	194	39
Okhaldhunga	0	0	3956	791	3019	604
Ramechhap	2590	518	26195	5239	15908	3182
Rasuwa	5194	1039	5725	1145	716	143
Sindhuli	4404	881	7124	1425	12988	2598
Sindhupalchok	26337	5267	37826	7565	5047	1009
TOTAL	91433	18287	143038	28608	137748	27550

[46] It must be noted that 8 VDCs in Okhaldunga district were fully mapped for susceptibility and therefore had to be excluded from both mapping and caseload estimations: Bhadaure, Mamkha, Ratmate, Tuluwa, Diyale, Kuebhire, Pokhare, Sherma. Mamkha VDC was covered during primary data collection and was found to be highly landslide prone

Estimated caseload bottom up approach: earthquake affected districts

- ✓ Maximum number of HH damaged and destroyed identified for each year for each district: max year/district
- ✓ Proportion of total affected households calculated for each max year/district out of total affected if all districts were affected with maximum recorded impact at once: prop max/total max
- ✓ Proportion of total affected households per district (prop max/ total max) applied to maximum total affected households recorded across all districts in one year: num max/year: Estimated caseload households
- ✓ Estimated caseload households multiplied by 5: Estimated caseload Individuals
- ✓ Identified change in landslide susceptibility pre and post 2015 earthquakes and applied percentage increase on estimated caseload

Increased landslide hazard due to destabilisation and changes in the landscape as a result of the 2015 earthquakes could continue for several years, as indicated by several studies.[47] In normal conditions, the monsoon triggers landslides on susceptible slopes in many parts of Nepal. The actual change in landslide hazard is thus connected with increased susceptibility of slopes, which in turn is linked to multiple changes caused by the 2015 earthquakes, meaning that all areas already at risk pre-earthquakes will still be at risk, while additional areas will now also be considered landslide prone.[48] In addition, another factor driving landslide hazard in coming years as noted above is the accumulated rubble left behind the earthquake induced landslides in 2015, which could become mobile in forthcoming monsoons.[49] To identify change in landslide susceptibility pre and post-earthquakes a comparison was done at district level between:

- o The percentage of the overall surface area in each district classified as each level of hazard as per landslide hazard maps for precipitation induced landslides found in the Nepal Hazard Risk Assessment (pre-EQ) [50]
- o The percentage of the overall surface area in each district classified as each level of hazard as per landslide susceptibility study (post-EQ) [51]

The results of the comparison (see table 6) indicate that all 14 priority earthquake affected districts have seen an increase in the percentage of surface area that is classified with a higher level of hazard and a corresponding decrease in the percentage classified with a lower hazard level.

[47] See Context section above for further detail. It should be noted here that these post-EQ landslide hazard studies focus on geological processes and trends as opposed to estimations of change in risk to populations. While estimations of landslide *hazard* posed by the upcoming monsoon can be conducted these can only serve as an indication of areas where populations are actually at *risk* of landslides.
[48] See comparison map of precipitation and earthquake landslide prone areas in 'Macro-level findings' section above.
[49] Ibid.
[50] Nepal Hazard Risk Assessment (ADPC/NGI/CECI, 2015)
[51] Landslide susceptibility mapping of earthquake affected districts of Nepal using logistic regression model (ICIMOD 2016)

Table 6: Comparison of percentage of surface area in each district classified by level of landslide hazard, before and after 2015 earthquakes

	Area % of hazard zones for precipitation induced landslides (NHRA 2015)				Area % of landslide susceptibility zones (ICIMOD 2016)			Increase of area % in hazard zone		
District	Negligible	Low	Medium	High	Low	Medium	High and Very high	Low and Negligible	Medium	High and Very high
Bhaktapur	17%	65%	15%	3%	73%	19%	7%	-9%	5%	4%
Dhading	11%	36%	45%	8%	24%	37%	39%	-23%	-9%	32%
Dolakha	16%	66%	17%	1%	39%	34%	27%	-43%	17%	26%
Gorkha	29%	37%	26%	8%	46%	27%	27%	-20%	1%	19%
Kavrepalanchok	15%	45%	39%	1%	23%	35%	42%	-36%	-4%	40%
Kathmandu	48%	40%	9%	3%	61%	25%	14%	-27%	16%	11%
Lalitpur	14%	50%	33%	3%	34%	25%	41%	-30%	-8%	38%
Makwanpur	17%	51%	26%	6%	48%	26%	26%	-20%	0%	20%
Nuwakot	17%	48%	31%	3%	20%	39%	41%	-45%	8%	37%
Okhaldhunga	3%	39%	57%	1%	38%	40%	22%	-4%	-18%	21%
Ramechhap	8%	49%	40%	3%	38%	39%	24%	-20%	-1%	21%
Rasuwa	25%	33%	31%	10%	43%	28%	29%	-15%	-3%	18%
Sindhuli	20%	41%	32%	7%	44%	31%	25%	-18%	0%	18%
Sindhupalchok	15%	47%	34%	4%	25%	35%	40%	-37%	0%	37%

Data sources:

- DesInventar: recorded impacts from flooding, 2000 to 2013 *(filename: DesInventar_1971-2013_Flood_Landslide)*
- NRCS: recorded impacts from flooding, 2000 to 2015 *(filenames: History of Disaster Situation2000-2014; NRCS Situation Update 7th September, 2015; Flood and landslide -sitrep- 22 May,2016)*

Table 7: Estimated caseload bottom up approach: Earthquake affected districts

District	Num max/year Prop max/total max applied to maximum total affected households recorded across all districts in one year	Estimated Caseload Individuals Num max/year x 5; assuming HH size=5 and each house destroyed/damaged representing one household	Increase of area % of Medium/High/Very high hazard zones in district	Estimated Caseload Individuals adjusted to increased area % in high and medium hazard zones	Estimated Caseload Households adjusted to increased area % in high and medium hazard zones
Bhaktapur	118	590	9%	642	128
Dhading	94	472	23%	580	116
Dolakha	83	417	43%	596	119
Gorkha	118	590	20%	706	141
Kathmandu	198	991	36%	1347	269
Kavrepalanchok	263	1315	27%	1673	335
Lalitpur	70	350	30%	454	91
Makwanpur	2034	10169	20%	12215	2443
Nuwakot	47	236	45%	343	69
Okhaldhunga	220	1100	4%	1139	228
Ramechhap	2062	10308	20%	12332	2466
Rasuwa	35	173	15%	199	40
Sindhuli	431	2154	18%	2532	506
Sindhupalchok	115	573	37%	787	157
TOTAL	5888	29440		35547	7109

Caseload estimates generated for the Terai districts using a bottom up (based on past events impact) and top down (based on current vulnerable population in areas at risk) approach generated similar estimates. In total, 334,874 individuals (66,975 households) were estimated to be living below the poverty line in VDCs with flood hazard or potential flood hazard and as such to be particularly at risk of impacts that they would have difficulties to mitigate or cope with during the approaching monsoon. Similarly, using the bottom up approach, 315,195 individuals (63,039 households) were estimated to have their shelters damaged or destroyed by flooding.

For earthquake affected priority districts however, the two approaches generated a very wide range. Here 234,471 individuals (46,894 households) were estimated to be living below the poverty line in temporary shelters or collective sites following the 2015 earthquakes, in VDCs with high or medium susceptibility to landslides.[52] The number rose to 372,219 (74,444 households) when including those living in VDCs with low susceptibility that nevertheless would likely be impacted by heavy monsoon rains due to their precarious shelter situation. The bottom up approach based on monsoon impacts before the 2015 earthquakes generated a much lower estimate – 35,547 individuals (7,109 households) were estimated to have their shelters damaged or destroyed by landslides or floods.

[52] 8 VDCs in Okhaldunga district were fully mapped for susceptibility and therefore had to be excluded from both mapping and caseload estimations: Bhadaure, Mamkha, Ratmate, Tuluwa, Diyale, Kuebhire, Pokhare, Sherma

Several key underlying factors drive the wide range observed in the earthquake affected areas. Firstly, landslides are generally more localised than flooding events, affecting a smaller portion of the population as opposed to flooding which can displace a large portion of a VDC. Secondly, while for flood case load estimates the most probable number of VDCs affected in any one year could be calculated and used to limit the top down caseload estimates, this was not possible to do for landslides as the average number of VDCs affected in the past was deemed an unreliable indicator of the number affected in the future, due to the changes in susceptibility caused by the 2015 earthquakes. Landslides induced by the 2015 earthquakes, for which records exist, would also be potentially misleading as an indicator given that areas with high susceptibility to earthquake induced landslides may not be susceptible to those induced by the monsoon.[53] Hence the top down caseload figure is calculated as if all VDCs in each hazard group were affected at any one time, a situation that is highly unlikely in reality. Thirdly, the adjustment for change in risk, as noted above, was based on the proportional increase in landslide hazard. However there is no guarantee that the increase in hazard would perfectly match the increase in risk, there could for instance be scarcely populated areas where hazard has increased greatly but the change in risk is negligible because the population at risk is very small. Conversely, there could be areas where the hazard has increased and the population is very dense, hence increasing the risk considerably. Finally, increased vulnerabilities amongst populations residing in earthquake affected areas, including the high proportion remaining in temporary shelter, are not reflected in the bottom up caseload estimates – an external factor that has changed compared to the time when the impact data was collected that the bottom up estimates are based upon.

Both caseload estimate approaches were presented to Shelter Cluster Nepal who adopted the top down approach and the resulting estimates (66,975 households in the Terai districts and 74,444 households in earthquake affected priority districts) for contingency planning purposes ahead of the 2016 monsoon.[54]

[53] See Map 6 for comparison of landslide hazard induced by earthquakes versus precipitation

[54] Case load estimates presented by Shelter Cluster Nepal for contingency planning differ slightly for the earthquake priority districts due to 4 VDCs in Okhaldunga with partial susceptibility mapping being included in the contingency plan amounting to 57 households in the medium hazard group and 53 households in the low hazard group.

MICRO-LEVEL FINDINGS: CASE STUDY LOCATION ANALYSIS

Primary data collection and analysis methodology

Twelve case study locations were selected from suggestions made by shelter agencies, based on community characteristics that are likely to affect monsoon vulnerability and preparedness.[55] Primary data was collected using qualitative methods at each case study location, including 49 community level focus group discussions (FGD) with participatory mapping; and 24 key informant (KI) interviews with local officials and carpenters/builders and traders in emergency, housing and reconstruction materials.

Case study locations

The purposive sampling strategy for the primary data collection component was focused on identifying case study communities across the districts of interest. Case study locations should possess characteristics that are likely to, in some way, render them vulnerable to the forthcoming monsoon.

Case study VDCs should have the following characteristics:

- ✓ Part of the population should currently be living in emergency or temporary shelters[56] and/or in shelters that remain partially damaged due to earthquake or monsoon impact.
- ✓ VDC should in the past have been affected by/or is understood to be at future risk of landslides and/or floods.
- ✓ VDC should be located either in the 14 earthquake affected or in the 22 Terai districts.

Shelter agencies suggested VDCs that represented the above characteristics across the area of interest, including both earthquake affected districts and Terai region districts, for inclusion as case studies in the primary data collection phase. Effort was made to ensure as wide as possible geographic coverage, including communities in hard to reach areas and coverage of both Terai and earthquake affected districts. A higher number of locations were covered in earthquake affected districts (8) compared to Terai (4), as monsoon vulnerability and preparedness was expected to have altered considerably here following the earthquakes and as such up-to-date information about vulnerability and preparedness was in higher need compared to districts in the Terai region. Secondary data-based vulnerability mapping was be relied upon to verify case study location characteristics and identify complementary locations where necessary. The final selection of locations is outlined below in Table 7.

The twelve locations were assessed between 23 May and 1 June 2016, including two days of training and piloting and followed by two days of debriefings when teams returned to Kathmandu from data collection. The data collection team consisted of 12 team members in total, divided into four teams. Shelter agencies at case study locations supported in liaising with communities and arranging FGDs and interviews.

[55] Mapping conducted through the secondary data review phase was used to triangulate the suggested case study locations and identify complementary locations.
[56] Here defined as the majority of the shelter consisting of CGI/tarps/tent.

Table 8: Number of Focus Group Discussions (FGD) and Key Informant (KI) interviews collected at each location

			FGD		KI		
Area of interest	District	VDC / Municipality	Female	Male	LA[57]	Market	TOTAL
EQ			18	15	8	8	49
EQ Priority district	Bhaktapur	Bhaktapur	4	2	1	1	8
EQ Priority district	Dhading	Semjong	2	2	1	1	6
EQ Priority district	Dolakha	Laduk	2	2	1	1	6
EQ Priority district	Gorkha	Jaubari	2	2	1	1	6
EQ Priority district	Nuwakot	Rautbesi	2	2	1	1	6
EQ Priority district	Okhaldunga	Mamkha	2	1	1	1	5
EQ Priority district	Rasuwa	Ramche	2	2	1	1	6
EQ Priority district	Sindhupalchok	Gati	2	2	1	1	6
Terai			8	8	4	4	24
Terai districts	Bardiya	Gulariya	2	2	1	1	6
Terai districts	Dang	Gadhawa	2	2	1	1	6
Terai districts	Mahottari	Gaushala, Jaleshwor	2	2	1	1	6
Terai districts	Sunsari	Inaruwa, Paschimkasuha, West Kasuwa	2	2	1	1	6
TOTAL			26	23	12	12	73

Data entry was undertaken on a daily basis, with the interviews conducted during the day entered into a purpose made database and sent to the coordination unit where internet connectivity allowed. Members of the coordination unit joined the teams on site throughout the data collection period, to ensure the methodology was followed and to form a first-hand understanding of the context faced by populations at as many locations as possible. In addition the coordination unit held daily debriefing calls with all teams to clarify methodology or implementation issues as they arose. Once data collection was completed, all teams returned to Kathmandu to join the coordination unit for final data entry and debriefing sessions where all data for each location was reviewed and cross-checked.

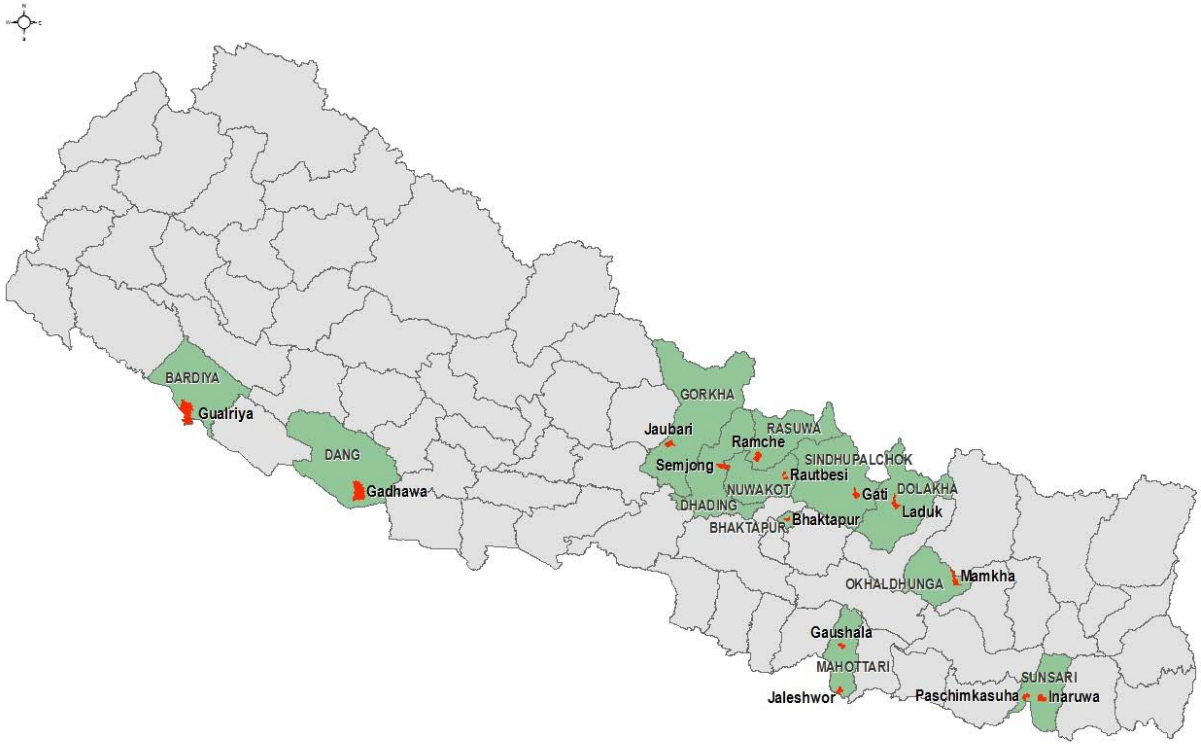
Cross-checked clean data was uploaded in qualitative data analysis platform Atlas-ti, where thematic analysis was undertaken. Preliminary findings from both primary and secondary data components were summarised and presented to shelter agencies and other clusters in Kathmandu on 10 June, where feedback was sought to be incorporated in the final analysis and report drafting conducted between 13 and 24 June.

A key objective of this assessment was to understand levels of awareness and implementation of Disaster Risk Reduction (DRR). Focus group discussion participants in assessed communities were therefore asked about key DRR messages disseminated by the Nepal Risk Reduction Consortium (NRRC), to help identify levels of DRR awareness. The NRRC was established by the Government of Nepal in February 2011[58], to support implementation of a long-term Disaster Risk Reduction action plan in the country, building on the National Strategy for Disaster Risk Management launched in 2009.

[57] Local Authority (LA)

[58] NRRC Steering Committee members include the Government of Nepal, the Asian Development Bank and World Bank, development partners and donors, the Red Cross and Red Crescent Movement and the United Nations.

Map 9: Case study locations



The NRRC identified 5 flagship priorities for risk reduction including; 1) School and Hospital Safety 2) Emergency Preparedness and Response 3) Flood Management 4) Community Based Disaster Risk Reduction 5) Policy and Institutional Support for Disaster Risk Management. The NRRC Communications Group developed key DRR messages for earthquake, landslides, flood and fire. This assessment focused on landslides and flood messages, to help assess level of awareness of DRR methods. The key messages developed by the NRRC that were assessed here, are outlined in Annex 2.

Challenges and limitations

Given that the sampling methodology for the qualitative data collection component is purposive with the objective to advance theory as opposed to measure prevalence, it will not be possible to generalise the findings from the primary data collection exercise with any specified level of precision. It should also be noted that due to limited time-frame and minimum resources available, the number of case studies must be limited to 12, while there may be additional combination of characteristics that would be fruitful to study in order to understand levels of expectations and preparedness across different types of communities.

Findings

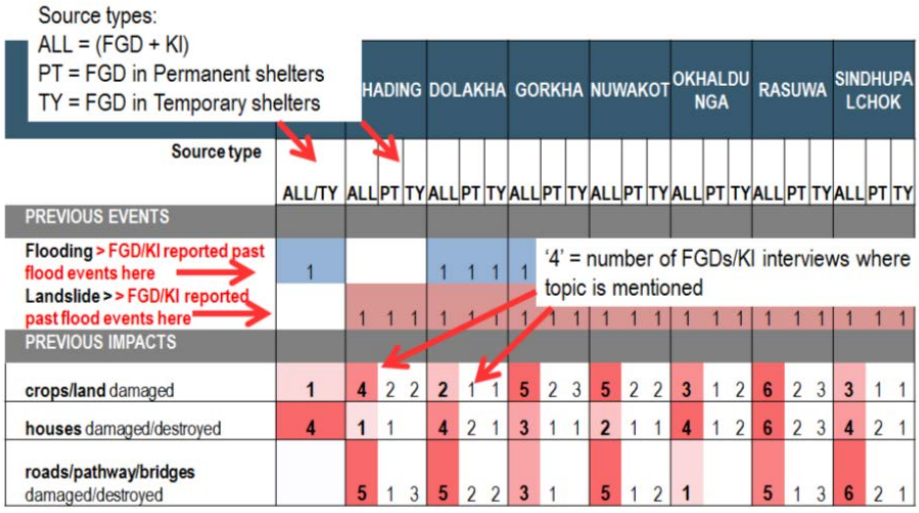
To understand levels of preparedness amongst households in earthquake affected and Terai districts; expectations of assistance; and potential coping strategies likely to be used in response to monsoon impacts, a case study assessment was conducted with participants at 12 locations[59], including those living in emergency (tents/tarpaulin) and temporary (CGI) shelters. Findings are summarised below

[59] See section 'Case study locations' section above for details on locations

using tables that show the number of interviews where each topic was mentioned across all interviews and in temporary and permanent shelter FGDs respectively (except in Bhaktapur where all FGDs were conducted with participants living in temporary or partially damaged buildings). The top row in each table lists names of districts where the assessed locations are located. The second row ('Source type') lists the type of interview where mentions are counted; 'ALL' summarises all interviews, 'PT indicates the number of FGDs with permanent shelter residents where a topic was mentioned, and 'TY' signifies the number of FGDs where a topic was mentioned by temporary shelter residents. The 'Previous events' section is always the same and is included in all tables to aid interpretation; these rows show whether flooding (blue) or landslide (pink) events were reported to have taken place at the location at some point in the past. The sections below in the table are specific to an overall theme identified in the data (e.g. 'Previous impacts'), listing identified sub-themes grouped under the overall theme (e.g. 'crops/land damaged') and the number of interviews or FGDs where the topic was mentioned. Hence a '6' under 'ALL' for 'crops/land damaged' in Rasuwa district (see Figure 1 below) means participants across 6 interviews or FGDs highlighted this impact.

It should be noted that KI interview counts are not listed separately (but as mentioned above only 'ALL', permanent shelter FGDs and temporary shelter FGDs). This is due to space restrictions as the disaggregation between temporary and permanent shelter residents was deemed most important to aid interpretation. However, the number of KI interviews where a topic was mentioned may still be deduced, in our example from Rasuwa (see Figure 1 below) 2 'PT' FGDs and 3 'TY' FGDs mentioned crops and or land being damaged, which leaves 1 KI interview that mentioned the same reaching a total of 6 interviews under 'ALL'. Note that themes listed differ in several cases between earthquake priority and Terai districts; this is simply because participants focused on different issues during interviews, due to the different contexts. It is also important to bear in mind that the number of interviews where a topic is mentioned is simply an indication of how strongly it features in community discussions and cannot be relied on for any further extrapolation. Directions on how to interpret the tables are summarised in Figure 1 below.

Figure 1: How to read the qualitative data analysis tables



Previous monsoon impacts

Image 1: Flooding at temporary settlement at Maheshwori football ground, Bhaktapur, 27 August, 201560

"There was a scary lightening and then we heard rumbling sound at 4:30 in the morning. Within 1 to 15 minutes we were already drowned in the water up to the neck.

It was hard for differently abled people to escape. As we were acquainted with the place we managed to swim to higher ground."

--FGD participant describing the flooding of temporary shelter site at Maheshwari football ground, August 2015

Experiences of past monsoon impacts in earthquake affected locations closely reflected findings from secondary data,[61] included landslides but also flooding, often occurring at the same time. Damages of crops and land were highlighted at all locations, with areas sometimes left permanently destroyed and impossible to inhabit. Houses, roads, pathways and bridges were often damaged or destroyed. Damages to water sources due to landslides or floods were also raised frequently as a major impact as were damages to schools and health facilities. Fatalities due to monsoon impacts were reported at all locations except one, and participants talked about livestock and belongings being swept away or abandoned in locations rendered too dangerous to access. Access to markets was reported to be temporarily severed in most locations during the monsoon season. Damages to electricity supplies were reported in Mamkha VDC in Okhaldunga and temple and sewage system had been flooded in Bhaktapur municipality in floods that inundated temporary shelter sites in August 2015. Table 8 below outline the mentions at each location.

[60] Kathmandu Post: http://kathmandupost.ekantipur.com/news/2015-08-27/bhaktapur-settlements-inundated-photo-feature.html
[61] DesInventar; MoHA; NRCS

Table 9: Previous impacts – Earthquake affected priority district locations

EQ priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
PREVIOUS IMPACTS																						
crops/land damaged	1	4	2	2	2	1	1	5	2	3	5	2	2	3	1	2	6	2	3	3	1	1
houses damaged/destroyed	4	1	1		4	2	1	3	1	1	2	1	1	4	1	2	6	2	3	4	2	1
roads/pathway/bridges damaged/destroyed		5	1	3	5	2	2	3	1		5	1	2	1			5	1	3	6	2	1
water source damaged/contaminated	2	5	2	2	4	2	1	4	2	2	5	2	2	3	1	1	3	1	2	1		
school damaged/destroyed	1	1		1	2		1	2		1	2	1	1	4		3	1		1			
fatalities		3	1	1				1		1				1		1	4	1	2	1	1	
livestock swept away		2		2							3		2	2	1	1	2		2			
health facility damaged/cut-off	2							1			1									1		1
belongings washed away/spoiled/not accessible	2																1		1			
access to markets construction materials cut-off		1						1						1			1			1		
land permanently destroyed/impossible to inhabit		1		1													1		1			
electricity cut off														2		1						
temple damaged	1																					
drainage/sewage system	1																					

Destruction of homes, crops and land was also raised by participants in Terai district locations, here caused by flooding. Roads, pathways and bridges were also here said to have been affected often with dire consequences as raised roads served both for transport and as barriers keeping flood water at bay. Belongings were often said to have been swept away as people fled to safety from rapidly rising waters. Damages to school and water sources were raised. People had often been left without food for several days, stranded and waiting for flood waters to withdraw. Soil erosion as a result of the flood water was mentioned at several locations and land had been left impossible to cultivate where a thick layer of sand was left by the receding flood waters. Local cooking stoves made of clay were damaged and sometimes impossible to use; electricity and phone networks cut off; and health facilities and temples damaged, as outlined in table 9 below.

Table 10: Previous impacts –Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
PREVIOUS IMPACTS												
houses damaged/destroyed	6	2	3	4	2	1	6	3	2	5	3	1
crops/land damaged	4		3	7	3	2	2	1		4	2	1
roads/pathway/bridges damaged/destroyed	4	1	2	6	2	2	3	1		4	2	1
belongings washed away/spoiled/not accessible	3		3	2	2		3	2	1	3		2
school damaged/destroyed	3	1	2				1	1		4	1	2
water source damaged/contaminated	1	1					1	1		3	1	1
without food during initial days				1	1		1		1	2	1	1
fatalities	4		3									
soil erosion				1		1	1		1	2		1
livestock swept away	1						1		1	1		1
land permanently destroyed/impossible to inhabit	1			1	1					1	1	
health facility damaged/cut-off				1			2			1		
cooking facilities damaged							2		2			
access markets construction materials cut-off										1		
electricity cut off							1					
temple damaged										1		
phone network cut off							1					

Living conditions and protection

Participants discussed current living conditions in the light of preparedness ahead of the coming monsoon. In earthquake priority districts, wood were mostly used for cooking followed by gas and dry dung or kerosene; electricity was often provided through hydropower, sometimes via main network or gas and solar. Several locations reported limited or non-existing electricity supplies in particular wards within the VDC. In Mamkha VDC in Okhaldunga, electricity was reportedly not accessible at all and the only access road had been permanently destroyed by landslides. The October 2015 shelter assessment found considerable variation in electricity access across districts, with households in Okhaldunga, Sindhupalchok and Dolakha districts most likely to report lack of electricity.[62]

Water was commonly accessed via taps, either connected to nearby springs or main networks. Rivers, wells and hand pumps were also relied on and most locations complained about restricted access to clean water either as sources were contaminated by floods or pipes destroyed by landslides. Most locations also highlighted temporary toilets in poor condition and some reported restricted or no access to sanitation at all. Shelters were said to be warm and dry by permanent shelter residents, in particular compared to the past monsoon which occurred immediately following the 2015 earthquakes. This is encouraging given that more than 50% of households overall reported that their homes were protected

[62] Sindhupalchok: 24%; Dolakha: 17%; Okhaldunga: 16% (REACH/Shelter Cluster Nepal (October 2015) Nepal Earthquake Recovery Monitoring Assessment)

from rain in the shelter assessment conducted across priority districts in October 2015.[63] However, participants remaining in temporary shelters raised concerns that structures were too weak to withstand strong winds and heavy rain, with frequent leakage and water inside, as outlined by table 10 below.

Table 11: Living conditions – Earthquake affected priority district locations

EQ priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
COOKING																						
wood	5	4	2	2				3	2	2	4	2	2	3	1	2	3	2	1	3	2	1
gas	1								2	1							2	1	1	1	1	
dry dung/kerosene		1												1								
ELECTRICITY																						
electricity - hydropower	1	1						1									1					
electricity - main network					1															1		
electricity - gas/solar	1																					
access electricity -		1			1						1			1								
access electricity - none														1								
access road - none														1								
WATER																						
tap - spring or main	2	4	2	2	1	1					5	2	2	4	1	2	2	1	1	1		1
river					3	2	1	4	2	2	2	1		1						2	1	1
well/ hand pump	6				1		1										1	1				
water contaminated/restricted	2				4	1	2	1	1		1						4	2	1	3	1	1
TOILETS																						
temporary/poor condition	1	1	1					3	1	2	2	1	1							1		1
shared/communal	2	2		2							2		2				1		1			
none	1																1	1				
insufficient toilets	2																					
SHELTERS																						
warm/dry	2	1	1		2	2		1		1	3	2	1				2	2		3	2	1
weak/leaking roof/water inside	7	3	1	2	1		1	3	2	1	2		2	3	1	2	2		2	1		1
unsafe	1	1		1	3	1	2	1		1	2	2		1		1	2	1	1	3	2	1
too hot/cold	2	2		2	2		2	3	2	1	1		1				1		1	1		1
insufficient space	1																					
mosquitos	1																					

[63] Ibid.

Access to land reportedly varied within locations, with some staying for free on government land but without documentation and in fear of eviction. Some were renting or owning land, with or without documentation and disputes over land was reported in several instances. In particular households residing on lands at risk of landslide or flooding were sometimes unable to relocate to safe sites despite having resources to do so, due to disagreement over land use with other groups within the community. The variation in land tenure found at these locations diverged from overall district findings in the shelter assessment conducted in October 2015 where the majority of households (92%) reported owning the land they resided on. This variation could be due to the comparatively high levels due to landslides at the case study locations, which had forced a large proportion of families to move from the land they owned.[64]

In earthquake affected district locations most participants reported having citizenship cards and most were said to belong to more vulnerable castes. Intra-communal conflict was reported at some locations following targeted distributions of aid which were seen as unfair and insufficient in terms of addressing local needs.

Image 2: Ramche VDC, Rasuwa district

[64] REACH/Shelter Cluster Nepal (October 2015) Nepal Earthquake Recovery Monitoring Assessment

Table 12: Protection – Earthquake affected priority district locations

EQ Priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
LAND TENURE																						
free land	2	1	1		1	1								1		1	4	2	2	1		1
renting land		1		1	1		1	5	2	2	1		1	1		1				2	1	1
own land		3	2	1	3	1	2	1		1	4	2	2	2	1	1				2	1	1
LAND TENURE DOCUMENTATION																						
land documentation - yes		1		1	3	1	2	2	1	1	4	2	2	3	1	2	1	1		2	1	1
land documentation - no	3	3	1	2	1	1		3	2	1	1		1	1		1	4	2	2	2	1	1
risk of eviction/land dispute	2				1	1		4	2	2				1		1	4	2	2	3	1	2
CITIZENSHIP																						
citizenship card - yes	5	4	2	2	4	2	2	4	2	2	4	2	2	3	1	2	4	2	2	4	2	2
citizenship card - no														2		2						
CASTE																						
caste more vulnerable (Janjati)	6	4	2	2	1		1	4	2	2	4	2	2	1	1		4	2	2	4	2	2
caste (Brahmin/Chettri)					1		1	1	1		1	1										
caste (Mixed)					2	2																
caste more vulnerable (Dalit)		1		1																		
INTRA-COMMUNITY TENSION																						
conflict over resources/assistance		1									2		2									

In Terai district locations, wood was similarly most frequently used as fuel for cooking. Some participants reported conflict over wood with other groups in the community. Electricity was also here obtained by hydropower or main networks, with some reportedly using solar and gas. No electricity at all was reportedly available for temporary shelter residents in Gulariya VDC, Bardiya and was limited for some in West Kasuwa VDC, Sunsari. Restricted phone network was reported in Gadhawa VDC in Dang. Water was here mostly obtained via wells and hand pumps, which were frequently contaminated by flood water during the monsoon. Locations reported that parts of the population had no access to toilets at all and that those existing were in poor condition.

Shelters were felt to be warm and dry by some permanent shelter residents in Gadhawa VDC in Dang, while remaining participants complained about weak and leaky structures unable to withstand monsoon weather, as outlined by table 12 below.

Table 13: Living conditions – Terai districts

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
COOKING												
wood	3	1	2	4	2	2	4	2	2	4	2	2
gas	1	1		3	2	1						
dry dung/kerosene										1		1
ELECTRICITY												
electricity - hydropower							1			1		
electricity - main network	1			1								
electricity - gas/solar												
access electricity - none	1		1									
access electricity - restricted										1		
access phone network - restricted				1								
WATER												
well/hand pump	5	2	2	4	2	2	5	2	2	5	2	2
river				1	1					4	1	2
tap - spring or main network							1					
water contaminated/restricted availability										1	1	
TOILETS												
none							4	2	2	1		1
temporary/poor condition	2		2							1		1
shared/communal	2		2									
SHELTERS												
warm/dry				1	1							
weak/leaking roof/water inside	5	1	3	3	2	1	6	4	2	4	2	2
too hot/cold	4	2	2	1	1		2	1	1			
insufficient space							1	1		1		1
mosquitos										1		1

Image 3: Gulariya VDC, Bardiya District

Similar to earthquake affected locations, land tenure varied within Terai district locations, with some staying on government or community land for free without documentation and some renting or owning, either with or without documentation. Fears of eviction and disputes over land were reported at most locations. Access to citizenship cards also varied with participants at two locations reporting that some did not have cards. Most participants belonged to more vulnerable castes and in two out of four locations, conflict with other groups over resources such as water sources were reported (see table 13 below for further detail).

Table 14: Protection – Terai districts

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
LAND TENURE												
free land	4	2	2	2		2	3	1	2			
renting land				1	1		1		1	3	1	2
own land				2	2		2	2		1	1	
LAND TENURE DOCUMENTATION												
land documentation - yes				2	2		3	1	2	1		1
land documentation - no	3	1	2	2		2	1		1	3	1	2
risk of eviction/land dispute	2	1	1				3	2	1	5	3	2
CITIZENSHIP												
citizenship card - yes	3	1	2	4	2	2	3	2	1	2	2	
citizenship card - no	2	1	1				1	1				
CASTE												
caste more vulnerable (Janjati)	1	1		4	2	2	4	2	2	4	2	2
caste (Brahmin/Chettri)	2		2									
caste (Mixed)	1	1										
INTRA-COMMUNITY TENSION												
conflict over resources/assistance							1		1	2	1	1

Preparedness and mitigation strategies used and perceived level of preparedness

Participants at all locations reported undertaking mitigation measures to protect themselves against potential monsoon impacts. At earthquake affected locations, strengthening roofs or other parts of shelter structures were reported and some were said to be storing foods in anticipation of market access being cut off. Temporary or weak shelters were being covered with plastic and some locations people reported building small barriers around homes, sometimes using sandbags, to divert heavy rain or flood water. In Mamkha VDC in Okhaldunga participants reported building temporary shelters at sites felt to be safer from landslides compared to their current location, where they would move to during the monsoon season until the risk of landslides abated.

Large barriers using gabion nets were being put in place in the Laduk VDC in Dolakha. Some reported feeling more prepared compared to the previous monsoon, which occurred immediately following the 2015 earthquakes, although several participants felt they were less prepared. Lack of money and resources to strengthen shelters or buy land in a safe location were raised as reasons for lack of

preparedness at all locations. Even where money was available, lack of available safe land was highlighted as a key barrier preventing people from protecting themselves against monsoon impacts. Participants that reported not storing food said they felt this was unnecessary as they felt market access was sufficient and had improved compared to previously when food storing was necessary.

Image 4: Gabion net used as flood barrier

Table 15: Preparedness – Earthquake affected priority district locations

EQ Priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
PREPAREDNESS ACTION TAKEN NOW																						
strengthening roofs/structure	3	4	1	1	3		2	3	1		1	1		2		1	4	1	1	4	1	1
storing food/stock	2	2	1								2	1	1	1						1		
cover roof/tent with plastic	2													2	1	1				1		
building small barriers/sandbags	1										1	1		1								
building temporary shelter in safe site														2		1						
building large barrier					1	1																
PREPAREDNESS COMPARED TO PREVIOUS YEAR																						
more than last year	2							4	1	2				4	1	1	3	1	1	1		
same as last year	1																1		1			
less than last year		1	1		3	1					4	1	1	1	1					2	1	1
REASONS FOR LACK OF PREPAREDNESS																						
lack of money/resources	1	5	1	2	2		2	2	1		1			1			3	2	1	2	2	
lack of safe site	2	2			1	1								1	1		1		1	1		1
improved access to/nearby markets		1			2	2		2	1	1							2		1			
lack of safe storage space	1	1		1																		

Participants at Terai district locations also reported strengthening roof and other shelter structures and covering both temporary and permanent structures with plastic to protect against heavy monsoon rains. In Bardiya and Dang locations, people were constructing raised platforms on top of poles away from the main house where children and valuable belongings were kept during the monsoon. Early warning systems were reportedly in place in all locations but participants highlighted that sometimes the flood waters rose so quickly that people in charge of the system did not have time to sound the alarm before rushing to safety.[65] Storing of food stock was reported and people were building small barriers, again often using sandbags, to protect homes from rising water. In Gadhawa VDC, Dang, where participants had experienced flooding during the night, family members were taking turns to stay awake during monsoon months to be able to spot rising water and warn others.

Table 16: Preparedness – Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	AL	P	T	AL	P	T	AL	P	T	AL	P	T
PREVIOUS EVENTS												
flooding												
PREPAREDNESS ACTION TAKEN												
strengthening roofs/structure	5	1	2	5	2	2	1	1		1	1	
cover roof/tent with plastic							4	2	2	2	1	1
moving children/belongings to raised	1	1		3	2	1						
early warning system	1			2			1			1		
storing food/stock				1	1		1			1	1	
building small barriers/sandbags	1			1								
family member stays awake during rain				1								
PREPAREDNESS COMPARED TO												
more than last year	2	1		1	1							
same as last year							1	1				
REASONS FOR LACK OF												
lack of money/resources	2	1		2		1	5	3	2	3	1	2
lack of safe site												
lack of safe storage space	2		2	1	1					1		1

Coping strategies previously used

Past use of coping strategies were explored in interviews and discussions to understand what measures households take to cope with monsoon impacts. Moving to a temporary location until flood waters receded or risk of landslide and flood was felt to reduce to an acceptable level, was frequently stated as a coping strategy used in earthquake affected locations. However, this temporary relocation often turned into long-term displacement, with all locations reporting households continuously displaced by landslides, often but not always directly caused by the 2015 earthquakes. Ongoing displacement was also reported due to flooding, lack of services and safe land. Overall, participants differentiated between temporary displacement (throughout monsoon season), ongoing displacement (continuing after monsoon season) and temporary evacuation (temporarily after a specific event during the monsoon).

[65] The Government of Nepal Ministry of Science, Technology and Environment: Department of Hydrology and Meteorology Flood Forecasting Project monitors water levels: http://hydrology.gov.np/new/bull3/index.php/hydrology/home/main

Rebuilding and clearing affected roads was also frequently prioritised by participants in earthquake affected locations, to restore access as quickly as possible. Participants also reported digging and re-digging small canals often on a daily basis, to divert flood and rain water away from their homes, a coping strategy that was also used ahead of the monsoon to mitigate against forthcoming impacts. Where market access was affected communities resorted to local materials for repairs including bamboo and timber where accessible. Where coping strategies were not possible to implement commonly cited reasons included lack of money and materials and access to safe land.

Table 17: Coping strategies – Earthquake affected priority districts

EQ priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
COPING STRATEGIES USED IN THE PAST																						
temporary displacement	5	2		1	3	2	1							6	1	4	1	1		3	1	1
rebuilding/clearing roads		2	2		3	2	1	1	1		1		1	1		1	1		1	2		1
digging small canals (before and during monsoon)	3				2	1					4	1	2				1		1	3	1	1
rebuilding schools					2	1	1				1		1	4	1	3						
using locally available/re-using materials		1			2		1				1			1			1			1		
rebuilding water points		3	1	2																		
rebuilding houses					1		1													1	1	
rebuilding canals								1	1													
using alternative markets								1			1											
plastic/straw on the floor	1																					
sharing water sources with other locations		1																				
temporary evacuation														1								
REASONS COPING STRATEGIES NOT USED																						
current site is not safe																	2		1			
lack of money/materials					1									1						1		
ONGOING DISPLACEMENT																						
due to landslide		2		1	1	1		5	2	2	1		1	3	1	1	1	4	4	2	1	1
due to EQ	7				3	1	2	1		1				1	1		2	1	1			
same ward	2	1		1	2		1	1		1	1									1		1
due to flooding								1			4	1	2									
due to lack of services					1	1								3	1	2						
original homes totally destroyed	4				1	1											1	1				
due to lack of land														1		1						

Temporary evacuation in response to flooding was a coping strategy frequently used by participants at the Terai locations. People moved to higher ground for a few days until waters receded, often pitching temporary shelters on roads built on top of embankments, or moving into schools or multi-storey buildings. Some participants moved to temporary locations throughout the monsoon season, only returning to their original sites when the flood risk was felt to have subsided. Rebuilding and clearing damaged roads was also frequently raised as a key coping strategy as these were often said to serve as flood barriers and were therefore crucial to maintain throughout the monsoon season.

Similar to earthquake affected locations, participants also here reported digging and re-digging small canals before and during the monsoon to divert water from heavy rains away from their homes.

Table 18: Coping strategies – Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
COPING STRATEGIES USED IN THE PAST												
rebuilding/clearing roads	4	2	1	5	2	2	1		1	3		1
temporary evacuation	2	2					5	2	2	5	1	3
temporary displacement	6	2	3	1						2	1	1
rebuilding houses	2	2		2	1	1	2	2				
digging small canals (before and during	2		1	1		1						
plastic/straw on the floor	1	1										
REASONS COPING STRATEGIES NOT USED												
lack of money/materials	1	1								1		
ONGOING DISPLACEMENT												
due to flooding				2	1		4	2	1	5	3	1
due to lack of services				1		1				1		1
original homes totally destroyed	2		2									
same ward	2		2									
due to lack of food				1		1						

Markets

Availability of selected construction materials and tools at locations assessed in Terai districts was good at the time of the assessment. The widest range of prices seen was for timber, crow bars, machetes and shovels. Traders and builders highlighted that one key underlying factor driving difference in price was difference in quality between products imported from China (less expensive, lower quality) and India (more expensive, better quality), with some better quality items priced at more than 4 times the amount charged for the same type of item at lower quality.

Table 19: Average price per unit at time of the assessment – Terai district locations

Item	UNITS	Bardiya	Dang	Mahottari	Sunsari	Min	Max	Range
MARKET		Gulariya	Ghadawa	Jaleshwor	Inaruwa			
Constructions materials								
Bamboo	1 Piece	150	100	200	200	100	200	100
Burnt Bricks	1 Piece	12.5	11	13	20	11	20	9
Cement	50 KG	800	712.5	700	800	700	800	100
Deformed Steel bars - 10-25mm	1 KG	850	73	78	80	73	850	777
Galvanized welded wire mesh	1 m2	80	90	80	200	80	200	120
Nails for roof	1 KG	150	160	140	120	120	160	40
Nails for wood	1 KG	150	180	100	100	100	180	80
Nylon rope	1 KG	350	130	250	160	130	350	220
Plastic sheet	1 KG	800	110	260	270	110	800	690
Tie wire	1 KG	150	110	150	120	110	150	40
Timber	1 m3	2400	2300	4500	6000	2300	6000	3700
Tools								
Claw hammer	1 Piece	150	350	300	250	150	350	200
Combination pliers	1 Piece	250	225	130	250	130	250	120
Gall (Crow bar)	1 Piece	250	1200	200	500	200	1200	1000
Hand saw	1 Piece	300	180	150	150	150	300	150
Machete	1 Piece			3000	1500	1500	3000	1500
Pick	1 Piece	500	600	350	400	350	600	250
Shovel	1 Piece	650	1350	300	275	275	1350	1075
Woven sack	1 Piece		10	20		10	20	10

The same items were found to have the widest range of pricing across earthquake affected locations as seen in the Terai districts. Timber, crow bar and machetes had the most variation in price. Timber was in some locations easily accessible at a low price, while in other places, lack of timber was reported as a key barrier when constructing earthquake resistant housing in line with methods taught in construction training provided by shelter agencies. Also notable, was that several locations reported accessing markets outside of their district, with limited communications at all with the district centre in case of Semjong VDC in Dhading, due to the considerably poorer road access to Dhading municipality compared to Nuwakot market centre, Trishuli.

Table 20: Average price per unit at the time of the assessment – Earthquake affected priority districts

ITEM	UNITS	Bhaktapur	Dhading	Dolakha	Gorkha	Nuwakot	Okhaldunga	Rasuwa	Sindupalchok	Min	Max	Range
MARKET		Bhaktapur	Trishuli (Nuwakot)	Lamidanda	Jaubari Narayanghat (Chittwan) Srinathkot	Rautbesi	Siddhicharan Dhundh Kunda Kuntadevi	Manigawo Ghumti Trishuli (Nuwakot)	Barabise			
Construction materials												
Bamboo	1 Piece	250	75	75	125	75	200	175	Free	75	250	175
Burnt Bricks	1 Piece	15	14	17	17	26	22	17	17	14	26	12
Cement	50 KG	800	975	712.5	712.5	800	1100	850	870	712.5	1100	387.5
Deformed Steel bars - 10-25mm	1 KG	NK	85	82.5	120	75	92.5	84	82.5	75	120	45
Galvanized welded wire mesh	1 m2	90	200	300	225	NA	400	130	300	90	400	310
Nails for roof	1 KG	127.5	300	150	160	170	280	180	150	127.5	300	172.5
Nails for wood	1 KG	95	120	100	110	110	150	225	100	95	225	130
Nylon rope	1 KG	220	150	270	210	190	400	NA	250	150	400	250
Plastic sheet	1 KG	135	305	305	305	210	300	230	350	135	350	215
Tie wire	1 KG	130	150	100	200	160	250	180	100	100	250	150
Timber	1 m3	2800	1400	NA	3500	1400	1000	3000	NA	1000	3500	2500
Tools												
Claw hammer	1 Piece	250	125	125	125	270	500	240	350	125	500	375
Combination pliers	1 Piece	250	225	225	225	275	150	130	325	130	325	195
Gall (Crow bar)	1 Piece	NK	700	700	700	700	1000	3000	1150	700	3000	2300
Hand saw	1 Piece	150	150	300	120	140	250	350	300	120	350	230
Machete	1 Piece	250	1250	1250	2750	1250	1000	2000	NA	250	2750	2500
Pick	1 Piece	300	250	330	350	250	300	425	330	250	425	175
Shovel	1 Piece	300	400	350	300	270	300	350	280	270	400	130
Woven sack	1 Piece	7.5	15	25	40	15	50	15	27.5	7.5	50	42.5

Disaster Risk Reduction (DRR) Messages & perceptions of safety

Disaster risk reduction messages disseminated by the Nepal Risk Reduction Consortium (NRRC) were discussed in FGD and KI interviews to explore levels of DRR awareness. Overall awareness was high, participants at all locations in earthquake affected priority districts knew of high risk areas in their VDC; knew what to do in case of landslide or flood; were looking out for warning signs of potential landslides; were listening to the radio to hear warnings; and were taking some action to reduce risk of landslides such as planting trees. Where flood risk was present, participants looked out for signs of flood risk and were building barriers to reduce flood risk, in some cases using gabion nets distributed by local government authorities. Awareness was lower about who would warn them or could be approached to find out about threats. Similarly, few had emergency bags prepared and at no location did participants report carrying a whistle to alert attention should they be trapped by floods or landslides.

Table 21: DRR message awareness and perceptions of safety – Earthquake affected priority district locations

EQ Priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Sources	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
DRR MESSAGE AWARENESS																						
aware of high risk areas	5	4	2	2	4	2	2	4	2	2	4	2	2	3	1	2	4	2	2	4	2	2
know what to do if flooding/landslide	5	4	2	2	4	2	2	2	2		3	2	1	3	1	2	3	2	1	4	2	2
look out for warning signs of landslide/soil erosion risk	1	2	1	1	4	2	2	4	2	2	4	2	2	3	1	2	2	1	1	2	1	1
listen to radio to monitor	3	2		2	3	2	1				4	2	2	2	1	1	2	2		4	2	2
know what to do if landslide	2	2	1	1	1	1		3	2	1	3	2	1	3	1	2	2	2		2		2
taking action to reduce	2	2	2		2		1	5	2	2	1		1	3	1	2	4	2	1	1		
look out for warning signs of flood risk	3				4	2	2	4	2	2	4	2	2	1		1				2		2
taking action to reduce flood	1				3	2		5	2	2	1	1		3	1	2	1					
know who will warn/who to ask about threats														2	1	1	1	1				
have emergency bag	2																			1	1	
FEELING SAFE																						
No - shelter is not strong	1	2		1	2		2	3	1	2	2		2				3	1	2	1	1	
No - risk of landslide/death					4	3	1							3	1	2	1	1		2	1	1
No - lack of available/identifiable safe land	2										4	2	2	1		1	1		1	1	1	
No - risk of flooding/drowning	1				3	2	1				1		1							1		1
No - heavy rainfall	1	2	2											1	1		2		2			
Yes - compared to previous								1	1													

Despite being relatively prepared according to the DRR messages, participants at all locations in earthquake affected districts reported feeling threatened by the approaching monsoon. In all locations apart from one, shelters were felt to not be strong enough to withstand monsoon impacts such as heavy rainfall, particularly amongst temporary shelter residents. Many reported fear of landslides and floods, in addition to worries that their land either was unsafe or potentially unsafe – although awareness as noted above, was high regarding known areas at risk, this knowledge was not felt to be exhaustive as new sites had become risky following the earthquake. Lack of confirmation on which areas were safe to remain in was thus a concern raised repeatedly, a worry validated by geological studies which have highlighted a change in risk areas following the 2015 earthquakes.[66] Permanent shelter residents in Gorkha stood out in reporting that they felt more safe compared to the previous monsoon, as they had managed to repair houses damaged by the 2015 earthquakes. Shelters were still not felt to be strong enough to withstand the monsoon but no immediate concerns were raised here regarding landslides or other monsoon impacts.

"Roads and land are at risk of extinction here, in 20 years there will be no Mamkha VDC"

— FGD participant describing how landslides are demolishing the hill VDC where she lives, Mamkha, Okhaldunga

Image 5: Access pathway to Mamkha VDC, Okhaldunga

Similar to earthquake affected locations, participants in Terai district locations expressed high awareness of risk areas; of what to do in the event of flooding; and were looking out for warning signs of floods. Local early warning systems were reported to a greater extent here, as reflected by the higher awareness of who would warn about rising flood risk. However, participants were looking out less for warning signs and in two out of four locations, no participant or key informant reported listening to the radio to hear warnings of potential monsoon impacts. Some were taking action to reduce flood risk but similar to in earthquake areas, emergency bags were not widely prepared and no participant reported carrying a whistle.

[66] See Context and Macro-level findings above.

Table 22: DRR message awareness and perceptions of safety – Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Sources	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
DRR MESSAGE AWARENESS												
know what to do if flooding/landslide	4	2	2	3	1	2	5	2	3	6	3	3
aware of high risk areas	4	2	2	3	2	1	4	2	2	3	2	1
look out for warning signs of flood risk	2		2	4	2	2	3	1	2	1		1
know who will warn/who to ask about threats	2		2	1	1		2		2	1	1	
look out for warning signs of landslide/soil							1	1		3	1	2
listen to radio to monitor weather/hear warnings				2		2	1	1				
taking action to reduce flood risk	1	1		2	1	1						
know what to do if landslide trapped							2	1	1			
have emergency bag				1	1							
taking action to reduce landslide risk										1	1	
FEELING SAFE												
No - risk of flooding/drowning	3	2		4	2	2	2	1	1	4	2	1
No - lack of safe evacuation route	1	1		1	1							
No - heavy rainfall	1		1							1	1	
No - lack of available/identifiable safe land										1		1
Yes - compared to previous location/before	1		1									
Yes - due to new flood barrier							1					

Again similar to earthquake areas, participants in Terai district locations did not feel safe from monsoon impacts. They were fully aware of high risk areas but felt they had no way of acting on this knowledge. They feared the floods and risk of drowning. Two locations raised lack of a save evacuation route when waters rose as a key concern. Heavy rainfalls damaging shelters and causing localised floods were also felt to be a key area of concern. In two locations some participants reported feeling safe, in one case compared to the previous year and in another due to a new flood barrier having been built.

Image 6: FGD in Gadhawa VDC, Dang.

"As there is not any way of being safe [from the flood] we just can climb up tree once it occurs."

—FGD participant describing lack of safety from flooding, Gadhawa, Dang

Monsoon assistance needs and expectations

Construction materials, particularly CGI sheets, were raised most frequently in earthquake affected locations, as the assistance that would help families prepare and cope better with monsoon impacts. Repairs or rebuilding of permanent housing were also frequently highlighted, often in discussion around the awaited government assistance for which enrolment had just began in some areas. Help to identify and access a safe site was also reported as a key priority, in addition to emergency shelters should the monsoon impacts render current homes uninhabitable. There were also calls for help to strengthen barriers and infrastructure such as roads, while prepositioning needs were raised by local authority key informants at two locations. Assistance in particular discussed in Mamkha VDC in Okhaldunga, a VDC that had seen comparatively low levels of external assistance in the past, reflected current unmet needs; electricity supply and access to health facilities. Insurance for farmers was suggested here as a type of assistance that could help families cope when crops and livestock were destroyed by monsoon impacts.

Table 23: Monsoon assistance needs – Earthquake affected priority districts

EQ Priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
MONSOON NEEDS																						
construction materials/CGI	1	4	1	2	1		1	5	2	2	3	1	2	4	1	3	3	2	1			
permanent/strong shelter	1	1		1	3		2	2		2	2	1	1				4	1	2	2	1	1
identification of/access to safe site	1				1	1					4		3	3	1	2				3		2
emergency shelter	2	1		1	1		1	2	1		1		1	1		1						
building/strengthening flood barrier/canals/clearing rivers	1				1	1					2		1							1	1	
strengthen/construct road/bridges		2	1	1	1									2		1						
food														2	1	1	1		1			
rescue assistance											2	1	1									
mosquito nets	3																					
cash														1		1						
early warning system																				1		1
electricity														1		1						
health facilities														2								
prepositioning											1			1								
safe shelter for livestock														1		1						

toilets/hygiene promotion									1	1		
fast assistance							1					
insurance for farmers							1					

As seen in earthquake affected locations, help to identify and access safe land was frequently raised in Terai district locations. This was followed closely by calls to strengthen and build flood barriers, which could ultimately help turn currently unsafe and frequently flooded land into locations safe enough for families to remain in throughout the monsoon season. Stronger shelters and sanitation was also pointed out, as was access to rescue assistance, particularly boats, to help people escape rising flood waters. Food was highlighted as a key type of assistance that was needed quickly following flooding, reflecting past experiences of those that were stranded for days without food after fleeing flood waters that were rising too quickly to allow any belongings to be carried to safety.

Table 24: Monsoon assistance needs – Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
MONSOON NEEDS												
identification of/access to safe site	2		2	1		1	2		2	4	3	1
building/strengthening flood barrier/canals/clearing rivers	1	1		6	2	2				3		2
permanent/strong shelter	2	2					3		2	3	1	2
toilets/hygiene promotion	1	1					3	1	2	1		1
rescue assistance boat/lifejackets	3	1	1	1						2	1	
food				1		1	1	1		2	1	1
strengthen/construct road/bridges							3	3		1		1
water							3	2	1			
restoration of land										2		2
construction materials/CGI							1	1		1		1
emergency shelter /tents/tarpaulin	1		1							1		1
early warning system										2	1	
mosquito nets										1		1
safe evacuation route										1	1	
prepositioning							1					

Expectations of actual assistance being provided in response to the monsoon were low across all locations. In half of earthquake affected locations most participants expected no assistance while some suggested that the long-awaited permanent shelter assistance following the 2015 earthquakes may be expected. CGI sheets, food, help to identify a safe location and strengthening of the main access roads were also raised as expectations at some locations. If assistance would arrive, government authorities were most frequently expected to be the source, followed by NGOs, although most locations complained that assistance promised in the past had not materialised, hence expectations were overall low.

Table 25: Monsoon assistance expectations – Earthquake affected districts

Q Priority district locations	BHAKTAPUR	DHADING			DOLAKHA			GORKHA			NUWAKOT			OKHALDUNGA			RASUWA			SINDHUPALCHOK		
Source	ALL	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS																						
flooding																						
landslide																						
MONSOON ASSISTANCE EXPECTATIONS - TYPE																						
none	3	4	1	2	1		1	3	1	1												
permanent shelter	1							1	1								1					
cash		1	1																			
CGI														1	1							
road strengthening		1		1																		
safe site														1	1							
food																	1					
MONSOON ASSISTANCE EXPECTATIONS - FROM																						
from government	2	1	1		3	1	1	3	2	1	2	1		3	1	2	2	2		2		1
from NGO		1	1		3	1	1	1	1		3	1	1				1		1	5	2	2
promised assistance has not been delivered		2	2		2	1	1	1		1							1		1	1		
from neighbours					1	1																

In Terai districts there was almost complete agreement across all FGDs and interviews that no assistance was expected in response to the forthcoming monsoon. In one location the local authority key informant suggested that rescue assistance may be provided if there was a major flood event. All but one location complained that assistance had been promised in the past but not materialised.

Table 26: Monsoon assistance expectations – Terai district locations

Terai district locations	BARDIYA			DANG			MAHOTTARI			SUNSARI		
Source	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY	ALL	PT	TY
PREVIOUS EVENTS												
flooding												
MONSOON ASSISTANCE EXPECTATIONS -												
none	2	1	1	3	1	1	3	2		5	2	2
rescue assistance	1											
MONSOON ASSISTANCE EXPECTATIONS -												
promised assistance not materialised	3	2	1				1		1	2		2
from NGO							2		2			
from government	1						1		1			

CONCLUSION

The top down caseload estimates generated through this assessment adopted families living below the poverty line as a starting point to identify a caseload of people who may be particularly vulnerable to monsoon impacts. Case study findings from 12 locations across Terai and earthquake affected locations indicate that a lack of resources is indeed likely to affect monsoon resilience at several levels. Poorer families are particularly likely to be living in low quality shelters that are unable to withstand heavy winds, and generally lack access to land that is safe from landslide and flooding.[67]

While this finding supports the conclusion that using a vulnerable subset of a population as a basis for caseload estimates—the methodology adopted for the top-down caseload calculations—is a logical approach to inform contingency planning, this study has also highlighted the inherent challenges in using such a methodology to estimate caseloads and areas at risk, when data from previous events is unavailable. The exercise has shown that it *is* possible to estimate areas at risk of landslide and flooding in the 14 earthquake priority districts, but that identification of the *probable number of areas affected areas during any one monsoon* remains a challenge due to a lack of available data. The top-down approach generates estimates that are based on the scenario that *all* areas at a given risk level will experience landslide impacts during the same monsoon, which is highly unlikely in reality. However, following the 2015 earthquakes, past events data can no longer be relied up to estimate the probable number of affected areas during any one monsoon, given the major changes in terrain conditions that followed. Nevertheless, the top-down approach is arguably the most reasonable approach for humanitarian planning purposes to use where no reliable data on past events exist to accurately inform a bottom up approach. Indeed, relying on past-events data in a setting where both risk *and* vulnerability of the population have increased, the size of the population at risk.

However, a lack of resources is not the sole factor driving monsoon vulnerabilities. In some cases assessed here, safe land was simply not available to purchase, even for those that had resources. Furthermore, communities repeatedly raised that they were unclear about which land was safe for them to use following changes to the landscape caused by the 2015 earthquakes. This concern was mirrored by secondary data findings that showed a considerable increase in landslide susceptibility in most of the earthquake affected priority districts, including loose debris left behind by the earthquakes that could be dislodged by heavy rains during forthcoming monsoons. In Terai districts, secondary data demonstrated the importance of triangulating several sources to identify areas where populations are at risk, as neither global flood modelling (which is limited in capturing localised flood risk) or local data (which appears to have less consistent methodology in assessing risk) is able to capture all potential risk areas.

Local land surveying to identify which land is safe to use in communities where risk exists would be a first step towards helping families that are living in fear of landslides and floods. As enrolment for permanent housing construction assistance is underway it will also be crucial for shelter agencies to conduct thorough assessments of risk at proposed permanent housing sites before commencing

[67] It must be stressed that the case studies conducted here cannot be considered as a representative sample for the districts where they are located; they simply allow us to conclude that issues encountered in these communities are likely to exist in other, similar communities.

construction. For communities where safe land is simply not available, alternative relocation sites will need to be identified to end the cycle of repeated annual displacement due to landslides and floods.

ANNEXES

Annex 1: Information needs and research questions

Data source	Information need	Research questions
SD[68]	Number of HHs living in temporary shelter in each district	>What is the estimated number of households remaining in temporary shelters?
SD	Caseload at high/medium/low risk of flooding and landslide	>What is the estimated number of households residing in high/medium/low risk areas?
PD	Status (legal/land status, living conditions, level of preparation, outlook if no assistance) of families living under tarps/tents and condition of the tarpaulin/tent	> What is the land/legal status of families living under tarps and tents? > What are the living conditions for families living under tarps and tents?
PD	Expectations of families in terms of monsoon assistance from the government	> What monsoon impacts have HH/Community experienced in the past? > What assistance and for whom, do HH/Community need ahead of monsoon? >> What would assistance be used for? > What assistance and for whom, are HH/Community expecting from government? >> What assistance have they received in the past in response to monsoon? CORRELATIONS: >How does shelter agency presence/current and previous activities affect expectations of communities?
PD	PREPAREDNESS/MITIGATION: Level of preparation amongst families in anticipation of the monsoon (plans to relocate to safe area before monsoon, strengthening roof/shelter structures)	>What impacts have HH/Community experienced during previous monsoons? >Are HH/Community aware of DRR information? >How do HH/Community receive warning messages? >How are HH/Community preparing for the monsoon? >> How do HH/Community rank preparations in terms of effective mitigation/preparation against monsoon? >> Did HH/Community receive any assistance following the EQ? >>>What was the assistance used for? >>>Has the assistance helped communities prepare for the monsoon? > What are the key challenges faced by HH/Community when preparing for the monsoon?

[68] SD = secondary data; PD = primary data

		>> How are HH living under tarps/tents preparing for the monsoon and what are their key challenges? > Do HH/Community feel safe at their current location? >> If not what are the site hazards/reasons for lack of safety? >> What is preventing them from achieving a safe location? CORRELATIONS: > How does shelter agency presence/current and previous activities affect preparations undertaken by communities? >How does previous monsoon impact level of preparation? >How do expectations of monsoon assistance affect level of preparation?
PD	COPING: Options for temporary displacement (potential IDP sites, host families, collective centers, camps planned or unplanned, transitional shelters)	> What coping strategies have HH/community resorted to in the past once the monsoon impacts are felt? >>Where have HH/community moved to in the past when relocation has been necessary due to monsoon? > What coping strategies do HH/community feel they can resort to during the forthcoming monsoon? >>Where could HH/community move to if relocation is necessary during the forthcoming monsoon?
PD	Availability/cost of building materials at local market	> Are materials available now? > What is the cost of materials now? > During what times during the year in the past have materials been unavailable? > How have HH/Community coped in the past when material has not been available? > Can HH/Community cope in the same way if material is not available during the forthcoming monsoon? *> > Coordinates of market location - - map distance from VDC*

Annex 2: Nepal Risk Reduction Consortium key DRR messages for flood and landslide

10 Key Messages for Floods	10 Key Messages for Landslide
1. Ask your local authorities if your community has a flood early warning system. If so, understand the early warning system to help prepare for floods. 2. Are you ready? Prepare a flood evacuation plan with your family. Agree on a meeting point at a safe place on high ground outside your home, such as a community flood platform if you have one. Establish safe evacuation routes to the meeting point for your family and livestock 3. Have an emergency bag ready for your family. This should contain essential items you will need immediately after a flood or landslide. Contents: a torch and batteries, a small radio, enough dry food such as beaten rice or instant noodles for one day, a plastic bottle of drinking water, a bottle of Piyush chlorine drops for purifying drinking water, a basic medical kit and photocopies of your ID cards. Store the bag in a safe place at least 3 feet above ground. 4. Carry a whistle on your person at all times to attract attention in an emergency. Blow the whistle if you are trapped or injured by an earthquake, flood or landslide. You can also blow the whistle if you are attacked. A whistle can be heard far away and it can save your voice. Keep the whistle on your key ring or hang it on a chord round your neck. 5. Monitor the weather for heavy rain which may cause floods or landslides, especially during the rainy season. Listen to local radio stations regularly and watch out for any warnings issued by the local authorities. Follow the advice given by the local authorities to protect yourself and your family against harm from floods and landslides. 6. Stay out of flood water to be safe. Do not play, bathe or swim in flood water. It is dangerous. Strong currents can sweep you away. Debris in the water can cause injury. Snakes in the water may bite you. The water may be contaminated and make you ill. 7. Do not drink water left by floods. It may be contaminated and make you ill. Make water safe to drink by boiling it for at least five minutes. You can also make water safe to drink by treating it with Piyush chlorine drops or the prescribed dose of other water purification chemicals. 8. Keep your children safe from drowning. Do not allow your children to play in flood water. Make sure they stay close to you at all times where you can see and hear them. 9. If you are isolated by flood water, use your mobile phone to call for help. If you do not have a working mobile phone, use a whistle or wave bright coloured clothing to attract attention. Flash a torch at night to identify your position. 10. Always defecate in proper toilets or latrines to prevent the spread of water-borne diseases such as diarrhoea. If you cannot use a latrine, bury your faeces in the ground. Do not defecate on open ground or near water sources.	1. Have an emergency bag ready for your family. This should contain essential items you will need immediately after a flood or landslide. Contents: a torch and batteries, a small radio, enough dry food such as beaten rice or instant noodles for one day, a plastic bottle of drinking water, a bottle of Piyush chlorine drops for purifying drinking water, a basic medical kit and photocopies of your ID cards. Store the bag in a safe place at least 3 feet above ground. 2. Carry a whistle on your person at all times to attract attention in an emergency. Blow the whistle if you are trapped or injured by an earthquake, flood or landslide. You can also blow the whistle if you are attacked. A whistle can be heard far away and it can save your voice. Keep the whistle on your key ring or hang it on a chord round your neck. 3. Mitigate your landslide risk by avoiding cutting down trees. Practicing land conservation on farmed hillsides such as terracing is more effective for growing crops. 4. Prepare a landslide evacuation plan with your family. Agree on a meeting point outside your home in a safe open space away from unstable slopes and cliff edges. Establish evacuation routes from your home to the meeting point. 5. Pay attention to the following warning signs to prepare for landslide risk: cracks in land, road or home, dirty underground water sources, and small stones falling for no apparent reason. If you notice these warnings, get to a safe place away from the risk area. 6. Monitor the weather for heavy rain which may cause floods or landslides, especially during the rainy season. Listen to local radio stations regularly and watch out for any warnings issued by the local authorities. Follow the advice given by the local authorities to protect yourself and your family against harm from floods and landslides. 7. During heavy rainfall, listen for rumbling sounds that may indicate an approaching landslide. If you hear a rumbling sound, move away from the noise immediately to safer ground away from the landslide 8. Be alert for landslides during heavy rainfall. Be especially alert for landslides at night when many people may be asleep. 9. After a landslide check for people who may have been trapped in debris. Direct rescuers to their location. Do not enter the landslide area alone. You may also become injured or trapped. 10. If you are trapped in a landslide, use a whistle to alert rescuers. Whistles can be heard easily. They also use less energy than shouting. If you do not have a whistle, make a loud noise by knocking objects together

Annex 3: Estimated caseloads – detailed calculation tables

Estimated caseload top down approach: Terai districts

District	Population (HIMS 2014/15)	Poverty Incidence	Population living in poverty	Proportion of VDCs with flood impact on shelter in the year when max number of VDCs had flood impact	% Population in VDC with Flood hazard	% Population in VDC with Possible Flood hazard	Estimated Caseload Individuals in VDCs with Flood hazard	Estimated Caseload Individuals in VDCs with Potential Flood hazard
Banke	533,874	0.26	140,943	0.09	0.22	0.27	2,580	3,257
Bara	737,985	0.30	220,658	0.05	0.00	0.45	0	5,041
Bardiya	446,466	0.29	128,136	0.18	0.71	0.09	16,451	2,066
Chitwan	623,832	0.09	55,521	0.08	0.4865	0.5135	2,078	2,193
Dang	587,924	0.25	147,569	0.15	0.5391	0.4260	11,643	9,199
Dhanusha	786,266	0.23	181,627	0.11	0.0000	0.8312	0	16,282
Jhapa	855,600	0.11	90,694	0.36	0.0000	0.8297	0	27,091
Kailali	839,390	0.34	282,035	0.39	0.3268	0.0910	35,613	9,914
Kanchanpur	479,952	0.31	150,705	0.52	0.5994	0.3120	47,316	24,629
Kapilbastu	607,225	0.36	215,565	0.10	0.0000	0.3335	0	7,373
Mahottari	656,037	0.16	106,278	0.13	0.0000	0.8934	0	12,331
Morang	1,014,212	0.17	167,345	0.11	0.2494	0.0000	4,426	0
Nawalparasi	675,379	0.17	114,814	0.09	0.5431	0.2053	5,820	2,199
Parsa	641,848	0.29	187,420	0.02	0.0000	0.6326	0	2,823
Rautahat	741,598	0.33	247,694	0.06	0.0204	0.6531	313	10,006
Rupandehi	950,288	0.17	164,400	0.14	0.0000	0.4557	0	10,406
Saptari	664,906	0.40	262,638	0.11	0.4449	0.4741	13,095	13,953
Sarlahi	813,977	0.18	144,074	0.07	0.0154	0.7507	156	7,571
Siraha	660,594	0.35	228,566	0.02	0.1209	0.0892	512	377
Sunsari	819,591	0.12	98,351	0.23	0.5136	0.3875	11,437	8,629

Surkhet	375,170	0.31	114,427	0.08	0.6579	0.2402	5,905	2,156
Udayapur	3,979	0.26	1,031	0.11	0.3117	0.0000	36	0
TOTAL	14,516,093		3,450,488				157,378	177,496

Estimated caseload top down approach: Earthquake priority districts

District	Population (HIMS 2014/15)	Poverty Incidence	Number of people living in poverty 2014/2015	% of population living in temp shelter / CC	Number of people living in poverty in temporary shelter	% pop in VDC with High landslide hazard	% pop in VDC with Moderate landslide hazard	% pop in VDC with Low landslide hazard	Estimated Caseload Individuals - High landslide hazard	Estimated Caseload Individuals - Moderate landslide hazard	Estimated Caseload Individuals - Low landslide hazard
Bhaktapur	327,907	0.13	40,988	38%	15752	0.00%	1.53%	98.47%	0	240	15511
Dhading	342,210	0.19	64,335	65%	41656	43.03%	49.48%	7.50%	17923	20610	3123
Dolakha	186,160	0.26	48,402	90%	43529	4.75%	38.97%	56.28%	2067	16965	24497
Gorkha	260,509	0.20	53,144	86%	45791	30.73%	31.62%	37.65%	14071	14478	17242
Kathmandu	1,916,667	0.08	145,667	7%	10499	1.97%	0.61%	97.42%	207	64	10227
Kavrepalanchok	389,550	0.14	54,147	59%	31715	37.98%	26.13%	35.90%	12044	8286	11385
Lalitpur	505,490	0.08	38,417	13%	5043	10.64%	2.31%	87.04%	537	117	4390
Makawanpur	436,089	0.28	121,669	16%	20031	28.76%	3.84%	67.40%	5761	770	13500
Nuwakot	6,456	0.20	1,311	90%	1175	25.41%	58.05%	16.54%	299	682	194
Okhaldhunga	148,812	0.21	30,506	26%	7881	0.00%	50.20%	38.31%	0	3956	3019
Ramechhap	203,966	0.26	52,215	86%	44693	5.79%	58.61%	35.59%	2590	26195	15908
Rasuwa	43,885	0.32	13,868	84%	11635	44.64%	49.20%	6.15%	5194	5725	716
Sindhuli	300,853	0.38	115,227	21%	24516	17.96%	29.06%	52.98%	4404	7124	12988
Sindhupalchok	289,780	0.25	73,604	94%	69210	38.05%	54.65%	7.29%	26337	37826	5047
TOTAL	5,358,334		853,500		373,124				91,433	143,038	137,748

Estimated caseload bottom up approach: Terai districts

District	DI	Year	NRCS	Year	max year/district *Maximum recorded HH destroyed/damaged by DI or NRCS*	Prop max/total max *Proportion of total affected households calculated for each max year/district out of total affected if all districts were affected with maximum recorded impact at once*	Num max/year *Prop max/total max applied to maximum total affected households recorded across all districts in one year*	Estimated Caseload Individuals: *(Num max/year x 5; assuming HH size=5 and each house destroyed/damaged representing one household)*
Banke	250	2012	10763	2014	10763	10%	6076	30381
Bara	4	2004	3258	2004	3258	3%	1839	9197
Bardiya	0	2000	17376	2014	17376	16%	9810	49048
Chitwan	689	2002	982	2003	982	1%	554	2772
Dang	500	2012	872	2014	872	1%	492	2461
Dhanusha	2	2004	11575	2007	11575	10%	6535	32673
Jhapa	626	2010	707	2010	707	1%	399	1996
Kailali	4068	2008	2049	2014	4068	4%	2297	11483
Kanchanpur	519	2008	1000	2009	1000	1%	565	2823
Kapilbastu	0	2007	62	2009	62	0%	35	175
Mahottari	1	2011	15000	2004	15000	13%	8468	42341
Morang	50	2010	1213	2000	1213	1%	685	3424
Nawalparasi	300	2009	901	2003	901	1%	509	2543
Parsa	35	2001	5087	2007	5087	5%	2872	14359
Rautahat	284	2002	3161	2004	3161	3%	1785	8923
Rupandehi	0	2001	289	2007	289	0%	163	816
Saptari	0	2002	3084	2004	3084	3%	1741	8705
Sarlahi	0	2001	16594	2004	16594	15%	9368	46841
Siraha	0	2001	10200	2004	10200	9%	5758	28792
Sunsari	38	2010	1239	2010	1239	1%	699	3497
Surkhet	0	2003	3101	2014	3101	3%	1751	8753
Udayapur	21	2010	1130	2004	1130	1%	638	3190
Total	4604	2008	63039	2007	63039		63039	315195

Estimated caseload bottom up approach: Earthquake affected districts

District	DI	Year	NRCS	Year	max year/district *Maximum recorded HH destroyed/ damaged by DI or NRCS*	Prop max/total max *Proportion of total affected households calculated for each max year/district out of total affected if all districts were affected with maximum recorded impact at once*	Num max/year *Prop max/total max applied to maximum total affected households recorded across all districts in one year*	Estimated Caseload Individuals: *(Num max/year x 5; assuming HH size=5 and each house destroyed/damaged representing one household)*	Increase of area % of Medium/High/Very high hazard zones in district	Estimated Caseload Individuals adjusted to increased area % in high and medium hazard zones	Estimated Caseload Households adjusted to increased area % in high and medium hazard zones
Bhaktapur	140	2011	29	2000	140	2%	118	590	9%	642	128
Dhading	52	2010	112	2003	112	2%	94	472	23%	580	116
Dolakha	61	2000	99	2012	99	1%	83	417	43%	596	119
Gorkha	140	2002	44	2012	140	2%	118	590	20%	706	141
Kathmandu	235	2002	52	2002	235	3%	198	991	36%	1347	269
Kavrepalanchok	312	2002	256	2004	312	4%	263	1315	27%	1673	335
Lalitpur	83	2002	54	2003	83	1%	70	350	30%	454	91
Makwanpur	300	2007	2412	2004	2412	35%	2034	10169	20%	12215	2443
Nuwakot	56	2002	25	2002	56	1%	47	236	45%	343	69
Okhaldhunga	153	2002	261	2004	261	4%	220	1100	4%	1139	228
Ramechhap	1031	2004	2445	2004	2445	35%	2062	10308	20%	12332	2466
Rasuwa	41	2006	8	2003	41	1%	35	173	15%	199	40
Sindhuli	138	2004	511	2004	511	7%	431	2154	18%	2532	506
Sindhupalchok	103	2000	136	2014	136	2%	115	573	37%	787	157
Total	1496	2002	5888	2004	5888		5888	29440		35547	7109

Annex 4: Risk categorisation by Terai District VDC

DIST_NAME	VDC_NAME	Risk category	DIST_NAME	VDC_NAME	Risk category
Banke	Bageshwari	No Risk	Nawalparasi	Rajahar	Risk
Banke	Baijapur	Risk	Nawalparasi	Rakachuli	No Risk
Banke	Banakatti	Risk	Nawalparasi	Rakuwa	Risk
Banke	Bankatwa	Maybe Risk	Nawalparasi	Ramgram Municipality	Maybe Risk
Banke	Basudevpur	No Risk	Nawalparasi	Ramnagar	Maybe Risk
Banke	Belahari	No Risk	Nawalparasi	Rampurkhadauna	Risk
Banke	Belbhar	No Risk	Nawalparasi	Rampurwa	Risk
Banke	Betahani	Risk	Nawalparasi	Ratanpur	Risk
Banke	Bhawaniyapur	No Risk	Nawalparasi	Royal Chitwan National Park	Risk (Not pop)
Banke	Binauna	Risk	Nawalparasi	Ruchang	No Risk
Banke	Chisapani	Maybe Risk	Nawalparasi	Rupauliya	Risk
Banke	Ganapur	No Risk	Nawalparasi	Sanai	Maybe Risk
Banke	Gangapur	Risk	Nawalparasi	Sarawal	Maybe Risk
Banke	Hirminiya	No Risk	Nawalparasi	Shivamandir	Maybe Risk
Banke	Holiya	Risk	Nawalparasi	Somani	Risk
Banke	Indrapur	No Risk	Nawalparasi	Sukrauli	Maybe Risk
Banke	Jaispur	No Risk	Nawalparasi	Sunwal	No Risk
Banke	Kachanapur	Risk	Nawalparasi	Swathi	No Risk
Banke	Kalaphat	No Risk	Nawalparasi	Tamsariya	Risk
Banke	Kamdi	Risk	Nawalparasi	Thulokhairatawa	Risk
Banke	Kaskarkando	No Risk	Nawalparasi	Tilakpur	No Risk
Banke	Katkuiya	No Risk	Nawalparasi	Trivenisusta	Risk
Banke	Khajurakhurda	No Risk	Nawalparasi	Upalloarkhale	Risk
Banke	Khaskushma	Risk	Parsa	Alau	Maybe Risk
Banke	Kohalpur	No Risk	Parsa	Amarpatti	Maybe Risk
Banke	Lakshmanpur	No Risk	Parsa	Auraha	No Risk
Banke	Mahadevpuri	Risk	Parsa	Bagahi	No Risk
Banke	Manikapur	Maybe Risk	Parsa	Bagbanna	No Risk
Banke	Matehiya	Risk	Parsa	Bageshwari Titarauna	Maybe Risk
Banke	Narenapur	No Risk	Parsa	Bahuari Pidari	Maybe Risk
Banke	Naubasta	No Risk	Parsa	Bahuarwa Bhatha	No Risk
Banke	Nepalgunj Municipality	Maybe Risk	Parsa	Bairiyabirta (Nau.Ta.Ja.)	No Risk
Banke	Paraspur	No Risk	Parsa	Bairiyanbirta (Wa.Pu.)	Maybe Risk
Banke	Phattepur	Risk	Parsa	Basadilwa	Maybe Risk
Banke	Piprahawa	No Risk	Parsa	Basantapur	Maybe Risk
Banke	Puraina	No Risk	Parsa	Belwapersene	No Risk
Banke	Puraini	No Risk	Parsa	Bhauaratar	Maybe Risk
Banke	Radhapur	Maybe Risk	Parsa	Bhawanipur	Maybe Risk
Banke	Rajhena	No Risk	Parsa	Bhedihari	No Risk
Banke	Raniyapur	No Risk	Parsa	Bhikhampur	No Risk
Banke	Saigaun	No Risk	Parsa	Bhiswa	No Risk
Banke	Samserganj	No Risk	Parsa	Bijbaniya	No Risk
Banke	Sitapur	Maybe Risk	Parsa	Bindabasini	Maybe Risk
Banke	Sounpur	No Risk	Parsa	Biranchibarwa	Maybe Risk
Banke	Titihiriya	Maybe Risk	Parsa	Birgunj Sub Metropolitan	Maybe Risk
Banke	Udarapur	No Risk	Parsa	Biruwaguthi	Maybe Risk

Banke	Udayapur	No Risk
Bara	Amarpatti	Maybe Risk
Bara	Amaw	No Risk
Bara	Amlekhganj	Maybe Risk
Bara	Amritganj	No Risk
Bara	Babuain	No Risk
Bara	Bachhanpurwa	No Risk
Bara	Badka Phulbariya	No Risk
Bara	Bagahi	No Risk
Bara	Bahuari	No Risk
Bara	Balrampur	Maybe Risk
Bara	Banauli	No Risk
Bara	Banjariya	Maybe Risk
Bara	Barainiya	Maybe Risk
Bara	Bariyarpur	Maybe Risk
Bara	Basatapur	Maybe Risk
Bara	Batara	No Risk
Bara	Beldari	No Risk
Bara	Bhagawanpur	No Risk
Bara	Bhaluhi Bharbaliya	Maybe Risk
Bara	Bharatganj Sigaul	No Risk
Bara	Bhatauda	Maybe Risk
Bara	Bhodaha	Maybe Risk
Bara	Bishrampur	No Risk
Bara	Bisunpurwa	No Risk
Bara	Bisunupur	No Risk
Bara	Bodhaban	Maybe Risk
Bara	Buniyad	Maybe Risk
Bara	Chhatapipra	No Risk
Bara	Chhatawa	No Risk
Bara	Dahiyar	No Risk
Bara	Devapur	No Risk
Bara	Dharamnagar	No Risk
Bara	Dhumbana	Maybe Risk
Bara	Dohari	Maybe Risk
Bara	Enarwamal	No Risk
Bara	Gadahal	No Risk
Bara	Ganjbhawanipur	Maybe Risk
Bara	Golganj	No Risk
Bara	Haraiya	Maybe Risk
Bara	Hardiya	No Risk
Bara	Hariharpur	No Risk
Bara	Inarwasira	Maybe Risk
Bara	Itiyahi	Maybe Risk
Bara	Jhitakaiya (Dakshin)	Maybe Risk
Bara	Jhitakaiya (Uttar)	No Risk
Bara	Jitpur	Maybe Risk
Bara	Kabahigoth	No Risk
Bara	Kabahijabdi	No Risk
Bara	Kachorwa	Maybe Risk
Parsa	Bishrampur	Maybe Risk
Parsa	Chorni	Maybe Risk
Parsa	Deurbana	Maybe Risk
Parsa	Dhobini	No Risk
Parsa	Dhore	Maybe Risk
Parsa	Gadi	No Risk
Parsa	Gamhariya	Maybe Risk
Parsa	Govindapur	Maybe Risk
Parsa	Hariharpur	No Risk
Parsa	Hariharpur Birta	No Risk
Parsa	Harpatganj	No Risk
Parsa	Harpur	Maybe Risk
Parsa	Jaganathpur	No Risk
Parsa	Janakitola	Maybe Risk
Parsa	Jayamangalapur	No Risk
Parsa	Jhauwaguthi	Maybe Risk
Parsa	Jitpur	Maybe Risk
Parsa	Kauwaban Kataiya	Maybe Risk
Parsa	Lahabarthakari	No Risk
Parsa	Lakhanpur	Maybe Risk
Parsa	Lalparsa	No Risk
Parsa	Langadi	No Risk
Parsa	Lipanibirta	No Risk
Parsa	Madhuban Mathaul	No Risk
Parsa	Mahadevpatti	No Risk
Parsa	Mahuwan	Maybe Risk
Parsa	Maniyari	Maybe Risk
Parsa	Masihani	No Risk
Parsa	Mirjapur	No Risk
Parsa	Mudali	No Risk
Parsa	Nagardaha	Maybe Risk
Parsa	Nichuta	No Risk
Parsa	Nirmalbasti	No Risk
Parsa	Pakahamainpur	Maybe Risk
Parsa	Pancharukhi	Maybe Risk
Parsa	Parashurampur	Maybe Risk
Parsa	Parsa Wildlife Reserve	No Risk (Not pop)
Parsa	Parsauni Bhatha	No Risk
Parsa	Parsauni Birta	Maybe Risk
Parsa	Paterwa Sugauli	Maybe Risk
Parsa	Patwaritolabarwa	Maybe Risk
Parsa	Pidariguthi	No Risk
Parsa	Pipra Ghoddaud	No Risk
Parsa	Pokhariya	Maybe Risk
Parsa	Ramgadhawa	Maybe Risk
Parsa	Ramnagari	Maybe Risk
Parsa	Sabaithawa	Maybe Risk
Parsa	Sakhuwa Prasauni	Maybe Risk
Parsa	Samjhauta	No Risk
Parsa	Sedhwa	No Risk

Bara	Kakadi	No Risk
Bara	Kalaiya Municipality	No Risk
Bara	Karaiya	Maybe Risk
Bara	Khopuwa	No Risk
Bara	Khutawa Jabdi	No Risk
Bara	Kolhabi	No Risk
Bara	Kudawa	Maybe Risk
Bara	Lakshmipur Kotwali	Maybe Risk
Bara	Lipanimal	No Risk
Bara	Madhurijabdi	Maybe Risk
Bara	Mahendra	No Risk
Bara	Maheshpur	Maybe Risk
Bara	Majhariya	No Risk
Bara	Manharwa	Maybe Risk
Bara	Matiarwa	No Risk
Bara	Motisar	Maybe Risk
Bara	Narahi	Maybe Risk
Bara	Nijgadh	Maybe Risk
Bara	Pakadiya (Chikani)	No Risk
Bara	Parashurampur	No Risk
Bara	Parsauni	No Risk
Bara	Paterwa	No Risk
Bara	Pathara	Maybe Risk
Bara	Patharhati	No Risk
Bara	Phattepur	Maybe Risk
Bara	Pheta	No Risk
Bara	Pipara Basantapur	Maybe Risk
Bara	Piparabirta	Maybe Risk
Bara	Piparadhigoth	Maybe Risk
Bara	Piparpati Dui	No Risk
Bara	Piparpati Ek	Maybe Risk
Bara	Pipra Simara	No Risk
Bara	Prasauna	No Risk
Bara	Prastoka	Maybe Risk
Bara	Purainiya	No Risk
Bara	Raghunathpur	No Risk
Bara	Rampur (Tokani)	No Risk
Bara	Rampurwa	Maybe Risk
Bara	Ratanpur	Maybe Risk
Bara	Rauwahi	No Risk
Bara	Sapahi	No Risk
Bara	Shrinagar Bairiya	No Risk
Bara	Sihorwa	No Risk
Bara	Singhasani	No Risk
Bara	Sisahaniya	No Risk
Bara	Tedhakatti	No Risk
Bara	Telkuwa	Maybe Risk
Bara	Tetariya	No Risk
Bara	Uchidiha	No Risk
Bara	Umajan	No Risk
Parsa	Shankarsaraiya	No Risk
Parsa	Sirsiya	No Risk
Parsa	Sirsiya	No Risk
Parsa	Sonbarsa	No Risk
Parsa	Subarnapur	No Risk
Parsa	Sugauli Birta	Maybe Risk
Parsa	Supauli	Maybe Risk
Parsa	Surjaha	Maybe Risk
Parsa	Thori	No Risk
Parsa	Tulsibarwa	No Risk
Parsa	Udayapur Ghurmi	Maybe Risk
Rautahat	Ajgaibi	No Risk
Rautahat	Akolawa	Maybe Risk
Rautahat	Auraiya	Maybe Risk
Rautahat	Badaharwa	Maybe Risk
Rautahat	Bagahi	No Risk
Rautahat	Bairiya	Maybe Risk
Rautahat	Banjaraha	Maybe Risk
Rautahat	Bariyapur	No Risk
Rautahat	Basabiti Jigreya	No Risk
Rautahat	Basantapatti	Maybe Risk
Rautahat	Basatpur	Risk
Rautahat	Bhasedawa	Maybe Risk
Rautahat	Bhediyahi	Maybe Risk
Rautahat	Birtiprastoka	No Risk
Rautahat	Bishrampur	Maybe Risk
Rautahat	Bisunpurwamanpur	No Risk
Rautahat	Bramhapuri	Risk
Rautahat	Chandranigahapur	Maybe Risk
Rautahat	Daewahi	Maybe Risk
Rautahat	Depahi	Maybe Risk
Rautahat	Dharahari	No Risk
Rautahat	Dharmapur	Maybe Risk
Rautahat	Dumariya (Paroha)	No Risk
Rautahat	Dumariya Matiyon	Maybe Risk
Rautahat	Gaddhi	No Risk
Rautahat	Gamhariya Birta	No Risk
Rautahat	Gamhariya Parsa	No Risk
Rautahat	Gangapipra	Maybe Risk
Rautahat	Garuda	No Risk
Rautahat	Gaur Municipality	Maybe Risk
Rautahat	Gedahiguthi	No Risk
Rautahat	Hajmaniya	Maybe Risk
Rautahat	Hardiyapaltuwa	No Risk
Rautahat	Hathiyahi	Maybe Risk
Rautahat	Inarawa	Maybe Risk
Rautahat	Inarbari Jyutahi	Maybe Risk
Rautahat	Jatahara	Maybe Risk
Rautahat	Jayanagar	Maybe Risk
Rautahat	Jethahiya	Maybe Risk

Bardiya	Badalpur	Risk
Bardiya	Bagnaha	Risk
Bardiya	Baniyabhar	Risk
Bardiya	Belawa	Risk
Bardiya	Bhimapur	Risk
Bardiya	Daulatpur	Risk
Bardiya	Deudakla	No Risk
Bardiya	Dhadhawar	Risk
Bardiya	Dhodari	Risk
Bardiya	Gola	Risk
Bardiya	Gulariya Municipality	Risk
Bardiya	Jamuni	No Risk
Bardiya	Kalika	Risk
Bardiya	Khairichandanpur	Risk
Bardiya	Magaragadhi	No Risk
Bardiya	Mahamadpur	Risk
Bardiya	Mainapokhar	Maybe Risk
Bardiya	Manau	Risk
Bardiya	Manpurtapara	Risk
Bardiya	Motipur	No Risk
Bardiya	Nayagaun	Risk
Bardiya	Neulapur	Maybe Risk
Bardiya	Padanaha	Risk
Bardiya	Pashupatinagar	Risk
Bardiya	Patabhar	Risk
Bardiya	Rajapur	Risk
Bardiya	Royal Bardiya National Park	Risk (Not pop)
Bardiya	Sanoshri	Risk
Bardiya	Shivapur	No Risk
Bardiya	Sorhawa	Maybe Risk
Bardiya	Suryapatuwa	Risk
Bardiya	Taratal	No Risk
Bardiya	Thakurdwara	Risk
Chitawan	Ayodhyapuri	Maybe Risk
Chitawan	Bachhauli	Maybe Risk
Chitawan	Baghauda	Maybe Risk
Chitawan	Bhandara	Maybe Risk
Chitawan	Bharatpur Municipality	Risk
Chitawan	Birendranagar	Maybe Risk
Chitawan	Chainpur	Maybe Risk
Chitawan	Chandibhanjyang	Risk
Chitawan	Dahakhani	Risk
Chitawan	Darechok	Risk
Chitawan	Divyanagar	Risk
Chitawan	Gardi	Maybe Risk
Chitawan	Gitanagar	Risk
Chitawan	Gunjanagar	Risk
Chitawan	Jagatpur	Maybe Risk
Chitawan	Jutpani	Maybe Risk
Chitawan	Kabilas	Risk
Rautahat	Jhingadawa Belbichhwa	Maybe Risk
Rautahat	Jhunkhunma	Maybe Risk
Rautahat	Jokaha	No Risk
Rautahat	Judibela	Maybe Risk
Rautahat	Kanakpur	Maybe Risk
Rautahat	Karkach	Maybe Risk
Rautahat	Karuniya	Maybe Risk
Rautahat	Katahariya	Maybe Risk
Rautahat	Khesarahiya	No Risk
Rautahat	Lakshminiya	Maybe Risk
Rautahat	Lakshmipur	No Risk
Rautahat	Lakshmipur Belbichhwa	Maybe Risk
Rautahat	Laukaha	Maybe Risk
Rautahat	Madanpur	Maybe Risk
Rautahat	Madhopur	No Risk
Rautahat	Mahamadpur	Maybe Risk
Rautahat	Malahi	No Risk
Rautahat	Maryadpur	Maybe Risk
Rautahat	Mathiya	No Risk
Rautahat	Matsari	Maybe Risk
Rautahat	Mithuawa	Maybe Risk
Rautahat	Mudbalawa	No Risk
Rautahat	Narkatiya	No Risk
Rautahat	Pacharukhi	Maybe Risk
Rautahat	Pataura	Maybe Risk
Rautahat	Patharabudharam	No Risk
Rautahat	Paurai	Maybe Risk
Rautahat	Phatuha Harsaha	No Risk
Rautahat	Phatuha Maheshpur	Maybe Risk
Rautahat	Pipara Pokhariya	No Risk
Rautahat	Pipariya (Do)	No Risk
Rautahat	Pipariya (Pa)	No Risk
Rautahat	Pipra Bhagwanpur	Maybe Risk
Rautahat	Pipra Bhalohiya	Maybe Risk
Rautahat	Pipra Rajwada	Maybe Risk
Rautahat	Pothiyahi	No Risk
Rautahat	Pratappur Paltuwa	Maybe Risk
Rautahat	Prempur Gonahi	Maybe Risk
Rautahat	Raghunathpur	No Risk
Rautahat	Rajdevi	Risk
Rautahat	Rajpur Pharhadawa	Maybe Risk
Rautahat	Rajpur Tulsi	Maybe Risk
Rautahat	Ramauli Bairiya	Maybe Risk
Rautahat	Rangapur	No Risk
Rautahat	Rangapur Khap	No Risk
Rautahat	Sakhuawa	No Risk
Rautahat	Sakhuawa Dhamaura	No Risk
Rautahat	Samanpur	Maybe Risk
Rautahat	Sangrampur	No Risk
Rautahat	Santapanra (Do)	Maybe Risk

Chitawan	Kalyanpur	Maybe Risk
Chitawan	Kathar	Maybe Risk
Chitawan	Kaule	Maybe Risk
Chitawan	Khairhani	Maybe Risk
Chitawan	Korak	Maybe Risk
Chitawan	Kumroj	Maybe Risk
Chitawan	Lothar	Maybe Risk
Chitawan	Mangalpur	Risk
Chitawan	Meghauli	Risk
Chitawan	Narayanpur (Fulbari)	Risk
Chitawan	Padampur	Maybe Risk
Chitawan	Parvatipur	Risk
Chitawan	Patihani	Maybe Risk
Chitawan	Piple	Maybe Risk
Chitawan	Pithuwa	Maybe Risk
Chitawan	Ratnanagar Municipality	Maybe Risk
Chitawan	Royal chitwan National Park	Risk (Not pop)
Chitawan	Shaktikhor	Maybe Risk
Chitawan	Sharadanagar	Risk
Chitawan	Shivanagar	Risk
Chitawan	Shukranagar	Risk
Chitawan	Siddhi	Maybe Risk
Dang	Baghmare	Maybe Risk
Dang	Bela	Risk
Dang	Bijauri	Maybe Risk
Dang	Chaulahi	Risk
Dang	Dhanauri	Risk
Dang	Dharna	Risk
Dang	Dhikpur	Risk
Dang	Duruwa	Risk
Dang	Gadawa	Risk
Dang	Gangaparaspur	Risk
Dang	Gobardiha	Risk
Dang	Goltakuri	Risk
Dang	Haluwar	Maybe Risk
Dang	Hansipur	Maybe Risk
Dang	Hapur	Maybe Risk
Dang	Hekuli	Risk
Dang	Kabhre	Maybe Risk
Dang	Koilabas	Maybe Risk
Dang	Lakshmipur	Risk
Dang	Lalmatiya	Risk
Dang	Loharpani	Maybe Risk
Dang	Manpur	Maybe Risk
Dang	Narayanpur	Maybe Risk
Dang	Panchakule	Risk
Dang	Pawannagar	Maybe Risk
Dang	Phulbari	Risk
Dang	Purandhara	Risk
Dang	Rajpur	Risk
Rautahat	Santapur (Ma)	No Risk
Rautahat	Sarmujawa	No Risk
Rautahat	Saruatha	Maybe Risk
Rautahat	Shitalpar Bairgania	Maybe Risk
Rautahat	Simarabhawanipur	Maybe Risk
Rautahat	Sonarmiya	Maybe Risk
Rautahat	Tejapakad	Maybe Risk
Rautahat	Tengraha	Maybe Risk
Rupandehi	Adarsha Amuwa	No Risk
Rupandehi	Ama	Maybe Risk
Rupandehi	Anandaban	No Risk
Rupandehi	Asurena	Maybe Risk
Rupandehi	Bagauli	Maybe Risk
Rupandehi	Basantapur	No Risk
Rupandehi	Betkuiya	Maybe Risk
Rupandehi	Bhagaha	No Risk
Rupandehi	Bhagamanpur	Maybe Risk
Rupandehi	Bisanpura	No Risk
Rupandehi	Bodabar	No Risk
Rupandehi	Bogadi	Maybe Risk
Rupandehi	Butawal Municipality	Maybe Risk
Rupandehi	Chhipagadh	No Risk
Rupandehi	Chhotkiramnagar	No Risk
Rupandehi	Chilhiya	Maybe Risk
Rupandehi	Dayanagar	No Risk
Rupandehi	Devdaha	Maybe Risk
Rupandehi	Dhakadhai	No Risk
Rupandehi	Dhamauli	No Risk
Rupandehi	Dudrakshya	No Risk
Rupandehi	Ekala	No Risk
Rupandehi	Gajedi	No Risk
Rupandehi	Gangobaliya	No Risk
Rupandehi	Gonaha	Maybe Risk
Rupandehi	Harnaiya	No Risk
Rupandehi	Hattibanagai	No Risk
Rupandehi	Hattipharsatikar	Maybe Risk
Rupandehi	Jogada	No Risk
Rupandehi	Kamhariya	Maybe Risk
Rupandehi	Karahiya	No Risk
Rupandehi	Karauta	Maybe Risk
Rupandehi	Kerwani	No Risk
Rupandehi	Khadwa Banagai	No Risk
Rupandehi	Khudabagar	No Risk
Rupandehi	Lumbini	No Risk
Rupandehi	Lumbini Development Area	No Risk (Not pop)
Rupandehi	Madhawaliya	No Risk
Rupandehi	Madhubani	Maybe Risk
Rupandehi	Mainihawa	No Risk
Rupandehi	Majhagawa	Maybe Risk
Rupandehi	Makrahar	No Risk

Dang	Rampur	Risk
Dang	Saigha	Maybe Risk
Dang	Satabariya	Risk
Dang	Saudiyar	Risk
Dang	Shantinagar	No Risk
Dang	Shrigaun	Risk
Dang	Sisahaniya	Risk
Dang	Siyaja	Maybe Risk
Dang	Sonpur	Risk
Dang	Tarigaun	No Risk
Dang	Tribhuwan Nagar Municipality	Maybe Risk
Dang	Tulsipur Municipality	Maybe Risk
Dang	Urahari	Risk
Dhanusa	Adhukuha	Maybe Risk
Dhanusa	Akrahi	Maybe Risk
Dhanusa	Andupatti	Maybe Risk
Dhanusa	Aurahi	Maybe Risk
Dhanusa	Baghchauda	Maybe Risk
Dhanusa	Bahedabela	Maybe Risk
Dhanusa	Bahuarwa	Maybe Risk
Dhanusa	Balabakhar	Maybe Risk
Dhanusa	Balahagoth	Maybe Risk
Dhanusa	Balahakathal	Maybe Risk
Dhanusa	Balahasaghara	Maybe Risk
Dhanusa	Baniniya	Maybe Risk
Dhanusa	Baphai	Maybe Risk
Dhanusa	Baramajhiya	Maybe Risk
Dhanusa	Basahiya	No Risk
Dhanusa	Basbitti	Maybe Risk
Dhanusa	Bateshwar	No Risk
Dhanusa	Benga Shivapur	Maybe Risk
Dhanusa	Bengadawar	Maybe Risk
Dhanusa	Bharatpur	No Risk
Dhanusa	Bhuchakrapur	No Risk
Dhanusa	Bhutahi Paterwa	Maybe Risk
Dhanusa	Binhi	Maybe Risk
Dhanusa	Bisarmhora	Maybe Risk
Dhanusa	Chakkar	Maybe Risk
Dhanusa	Chorakoyalpur	Maybe Risk
Dhanusa	Deuriparbaha	Maybe Risk
Dhanusa	Devdiha	Maybe Risk
Dhanusa	Devpura Rupaitha	Maybe Risk
Dhanusa	Dhabauli	Maybe Risk
Dhanusa	Dhalkebar	No Risk
Dhanusa	Dhanauji	Maybe Risk
Dhanusa	Dhanusha Govindapur	Maybe Risk
Dhanusa	Dhanushadham	Maybe Risk
Dhanusa	Digambarpur	Maybe Risk
Dhanusa	Duhawe	Maybe Risk
Dhanusa	Duwarkot Hatletawa	Maybe Risk
Rupandehi	Manmateriya	No Risk
Rupandehi	Manpakadi	No Risk
Rupandehi	Maryadpur	Maybe Risk
Rupandehi	Masina	No Risk
Rupandehi	Motipur	Maybe Risk
Rupandehi	Padsari	No Risk
Rupandehi	Pajarkatti	No Risk
Rupandehi	Pakadisakron	Maybe Risk
Rupandehi	Parroha	No Risk
Rupandehi	Patkhauli	No Risk
Rupandehi	Pharena	No Risk
Rupandehi	Pokharbhindi	No Risk
Rupandehi	Rayapur	Maybe Risk
Rupandehi	Rohinihawa	Maybe Risk
Rupandehi	Rudrapur	No Risk
Rupandehi	Sadi	No Risk
Rupandehi	Saljhundi	Maybe Risk
Rupandehi	Saurahapharsatikar	No Risk
Rupandehi	Semara	Maybe Risk
Rupandehi	Semlar	Maybe Risk
Rupandehi	Shankarnagar	No Risk
Rupandehi	Siddhartha Nagar Municipality	No Risk
Rupandehi	Siktahan	No Risk
Rupandehi	Silautiya	Maybe Risk
Rupandehi	Sipuha	Maybe Risk
Rupandehi	Suryapura	Maybe Risk
Rupandehi	Tenuhawa	No Risk
Rupandehi	Thumha Piprahawa	Maybe Risk
Rupandehi	Tikuligadh	Maybe Risk
Rupandehi	Wayarghat	Maybe Risk
Saptari	Aarnaha	Maybe Risk
Saptari	Aurahi	Maybe Risk
Saptari	Badgama	Risk
Saptari	Bairawa	Risk
Saptari	Bakdhuwa	Maybe Risk
Saptari	Banarjhula	Maybe Risk
Saptari	Banaula	Maybe Risk
Saptari	Banaule	Maybe Risk
Saptari	Banauniya	No Risk
Saptari	Baramjhiya	Maybe Risk
Saptari	Barashine (Bode)	Maybe Risk
Saptari	Barsain(Ko.)	Risk
Saptari	Basbitti	Maybe Risk
Saptari	Bathanaha	Risk
Saptari	Bavangama Katti	Risk
Saptari	Bhagawatpur	No Risk
Saptari	Bhangaha	Maybe Risk
Saptari	Bhardaha	Risk
Saptari	Bhramhapur	No Risk
Saptari	Bhutahi	Maybe Risk

Dhanusa	Ghodghas	Maybe Risk
Dhanusa	Giddha	Maybe Risk
Dhanusa	Gopalpur	Maybe Risk
Dhanusa	Gothkoyalpur	Maybe Risk
Dhanusa	Hansapur Kathpulla	Maybe Risk
Dhanusa	Hariharpur	No Risk
Dhanusa	Harine	Maybe Risk
Dhanusa	Hathipur Harbara	Maybe Risk
Dhanusa	Inarwa	Maybe Risk
Dhanusa	Itaharwa	Maybe Risk
Dhanusa	Janakpur Municipality	Maybe Risk
Dhanusa	Jhatiyahi	Maybe Risk
Dhanusa	Jhojhi Kataiya	Maybe Risk
Dhanusa	Kajararmaul	Maybe Risk
Dhanusa	Kanakpatti	Maybe Risk
Dhanusa	Khajuri Chanha	Maybe Risk
Dhanusa	Kharihani	Maybe Risk
Dhanusa	Kurtha	Maybe Risk
Dhanusa	Labatoli	No Risk
Dhanusa	Lagmagadha Guthi	Maybe Risk
Dhanusa	Lakhauri	Maybe Risk
Dhanusa	Lakkar	No Risk
Dhanusa	Lakshminiwas	No Risk
Dhanusa	Laksmipur Bagewa	No Risk
Dhanusa	Lohana	Maybe Risk
Dhanusa	Machi Jhitkaiya	Maybe Risk
Dhanusa	Makhanaha	Maybe Risk
Dhanusa	Mansingpatti	Maybe Risk
Dhanusa	Mithileshwar Mauwahi	Maybe Risk
Dhanusa	Mithileshwar Nikas	Maybe Risk
Dhanusa	Mukhiyapatti	Maybe Risk
Dhanusa	Nagarain	Maybe Risk
Dhanusa	Nakatajhij	Maybe Risk
Dhanusa	Nannupatti	Maybe Risk
Dhanusa	Nauwakhor Prasahi	Maybe Risk
Dhanusa	Pachaharwa	Maybe Risk
Dhanusa	Pai. Ko. Mahuwa	Maybe Risk
Dhanusa	Paterwa	Maybe Risk
Dhanusa	Patnuka	Maybe Risk
Dhanusa	Paudeshwar	Maybe Risk
Dhanusa	Phulgama	Maybe Risk
Dhanusa	Pra. Ko. Mahuwa	Maybe Risk
Dhanusa	Pushpalpur	No Risk
Dhanusa	Raghunathpur	Maybe Risk
Dhanusa	Ramdaiya	No Risk
Dhanusa	Sabaila	Maybe Risk
Dhanusa	Sakhuwa Mahendranagar	Maybe Risk
Dhanusa	Sapahi	Maybe Risk
Dhanusa	Satoshar	Maybe Risk
Dhanusa	Shantipur	Maybe Risk
Saptari	Birpur	Risk
Saptari	Bishahariya	Risk
Saptari	Boriya	No Risk
Saptari	Chhinamasta	Risk
Saptari	Dadha	Maybe Risk
Saptari	Daulatpur	Risk
Saptari	Demon	No Risk
Saptari	Deuri	Maybe Risk
Saptari	Deuri Bharuwa	Risk
Saptari	Dhangadhi	Maybe Risk
Saptari	Dharampur	Maybe Risk
Saptari	Dhodhanpur	Risk
Saptari	Didhuwa	Risk
Saptari	Enarwa	Risk
Saptari	Gamariya Parawaha	No Risk
Saptari	Gobargada	Risk
Saptari	Goethi	No Risk
Saptari	Hanumannagar	Risk
Saptari	Hardiya	Risk
Saptari	Hariharpur	Maybe Risk
Saptari	Haripur	Risk
Saptari	Inarwaphulwariya	Maybe Risk
Saptari	Itahari Bihsnupura	No Risk
Saptari	Jagatpur	Risk
Saptari	Jamuni Madhepura	Maybe Risk
Saptari	Jandoul	Maybe Risk
Saptari	Jhutki	Maybe Risk
Saptari	Joginiya-1	Risk
Saptari	Joginiya-2	Risk
Saptari	Kachan	Maybe Risk
Saptari	Kalyanpur	Maybe Risk
Saptari	Kamalpur	Risk
Saptari	Kanchanpur	No Risk
Saptari	Kataiya	Maybe Risk
Saptari	Khadakpur	Maybe Risk
Saptari	Khojpur	Maybe Risk
Saptari	Khoksarparwaha	Maybe Risk
Saptari	Kochabakhari	Risk
Saptari	Koeladi	Risk
Saptari	Komadhepura	Risk
Saptari	Koshi Tappu Wildlife Reserve	Risk (Not pop)
Saptari	Kushaha	Risk
Saptari	Lalapatthi	Risk
Saptari	Launiya	Risk
Saptari	Lohajara	Maybe Risk
Saptari	Madhupatti	Risk
Saptari	Madhupur (Kabilash)	Maybe Risk
Saptari	Madhuwapur	Risk
Saptari	Mahadewa	Risk
Saptari	Maina Sahashrawahu	Maybe Risk

Dhanusa	Singyahi Madan	Maybe Risk
Dhanusa	Sinurjoda	Maybe Risk
Dhanusa	Songama	No Risk
Dhanusa	Sugamadhukarhi	Maybe Risk
Dhanusa	Suganikas	Maybe Risk
Dhanusa	Tallogodar	No Risk
Dhanusa	Tarapatti Sirsiya	Maybe Risk
Dhanusa	Thadi Jhijha	Maybe Risk
Dhanusa	Therakachuri	Maybe Risk
Dhanusa	Thilla Jadruwa	Maybe Risk
Dhanusa	Tulsi	Maybe Risk
Dhanusa	Tulsiyahi Nikas	Maybe Risk
Dhanusa	Tulsiyahijabdi	Maybe Risk
Dhanusa	Umaprempur	No Risk
Dhanusa	Yagyabhumi	No Risk
Jhapa	Anarmani	Maybe Risk
Jhapa	Arjundhara	Maybe Risk
Jhapa	Bahundangi	Maybe Risk
Jhapa	Baigundhura	No Risk
Jhapa	Baluwadi	No Risk
Jhapa	Baniyani	No Risk
Jhapa	Bhadrapur Municipality	Maybe Risk
Jhapa	Budhabare	Maybe Risk
Jhapa	Chakchaki	Maybe Risk
Jhapa	Chandragadi	Maybe Risk
Jhapa	Charpane	Maybe Risk
Jhapa	Daagibari	Maybe Risk
Jhapa	Damak Municipality	Maybe Risk
Jhapa	Dhaijan	No Risk
Jhapa	Dhailadubba	Maybe Risk
Jhapa	Dharampur	Maybe Risk
Jhapa	Duwagadi	Maybe Risk
Jhapa	Garamuni	No Risk
Jhapa	Gauradaha	No Risk
Jhapa	Gauriganj	No Risk
Jhapa	Gherawari	No Risk
Jhapa	Goldhap	Maybe Risk
Jhapa	Haldiwari	Maybe Risk
Jhapa	Jalthal	Maybe Risk
Jhapa	Juropani	Maybe Risk
Jhapa	Jyamirgadi	Maybe Risk
Jhapa	Kechna	No Risk
Jhapa	Khajurgachi	No Risk
Jhapa	Khudnawari	Maybe Risk
Jhapa	Kohwora	Maybe Risk
Jhapa	Korabari	Maybe Risk
Jhapa	Kumarkhod	Maybe Risk
Jhapa	Lakhanpur	Maybe Risk
Jhapa	Mahabhara	Maybe Risk
Jhapa	Maharanijhora	No Risk
Saptari	Malahanama	Maybe Risk
Saptari	Malahaniya	Risk
Saptari	Maleth	Maybe Risk
Saptari	Malikpur	Maybe Risk
Saptari	Manraja	Maybe Risk
Saptari	Mauwaha	Risk
Saptari	Menakadari	Maybe Risk
Saptari	Mohanpur	Maybe Risk
Saptari	Nakati Rayapur	Maybe Risk
Saptari	Nargho	Maybe Risk
Saptari	Nawarajpur (Basawalpur)	Maybe Risk
Saptari	Nengada	Maybe Risk
Saptari	Odraha	Risk
Saptari	Pakari	Risk
Saptari	Pansera	Maybe Risk
Saptari	Parashbani	Maybe Risk
Saptari	Paterwa	Risk
Saptari	Pato	Maybe Risk
Saptari	Patthargada	No Risk
Saptari	Paurataha	Risk
Saptari	Phakira	Risk
Saptari	Pharsheeth	Risk
Saptari	Phattehapur	Risk
Saptari	Phulkahi	Maybe Risk
Saptari	Pipra (Paschim)	Maybe Risk
Saptari	Pipra (Purba)	Risk
Saptari	Rajbiraj Municipality	Risk
Saptari	Ramnagar	Maybe Risk
Saptari	Rampur Jamuwa	Maybe Risk
Saptari	Rampur Malhaniya	Risk
Saptari	Rautahat	Maybe Risk
Saptari	Roopnagar	Maybe Risk
Saptari	Sakarpura	Risk
Saptari	Sarashwor	Maybe Risk
Saptari	Shambhunath	Maybe Risk
Saptari	Shimarahasigyaun	Maybe Risk
Saptari	Shishwa	Maybe Risk
Saptari	Sitapur	Maybe Risk
Saptari	Tarahi	Maybe Risk
Saptari	Terahota	Maybe Risk
Saptari	Theleya	Maybe Risk
Saptari	Tikuliya	Risk
Saptari	Tilathi	Risk
Saptari	Trikaul	Maybe Risk
Saptari	Welhe	Risk
Saptari	Welhe Chapena	Maybe Risk
Sarlahi	Achalgadh	Maybe Risk
Sarlahi	Arnaha	Maybe Risk
Sarlahi	Atrauli	Maybe Risk
Sarlahi	Aurahi	No Risk

Jhapa	Maheshpur	Maybe Risk
Jhapa	Mechinagar Municipality	Maybe Risk
Jhapa	Pachgachi	Maybe Risk
Jhapa	Pathamari	No Risk
Jhapa	Pathriya	No Risk
Jhapa	Pathvinagar	No Risk
Jhapa	Rajgad	Maybe Risk
Jhapa	Sattashidham	Maybe Risk
Jhapa	Shanishchare	Maybe Risk
Jhapa	Shantinagar	Maybe Risk
Jhapa	Sharnamti	Maybe Risk
Jhapa	Shiwganj	Maybe Risk
Jhapa	Surung	Maybe Risk
Jhapa	Taanghandubba	Maybe Risk
Jhapa	Topgachi	Maybe Risk
Kailali	Baliya	Risk
Kailali	Basauti	No Risk
Kailali	Bauniya	No Risk
Kailali	Beladevipur	No Risk
Kailali	Bhajani	Risk
Kailali	Chaumala	No Risk
Kailali	Chuha	No Risk
Kailali	Darakh	No Risk
Kailali	Dhangadhi Municipality	No Risk
Kailali	Dhansinghapur	Risk
Kailali	Dododhara	No Risk
Kailali	Durgauli	Risk
Kailali	Gadariya	No Risk
Kailali	Geta	No Risk
Kailali	Godawari	Maybe Risk
Kailali	Hasuliya	Maybe Risk
Kailali	Janakinagar	Risk
Kailali	Joshipur	Risk
Kailali	Khailad	No Risk
Kailali	Khairala	No Risk
Kailali	Kota Tulsipur	No Risk
Kailali	Lalbojhi	Risk
Kailali	Malakheti	No Risk
Kailali	Masuriya	No Risk
Kailali	Mohanyal	Risk
Kailali	Munuwa	Risk
Kailali	Narayanpur	Risk
Kailali	Nigali	No Risk
Kailali	Pabera	No Risk
Kailali	Pahalmanpur	Maybe Risk
Kailali	Pandaun	Risk
Kailali	Pathariya	Risk
Kailali	Phulbari	No Risk
Kailali	Pratappur	No Risk
Kailali	Ramshikharjhala	Maybe Risk
Sarlahi	Babarganj	No Risk
Sarlahi	Bagdaha	Maybe Risk
Sarlahi	Bahadurpur	Maybe Risk
Sarlahi	Balara	Maybe Risk
Sarlahi	Baraudhoran	Maybe Risk
Sarlahi	Barhathawa	Maybe Risk
Sarlahi	Basantapur	Maybe Risk
Sarlahi	Batraul	No Risk
Sarlahi	Bela	Maybe Risk
Sarlahi	Belhi	Maybe Risk
Sarlahi	Belwajabdi	Maybe Risk
Sarlahi	Bhagawatipur	Maybe Risk
Sarlahi	Bhaktipur	No Risk
Sarlahi	Bhandsar	Maybe Risk
Sarlahi	Bhawanipur	Maybe Risk
Sarlahi	Bhelhi	Maybe Risk
Sarlahi	Bramhapuri	Maybe Risk
Sarlahi	Chandranagar	No Risk
Sarlahi	Chhataul	Maybe Risk
Sarlahi	Chhatauna	Risk
Sarlahi	Dhangadha	Maybe Risk
Sarlahi	Dhankaul	Maybe Risk
Sarlahi	Dhankaul	No Risk
Sarlahi	Dhungrekhola	Maybe Risk
Sarlahi	Dumariya	Maybe Risk
Sarlahi	Gadahiya	Maybe Risk
Sarlahi	Gamhariya	Maybe Risk
Sarlahi	Gaudeta	Maybe Risk
Sarlahi	Gaurishankar	No Risk
Sarlahi	Ghurkauli	Maybe Risk
Sarlahi	Hajariya	Maybe Risk
Sarlahi	Hariban	Maybe Risk
Sarlahi	Haripur	Maybe Risk
Sarlahi	Haripurwa	No Risk
Sarlahi	Harkathawa	Maybe Risk
Sarlahi	Hathiaul	Risk
Sarlahi	Hempur	Maybe Risk
Sarlahi	Ishwarpur	Maybe Risk
Sarlahi	Jabdi	Maybe Risk
Sarlahi	Jamuniya	Maybe Risk
Sarlahi	Janakinagar	Maybe Risk
Sarlahi	Jingadawa	No Risk
Sarlahi	Kabilasi	Maybe Risk
Sarlahi	Kalinjor	Maybe Risk
Sarlahi	Karmaiya	Maybe Risk
Sarlahi	Khairawa Muglaha	Maybe Risk
Sarlahi	Khoriya	No Risk
Sarlahi	Khutauna	Maybe Risk
Sarlahi	Kisanpur	Maybe Risk
Sarlahi	Koudena	Maybe Risk

Kailali	Ratanpur	Maybe Risk
Kailali	Sahajpur	No Risk
Kailali	Sandepani	No Risk
Kailali	Shripur	No Risk
Kailali	Sugurkhal	Risk
Kailali	Thapapur	Risk
Kailali	Tikapur Municipality	Risk
Kailali	Udasipur	No Risk
Kailali	Urme	No Risk
Kanchanpur	Beldada	Risk
Kanchanpur	Chadani	Risk
Kanchanpur	Daiji	Risk
Kanchanpur	Dekhatmuli	Maybe Risk
Kanchanpur	Dodhara	Risk
Kanchanpur	Jhalari	No Risk
Kanchanpur	Kalika	No Risk
Kanchanpur	Krishnapur	Maybe Risk
Kanchanpur	Laxmipur	Risk
Kanchanpur	Mahendranagar Municipality	Risk
Kanchanpur	Parasan	Maybe Risk
Kanchanpur	Pepladi	Maybe Risk
Kanchanpur	Raikawarabechawa	Maybe Risk
Kanchanpur	Raitali Bechawa	Risk
Kanchanpur	Rampur Bilaspur	Risk
Kanchanpur	Royal Shukla Phanta National Park	Risk (Not pop)
Kanchanpur	Shankarpur	Maybe Risk
Kanchanpur	Shreepur	Risk
Kanchanpur	Sudha	Risk
Kanchanpur	Tribhuwanbasti	Maybe Risk
Kanchanpur	Waesi Bichawa	Maybe Risk
Kapilbastu	Ajigara	No Risk
Kapilbastu	Amirawa	No Risk
Kapilbastu	Bahadurganj	No Risk
Kapilbastu	Balarampur	No Risk
Kapilbastu	Baluhawa	No Risk
Kapilbastu	Banganga	No Risk
Kapilbastu	Banskhor	Maybe Risk
Kapilbastu	Barkulpur	No Risk
Kapilbastu	Basantapur	No Risk
Kapilbastu	Bedauli	Maybe Risk
Kapilbastu	Bhagwanpur	No Risk
Kapilbastu	Bhalawad	Maybe Risk
Kapilbastu	Bhaluwari	No Risk
Kapilbastu	Bhilmi	No Risk
Kapilbastu	Bidyanagar	No Risk
Kapilbastu	Bijuwa	No Risk
Kapilbastu	Birahipur	No Risk
Kapilbastu	Birpur	No Risk
Kapilbastu	Bisunpur	Maybe Risk
Kapilbastu	Budhi	No Risk
Sarlahi	Lakshmipur Kodraha	Maybe Risk
Sarlahi	Lalbandi	No Risk
Sarlahi	Laukat	Maybe Risk
Sarlahi	Laxmipur (Pra.Ma.)	Maybe Risk
Sarlahi	Madhuban	Maybe Risk
Sarlahi	Madhubani	Maybe Risk
Sarlahi	Mahinathpur	Maybe Risk
Sarlahi	Malangawa Municipality	Maybe Risk
Sarlahi	Manpur	Maybe Risk
Sarlahi	Mirjapur	Maybe Risk
Sarlahi	Mohanpur	No Risk
Sarlahi	Motipur	No Risk
Sarlahi	Murtiya	No Risk
Sarlahi	Musaili	Maybe Risk
Sarlahi	Narayankhola	Maybe Risk
Sarlahi	Narayanpur	No Risk
Sarlahi	Naukailawa	No Risk
Sarlahi	Netraganj	Maybe Risk
Sarlahi	Padariya	Maybe Risk
Sarlahi	Parsa	No Risk
Sarlahi	Parwanipur	Maybe Risk
Sarlahi	Pattharkot	Maybe Risk
Sarlahi	Pharahadawa	No Risk
Sarlahi	Phulparasi	Maybe Risk
Sarlahi	Pidari	Maybe Risk
Sarlahi	Pipariya	Maybe Risk
Sarlahi	Rajghat	Maybe Risk
Sarlahi	Ramban	Maybe Risk
Sarlahi	Ramnagar Bahuarwa	Maybe Risk
Sarlahi	Raniganj	No Risk
Sarlahi	Rohuwa	Maybe Risk
Sarlahi	Sahodawa	Maybe Risk
Sarlahi	Salempur	Maybe Risk
Sarlahi	Sangrampur	Maybe Risk
Sarlahi	Sasapur	Maybe Risk
Sarlahi	Satroul	Maybe Risk
Sarlahi	Sesauta	Maybe Risk
Sarlahi	Shankarpur	No Risk
Sarlahi	Shripur	Maybe Risk
Sarlahi	Simara	Maybe Risk
Sarlahi	Sisauna	Maybe Risk
Sarlahi	Sisautiya	Maybe Risk
Sarlahi	Sudama	Maybe Risk
Sarlahi	Sundarpur	Maybe Risk
Sarlahi	Sundarpur Choharwa	No Risk
Sarlahi	Tribhuvannagar	Maybe Risk
Siraha	Aarnama	No Risk
Siraha	Arnama Rampur	No Risk
Siraha	Ashokpur Wolkawa	No Risk
Siraha	Ashonpur	No Risk

Kapilbastu	Chanai	No Risk
Kapilbastu	Dhankauli	Maybe Risk
Kapilbastu	Dharmapaniya	No Risk
Kapilbastu	Dohani	No Risk
Kapilbastu	Dumara	No Risk
Kapilbastu	Duwiya	No Risk
Kapilbastu	Gajehada	No Risk
Kapilbastu	Ganeshpur	No Risk
Kapilbastu	Gauri	No Risk
Kapilbastu	Gotihawa	No Risk
Kapilbastu	Gugauli	No Risk
Kapilbastu	Haranampur	No Risk
Kapilbastu	Hardona	Maybe Risk
Kapilbastu	Hariharpur	No Risk
Kapilbastu	Hathausa	No Risk
Kapilbastu	Hathihawa	No Risk
Kapilbastu	Jahadi	No Risk
Kapilbastu	Jawabhari	No Risk
Kapilbastu	Jayanagar	No Risk
Kapilbastu	Kajarhawa	Maybe Risk
Kapilbastu	Kapilbastu Municipality	Maybe Risk
Kapilbastu	Khurhuriya	No Risk
Kapilbastu	Kopuwa	Maybe Risk
Kapilbastu	Krishnanagar	No Risk
Kapilbastu	Kusahawa	No Risk
Kapilbastu	Labani	No Risk
Kapilbastu	Lalpur	No Risk
Kapilbastu	Maharajganj	Maybe Risk
Kapilbastu	Mahendrakot	No Risk
Kapilbastu	Mahuwa	No Risk
Kapilbastu	Manpur	No Risk
Kapilbastu	Motipur	Maybe Risk
Kapilbastu	Nandanagar	No Risk
Kapilbastu	Niglihawa	Maybe Risk
Kapilbastu	Pakadi	No Risk
Kapilbastu	Parsohiya	No Risk
Kapilbastu	Patariya	No Risk
Kapilbastu	Patna	No Risk
Kapilbastu	Patthardehiya	Maybe Risk
Kapilbastu	Phulika	No Risk
Kapilbastu	Pipara	No Risk
Kapilbastu	Pithuwa	No Risk
Kapilbastu	Purushottampur	No Risk
Kapilbastu	Rajpur	No Risk
Kapilbastu	Ramnagar	No Risk
Kapilbastu	Rangapur	Maybe Risk
Kapilbastu	Sauraha	Maybe Risk
Kapilbastu	Shivagadhi	No Risk
Kapilbastu	Shivanagar	No Risk
Kapilbastu	Shivapur	Maybe Risk
Siraha	Aurahi	No Risk
Siraha	Ayoudhanagar	No Risk
Siraha	Badahara Michaiyamal	No Risk
Siraha	Barchawa	No Risk
Siraha	Bariyarpatti	Maybe Risk
Siraha	Bashtipur	No Risk
Siraha	Belaha	No Risk
Siraha	Bellhi	No Risk
Siraha	Betauna	No Risk
Siraha	Bhadaiya	No Risk
Siraha	Bhagwanpur	Risk
Siraha	Bhagwatipur	No Risk
Siraha	Bhawanipur	No Risk
Siraha	Bhawanipurkalabanjar	No Risk
Siraha	Bhediya	No Risk
Siraha	Bhotraha	No Risk
Siraha	Bhramhamangorchhari	No Risk
Siraha	Bidhanagar	Maybe Risk
Siraha	Bishnupur Rampurwa	No Risk
Siraha	Bishnupurkatti	Maybe Risk
Siraha	Bishnupurmahishoth	No Risk
Siraha	Chandra Lalpur	No Risk
Siraha	Chandrayodhyapur	No Risk
Siraha	Chandrodayapur	No Risk
Siraha	Chatari	No Risk
Siraha	Chikna	No Risk
Siraha	Devipur	No Risk
Siraha	Dhangadhi	No Risk
Siraha	Dhodna	No Risk
Siraha	Dumari	No Risk
Siraha	Durgapur	No Risk
Siraha	Gadha	Risk
Siraha	Gamadaha	No Risk
Siraha	Gauripur	No Risk
Siraha	Gautadi	No Risk
Siraha	Gobinapur Taregana	Risk
Siraha	Govindapur Malahaniya	No Risk
Siraha	Hakpara	No Risk
Siraha	Hanumannagar (Pra.Dha.)	No Risk
Siraha	Hanumannagar (Pra.Ma.)	No Risk
Siraha	Harkatti	No Risk
Siraha	Inarwa	Risk
Siraha	Itari Parsahi	No Risk
Siraha	Itarwa	Risk
Siraha	Itatar	No Risk
Siraha	Janakinagar	No Risk
Siraha	Jijhaul	No Risk
Siraha	Kabilashi	No Risk
Siraha	Kachanari	No Risk
Siraha	Kalabanzaar	No Risk

Kapilbastu	Singhakhor	Maybe Risk
Kapilbastu	Sirsihawa	No Risk
Kapilbastu	Sisawa	No Risk
Kapilbastu	Somdiha	Maybe Risk
Kapilbastu	Thunhiya	No Risk
Kapilbastu	Tilaurakot	Maybe Risk
Kapilbastu	Titirkhi	Maybe Risk
Kapilbastu	Udayapur	No Risk
Mahottari	Angkar	Maybe Risk
Mahottari	Aurahi	Maybe Risk
Mahottari	Badiya Banchauri	Maybe Risk
Mahottari	Bagada	Maybe Risk
Mahottari	Bairgiya Lakshminiya	Maybe Risk
Mahottari	Balawa	Maybe Risk
Mahottari	Banauli Danauli	Maybe Risk
Mahottari	Banauta	No Risk
Mahottari	Bardibas	Maybe Risk
Mahottari	Basabitti	Maybe Risk
Mahottari	Bathanaha	Maybe Risk
Mahottari	Belgachhi	Maybe Risk
Mahottari	Bhangaha	Maybe Risk
Mahottari	Bharatpur	Maybe Risk
Mahottari	Bhatauliya	Maybe Risk
Mahottari	Bhramarpura	Maybe Risk
Mahottari	Bijalpura	Maybe Risk
Mahottari	Damhimadai	Maybe Risk
Mahottari	Dhamaura	Maybe Risk
Mahottari	Dharmapur	Maybe Risk
Mahottari	Dhirapur	Maybe Risk
Mahottari	Ekadara	Maybe Risk
Mahottari	Ekarahiya	Maybe Risk
Mahottari	Gaidhabhetpur	Maybe Risk
Mahottari	Gauribas	Maybe Risk
Mahottari	Gaushala	Maybe Risk
Mahottari	Gonarpura	Maybe Risk
Mahottari	Halkhori	Maybe Risk
Mahottari	Hariharpur Harinamari	Maybe Risk
Mahottari	Hathilet	Maybe Risk
Mahottari	Hattisarwa	Maybe Risk
Mahottari	Itaharwakatti	Maybe Risk
Mahottari	Jaleshwor Municipality	No Risk
Mahottari	Khairbani	Maybe Risk
Mahottari	Khairmara	Maybe Risk
Mahottari	Khopi	Maybe Risk
Mahottari	Khuttapipradhi	Maybe Risk
Mahottari	Kisannagar	Maybe Risk
Mahottari	Kolhuwabagaiya	No Risk
Mahottari	Lakshminiya	No Risk
Mahottari	Loharpatti	No Risk
Mahottari	Mahadaiyatapanpur	No Risk
Siraha	Kalyanpur Jaabdi	No Risk
Siraha	Karjanha	No Risk
Siraha	Khirauna	No Risk
Siraha	Khurkiyahi	Maybe Risk
Siraha	Krishnapur	No Risk
Siraha	Kushahallaxminiya	No Risk
Siraha	Lagadi Gadhiyani	No Risk
Siraha	Lagadigoath	No Risk
Siraha	Lahan Municipality	Risk
Siraha	Lalpur	No Risk
Siraha	Laxminiya	Maybe Risk
Siraha	Laxmipur (Patari)	No Risk
Siraha	Laxmipur (Pra.Ma.)	No Risk
Siraha	Madar	No Risk
Siraha	Mahadewa Portaha	No Risk
Siraha	Mahanaur	No Risk
Siraha	Maheshpur Gamahariya	No Risk
Siraha	Maheshpur Pattar	Maybe Risk
Siraha	Majhauliya	No Risk
Siraha	Majhura	No Risk
Siraha	Malahaniya Gamariya	No Risk
Siraha	Malhaniya Khori	No Risk
Siraha	Mauwahi	No Risk
Siraha	Mohanpur Kamalpur	Maybe Risk
Siraha	Mukashar	Maybe Risk
Siraha	Naraha Wolkawa	No Risk
Siraha	Naraharigol (Gamahariya)	Risk
Siraha	Nawarajpur	No Risk
Siraha	Pathariyatharutole	No Risk
Siraha	Phulkaha Patti	No Risk
Siraha	Phulwariya	No Risk
Siraha	Pipra	No Risk
Siraha	Pipra (Dhanawar)	Maybe Risk
Siraha	Pokharbhinda	No Risk
Siraha	Radhapur	No Risk
Siraha	Rajpur	No Risk
Siraha	Ramnagar Michaiya	No Risk
Siraha	Rampur Birta	No Risk
Siraha	Sakhuwa Nankarkatti	Risk
Siraha	Sanaitha	No Risk
Siraha	Sarswor	No Risk
Siraha	Shilorwa	No Risk
Siraha	Shishbani	No Risk
Siraha	Shukhipur	No Risk
Siraha	Siraha Municipality	No Risk
Siraha	Sitapur (Pra.Da.)	No Risk
Siraha	Sitapur (Pra.Ra.)	No Risk
Siraha	Sitron	No Risk
Siraha	Sonmati	Risk
Siraha	Sothiyan	No Risk

Mahottari	Mahottari	Maybe Risk
Mahottari	Maisthan	Maybe Risk
Mahottari	Manara	Maybe Risk
Mahottari	Matihani	Maybe Risk
Mahottari	Meghanath Gorhanna	Maybe Risk
Mahottari	Mujhaura Vishnupur	Maybe Risk
Mahottari	Nainhi	Maybe Risk
Mahottari	Nigaul	Maybe Risk
Mahottari	Padaul	Maybe Risk
Mahottari	Parikauli Phuhatta	Maybe Risk
Mahottari	Parsadewad	Maybe Risk
Mahottari	Parsapataili	Maybe Risk
Mahottari	Pashupatinagar (Bunarghula)	Maybe Risk
Mahottari	Phulkaha	Maybe Risk
Mahottari	Pigauna	No Risk
Mahottari	Pipra	Maybe Risk
Mahottari	Pokharbhinda Sangrampur	Maybe Risk
Mahottari	Raghunathpur	Maybe Risk
Mahottari	Ramgopalpur	Maybe Risk
Mahottari	Ramnagar	Maybe Risk
Mahottari	Ratauli	Maybe Risk
Mahottari	Sahasaula	Maybe Risk
Mahottari	Sahodawa	Maybe Risk
Mahottari	Sandha	Maybe Risk
Mahottari	Sarpallo	Maybe Risk
Mahottari	Shamsi	Maybe Risk
Mahottari	Shripur	Maybe Risk
Mahottari	Simardahi	Maybe Risk
Mahottari	Singyahi	Maybe Risk
Mahottari	Sisawakataiya	Maybe Risk
Mahottari	Sonama	Maybe Risk
Mahottari	Sonamai	Maybe Risk
Mahottari	Sonaul	Maybe Risk
Mahottari	Sugabhawanipatti	Maybe Risk
Mahottari	Sundarpur	Maybe Risk
Morang	Amahivariyati	No Risk
Morang	Amardaha	No Risk
Morang	Amgachi	No Risk
Morang	Babiyabirta	No Risk
Morang	Bahuni	No Risk
Morang	Barangi	No Risk
Morang	Bardaga	No Risk
Morang	Bayarwan	No Risk
Morang	Belbari	No Risk
Morang	Bhaudaha	No Risk
Morang	Bhogteni	No Risk
Morang	Biratnagar Sub Metropolitan	Risk
Morang	Budhanagar	Risk
Morang	Daaeniya	No Risk
Morang	Dadarbairiya	No Risk
Siraha	Sukhchaina	No Risk
Siraha	Tenuwapatti	Maybe Risk
Siraha	Thalaha Kataha	No Risk
Siraha	Tulshipur	Maybe Risk
Sunsari	Amaduba	Risk
Sunsari	Amahibela	Risk
Sunsari	Aurabani	Risk
Sunsari	Babiyabirta	Risk
Sunsari	Bakloura	Maybe Risk
Sunsari	Baraha Chhetra	Risk
Sunsari	Bashntapur	Risk
Sunsari	Bhadgaun Sinuwari	Maybe Risk
Sunsari	Bhaluwa	Maybe Risk
Sunsari	Bharaul	Risk
Sunsari	Bhokraha	Risk
Sunsari	Chandbela	Maybe Risk
Sunsari	Chhitaha	Risk
Sunsari	Chimdi	Risk
Sunsari	Dewangunj	Risk
Sunsari	Dharan Municipality	Maybe Risk
Sunsari	Dhuskighat	Risk
Sunsari	Duhavi	Maybe Risk
Sunsari	Dumraha	Risk
Sunsari	Ekamba	Maybe Risk
Sunsari	Gautampur	Risk
Sunsari	Hansposa	Maybe Risk
Sunsari	Harinagar	Risk
Sunsari	Inarwa Municipality	Risk
Sunsari	Itahari Municipality	No Risk
Sunsari	Jalpapur	Risk
Sunsari	Kaptangunj	Risk
Sunsari	Khanar	Maybe Risk
Sunsari	Koshi Tappu Wildlife Reserve	Risk (Not pop)
Sunsari	Kusahapaschim	Risk
Sunsari	Lokahi	Risk
Sunsari	Madhali	Maybe Risk
Sunsari	Madhesa	Risk
Sunsari	Madhuban	Risk
Sunsari	Madhyaharshahi	Risk
Sunsari	Mahendranagar	Risk
Sunsari	Narshigha	Risk
Sunsari	Pakali	Maybe Risk
Sunsari	Panchakanya	Maybe Risk
Sunsari	Prakashpur	Risk
Sunsari	Purba Kusahha	Risk
Sunsari	Ramgunjbelgachhiya	Risk
Sunsari	Ramnagar Bhutaha	Risk
Sunsari	Satterjhora	Risk
Sunsari	Shahebgunj	Risk
Sunsari	Shreeharipur	Risk

Morang	Dangihaat	No Risk
Morang	Dangraha	No Risk
Morang	Darbesa	No Risk
Morang	Dulari	No Risk
Morang	Gobindapur	No Risk
Morang	Haraincha	No Risk
Morang	Hasandaha	No Risk
Morang	Hathimudha	No Risk
Morang	Hoklawari	No Risk
Morang	Indrapur	No Risk
Morang	Itahara	No Risk
Morang	Jate	No Risk
Morang	Jhorahat	No Risk
Morang	Jhurkiya	No Risk
Morang	Kadmaha	No Risk
Morang	Kashini	No Risk
Morang	Katahari	No Risk
Morang	Kerabari	No Risk
Morang	Keraun	No Risk
Morang	Lakhantari	No Risk
Morang	Letang	No Risk
Morang	Madhumalla	No Risk
Morang	Mahadewa	No Risk
Morang	Majhare	Risk
Morang	Mathigachha	Risk
Morang	Motipur	No Risk
Morang	Mrigauliya	No Risk
Morang	Nocha	No Risk
Morang	Pathari	No Risk
Morang	Patigaun	No Risk
Morang	Pokhariya	No Risk
Morang	Rajghat	No Risk
Morang	Ramitekhola	No Risk
Morang	Rangoli	No Risk
Morang	Shanishchare	No Risk
Morang	Sidraha	No Risk
Morang	Sijuwa	No Risk
Morang	Singhdevi	No Risk
Morang	Sisbani Badhara	No Risk
Morang	Sisvani Jahada	No Risk
Morang	Sorabhag	No Risk
Morang	Sundarpur	No Risk
Morang	Takuwa	No Risk
Morang	Tandi	No Risk
Morang	Tankisinuwari	No Risk
Morang	Tetaria	No Risk
Morang	Thalaha	No Risk
Morang	Urlawari	No Risk
Morang	Vaijanathpur	No Risk
Morang	Vanigama	No Risk
Sunsari	Shreepurjavdi	Risk
Sunsari	Simaria	Maybe Risk
Sunsari	Singiya	Risk
Sunsari	Sinwari Rajgunj	Risk
Sunsari	Sonapur	Maybe Risk
Sunsari	Tanmuna	Risk
Sunsari	Vishnupaduka	Maybe Risk
Surkhet	Agrigaun	Risk
Surkhet	Awalching	No Risk
Surkhet	Babiyachur	Risk
Surkhet	Bajedichaur	Risk
Surkhet	Betam	Risk
Surkhet	Bijora	Risk
Surkhet	Birendranagar Municipality	Maybe Risk
Surkhet	Chhapre	Risk
Surkhet	Chhinchu	No Risk
Surkhet	Dahachaur	Risk
Surkhet	Dandakhali	Maybe Risk
Surkhet	Dasharathpur	Risk
Surkhet	Dharapani	Risk
Surkhet	Gadhi	Maybe Risk
Surkhet	Garpan	No Risk
Surkhet	Ghatgaun	Risk
Surkhet	Ghoreta	Risk
Surkhet	Ghumkhahare	Risk
Surkhet	Gumi	Risk
Surkhet	Guthu	Risk
Surkhet	Hariharpur	Risk
Surkhet	Jarbuta	Maybe Risk
Surkhet	Kalyanpur	Risk
Surkhet	Kaphal Kot	Maybe Risk
Surkhet	Kaprichaur	Risk
Surkhet	Khanikhola	Maybe Risk
Surkhet	Kunathari	Risk
Surkhet	Lagam	Risk
Surkhet	Latikoili	Risk
Surkhet	Lekgaun	No Risk
Surkhet	Lekhparajul	Risk
Surkhet	Lekhpharsa	Risk
Surkhet	Maintara	Risk
Surkhet	Malarani	Maybe Risk
Surkhet	Matela	No Risk
Surkhet	Mehelkuna	Risk
Surkhet	Neta	Maybe Risk
Surkhet	Pamka	No Risk
Surkhet	Pokharikanda	Risk
Surkhet	Rajena	Maybe Risk
Surkhet	Rakam	Risk
Surkhet	Ramghat	Risk
Surkhet	Ranibas	No Risk

Morang	Yangsila	No Risk
Nawalparasi	Amarapuri	Risk
Nawalparasi	Amraud	No Risk
Nawalparasi	Argyauli	Risk
Nawalparasi	Badahara Dubauliya	Risk
Nawalparasi	Banjariya	No Risk
Nawalparasi	Bedoli	Risk
Nawalparasi	Benimanipur	No Risk
Nawalparasi	Bharatipur	Risk
Nawalparasi	Bhujahawa	Risk
Nawalparasi	Bulingtar	Risk
Nawalparasi	Dandajheritadi	Risk
Nawalparasi	Daunnedevi	Risk
Nawalparasi	Dedgaun	No Risk
Nawalparasi	Deurali	Maybe Risk
Nawalparasi	Devchuli	No Risk
Nawalparasi	Devgaun	Risk
Nawalparasi	Dhauwadi	Maybe Risk
Nawalparasi	Dhurkot	No Risk
Nawalparasi	Divyapuri	Risk
Nawalparasi	Dumkibas	Risk
Nawalparasi	Gaindakot	Risk
Nawalparasi	Germi	No Risk
Nawalparasi	Guthiparsauni	Risk
Nawalparasi	Guthisuryapura	Risk
Nawalparasi	Hakui	Maybe Risk
Nawalparasi	Harpur	Maybe Risk
Nawalparasi	Hupsekot	No Risk
Nawalparasi	Jahada	Maybe Risk
Nawalparasi	Jamuniya	Risk
Nawalparasi	Jaubari	No Risk
Nawalparasi	Kawasoti	Risk
Nawalparasi	Kolhuwa	Risk
Nawalparasi	Kotthar	Risk
Nawalparasi	Kudiya	Risk
Nawalparasi	Kumarbarti	Risk
Nawalparasi	Kusma	No Risk
Nawalparasi	Mainaghar	No Risk
Nawalparasi	Makar	No Risk
Nawalparasi	Manari	Maybe Risk
Nawalparasi	Mithukaram	Risk
Nawalparasi	Mukundapur	Risk
Nawalparasi	Naram	No Risk
Nawalparasi	Narayani	Risk
Nawalparasi	Narsahi	Risk
Nawalparasi	Nayabelhani	Risk
Nawalparasi	Paklihawa	Risk
Nawalparasi	Palhi	No Risk
Nawalparasi	Panchanagar	No Risk
Nawalparasi	Parsauni	Risk
Surkhet	Ratudevistan	Maybe Risk
Surkhet	Sahare	Risk
Surkhet	Salkot	Risk
Surkhet	Satakhani	Risk
Surkhet	Taranga Ghat	Risk
Surkhet	Tatopani	Risk
Surkhet	Uttarganga	Risk
Surkhet	Vidyapur	Risk
Udayapur	Aaptar	Risk
Udayapur	Balamta	Risk
Udayapur	Baraha	No Risk
Udayapur	Bare	No Risk
Udayapur	Bashaha	No Risk
Udayapur	Bashbote	Risk
Udayapur	Bhalayedadha	Risk
Udayapur	Bhutar	No Risk
Udayapur	Chaudandi	Risk
Udayapur	Dumbre	No Risk
Udayapur	Enamea	No Risk
Udayapur	Hadiya	No Risk
Udayapur	Hardeni	No Risk
Udayapur	Jaate	Risk
Udayapur	Jalapa Chilauni	No Risk
Udayapur	Jogidaha	No Risk
Udayapur	Katari	No Risk
Udayapur	Katunjebabala	Risk
Udayapur	Khaabu	Risk
Udayapur	Lafagaun	Risk
Udayapur	Lekhani	Risk
Udayapur	Lekhgaun	No Risk
Udayapur	Limpatar	No Risk
Udayapur	Mainamaine	Risk
Udayapur	Mayakhu	No Risk
Udayapur	Nametar	No Risk
Udayapur	Okhale	Risk
Udayapur	Panchabatti	No Risk
Udayapur	Pokhari	No Risk
Udayapur	Rauta	No Risk
Udayapur	Rishku	No Risk
Udayapur	Rupatar	Risk
Udayapur	Saune	Risk
Udayapur	Shiddhipur	Risk
Udayapur	Shirishea	No Risk
Udayapur	Shorung	Risk
Udayapur	Sundarpur	No Risk
Udayapur	Tabashree	No Risk
Udayapur	Tamlichha	Risk
Udayapur	Tapeshworibelahi	Risk
Udayapur	Thanagaun	Risk
Udayapur	Thockshila	Risk

Nawalparasi	Pithauli	Risk
Nawalparasi	Pragatinagar	Risk
Nawalparasi	Pratappur	Risk
Udayapur	Tribeni	No Risk
Udayapur	Triyuga Municipality	No Risk
Udayapur	Weltar	No Risk

Annex 5: Risk categorisation by Earthquake affected priority district VDC

DIST_NAME	VDC_NAME	Landslide Susceptibility	DIST_NAME	VDC_NAME	Landslide Susceptibility
Bhaktapur	Bageshwari	Low	Makwanpur	Tikathali	Low
Bhaktapur	Balkot	Low	Makwanpur	Agra	Moderate
Bhaktapur	Bhaktapur Municipality	Low	Makwanpur	Ambhanjyang	High
Bhaktapur	Changunarayan	Low	Makwanpur	Bajrabarahi	Low
Bhaktapur	Chhaling	Low	Makwanpur	Basamadi	Low
Bhaktapur	Chitapol	Low	Makwanpur	Beteni	Moderate
Bhaktapur	Dadhikot	Low	Makwanpur	Bhainse	High
Bhaktapur	Duwakot	Low	Makwanpur	Bhartapunyadevi	High
Bhaktapur	Gundu	Low	Makwanpur	Bhimphedi	High
Bhaktapur	Jhaukhel	Low	Makwanpur	Budhichaur	High
Bhaktapur	Katunje	Low	Makwanpur	Chitlang	High
Bhaktapur	Madhyapur Thimi Municipality	Low	Makwanpur	Churemai	Low
Bhaktapur	Nagarkot	Moderate	Makwanpur	Daman	Low
Bhaktapur	Nangkhel	Low	Makwanpur	Dandakharka	Moderate
Bhaktapur	Sipadol	Low	Makwanpur	Dhiyal	Low
Bhaktapur	Sirutar	Low	Makwanpur	Gomane	High
Bhaktapur	Sudal	Low	Makwanpur	Handikhola	Low
Bhaktapur	Tathali	Low	Makwanpur	Harnamadi	Low
Dhading	Aginchok	Low	Makwanpur	Hatiya	Low
Dhading	Baireni	High	Makwanpur	Hetauda Municipality	Low
Dhading	Baseri	Low	Makwanpur	Ipa Panchakanya	High
Dhading	Benighat	High	Makwanpur	Kagate	High
Dhading	Bhumisthan	High	Makwanpur	Kalikatar	High
Dhading	Budhathum	Moderate	Makwanpur	Kangkada	High
Dhading	Chainpur	Moderate	Makwanpur	Khairang	High
Dhading	Chhatre Deurali	Moderate	Makwanpur	Kulekhani	High
Dhading	Darkha	Moderate	Makwanpur	Makawanpur Gadhi	Low
Dhading	Dhol	Low	Makwanpur	Manahari	Low
Dhading	Dhursa	High	Makwanpur	Manthali	High
Dhading	Dhuwakot	Moderate	Makwanpur	Markhu	High
Dhading	Gajuri	Moderate	Makwanpur	Namtar	High
Dhading	Goganpani	Moderate	Makwanpur	Nibuwatar	High
Dhading	Gumdi	Moderate	Makwanpur	Padampokhari	Low
Dhading	Jharlang	High	Makwanpur	Palung	High
Dhading	Jiwanpur	Moderate	Makwanpur	Phakhel	High
Dhading	Jogimara	High	Makwanpur	Phaparbari	Low
Dhading	Jyamruck	Moderate	Makwanpur	Raigaun	Low
Dhading	Kalleri	High	Makwanpur	Raksirang	High
Dhading	Katunje	High	Makwanpur	Sarikhetpalase	High
Dhading	Kebalpur	Moderate	Makwanpur	Shikharpur	Low
Dhading	Khalte	High	Makwanpur	Sisneri	High
Dhading	Khari	Moderate	Makwanpur	Sukaura	High
Dhading	Kiranchok	Moderate	Nuwakot	Thingan	High
Dhading	Kumpur	High	Nuwakot	Bageshwari	Moderate
Dhading	Lapa	High	Nuwakot	Balkumari	High
Dhading	Mahadevsthan	High	Nuwakot	Barsunchet	High
Dhading	Maidi	Moderate	Nuwakot	Belkot	Moderate

Dhading	Marpak	High
Dhading	Mulpani	Moderate
Dhading	Muralibhanjyang	Moderate
Dhading	Nalang	Moderate
Dhading	Naubise	High
Dhading	Nilkanth	Moderate
Dhading	Phulkharka	Moderate
Dhading	Pida	Moderate
Dhading	Rigaun	High
Dhading	Salang	High
Dhading	Salyan Tar	Low
Dhading	Salyankot	Moderate
Dhading	Sangkos	Moderate
Dhading	Satyadevi	Moderate
Dhading	Semdhung	Moderate
Dhading	Sertung	High
Dhading	Sunaulabajar	High
Dhading	Tasarpu	High
Dhading	Thakre	High
Dhading	Tipling	Low
Dhading	Tripura	Low
Dolakha	Alambu	High
Dolakha	Babare	Moderate
Dolakha	Bhedpu	Low
Dolakha	Bhimeswor Municipality	Low
Dolakha	Bhirkot	Low
Dolakha	Bhusaphedi	Moderate
Dolakha	Bigu	Moderate
Dolakha	Boch	Moderate
Dolakha	Bulung	Low
Dolakha	Changkhu	Moderate
Dolakha	Chhetrapa	Low
Dolakha	Chilangkha	High
Dolakha	Chyama	Low
Dolakha	Dandakharka	Moderate
Dolakha	Dodhapokhari	Moderate
Dolakha	Gairimudi	Low
Dolakha	Gaurishankar	Low
Dolakha	Ghyangsukathokar	Low
Dolakha	Hawa	Moderate
Dolakha	Japhe	Low
Dolakha	Jhule	Low
Dolakha	Jhyanku	Moderate
Dolakha	Jiri	Low
Dolakha	Jungu	Moderate
Dolakha	Kabre	Low
Dolakha	Kalinchok	Moderate
Dolakha	Katakuti	Low
Dolakha	Khare	High
Dolakha	Khopachagu	Low
Nuwakot	Beteni	High
Nuwakot	Bhadratar	Moderate
Nuwakot	Bhalche	Moderate
Nuwakot	Bidur Municipality	Low
Nuwakot	Budhasing	High
Nuwakot	Bungtang	High
Nuwakot	Charghare	Moderate
Nuwakot	Chaturale	Moderate
Nuwakot	Chaughoda	Low
Nuwakot	Chauthe	Moderate
Nuwakot	Chhap	High
Nuwakot	Dangsing	Moderate
Nuwakot	Deurali	Moderate
Nuwakot	Duipipal	Moderate
Nuwakot	Ganeshsthan	Moderate
Nuwakot	Gaunkharka	High
Nuwakot	Gerkhu	Moderate
Nuwakot	Ghyangphedi	High
Nuwakot	Gorsyang	High
Nuwakot	Jiling	Moderate
Nuwakot	Kabilas	Moderate
Nuwakot	Kakani	Moderate
Nuwakot	Kalika Halldae	Moderate
Nuwakot	Kalyanpur	High
Nuwakot	Karki Manakamana	Moderate
Nuwakot	Kaule	Moderate
Nuwakot	Khadga Bhanjyang	Moderate
Nuwakot	Khanigaun	Low
Nuwakot	Kharanitar	Moderate
Nuwakot	Kintang	Moderate
Nuwakot	Kumari	Moderate
Nuwakot	Lachyang	High
Nuwakot	Likhu	High
Nuwakot	Madanpur	Moderate
Nuwakot	Mahakali	High
Nuwakot	Narjamandap	Moderate
Nuwakot	Okharpauwa	Moderate
Nuwakot	Panchakanya	Moderate
Nuwakot	Phikuri	Moderate
Nuwakot	Ralukadevi	Moderate
Nuwakot	Ratmate	High
Nuwakot	Rautbesi	High
Nuwakot	Salme	Moderate
Nuwakot	Samari	High
Nuwakot	Samudradevi Kholegaun	Moderate
Nuwakot	Samudratar	High
Nuwakot	Shikharbesi	High
Nuwakot	Sikre	High
Nuwakot	Sundaradevi	Moderate
Nuwakot	Sunkhani	Moderate

Dolakha	Laduk	Moderate
Dolakha	Lakuridanda	Moderate
Dolakha	Lamabagar	Low
Dolakha	Lamidanda	Low
Dolakha	Lapilang	Moderate
Dolakha	Magapauwa	Low
Dolakha	Mali	Low
Dolakha	Malu	Low
Dolakha	Marbu	Low
Dolakha	Melung	Moderate
Dolakha	Mirge	Moderate
Dolakha	Namdru	Low
Dolakha	Pawati	Low
Dolakha	Phasku	Low
Dolakha	Sailungeshwar	Low
Dolakha	Shahare	Moderate
Dolakha	Sundrawati	Moderate
Dolakha	Sunkhani	Moderate
Dolakha	Suri	Moderate
Dolakha	Suspa Kshyamawati	Moderate
Dolakha	Syama	Low
Dolakha	Thulo Pataal	Moderate
Dolakha	Worang	High
Gorkha	Aaruaarbad	High
Gorkha	Amppipal	Moderate
Gorkha	Aruchanaute	Low
Gorkha	Arupokhari	Moderate
Gorkha	Asrang	Moderate
Gorkha	Baguwa	Low
Gorkha	Bakrang	High
Gorkha	Bihi	Moderate
Gorkha	Borlang	Moderate
Gorkha	Bungkot	Moderate
Gorkha	Chhekampar	Low
Gorkha	Chhoprak	Moderate
Gorkha	Chunchet	Low
Gorkha	Chyangling	Low
Gorkha	Darbung	High
Gorkha	Deurali	Moderate
Gorkha	Dhawa	Low
Gorkha	Dhuwakot	Low
Gorkha	Gaikhur	Low
Gorkha	Gangkhu	Moderate
Gorkha	Ghairung	Moderate
Gorkha	Ghyachok	High
Gorkha	Ghyalchok	High
Gorkha	Gumda	High
Gorkha	Hansapur	Moderate
Gorkha	Harmi	Moderate
Gorkha	Jaubari	High
Nuwakot	Suryamati	High
Nuwakot	Talakhu	High
Nuwakot	Taruka	Moderate
Nuwakot	Thanapati	Moderate
Nuwakot	Thansing	Low
Nuwakot	Thaprek	Moderate
Nuwakot	Tupche	Moderate
Okhaldhunga	Urleni	High
Okhaldhunga	Baksha	Moderate
Okhaldhunga	Balakhu	Moderate
Okhaldhunga	Barnalu	Moderate
Okhaldhunga	Barudeshwor	Low
Okhaldhunga	Betini	Moderate
Okhaldhunga	Bhadaure	No data
Okhaldhunga	Bhushanga	Moderate
Okhaldhunga	Bigutar	Low
Okhaldhunga	Bilandu	Moderate
Okhaldhunga	Chyanam	Moderate
Okhaldhunga	Diyale	#N/A
Okhaldhunga	Gamnangtar	Low
Okhaldhunga	Harkapur	Moderate
Okhaldhunga	Jantarkhani	Low
Okhaldhunga	Jyamere	Low
Okhaldhunga	Kalikadevi	Moderate
Okhaldhunga	Katunje	Moderate
Okhaldhunga	Ketuke	Moderate
Okhaldhunga	Khijichandeshwori	Low
Okhaldhunga	Khijiflate	Low
Okhaldhunga	Khijikaanthi	Moderate
Okhaldhunga	Kuebhire	#N/A
Okhaldhunga	Kuntadevi	Low
Okhaldhunga	Madhabpur	Moderate
Okhaldhunga	Mamkha	No data
Okhaldhunga	Manebhanjyang	Moderate
Okhaldhunga	Moli	Moderate
Okhaldhunga	Mulkharka	Moderate
Okhaldhunga	Narayansthan	Low
Okhaldhunga	Narmadeshwor	Moderate
Okhaldhunga	Okhaldhunga	Low
Okhaldhunga	Palapu	Moderate
Okhaldhunga	Patale	Low
Okhaldhunga	Phedighooth	Moderate
Okhaldhunga	Phulbari	Moderate
Okhaldhunga	Pokali	Low
Okhaldhunga	Pokhare	#N/A
Okhaldhunga	Prapcha	Moderate
Okhaldhunga	Ragadeep	Moderate
Okhaldhunga	Ragani	Low
Okhaldhunga	Ranibaan	Moderate
Okhaldhunga	Ratmate	No data

Gorkha	Kashigaun	High
Gorkha	Kerabari	High
Gorkha	Keroja	Low
Gorkha	Kharibot	Moderate
Gorkha	Khoplang	Low
Gorkha	Laprak	High
Gorkha	Lapu	High
Gorkha	Lho	Low
Gorkha	Makaising	High
Gorkha	Manakamana	High
Gorkha	Manbu	Moderate
Gorkha	Masel	Moderate
Gorkha	Muchchok	High
Gorkha	Mumlichok	High
Gorkha	Namjung	Moderate
Gorkha	Nataeshwar	Low
Gorkha	Palungtar	Low
Gorkha	Panchkhuwa Deurali	Moderate
Gorkha	Pandrung	Moderate
Gorkha	Phinam	Moderate
Gorkha	Phujel	Low
Gorkha	Prithbinarayan Municipality	Low
Gorkha	Prok	Low
Gorkha	Sairpani	High
Gorkha	Samagaun	Low
Gorkha	Shrithankot	Moderate
Gorkha	Simjung	High
Gorkha	Sirdibas	Low
Gorkha	Swara	High
Gorkha	Taklung	High
Gorkha	Takumaj Hlakuri	High
Gorkha	Tandrang	Low
Gorkha	Tanglichok	High
Gorkha	Taple	Moderate
Gorkha	Tarkukot	Moderate
Gorkha	Thalajung	Moderate
Gorkha	Thumo	High
Gorkha	Uhiya	High
Gorkha	Virkot	Low
Gorkha	Warpak	High
Kathmandu	Alapot	Low
Kathmandu	Badbhanjyang	Low
Kathmandu	Balambu	Low
Kathmandu	Baluwa	Low
Kathmandu	Bhadrabas	Low
Kathmandu	Bhimdhunga	High
Kathmandu	Budhanilkantha	Low
Kathmandu	Chalnakhel	Low
Kathmandu	Chapali Bhadrakali	Low
Kathmandu	Chhaimale	Low
Okhaldhunga	Rawadol	Moderate
Okhaldhunga	Rumjatar	Low
Okhaldhunga	Sallere	Low
Okhaldhunga	Sherma	#N/A
Okhaldhunga	Shishneri	Moderate
Okhaldhunga	Shrichaor	Low
Okhaldhunga	Singhadevi	Moderate
Okhaldhunga	Tarkerabari	Low
Okhaldhunga	Thakle	Low
Okhaldhunga	Thulachaap	Low
Okhaldhunga	Tokshel	Moderate
Okhaldhunga	Tuluwa	No data
Okhaldhunga	Ubu	Moderate
Ramechhap	Yesham	Low
Ramechhap	Bamti	Low
Ramechhap	Betali	Low
Ramechhap	Bethan	Moderate
Ramechhap	Bhaluwajor	Moderate
Ramechhap	Bhatauli	Moderate
Ramechhap	Bhirpani	Moderate
Ramechhap	Bhuji	Moderate
Ramechhap	Bijulikot	Low
Ramechhap	Chanakhu	Moderate
Ramechhap	Chisapani	Low
Ramechhap	Chuchure	Moderate
Ramechhap	Dadhuwa	Moderate
Ramechhap	Deurali	Moderate
Ramechhap	Dimipokhari	Moderate
Ramechhap	Doramba	Moderate
Ramechhap	Duragaun	Moderate
Ramechhap	Gagal Bhadaure	Moderate
Ramechhap	Gelu	Moderate
Ramechhap	Goshwara	High
Ramechhap	Gothgaun	Low
Ramechhap	Gumdel	Low
Ramechhap	Gunsi	High
Ramechhap	Gupteshwar	Moderate
Ramechhap	Hiledevi	Moderate
Ramechhap	Himganga	Moderate
Ramechhap	Kathjor	Low
Ramechhap	Khandadevi	Moderate
Ramechhap	Khaniyapani	Moderate
Ramechhap	Khimti	Moderate
Ramechhap	Kunbhukasthali	Low
Ramechhap	Lakhanpur	Moderate
Ramechhap	Majhuwa	Moderate
Ramechhap	Makadhum	Low
Ramechhap	Manthali	Low
Ramechhap	Nagdaha	Low
Ramechhap	Namadi	Moderate

Kathmandu	Chunikhel	Low
Kathmandu	Dahachok	Low
Kathmandu	Dakshinkali	Low
Kathmandu	Dhapasi	Low
Kathmandu	Dharmasthali	Low
Kathmandu	Gagal Phedi	Low
Kathmandu	Gokarneshwar	Low
Kathmandu	Goldhunga	Low
Kathmandu	Gongabu	Low
Kathmandu	Gothatar	Low
Kathmandu	Ichangunarayan	High
Kathmandu	Indrayani	Low
Kathmandu	Jhormahangkal	Low
Kathmandu	Jitpur Phedi	Low
Kathmandu	Jorpati	Low
Kathmandu	Kabhresthali	Low
Kathmandu	Kapan	Low
Kathmandu	Kathmandu Metropolitan	Low
Kathmandu	Khadka Bhadrakali	Low
Kathmandu	Kirtipur Municipality	Low
Kathmandu	Lapsiphedi	Moderate
Kathmandu	Machchhegaun	High
Kathmandu	Mahadevsthan	Low
Kathmandu	Mahangkal	Low
Kathmandu	Manmaijn	Low
Kathmandu	Matatirtha	Low
Kathmandu	Mulpani	Low
Kathmandu	Naikap Naya	Low
Kathmandu	Naikap Purano	Low
Kathmandu	Nanglebhare	Moderate
Kathmandu	Nayapati	Low
Kathmandu	Phutung	Low
Kathmandu	Pukulachhi	Low
Kathmandu	Ramkot	Low
Kathmandu	Sangkhu Bajrayogini	Low
Kathmandu	Sangkhu Suntol	Low
Kathmandu	Sangla	Low
Kathmandu	Satungal	Low
Kathmandu	Saukhel	Low
Kathmandu	Shesh Narayan	Low
Kathmandu	Sitapaila	Low
Kathmandu	Sundarijal	Low
Kathmandu	Syuchatar	Low
Kathmandu	Talkudunde Chaur	High
Kathmandu	Thalidanchhi	Low
Kathmandu	Thankot	Low
Kathmandu	Tinthana	Low
Kathmandu	Tokhachandeshwari	Low
Kathmandu	Tokhasaraswati	Low
Kavrepalanchok	Anekot	Moderate
Ramechhap	Okhreni	Moderate
Ramechhap	Pakarbas	Low
Ramechhap	Phulasi	Low
Ramechhap	Pingkhuri	Moderate
Ramechhap	Priti	Moderate
Ramechhap	Puranagaun	Moderate
Ramechhap	Rakathum	Moderate
Ramechhap	Ramechhap	Moderate
Ramechhap	Rampur	Moderate
Ramechhap	Rasanalu	Low
Ramechhap	Saipu	Moderate
Ramechhap	Salu	Low
Ramechhap	Sandhutar	Low
Ramechhap	Sukajor	Moderate
Ramechhap	Sunarpani	Low
Ramechhap	Tharpu	Moderate
Ramechhap	Thokarpur	High
Ramechhap	Those	Moderate
Rasuwa	Tilpung	Low
Rasuwa	Bhorle	Moderate
Rasuwa	Briddim	High
Rasuwa	Chilime	High
Rasuwa	Danda Gaun	High
Rasuwa	Dhunche	Moderate
Rasuwa	Gatlang	Low
Rasuwa	Goljung	Moderate
Rasuwa	Haku	High
Rasuwa	Jibjibe (Nilkantha)	Moderate
Rasuwa	Laharepauwa	Moderate
Rasuwa	Langtang	Low
Rasuwa	Ramche	High
Rasuwa	Saramthali	High
Rasuwa	Syaphru	High
Rasuwa	Thulo Gaun	Moderate
Rasuwa	Thuman	High
Rasuwa	Timure	Low
Sindhuli	Yarsa	High
Sindhuli	Amale	Moderate
Sindhuli	Arunthakur	Moderate
Sindhuli	Bahuntilpung	Low
Sindhuli	Balajor	Moderate
Sindhuli	Baseshwar	High
Sindhuli	Bastipur	High
Sindhuli	Beldhari	Moderate
Sindhuli	Bhadrakali	High
Sindhuli	Bhimeshwar	Low
Sindhuli	Bhimsthan	Low
Sindhuli	Bhuvaneshwari Gwaltar	High
Sindhuli	Bitijor Bagaincha	Moderate
Sindhuli	Dandiguranse	Low

Kavrepalanchok	Balthali	High
Kavrepalanchok	Baluwa Pati Naldhun	Moderate
Kavrepalanchok	Baluwadeubhumi	Low
Kavrepalanchok	Banepa Municipality	Low
Kavrepalanchok	Bekhsimle Ghartigaon	Moderate
Kavrepalanchok	Bhimkhori	High
Kavrepalanchok	Bhugdeu Mahankalchaur	High
Kavrepalanchok	Bhumlutar	Moderate
Kavrepalanchok	Birtadeurali	High
Kavrepalanchok	Boldephadiche	High
Kavrepalanchok	Budhakhani	High
Kavrepalanchok	Chalalganeshsthan	High
Kavrepalanchok	Chandeni Mandan	High
Kavrepalanchok	Chaubas	Moderate
Kavrepalanchok	Chauri Pokhari	Low
Kavrepalanchok	Chyamrangbesi	High
Kavrepalanchok	Chyasingkharka	High
Kavrepalanchok	Dandagaun	High
Kavrepalanchok	Dapcha Chatraebangha	Moderate
Kavrepalanchok	Dapcha Khanalthok	High
Kavrepalanchok	Daraunepokhari	Moderate
Kavrepalanchok	Devitar	Moderate
Kavrepalanchok	Dhulikhel Municipality	Low
Kavrepalanchok	Dhungkharka Bahrabisae	High
Kavrepalanchok	Dolalghat	High
Kavrepalanchok	Gairi Bisauna Deupur	Moderate
Kavrepalanchok	Ghartichhap	High
Kavrepalanchok	Ghusenisiwalaye	Moderate
Kavrepalanchok	Gokule	High
Kavrepalanchok	Gotpani	Moderate
Kavrepalanchok	Hoksebazar	Low
Kavrepalanchok	Jaisithok Mandan	Moderate
Kavrepalanchok	Jyamdi Mandan	High
Kavrepalanchok	Kabhrenitya Chandeshwari	Moderate
Kavrepalanchok	Kanpur Kalapani	High
Kavrepalanchok	Kapali Bhumaedanda	High
Kavrepalanchok	Kattike Deurali	Moderate
Kavrepalanchok	Katunjebesi	High
Kavrepalanchok	Khaharepangu	High
Kavrepalanchok	Kharelthok	Moderate
Kavrepalanchok	Kharpachok	High
Kavrepalanchok	Kolanti	Moderate
Kavrepalanchok	Koshidekha	High
Kavrepalanchok	Kuruwas Chapakhori	Moderate
Kavrepalanchok	Kushadevi	High
Kavrepalanchok	Madankundari	Moderate
Kavrepalanchok	Mahadevsthan Mandan	Low
Kavrepalanchok	Mahadevtar	High
Kavrepalanchok	Mahendrajyoti Bansdol	Moderate
Kavrepalanchok	Majhipheda	Moderate
Sindhuli	Dudhauli	Low
Sindhuli	Dudhbhanjyang	High
Sindhuli	Hariharpurgadhi	Low
Sindhuli	Harsahi	Low
Sindhuli	Hatpate	Low
Sindhuli	Jalkanyachapauli	Moderate
Sindhuli	Jarayotar	Moderate
Sindhuli	Jhangajholi Ratmata	High
Sindhuli	Jinakhu	Moderate
Sindhuli	Kakur Thakur	Moderate
Sindhuli	Kalpabrikshya	Low
Sindhuli	Kamalami Municipality	Low
Sindhuli	Kapilakot	Moderate
Sindhuli	Khangsang	High
Sindhuli	Kholagaun	Moderate
Sindhuli	Kusheshwar Dumja	High
Sindhuli	Kyaneshwar	Low
Sindhuli	Lampantar	Moderate
Sindhuli	Mahadevdanda	Moderate
Sindhuli	Mahadevsthan	Low
Sindhuli	Mahendra Ladabhir	Low
Sindhuli	Mahendrajhyadi	Low
Sindhuli	Majhuwa	High
Sindhuli	Netrakali	High
Sindhuli	Nipane	Low
Sindhuli	Pipalmadi	Low
Sindhuli	Puranojhangajholi	High
Sindhuli	Ranibas	Low
Sindhuli	Ranichuri	Moderate
Sindhuli	Ratanchur	Moderate
Sindhuli	Ratnawati	High
Sindhuli	Shanteshwari Rampur	High
Sindhuli	Sirthauli	Low
Sindhuli	Sitalpati	Moderate
Sindhuli	Sumnampokhari	Moderate
Sindhuli	Swalpathana	High
Sindhuli	Tamajor	High
Sindhuli	Tandi	Low
Sindhuli	Tinkanya	High
Sindhuli	Tosarangkhola	Moderate
Sindhupalchok	Tribhuvan Ambote	Moderate
Sindhupalchok	Attarpur	Moderate
Sindhupalchok	Bandegaun	Moderate
Sindhupalchok	Bansbari	High
Sindhupalchok	Banskharka	High
Sindhupalchok	Baramchae	High
Sindhupalchok	Barhabise	Low
Sindhupalchok	Baruwa	High
Sindhupalchok	Batase	High
Sindhupalchok	Bhimtar	Low

Kavrepalanchok	Mangaltar	High
Kavrepalanchok	Mathurapati Phulbari	Moderate
Kavrepalanchok	Mechchhe	High
Kavrepalanchok	Methinkot	Moderate
Kavrepalanchok	Milche	High
Kavrepalanchok	Nangregagarche	Moderate
Kavrepalanchok	Nasikasthan Sanga	Low
Kavrepalanchok	Naya Gaun Deupur	Moderate
Kavrepalanchok	Panauti Municipality	Low
Kavrepalanchok	Panchkhal	Low
Kavrepalanchok	Patlekhet	Moderate
Kavrepalanchok	Phalametar	High
Kavrepalanchok	Phalete	High
Kavrepalanchok	Phoksingtar	High
Kavrepalanchok	Pokhari Narayansthan	High
Kavrepalanchok	Purana Gaun Pokhari	Moderate
Kavrepalanchok	Rabiopi	Moderate
Kavrepalanchok	Ryale Bihawar	High
Kavrepalanchok	Saldhara	High
Kavrepalanchok	Salle Blullu	Low
Kavrepalanchok	Salme Taldhunga	High
Kavrepalanchok	Sangkhupatichaur	Low
Kavrepalanchok	Sanuwangthali	Moderate
Kavrepalanchok	Saping	High
Kavrepalanchok	Sarmathali	High
Kavrepalanchok	Sarsyunkharka	High
Kavrepalanchok	Sathigharbhagawati	Moderate
Kavrepalanchok	Sharada (Batase)	Low
Kavrepalanchok	Shikhar Ambote	High
Kavrepalanchok	Simthali	High
Kavrepalanchok	Sipali Chilaune	High
Kavrepalanchok	Sisakhani	High
Kavrepalanchok	Syampati Simalchaur	Moderate
Kavrepalanchok	Thulo Parsel	High
Kavrepalanchok	Tukuchanala	Moderate
Kavrepalanchok	Ugrachandinala	Low
Kavrepalanchok	Ugratara Janagal	Low
Kavrepalanchok	Walting	High
Kavrepalanchok	Wanakhu	High
Lalitpur	Asrang	High
Lalitpur	Badikhel	Low
Lalitpur	Bhardeu	High
Lalitpur	Bhattedanda	High
Lalitpur	Bisangkhunarayan	Low
Lalitpur	Bukhel	High
Lalitpur	Bungmati	Low
Lalitpur	Chandanpur	High
Lalitpur	Chapagaun	Low
Lalitpur	Chaughare	High
Lalitpur	Chhampi	Low
Sindhupalchok	Bhotang	High
Sindhupalchok	Bhotechaur	Moderate
Sindhupalchok	Bhotenamlang	Moderate
Sindhupalchok	Bhotsipa	High
Sindhupalchok	Chautara	Moderate
Sindhupalchok	Chokati	High
Sindhupalchok	Dhuyang	Moderate
Sindhupalchok	Dubachaur	Moderate
Sindhupalchok	Gati	High
Sindhupalchok	Ghorthali	High
Sindhupalchok	Ghunsakot	Moderate
Sindhupalchok	Ghuyang (Thanpalchap)	Moderate
Sindhupalchok	Golche	High
Sindhupalchok	Gumba	Low
Sindhupalchok	Gunsakun	Low
Sindhupalchok	Hagam	High
Sindhupalchok	Haibung	Moderate
Sindhupalchok	Helambu	High
Sindhupalchok	Ichok	High
Sindhupalchok	Irkhu	Moderate
Sindhupalchok	Jalbire	Moderate
Sindhupalchok	Jethal	Moderate
Sindhupalchok	Jyamire	Moderate
Sindhupalchok	Kadambas	Moderate
Sindhupalchok	Kalika	High
Sindhupalchok	Karthali	Moderate
Sindhupalchok	Kiul	High
Sindhupalchok	Kubhinde	Moderate
Sindhupalchok	Kunchok	High
Sindhupalchok	Lagarche	Moderate
Sindhupalchok	Lisangkhu	Moderate
Sindhupalchok	Listokot	High
Sindhupalchok	Mahangkal	High
Sindhupalchok	Maneswar	Moderate
Sindhupalchok	Mangkha	Moderate
Sindhupalchok	Marming	Moderate
Sindhupalchok	Melamchi	Moderate
Sindhupalchok	Nawalpur	Moderate
Sindhupalchok	Palchok	Moderate
Sindhupalchok	Pangretar	High
Sindhupalchok	Pangtang	Moderate
Sindhupalchok	Pedku	High
Sindhupalchok	Phataksila	Moderate
Sindhupalchok	Phulchodanda	Moderate
Sindhupalchok	Phulpingkatti	High
Sindhupalchok	Phulpingkot	Moderate
Sindhupalchok	Pipaldanda	Moderate
Sindhupalchok	Piskar	Moderate
Sindhupalchok	Ramche	Moderate
Sindhupalchok	Sangachok	Moderate

Lalitpur	Dahachok	High
Lalitpur	Devichaur	High
Lalitpur	Dhapakhel	Low
Lalitpur	Dukuchhap	Low
Lalitpur	Ghusel	High
Lalitpur	Gimdi	High
Lalitpur	Godamchaur	Low
Lalitpur	Godawari	High
Lalitpur	Gotikhel	High
Lalitpur	Harisiddhi	Low
Lalitpur	Ikudol	High
Lalitpur	Imadol	Low
Lalitpur	Jharuwarasi	Low
Lalitpur	Kaleshwar	High
Lalitpur	Khokana	Low
Lalitpur	Lalitpur Sub Metropolitan	Low
Lalitpur	Lamatar	High
Lalitpur	Lele	Moderate
Lalitpur	Lubhu	Low
Lalitpur	Malta	High
Lalitpur	Manikhel	High
Lalitpur	Nallu	Moderate
Lalitpur	Pyutar	High
Lalitpur	Sairbu	Low
Lalitpur	Sangkhu	High
Lalitpur	Siddhipur	Low
Lalitpur	Sunakothi	Low
Lalitpur	Thaiba	Low
Lalitpur	Thecho	Low
Lalitpur	Thuladurlung	High
Lalitpur	Tikathali	Low
Sindhupalchok	Sanusirubari	High
Sindhupalchok	Selang	High
Sindhupalchok	Shikharpur	Moderate
Sindhupalchok	Sindhukot	Moderate
Sindhupalchok	Sinpal Kavre	High
Sindhupalchok	Sipapokharae	High
Sindhupalchok	Sunkhani	Moderate
Sindhupalchok	Syaule	High
Sindhupalchok	Talamarang	High
Sindhupalchok	Tatopani	High
Sindhupalchok	Tauthali	High
Sindhupalchok	Tekanpur	Moderate
Sindhupalchok	Thakani	High
Sindhupalchok	Thapalkot	High
Sindhupalchok	Thokarpa	Moderate
Sindhupalchok	Thulo Dhading	Moderate
Sindhupalchok	Thulo Pakhar	Low
Sindhupalchok	Thulo Sirubari	Moderate
Sindhupalchok	Thumpakhar	Moderate
	Yamuna Danda	High