



NEPAL EARTHQUAKE 2015

# Post Disaster Needs Assessment

VOL. B: SECTOR REPORTS



GOVERNMENT OF NEPAL

**NATIONAL PLANNING COMMISSION**

KATHMANDU 2015



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THE PRIME MINISTER

KATHMANDU  
NEPAL

# Message

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This Post Disaster Needs Assessment (PDNA) is the outcome of an exhaustive participatory exercise led by the National Planning Commission (NPC) with generous assistance of national experts and institutions, neighbouring countries and development partners. As a result of the two major earthquakes that struck Nepal on 25 April and 12 May 2015, nearly 9,000 lives and over a half a million homes have been destroyed. This is a colossal loss for an impoverished country like ours at a time when we were focused on attracting investments to put Nepal on a path of high and sustained economic growth.

Though there has been an acute need to augment our capacities, efforts on relief and early recovery have gone on undaunted over the past few weeks. This PDNA exercise was launched simultaneously to take stock of our damage, loss and needs so far. This report now equips us with a well rounded view of the scale of devastation and an outline recovery strategy to chart the course for reconstruction and rehabilitation. The assessment and recovery planning process has paid particular attention to the issue of social inclusion of the most marginalised and vulnerable groups, including women, children, the aged, persons with disabilities.

In the wake of this tragedy also comes an opportunity for us and the international community to put the new Sendai Framework for Disaster Risk Reduction (SFDRR) adopted in March 2015. Three major issues highlighted in SFDRR will play a key role: the concept of 'Build Back Better'; a move away from silos to working on integrated model of recovery which takes into account environmental factors, underlying vulnerabilities and community knowledge; and recognition of the importance of various stakeholders, with particular emphasis on communities themselves.

While the earthquake has severely shaken the country, the people of Nepal are resilient and are already finding ways to rebuild their lives. The months and years ahead will give shape to our vision of a progressive yet eco-sensitive Nepal. I congratulate my colleagues in the National Planning Commission and line ministries, as well as our development partners in achieving the mammoth task of carrying out this PDNA in a very short time through a credible, participatory process. I seek and invite durable national and international partnerships to forge ahead with a program of swift and effective recovery that will pave the way for national economic rejuvenation.

**Sushil Koirala**  
Prime Minister and Chairman  
National Planning Commission



VICE-CHAIRMAN

GOVERNMENT OF NEPAL

**National Planning Commission**

KATHMANDU

## Preface

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The major earthquakes of 25 April and 12 May this year devastated parts of central Nepal. While the country has not faced a disaster of this magnitude for over 80 years, the people are confronting this adversity bravely and proving their resilience to the world. Our immediate neighbours and the global community at large stood in solidarity with us by sending unprecedented volumes of technical, financial and humanitarian aid.

It is now necessary to plan for long-term reconstruction to restore not only lost assets but also to rebuild lives. The challenge ahead is to craft and execute a reconstruction plan that takes into account the aspirations of people as well as the constraints posed by time and funds. The preparation of a comprehensive reconstruction plan needs proper assessment of the damage, loss and recovery needs. The Post Disaster Needs Assessment (PDNA) is based on an agreed upon methodology acceptable to the international community. Conducting PDNA after a disaster is never easy, but after two disasters in succession, it was even more daunting.

The National Planning Commission (NPC) took on this challenging task with the help of all line ministries of the Government, and a core group of development partners led by the United Nations, the World Bank, the Asian Development Bank, the European Union, and the Japan International Cooperation Agency. We also benefited immensely from the regional and global experiences of senior experts from neighbouring countries and other development agencies. More than 250 national and foreign experts worked round the clock to produce this assessment covering 23 sectors in less than one month.

We focused not only on the product, but also on the process. Several rounds of consultations and discus-

sions were held with diverse stakeholders to make the process transparent and participatory. This began with a two day orientation to familiarize stakeholders about the use of PDNA techniques. Consultations were also held with members of parliament, experts on disaster management and heritage conservation, development partners, private sector, civil society, academics, political leaders and the media. The NPC welcomed guidance and critical feedback to ensure that the PDNA is representative and robust. We were clear, however, that the PDNA had to be realistic and credible, and that it ought not evolve into a wish list of long-term wants.

Indeed, we see the PDNA as a living document that will undergo revisions as better data becomes available. It is not a final document cast in concrete. The report has kept in mind what is desirable and what is possible. The objective is to estimate damages and losses and to arrive at estimated needs to mobilize funds and to launch immediate recovery. The next step is to start a detailed damage assessment sector by sector with the purpose of reconstruction. It is then that the more ambitious projects of national significance will dovetail with the findings of the PDNA.

Nepal has grown from strength to strength after every disaster in the past. I have faith in the hard work, determination and resilience of our people. We have the commitment and persistence, but we will also need generous support from friends and institutions within Nepal and from outside.

Hundreds of colleagues worked tirelessly to produce this PDNA in two volumes. My sincere thanks are due to the Members of the National Planning Commission (NPC), officials and staff of the NPC Secretariat and line ministries, and national institutions. I look forward to their continued support in realizing the goals identified in this PDNA report.

**Prof. Dr. Govind Raj Pokharel**



# Foreword

The earthquakes of 25 April and 12 May 2015 have been a terrible calamity for Nepal as they affected almost half of its districts, including hard-to-reach isolated mountainous areas. Approximately 9,000 people lost their lives and more than 22,000 people were injured. As per the latest estimates, more than half a million houses collapsed or are damaged. The scale of destruction is immense. This catastrophe has tested the nation in many ways. Nepal has not experienced a tragedy on such a scale in close to a century. It was a disaster which largely affected rural areas, with the most poor and vulnerable disproportionately impacted.

As long-standing development partners, we extended our complete support to the Government of Nepal. Humanitarian assistance was mobilized from all parts of the world. As a large number of aftershocks were felt, the people were left shaken. They needed help and a steady assurance of safety.

Despite the hardships the people had to face, they showed tremendous resilience and community solidarity. It was as if the people had imbibed the indomitable spirit of the Himalayas. They came together to reclaim their life from the extensive destruction. It was time to come to their assistance for their short and long term recovery.

At the request of the Government of Nepal, a comprehensive assessment of the damages and losses caused by the earthquake was undertaken as the first step towards recovery planning. It helps identify recovery needs as well as strategy required for its implementation. The government requested development partners to provide technical assistance for conducting such an assessment. In a short span of one month, the assessment was conducted under the strong leadership of the National Planning Commission with the participation of various ministries of the Government of Nepal, the private sector and civil society as well as bilateral and international donors and agencies, mobilizing a large number of sector experts. It

became an unprecedented exercise with more than 250 national and international experts participating in it, and assessing damages and losses. On the basis of these findings, they identified recovery needs, developed first cost estimates for these needs and recommended implementation arrangements. Altogether 23 thematic areas were covered, which were grouped under four broad sectors. In terms of richness of data and breadth of analysis it was a remarkable exercise, steered by a highly collaborative arrangement between the National Planning Commission, the development partners and other stakeholders.

We feel a great sense of satisfaction in presenting the PDNA, which has been organised into two volumes. The first volume includes the key findings of the PDNA, while the second volume is a compendium of sector reports. The analysis included in these reports presents a solid foundation for a recovery plan. It represents an excellent beginning upon which the Government of Nepal in a collective effort with the private sector, civil society and international partners can undertake the gigantic task of recovery planning and implementation.

This is just the beginning and we have a long way to go before the people fully recover. But it is possible. In these trying times, we stand united with the Government of Nepal in supporting its recovery efforts. A special orientation towards the poorest and most vulnerable should guide all efforts.

To undertake this arduous journey we are committed to continue this collaboration with the Government of Nepal and other stakeholders in all the sectors included in the PDNA. This offers a unique opportunity to build back better a more resilient and inclusive Nepal that can continue progressing on its development pathway towards a more prosperous democratic country with better opportunities for all.

**Kenichi Yokoyama**  
Country Director  
Asian Development Bank  
Nepal Resident Mission

**H.E. Rensje Teerink,**  
Ambassador, Delegation  
of the European Union  
to Nepal

**Tsutomu Shimizu**  
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Nepal Office

**Jamie McGoldrick**  
UN Resident and  
Humanitarian  
Coordinator, Nepal

**Johannes Zutt**  
Country Director  
World Bank, Nepal

# Acknowledgements

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The Post Disaster Needs Assessment (PDNA) of Nepal Earthquake 2015 is prepared by the National Planning Commission (NPC) of the Government of Nepal (GoN) under the overall leadership of the Honourable Vice Chairman Professor Dr. Govind Raj Pokharel. Honourable Members Professor Dr. Govind Nepal, Dr. Chandra Mani Adhikari and Dr. Swarnim Wagle steered the process of PDNA preparation and provided technical guidance. Sectoral assessments were carried out under the leadership of Honourable Members Dr. Yagya Bahadur Karki, Dr. Bhartendu Mishra, Dr. Prem Prasad Dangal and Dr. Bimala Rai Paudyal. Mr. Lal Shanker Ghimire, Joint Secretary at NPC, served as the Lead Focal Point.

Together with the NPC, the Core Coordination Team included Her Excellency Ms. Rensje Teerink, European Union Ambassador to Nepal; Mr. Jamie McGoldrick, United Nations Resident Coordinator and Resident Representative of United Nations Development Programme; Mr. Renaud Meyer, UNDP Country Director; Mr. Kenichi Yokoyama, Country Director, Asian Development Bank; Mr. Johannes Zutt and Mr. Takuya Kamata, Country Director and Country Manager, respectively, the World Bank; and Mr. Tsutomu Shimizu, Country Representative, Japan International Cooperation Agency.

NPC Member Secretary Mr. Sharada Prasad Trital and Joint Secretaries, Mr. Purushottam Ghimire, Mr. Pushpalal Shakya, Mr. Gopi Nath Mainali, Dr. Teertha Raj Dhakal and Mr. Bishnu Prasad Nepal coordinated and facilitated the sectoral assessments. Mr. Suresh Prakash Acharya, Regional Administrator of Eastern Development Region, and Senior NPC Advisors Mr. Kishore Thapa and Dr. Venkatachalam Thiruppugazh provided substantive inputs throughout the process. His Excellency Mr. Urs Herren, Ambassador of Switzerland to Nepal, helped

convene early discussion on the PDNA process.

Twenty three sector teams and over 250 experts from the Government and development partner agencies undertook an intensive exercise of data collection, field visits and verification in just three weeks, a tight timeline given the scale and magnitude of the disaster. This was possible only because of the excellent cooperation between the Government of Nepal and development partners. The NPC thanks senior officials from all participating ministries for their immense contribution to the PDNA process.

Sector teams headed by GoN Joint Secretaries and experts from lead agencies were guided and supported by the PDNA Secretariat, led by Mr. Krishna S. Vatsa (UNDP), Mr. Hemang Karelia (World Bank) and Mr. S.V. Anil Das (ADB). The Secretariat also comprised experts from the European Union (Mr. Ricardo Zapata-Marti and Mr. Roberto Jovel), and staff representing the United Nations System (Ms. Shairi Mathur, Ms. Cecilia Aipira, and Mr. Julian Schweitzer), the World Bank Group (Mr. Sudyumna Dahal and Mr. James Newman), and the Japan International Cooperation Agency (Ms. Maki Tsumagari). Mr. Andreas Roettger (European Union) and Mr. Rajib Upadhyaya (World Bank) provided overall coordination support. The logistics of PDNA secretariat and workshops were efficiently handled by Ms. Alina Thapa (World Bank). Crucial research inputs were received from Mr. Anshu Sharma and Mr. Nisarg Dave, mapping support was provided by Mr. Prabhat Kumar (UNDP) and Mr. Abyaya Neopane assisted with comprehensive data analysis. Ms. Chitra Padmanabhan and Ms. Sumitra Srinivasan provided editorial assistance for the PDNA report. Special thanks to Mr. Hari Marasini for layout and design of this report.

The NPC is grateful to the Global Facility for Disaster Reduction and Recovery (GFDRR)



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outreach of world-class experts on disaster management.

In this unprecedented exercise, the NPC consulted with a wide range of stakeholders including Members of the Legislature-Parliament, former Ministers, former office bearers of the NPC, political leaders, disaster management experts, and citizens. It received tremendous support from all arms of the government and the society at large: civil servants, security personnel, media, private sector, civil society and academia.

A full list of other contributors to the PDNA report is included in Annex 1. To all the contributors, NPC expresses its deepest gratitude and appreciation.





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# Executive Summary

## Background

Nepal is the 11th most earthquake-prone country in the world.<sup>1</sup> Ever since the first recorded earthquake of 1255 AD that killed one-third of the population of the Kathmandu Valley and its King, Abhaya Malla, Nepal has experienced a major earthquake every few generations. The last great earthquake (of magnitude 8.4) in 1934 AD resulted in more than 10,000 deaths in the Kathmandu Valley. Most of the infrastructure and major heritage sites had to be rebuilt. There have since been earthquakes causing severe human and physical loss in 1980, 1988 and 2011.

On Saturday, 25 April 2015 at 11:56 local time, a 7.6 magnitude earthquake as recorded by Nepal's National Seismological Centre (NSC), struck Barpak in the historic district of Gorkha, about 76 km northwest of Kathmandu. Nepal had not faced a natural shock of comparable magnitude for over 80 years.

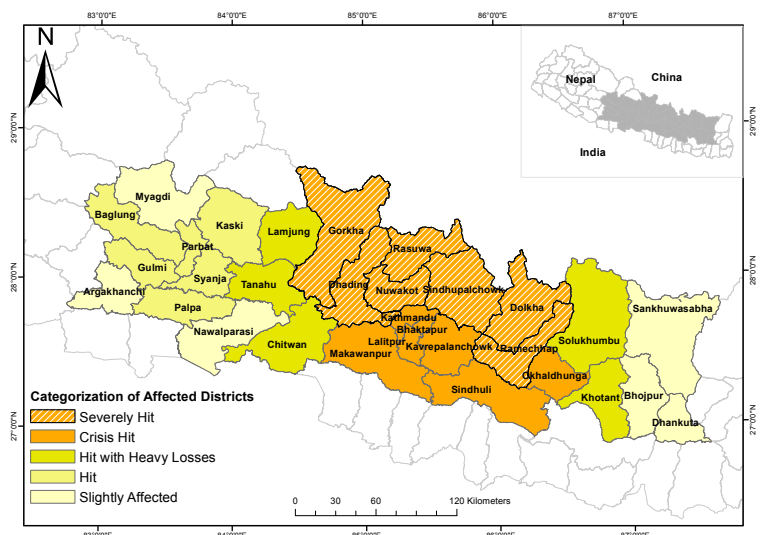
The catastrophic earthquake was followed by more than 300 aftershocks greater than magnitude 4.0 (as of 7 June 2015). Four aftershocks were greater than magnitude 6.0, including one measuring 6.8 which struck 17 days after the first big one with the epicentre near Mount Everest. To date, there are over 8,790 casualties and 22,300 injuries. It is estimated that the lives of eight million people, almost one-third of the population of Nepal, have been impacted by these earthquakes. Thirty-one of the country's 75 districts have been affected, out of which 14 were declared 'crisis-hit' (see Figure 1) for the purpose of prioritizing rescue and relief operations; another 17 neighbouring districts are partially affected.

The destruction was widespread covering residential and government buildings, heritage sites, schools and health posts, rural roads, bridges, water supply systems, agricultural land, trekking routes, hydropower plants and sports facilities. The geodetic network centres including horizontal and vertical control points have been damaged in

a manner that will affect reconstruction planning. Rural areas in the central and western regions were particularly devastated and further isolated due to road damage and obstructions. In the worst hit areas, entire settlements, including popular tourist destinations like Langtang, were swept away by landslides and avalanches triggered by the earthquakes. Due to the weakened, ruptured, and destabilized slopes and surfaces, the vulnerable areas have now become even more susceptible to flooding and landslides that can occur during the monsoon.<sup>2</sup>

Hundreds of historical and cultural monuments at least a century old were either destroyed or extensively damaged. Over half a million houses were destroyed. The damage exposed the weaknesses of houses that did not have any seismic-resistant features or were not in accordance with the building codes. The disaster also highlighted aspects of inequities in Nepali society spanning geography, income and gender. Poorer rural areas have been more adversely affected than towns and cities due to their inferior quality of houses. More women and girls died than men and boys, partly because

**FIGURE 1: CATEGORIES OF EARTHQUAKE-AFFECTED DISTRICTS**



Source: GoN/MoHA as of 21 May 2015

<sup>1</sup> UNDP (2009)

<sup>2</sup> American Geophysical Union.



of gendered roles that disproportionately assign indoor chores to women.

The time and day the first earthquake was experienced saved thousands of lives. Being a Saturday, the weekly holiday, schools across Nepal were closed on 25 April. The death toll of young people could have been much higher considering that nearly 7,000 schools were completely or significantly damaged. Similarly, if the earthquake had struck at night, and not in the middle of the day, there would certainly have been greater casualties.

### Relief Operations and External Assistance

The Government of Nepal (GoN) made an official request for international assistance within hours of the 25 April earthquake. Nepal's National Disaster Response Framework (NDRF) served as a key tool for coordination of earthquake response, facilitating decisions and instructions from the central government. The first meeting of the Central Disaster Relief Committee (CDRC) was held two hours after the first earthquake, with the National Emergency Operation Centre (NEOC) providing an initial report to the CDRC recommending a focus on Search and Rescue (SAR), and lifesaving actions. Financial resources from the Prime Minister's Disaster Relief Fund were immediately allocated, and the government's Cluster mechanisms, comprising 11 sectors, were instantly activated.

Several donor meetings were convened to seek international assistance for search and rescue and immediate relief operations. Though Nepal did not have an integrated national search and rescue capacity formed prior to the event, the trained human resource of the Nepal Army (NA), Nepal Police (NP) and Armed Police Force (APF) carried out effective SAR, despite several limitations. The Indian National Disaster Response Force (NDRF), Indian Air Force and Indian Army Medical Corps were the first foreign contingents to land in Kathmandu within hours of the disaster to help launch relief operations.

Over time, 134 international SAR teams from 34 countries responded to Nepal's request for help. The Ministry of Home Affairs (MoHA) reported that "for SAR, 4,236 helicopter flights were used (GoN/private), with 7,558 persons

rescued by air and 4,689 persons rescued by land." More than 90 percent of the security forces were mobilized to focus on SAR. Overall, 22,500 civil servants, 65,059 staff of the Nepal Army, 41,776 staff of Nepal Police and 24,775 staff of the Armed Police Force, as well as 4,000 government and private health workers were mobilized to aid rescue and relief efforts.

Emergency relief and humanitarian assistance to the affected population was provided with the active support of and contribution by over 60 countries as well as the United Nations and other international agencies. Fixed wing and rotary aircrafts from friendly countries were engaged in carrying out numerous sorties to bring relief supplies into the country and to distribute them in remote areas. A newly constructed humanitarian staging area at the Tribhuvan International Airport (TIA) facilitated the receipt of cargo by air and by truck immediately after the earthquake so that distribution around the country could commence.

A UN flash appeal for support was launched on 29 April 2015 for a sum of US\$ 422 million to meet critical humanitarian needs for the following three months. Till date, US\$ 129.1 million or 31 percent of the appeal has been met.<sup>3</sup>

Transit shelters were established immediately in Kathmandu with official support in designated public spaces. However, the supply of non-food items, particularly tarpaulins, proved inadequate as the fear of being trapped drove many families, including those whose houses had not been damaged, to seek temporary shelter in the open.

As is typical in disasters, community members particularly youths were galvanized into action, digging out neighbours from the rubble, and providing whatever assistance they could before the arrival of rescue and relief teams. Local governments were also hamstrung, having been under-staffed for years and working without any elected officials. Many local authorities lost family members and their houses were destroyed as well. Furthermore, the remoteness of several villages in the affected areas, coupled with poor weather, hampered relief operations during the initial days. Many district level offices providing public services were severely damaged or reduced to rubble, as a result of which many of-

*The death toll of young people could have been much higher considering that nearly 7,000 schools were completely or significantly damaged*

ficials started functioning out of tents and temporary shelters.

The network of NGOs and local affiliates of INGOs based in Nepal swiftly rallied to support community rescue and relief efforts. Several volunteer groups, especially of youth and professionals like doctors and engineers, were active in treating the wounded, setting up temporary shelters, supplying food and attending to vital needs.

### Disaster Effects

The humanitarian challenge became immediately apparent as millions of people whose houses were either destroyed and those who were fearful of imminent aftershocks started camping out

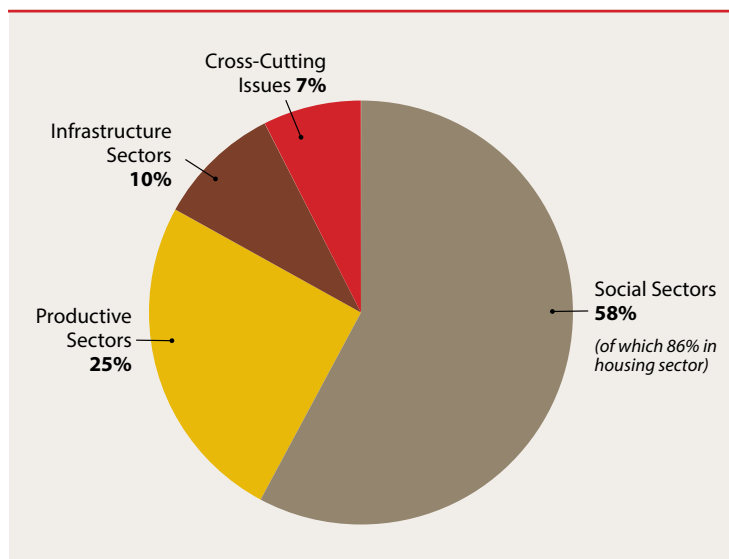
in the open. This put a tremendous demand on the government and philanthropic associations for materials to erect makeshift shelters and to supply essentials. More than a month after the disaster, tens of thousands of people are still reported to be living either in temporary or transitional shelters in spaces presumed to be safe from landslide and rain. The distribution of relief materials proved challenging because of the remoteness of many villages, rugged terrain, threat of landslides, and logistical difficulties. In the earliest days, when the coordinating authority of the District Administration Offices had yet to be fully asserted, there were also duplication and imbalance in the supply of relief materials benefiting the more accessible villages disproportionately.

**TABLE 1. SUMMARY OF DISASTER EFFECTS**

	Disaster Effects (NPR million)			Distribution of Disaster Effects (NPR million)		Losses in personal income (NPR million)
	Damages	Losses	Total	Private	Public	
<b>Social Sectors</b>	<b>355,028</b>	<b>53,597</b>	<b>408,625</b>	<b>363,248</b>	<b>45,377</b>	-
Housing and Human Settlements	303,632	46,908	350,540	350,540	-	-
Health	6,422	1,122	7,544	1,394	6,150	-
Education	28,064	3,254	31,318	2,365	28,953	-
Cultural Heritage	16,910	2,313	19,223	8,948	10,274	-
<b>Productive Sectors</b>	<b>58,074</b>	<b>120,046</b>	<b>178,121</b>	<b>158,079</b>	<b>20,043</b>	<b>17,124</b>
Agriculture	16,405	11,962	28,366	25,813	2,553	4,603
Irrigation	383	-	383	-	383	-
Commerce	9,015	7,938	16,953	16,953	-	2,667
Industry	8,394	10,877	19,271	19,271	-	3,654
Tourism	18,863	62,379	81,242	75,105	6,137	6,200
Finance	5,015	26,890	31,905	20,937	10,969	-
<b>Infrastructure Sectors</b>	<b>52,460</b>	<b>14,323</b>	<b>66,783</b>	<b>17,281</b>	<b>49,502</b>	
Electricity	17,807	3,435	21,242	15,569	5,673	-
Communications	3,610	5,085	8,695	1,712	6,983	-
Community Infrastructure	3,349	-	3,349	-	3,349	-
Transport	17,188	4,930	22,118	-	22,118	-
Water and Sanitation	10,506	873	11,379	-	11,379	-
<b>Cross-Cutting Issues</b>	<b>51,872</b>	<b>1,061</b>	<b>52,933</b>	<b>1,755</b>	<b>51,178</b>	-
Governance	18,757	-	18,757	-	18,757	-
Disaster Risk Reduction	155	-	155	-	155	-
Environment and Forestry	32,960	1,061	34,021	1,755	32,267	-
<b>Total</b>	<b>517,434</b>	<b>189,027</b>	<b>706,461</b>	<b>540,362</b>	<b>166,100</b>	<b>17,124</b>
<b>Total (US\$ million)</b>	<b>\$5,174</b>	<b>\$1,890</b>	<b>\$7,065</b>	<b>\$5,404</b>	<b>\$1,661</b>	<b>\$171</b>

Source: Estimations by PDNA Team

**FIGURE 2: SHARE OF DISASTER EFFECTS ACROSS SECTORS**



Source: Estimations by PDNA Team

Subsistence-based households are badly affected in rural areas as the earthquake hit Nepal only a few weeks prior to the start of the paddy planting season. An overwhelming majority of the estimated losses and damages have been to private property such as residential buildings, commercial buildings, farmland, and livestock. Public property, such as roads, schools, utilities, heritage monuments, and hospitals, have also suffered damage in severely affected districts. According to UNFPA, about a million children and more than 1.4 million females of reproductive age live in the 14 districts; and approximately 138,000 of the female population are or will be pregnant in the next 12 months. Of this figure, 18,600 will need obstetric care.

*It is estimated that the total value of disaster effects (damages and losses) caused by the earthquakes is NPR 706 billion or its equivalent of US\$ 7 billion*

It is estimated that the total value of disaster effects (damages and losses) caused by the earthquakes is NPR 706 billion or its equivalent of US\$ 7 billion. Of that amount, NPR 517 billion (or 76 percent of the total effects) represents the value of destroyed physical assets, and NPR 189 billion (24 percent of the total effects) reflects the losses and higher costs of production of goods and services arising from the disaster (see Table 1). These estimates are based on the aggregation of information and data collected across sectors of social and economic activity and checked to avoid duplication of numbers.

The relative distribution of effects, that is, damages versus losses – is typical of disasters caused

by natural events of geological origin, whereby the larger fraction of disaster effects represents the destruction of physical and durable assets.

The share of estimated total disaster effects among the main sectors of social and economic activity (see Figure 2) reveals that the most affected are social sectors (58 percent of the total effects), which includes housing. This is followed by productive sectors (25 percent), infrastructure (10 percent) and cross-cutting issues (7 percent).

When considering individual sectors of social and economic activity, the distribution of disaster effects provides direction to the recovery and reconstruction strategy (see Figure 3). The most affected sector, housing and settlements, sustained about 50 percent of the destruction and production decline caused by the disaster, followed by tourism at 11 percent. The environment, education, finance and agriculture sectors represent between 4-5 percent each of the total disaster effects.

The effects of the disasters illustrate that the estimated value of total damages and losses (changes in flows) is equivalent to about one third of the Gross Domestic Product (GDP) in FY 2013-2014. In addition, the estimated value of damage is equivalent to more than 100 percent of the Gross Fixed Capital Formation (GFCF) for FY 2013-2014. To put it differently, if all other capital formation activities were stopped, it would take Nepal more than one year to rebuild the fixed capital that was destroyed by the earthquakes. Furthermore, the estimated production losses represents about 10 percent of the added value of all goods and services produced in one year in the country, which will result in a slow-down of the economy in the short term, despite the fact that the estimated losses for some sectors like cultural heritage and environment, among others, would unfold over several years.

Disaster effects are spread unevenly between public and private sectors. The private sector has sustained about 3.3 times the value of damages and losses in comparison with the public sector (see Figure 4), which provides a first indication of the relative efforts that each sector must invest during recovery and reconstruction. While the government plans to utilize most of its resources to assist the poorer strata and rural population



to revive the social and productive sectors, it is critical to ensure availability of finance through banking and non-banking institutions including cooperatives for the recovery of the private sector.

With the exception of the Kathmandu Valley, the central and western regions that have been affected by the earthquake are essentially rural. They are heavily dependent on agriculture for livelihood, which the earthquakes and the ensuing landslides have damaged. Furthermore, these districts have a generally higher per unit livestock than the national average, indicating that the widespread loss of livestock, which is another main source of income for rural households, will potentially cause a severe income shock in the short term. Some of the affected districts such as Gorkha have a skewed female population due to male out-migration, which means women will take on a larger responsibility of rebuilding sectors like agriculture and livestock. These rural districts also face a wide revenue-expenditure gap, suggesting the need for transfer of funds to meet the local development and reconstruction tasks in the years ahead. Further, they account for about 20 percent of strategic road networks and 23 percent of total

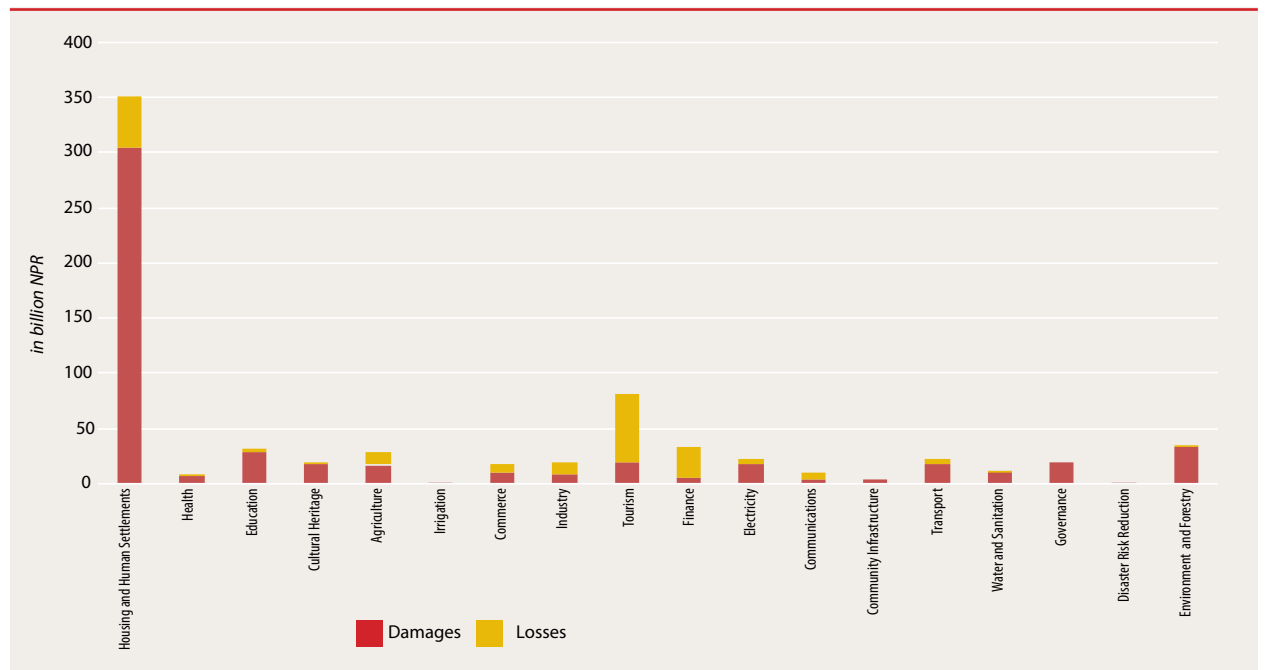
schools. About a quarter of total hydroelectricity generated in the country is also affected by the earthquake.

The 14 worst-affected districts have a particularly high absentee population, which migrates overseas for jobs, and their remittances constitute an important share of household incomes. Tens of thousands of workers have returned from overseas to help reconstruct their houses in the quake-affected areas. The enhancement of entrepreneurial skills and physical connectivity of the affected areas to market centres, within and outside the district headquarters, is critical, considering that the severely affected districts together account for 30 percent of the total cottage industries in the country. Restoration as well as rebuilding of earthquake-resistant school buildings and community centres will also be equally important to support both learning in a secure environment and to help the local authorities to efficiently manage resources and relief operations at times of emergency.

### Poverty and Human Development

Consumption based poverty – defined as the percentage of Nepalis living below the national

**FIGURE 3: DISASTER EFFECTS ACROSS SECTORS**



Source: Estimations by PDNA Team

*The earthquakes will end up pushing an additional 2.5 to 3.5 percent Nepalis into poverty in 2015-2016 which translates into at least 700,000 additional poor*

poverty line of Rs.19,261 (per person per year) – stood at 25.2 percent in FY 2010-2011 which represents a spectacular decline from when poverty was measured using similar data in FY 1995-1996. However, the earthquake has exposed one of the weaker aspects of the poverty reduction experience in the country, namely the high degree of vulnerability.

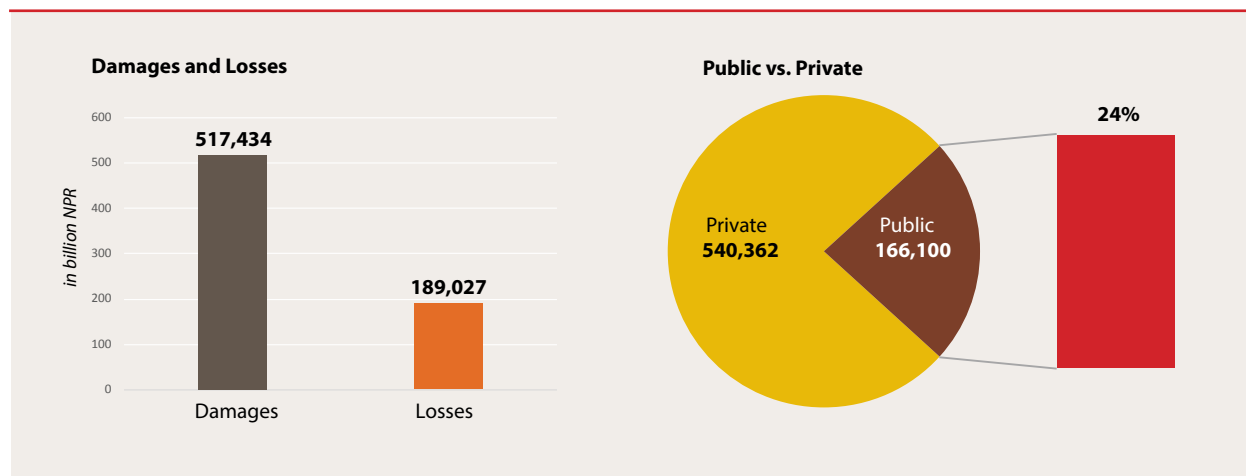
Preliminary assessment of incidence and impact suggests that the earthquakes have disproportionately affected the poorer, rural locations relative to the urban and less poor areas. Even within the relatively prosperous areas that have been affected, for example the Kathmandu Valley, households that were already either poor or vulnerable have been particularly exposed. According to the World Bank’s simulations, the earthquakes will end up pushing an additional 2.5 to 3.5 percent Nepalis into poverty in FY 2015-2016 which translates into at least 700,000 additional poor. Roughly 50 to 70 percent of the increase in poverty will come from rural central hills and mountains where overall vulnerability prior to the earthquake was already high. Additionally, the deterioration of water and sanitation services, disruption of schools and health services, and the possible increase in food insecurity may lead to a bigger impact on multidimensional poverty.

Nine of the 14 severely affected districts have human development index (HDI) scores lower than the national average, indicating their lag-

ging status in average income, education and health outcomes. The population in the lowest two income quintiles is likely to be particularly affected. The loss of poorly built residential houses, farmland and livestock will amplify the income shock and push poor households below the poverty line for an extended period if reconstruction and rehabilitation activities are delayed. The geographical disaggregation of disaster effects will have negative impacts on individual households, decreasing personal capital and incomes. Such impact includes losses in equivalent employment and in imputed personal income to the tune of NPR 17,124 million (see Table 1). Further, an analysis of the data for each affected district, in combination with the data on population, reveals that the average values of disaster effects per person range from a high of NPR 255,860 per person in Dolakha to NPR 43,800 in Makawanpur, with an average of NPR 130,000 per person across the 14 most-affected districts (see Table 2).

The pre-disaster HDI in the country was 0.491. The data included in Table 2 reveals that the poorer population residing in the six lowest-HDI districts that witnessed disaster effects above NPR 130,000 per person are in Dolakha, Sindhupalchowk, Gorkha, Nuwakot, Rasuwa and Dhading, which confirms that the poorest and the most vulnerable people usually sustain the worst impact of disasters. Further, the inhabitants in the higher-HDI districts of Kathmandu, Lalitpur, Bhaktapur, Kavrepalanchowk

**FIGURE 4: DISTRIBUTION OF DISASTER EFFECTS**



Source: Estimations by PDNA Team

and Makawanpur sustained disaster effects lower than the average value of NPR 130,000 per person. These facts, coupled with the distinction between the urban and rural economy of such districts, need to be taken into consideration in the formulation of the recovery and reconstruction strategy in view of the differential impact felt by the population of each district.

### Gender Equality and Social Inclusion

The disadvantaged social groups in the poorer districts have suffered the largest damage and loss. The majority of the agricultural and informal sector workers are female due to the low capital entry requirement of the informal sector and lack of livelihood options. The widespread loss of food stocks, potential loss in crop productivity and loss of livestock as well as small scale enterprises will likely cause a severe income shock for women who rely on this sector.

A narrow asset base, burden of domestic work, limited access to economic resources combined with the lack of alternate livelihoods also mean that recovery for women may take longer than for men who have more livelihood options. Dalits and other marginalized groups, and people living in remote geographical regions who are already deprived of access to social services, will face similar challenges.

The housing sector, which is the hardest hit, has a bearing on gender equality and social inclusion. Women, Dalits and some ethnic groups have limited ownership of land, which could hinder their participation in the housing recovery programme and the benefits accruing from them. Senior citizens, female-headed households and people living with disabilities (PLWDs) have also been heavily affected as many do not have the means to reconstruct their houses.

The destruction of water supply and sanitation facilities will have a direct negative impact on women and girls as they will now have to fetch water from greater distance. The work burden on women, and the disproportionate cost borne by them in the household economy, not only limits the time they can spend in economic activities but restricts them spatially and culturally

**TABLE 2. PER CAPITA DISASTER EFFECTS AND PRE-DISASTER HDI IN MOST-AFFECTED DISTRICTS**

District	Per capita Disaster Effects, NPR/person	HDI
Dolakha	255,860	0.459
Sindhupalchowk	233,370	0.455
Gorkha	209,080	0.481
Nuwakot	204,930	0.466
Rasuwa	179,700	0.461
Dhading	149,580	0.461
Kavrepalanchowk	119,200	0.520
Ramechhap	112,740	0.468
Bhaktapur	78,770	0.573
Okhaldhunga	74,500	0.468
Sindhuli	57,865	0.440
Lalitpur	52,765	0.601
Kathmandu	49,495	0.632
Makawanpur	43,760	0.497

Source: Estimations by PDNA Team and UNDP

to activities that are compatible with their domestic obligations.

Families are deploying different coping mechanisms to deal with the disaster, including distress sales of assets and receipt of remittances. However, for vulnerable families, the loss of assets combined with the loss of family protection, and desperation for alternate livelihoods could have disastrous consequences on women, girls and children who may face heightened risk of sexual and gender-based violence, human trafficking, child marriage, and child labour.

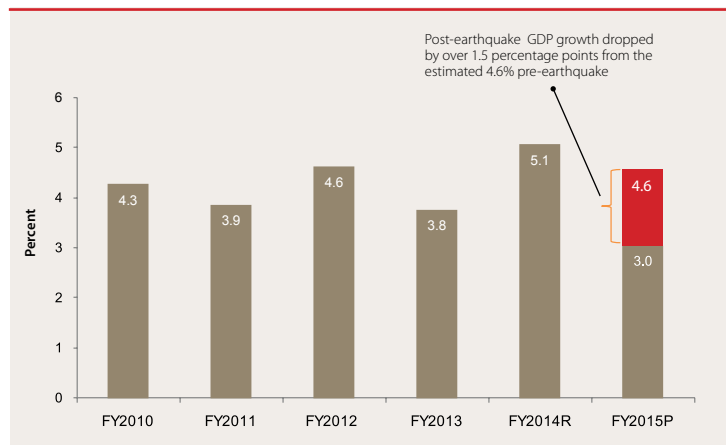
### Macroeconomic Impact

After decades of political instability, Nepal had begun gearing up for a higher trajectory of economic growth. The earthquake upsets the nation's high aspirations for swifter economic progress in the short run.

#### REAL SECTOR

Annual economic growth in FY 2014-2015 is expected to be the lowest in eight years, at 3 percent (basic prices). The earthquakes suppressed an earlier projection of 4.6 percent by over 1.5 points (see Figure 5). Compared to FY 2013-

**FIGURE 5: IMPACT ON GDP GROWTH**



Source: CBS  
 Note 1: R (revised); P (projected)

2014, when growth exceeded 5 percent, the lost momentum through foregone production in just less than three months (between late April and mid-July 2015), valued at NPR 52 billion, is a major setback.<sup>4</sup> The losses will continue to accumulate during FY 2015-2016 and beyond until major sectors recover fully.

The economic activity that has been the hardest hit is that of real estate, renting and business services, with annual growth projection revised downwards from 4.8 percent to 0.8 percent. There has been a massive destruction of owner-occupied dwellings<sup>5</sup> and public assets worth over NPR 300 billion. Partly because of their exposure to residential finance and real estate, the banking and financial institutions (BFIs) are likely to see modest deterioration in the quality of loan portfolios, impacting the solvency of institutions, micro and large, and the overall flow of credit. The insurance sector faces claims exceeding NPR 16 billion; a large share of this is re-insured abroad, but local liability remains substantial.

In agriculture, the harvest of rice and maize had already been disappointing. What the earthquakes did additionally was to destroy the stockpile of stored grains and devastate the livestock sector, which accounts for over 23 percent of value added in agriculture. The loss of over 17,000 cattle and about 40,000 smaller, domesticated animals has resulted in the downward revision of the projected growth in agriculture from 2.2 percent to 1.8 percent this year.

**Annual economic growth in FY 2014-2015 is expected to be the lowest in eight years, at 3 percent (basic prices)**

In services, tourism has been adversely affected with every nine in ten planned foreign arrivals cancelled in the aftermath of the quakes which occurred during the first of the two major seasons of the year. The main earthquake and prolonged aftershocks caused damage to seven out of 10 World Heritage sites in the Kathmandu Valley and affected popular trekking routes. Destroyed tourism-related supply of services and decreased tourist spending are likely to lead to a loss of NPR 62 billion over the next two years. Conditional on low or no seismic activity over the coming months, tourism can rebound somewhat by the autumn, and strongly by next spring's climbing season.

In the social sectors, education is expected to record slower growth because of disruptions spanning several weeks, while the health services sector has recorded a modest uptick in its growth even though it accounts for only 1.7 percent of GDP. The largest contributor to value addition in services comes from the wholesale and retail (trading) industries. There has been an estimated decrease of about NPR 7 billion in the tradable 'margin' of goods after the earthquake within FY 2014-2015. Women are emerging as traders in Nepal, and might have been disproportionately affected in some sectors. Of the 19 export products prioritized in the national trade integration strategy of 2010, women are the primary producers of more than half of them.

A majority of the large manufacturing industries located in the plains were not directly affected. But they have felt the externalities of falling national demand and fleeing workers. Private construction in the immediate aftermath of the quakes came to a halt. In the FY 2015-2016, however, labour demand for demolition, clearing of debris, and reconstruction of destroyed and damaged dwellings and other physical infrastructure will grow. This will increase demand and earnings for skilled and unskilled labour in ancillary industries.

In the electricity sector, as a result of increased water flow, there has been no notable drop in power production after the earthquakes even though about 115 MW of hydropower facilities are estimated to have sustained damage. All the transmission facilities are in operation. How-

<sup>4</sup> The economic impact on GDP, estimated at NPR 31 billion (in basic price), is the difference between the Gross Value Added estimated just prior to the earthquake on April 22 and the revised projection of June 6.  
<sup>5</sup> The System of National Accounts (SNA) 1993 defines services of owner-occupied dwellings as "own household unincorporated enterprises that produce housing services for their own consumption." These are included within the production boundary of the SNA.

**TABLE 3. SUMMARY OF TOTAL NEEDS**

SECTOR	Total Needs (NPR million)	Total Needs (US\$ million)	Share of Needs by Sector
<b>Social Sectors</b>	<b>407,747</b>	<b>4,077</b>	<b>60.9%</b>
Housing	327,762	3,278	49.0%
Health	14,690	147	2.2%
Nutrition	5,036	50	0.8%
Education	39,706	397	5.9%
Cultural Heritage	20,553	206	3.1%
<b>Productive Sectors</b>	<b>115,618</b>	<b>1,156</b>	<b>17.3%</b>
Agriculture	15,561	156	2.3%
Irrigation	467	5	0.1%
Commerce	20,051	201	3.0%
Industry	7,357	74	1.1%
Tourism	38,710	387	5.8%
Finance	33,472	335	5.0%
<b>Infrastructure Sectors</b>	<b>74,266</b>	<b>743</b>	<b>11.1%</b>
Electricity	18,586	186	2.8%
Communications	4,939	49	0.7%
Community Infrastructure	4,450	45	0.7%
Transport	28,185	282	4.2%
Water and Sanitation	18,106	181	2.7%
<b>Cross-Cutting Issues</b>	<b>71,873</b>	<b>719</b>	<b>10.7%</b>
Governance	18,442	184	2.8%
Disaster Risk Reduction	8,204	82	1.2%
Environment and Forestry	25,197	252	3.8%
Employment and Livelihoods	12,547	125	1.9%
Social Protection	6,398	64	1.0%
Gender and Social Inclusion	1,086	11	0.2%
<b>Total</b>	<b>669,505</b>	<b>6,695</b>	

Source: Estimations by PDNA Team

ever, about 800 km of distribution lines at different voltage levels and 365 transformers at different capacity are out of service. For generation plants under construction, about 1,000 MW of hydropower projects, owned both by independent power producers and the Nepal Electricity Authority, have been partially damaged.

#### FISCAL AND MONETARY SECTORS

Public revenues have taken a direct hit in the aftermath of the quake. It is now certain that the target for revenue collection in the current fiscal year, of NPR 423 billion, will not be met. With only NPR 390 billion expected to be raised by

mid-July 2015, there will be a shortfall of about 8 percent. This sets up a much lower base for FY 2015-2016, where the target now is to raise only between NPR 460 and NPR 480 billion against a projection of NPR 512 billion prior to the earthquake. Of the five major sources, customs and those deemed non-tax revenue have seen the largest drop in collection. This is because of reduced imports, including luxurious items such as motorized vehicles. A preliminary debt sustainability analysis indicates that Nepal may be able to maintain its current low debt distress rating. However, close monitoring and concessional support will be needed to cope with the upward pressure.

Broad money is not expected to grow by more than 17.5 percent and inflation is expected to be contained within single digits during FY 2014-2015. However, the differences in sector specific inflation rates will be amplified going forward as demand for reconstruction inputs increase. In FY 2015-2016, as a result of an expansionary budget, and, likely supply-side bottlenecks, an inflationary pressure is expected to build up further. There will also be an upward pressure on wages of both skilled and unskilled workers.

**EXTERNAL SECTOR**

As a result of the earthquake, export-oriented industries have been damaged. Further, domestic consumption of items that are normally exported have increased, reducing estimated exports by about 6 percent, as compared with the previous year. Imports are likely to expand as a result of increased demand for machinery parts, food, medicines, and construction materials. The fall in the world price of petroleum products checked the growth in import bills this year.

There is an expected surge in both international transfers and remittances. However, the trade imbalance will worsen this year and the next. Exports are unlikely to pick up rapidly because of the uncertain investment climate. Imports are expected to grow by about 18 percent in FY 2015-2016.

Overall, the narrative of the Nepali economy is one that has struggled with the challenge of triggering sustained growth, yet was supported by a reasonably comfortable fiscal space and balance of payments (BoP). With the need for rehabilitation and reconstruction looming large, the challenge ahead is to garner resources from within and abroad in a manner that does not strain macro-prudential norms and disciplines on internal and external borrowing. The recently secured consensus among the largest political parties to promulgate a new constitution at the earliest adds optimism to efforts aimed at restoring the trajectory of higher economic growth. A push towards economic reforms has to continue so that the investment climate is friendlier.

**Financial Requirements**

The nation will require substantial external assistance to meet the rehabilitation and reconstruction costs, estimated to be at least NPR 669 billion or

US\$ 6.7 billion (see Table 3) over a number of years depending on the sector. Furthermore, the government's revenue growth has slowed down in the short term, as a result of disrupted business activities. The slack in aggregate demand coming from the private sector and the costs to rehabilitate and reconstruct public goods such as schools, hospitals, heritage monuments, roads, energy projects, and water supply systems, among others, will exert substantial pressure on public finances as will announced subsidies to private home owners. There are limits to internal borrowing. To finance the rehabilitation and reconstruction cost, the government has set up a National Reconstruction Fund of NPR 200 billion, to which it has already committed NPR 20 billion.

**Towards Resilience**

**DISASTER RISK REDUCTION AND BUILD BACK BETTER**

In the recovery and reconstruction phase it is critical to prevent actions that end up creating disaster risks by increasing public awareness, and investing in the principle of Build Back Better (BBB). Noting the limited priority and resources given to Disaster Risk Reduction (DRR) prior to the earthquake, improvements are urgently needed in the DRR system in Nepal in the short (up to one year), medium (two to three years), and long (four to five years) term to enhance the resilience of the country.

Short-term priorities include:

- reconstruction of damaged DRR assets and improvements on BBB principle;
- measures to improve preparedness, response, relief and logistics systems;
- measures to strengthen information and communication capacities for relief, response and recovery; and
- measures to enhance multi-hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness.

Medium to long term priorities include:

- improvements in legal and institutional arrangements;
- measures to mainstream DRR into the developmental sector, particularly housing, private and public infrastructure, social sectors (health and education), and livelihood; and
- measures to improve integration of climate change adaptation and DRR.

*The recently secured political consensus to promulgate a new constitution at the earliest adds optimism towards restoring the trajectory of higher economic growth*



The government will develop a seismic policy and set up a network for seismic monitoring throughout the country, and promote seismological research. The policy will include the revision of building codes, development of building by-laws for all municipal areas, application of Mandatory Rule of Thumb (MRT) in rural areas, and development of risk-sensitive land use plans for all the municipalities of the country. The recovery programme must make Nepal more earthquake-resistant. Along with seismic policies, the government will implement a number of DRR measures targeting secondary disasters. It will undertake risk assessment which provides a basis for mitigation measures at the community level. As part of the recovery programme, the government will support early warning and preparedness measures and support strengthening and retrofitting of schools and hospitals that are critical to risk reduction in Nepal. To effectively mainstream DRR in development planning, the government will also undertake a number of measures to strengthen disaster risk governance.

#### **PATHWAYS TO RECOVERY**

As the earthquakes in Nepal have left a large part of the country shaken, the need for recovery is immediate and urgent. People have already initiated their efforts for recovery, and they expect the government to help in the process as quickly as possible. As the government prepares to develop a large-scale recovery programme on the basis of the PDNA results, there is a widely shared realization that it has to be a multi-pronged effort with a strong orientation towards the poorest and the most vulnerable. While the government would plan, organize and facilitate the recovery programme, it has to be supported by other sectors of Nepali society and economy— the private sector, NGOs, and international development partners.

The total recovery needs of NPR 669 billion or US\$ 6.7 billion take into account the cost of reconstruction with better specifications, equipment, improved governance and risk reduction. While calculating the recovery needs, it does not consider the replacement value, particularly with respect to the housing sector. It specifies a core house with a minimum area as the recovery need, and estimates the total needs on the basis of the cost of construction per square feet.

In view of exceptionally huge recovery needs, the government would need to undertake a sustained effort to mobilize financial resources. As is the case in most recovery programmes, the resources would be pooled through several windows of funding: own resource mobilization including budgetary reallocations, grants from multilateral and bilateral agencies, contributions from the private sector and citizens, loans from IFIs, and reallocations from existing project portfolios. The resources would be pooled in a way that it would keep the debt ratio within manageable levels, and utilize grants assistance to the extent possible.

A recovery programme involves implementing a large number of activities in a relatively short period of time, which requires enormous preparation in institutional, financial and logistical terms to support implementation. It also calls for relevant technologies, regulations, and innovations to meet the demands arising from the extremely dynamic context of the recovery programme. The objective is to promote the principle of BBB in recovery and reconstruction. Given the recurrence of disasters and vulnerability of the country, it is only appropriate that recovery and reconstruction should be implemented in a way that it contributes to the resilience of the country, reflected in its economy, social cohesion and governance.

There are several aspects of recovery which can be implemented only by developing a national consensus. Strong political will, sustained resource mobilization and continuous dialogue with the affected people, are among the most important prerequisites of a recovery programme. The provision of income generating activities, skills development and community mobilization are catalytic for swift recovery and enhanced resilience. In addition to existing institutional arrangements of the government's social assistance programme for vulnerable groups, cash transfers will be essential to support vulnerable single women and widows, PLWDs, Dalits, disadvantaged groups, and children from households that have suffered catastrophic economic losses.

Women and marginalized groups have unique capacities to drive resilience building of communities, given the right support. Overall, women's dominance in the agricultural and informal sector means that they will play a critical

*Strong political will, sustained resource mobilization and continuous dialogue with the affected people, are among the most important prerequisites of a recovery programme*

*Nepal also needs to tap unconventional assets at its disposal such as the growing financial and technical clout of the diaspora, skills of temporary migrants, the spirit of volunteerism of its youth at home and abroad, and new sources of philanthropy*

role in the recovery and rebuilding of Nepal if supported appropriately. Equitable economic growth can lead them out of their disadvantaged conditions, increase resilience and lead to higher rates of economic growth. Post-disaster recovery will therefore be more effective and sustainable if gender equality and social inclusion are acknowledged as one of the key guiding principles of implementation.

The recovery strategy would have special focus on the restoration and reconstruction of all damaged and collapsed historic buildings including refurbishment of cultural institutions and museums. Expertise is needed in the fields of structural and seismic engineering, architecture and conservation as well as other areas related to preserving cultural heritage. It will be imperative to rope in specialists in intangible heritage such as anthropologists, art historians, linguists, ethno-musicologists, among others, to investigate losses and help communities identify ways to revitalize their traditions. The impact of investing generously in the preservation and conservation of Nepal's cultural heritage,

including capacity building and upgrading of skills and knowledge, will have a positive effect on the intangible culture.

While the earthquake recovery in Nepal will draw upon all the good practices followed in other recovery programmes in South Asia and elsewhere, it has to be developed and implemented in a way that is uniquely Nepali. The people of Nepal have demonstrated considerable resilience in coping with many adversities. Nepal also has a lot of experience in recovery and reconstruction following natural disasters and conflicts in the country. The government will draw upon its own national experiences and resources to support recovery and develop institutions, pools of resources and practices to implement recovery, knowing that the challenges of difficult terrain can be handled by creating strong social capital and effective local governance. Nepal also needs to tap unconventional assets at its disposal such as the growing financial and technical clout of the diaspora, skills of temporary migrants, the spirit of volunteerism of its youth at home and abroad, and new sources of philanthropy.



# Post Disaster Needs Assessment: Process and Methodology

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## Process

Within three days of the second earthquake on 12 May 2015, the Government of Nepal convened a meeting of local development partners and called for a Post Disaster Needs Assessment (PDNA) to be carried out under the leadership of the National Planning Commission (NPC). The purpose was to assess the impact of the disaster and define a recovery strategy, including its funding implications, for the restoration of livelihoods, economy and services, rehabilitation and reconstruction of housing and infrastructure to ensure a resilient recovery. The PDNA follows a methodology jointly developed by the European Union, the World Bank and the UN system that incorporates a collection of analytical methods, tools and techniques developed for post-disaster assessments and recovery planning, ensuring sector to sector comparability and homogeneity in the definition of basic concepts of damages, losses and post-disaster recovery needs. The assessment builds on the initial and detailed sector damage assessments undertaken by central and local governments and the clusters established by the government with support from development partners.

A high-level oversight mechanism was set up at the NPC under the leadership of its Vice Chairman, directly assisted by a core group of NPC Members to oversee the preparation of PDNA. Other Members in charge of specific sectors assumed a lead role in coordinating and overseeing the assessment of their respective portfolios. In addition, the NPC also invited a team of distinguished advisors embedded in its Secretariat from Nepal and abroad.

A Core Coordination Team was constituted under the leadership of the NPC, including Heads of Agencies from the following donor partners: the Asian Development Bank (ADB), the European Union (EU), the United Nations (UN/UNDP), the World Bank (WB) and the Japan International Cooperation Agency (JICA). Rep-

resentatives from these agencies formed the core PDNA Secretariat providing daily guidance to the assessment teams.

Following a two-day workshop on the methodology and scope of the PDNA, over 250 officials and experts from the government and 30 development partner agencies were organized into 23 thematic groups. Each group had a dedicated Joint Secretary assigned from the directly relevant line ministry and the NPC to work together with a lead agency on the part of development partners. These joint teams undertook an intensive exercise of data collection, field visits and verification in just over three weeks, from 22 May to 10 June, a tight timeline, given the scale and magnitude of the disaster.<sup>6</sup> An intermediate milestone for the PDNA report is the presentation of key findings at the International Conference on Nepal's Reconstruction (ICNR) on 25 June.

## Methodology

The PDNA for the Nepal earthquakes is an assessment led by the National Planning Commission covering 23 thematic areas as follows:

- **Social Sectors:** Housing, Health & Population, Nutrition, Education, and Cultural Heritage
- **Productive Sectors:** Agriculture, Irrigation, Commerce & Industry, Tourism, and Financial Sector
- **Infrastructure Sectors:** Electricity, Communications, Community Infrastructure, Transport, and Water, Sanitation & Hygiene
- **Cross-cutting Sectors:** Governance, Disaster Risk Reduction, Environment & Forestry, Employment & Livelihoods, Social Protection, Gender Equity & Social Inclusion, Poverty and Human Development, and Macroeconomic Impact Assessment.

With a few exceptions, assessment covers 31 districts affected by the earthquakes, of which 14 districts are the worst affected. All the sector

*The assessment covers 31 districts affected by the earthquakes, of which 14 districts are the worst affected*

<sup>6</sup> The PDNA provides informed estimates of the damages, losses and needs in each of the 23 sectors and themes it covers. This is sufficient to show the approximate overall damages, losses and needs, as well as the relative impact between sectors.

*Based on the estimation of damages and losses as well as qualitative impacts, each sector has specified recovery needs and suggested implementation arrangements*

teams assessed damages, losses and needs in these 14 districts. In respect to the remaining districts, they have been covered by the sector teams on the basis of availability of data, which implies that there are variations in geographical coverage across the sectors.

The sector teams conducted the assessment through:

- the collection of pre-disaster baseline data to compare with post-disaster conditions;
- the evaluation of disaster effects and impacts in each sector to determine the overall recovery needs;
- the prioritization of these recovery needs by way of a recovery strategy; and
- a recovery strategy that suggests appropriate interventions to meet priority recovery needs.

Most of the sector teams conducted field visits to assess the destruction of housing, infrastructure and social amenities, and estimate the impact on production of goods and delivery of services. They assessed how the disasters affected governance arrangements and brought out the context of risks and vulnerabilities in each sector. In the course of the assessment, a number of cross-cutting issues such as gender and social inclusion, disaster risk reduction and governance have been addressed. Each sector has also discussed the impact of the disaster in qualitative terms and outlined the emerging issues arising from the disaster.

Most of the sectors have valued the effects, which includes the value of damages to infrastructure and assets, as well as losses due to changes in financial flows, in Nepali Rupees and US dollars. A number of assessments in social and productive sectors have also estimated the

household impacts in terms of decline in personal income and access to social services. The values assessed by all the sectors have been aggregated, and the total value of damages and losses caused by the earthquakes has been arrived at. The cross-sectoral linkages have made it possible to avoid double or multiple counting in estimating the value of effects.

The aggregate value of damages and losses as well as qualitative information available through a household survey has facilitated the estimation of economic impact at macro and micro levels, and on human development. Two independent chapters are devoted to the assessment of these impacts.

Furthermore, the national accounts data freshly released by the Central Bureau of Statistics (CBS) were used as a benchmark to guide the assessment of change in flows across 15 major economic sectors.

Based on the estimation of damages and losses as well as qualitative impacts, each sector has specified recovery needs<sup>7</sup> and suggested implementation arrangements. This includes the cost of reconstruction of destroyed assets, provision of services, improved specifications and risk reduction measures. The cost of recovery needs has not been estimated at the replacement value; rather, a cost estimate has been provided on the basis of fiscal prudence and acceptable levels of recovery. The total cost of recovery, which includes the cost of reconstruction of destroyed assets, has been arrived at through aggregation of the cost of recovery needs of all sectors. An overarching strategy has also been suggested for the recovery programme covering all the sectors.

<sup>7</sup> Recovery needs are derived on the basis of disaster effects and disaster impacts in each sector. Recovery needs are determined for four components: (i) the reconstruction of damaged infrastructure and physical assets; (ii) the resumption of production, service delivery and access to goods and services; (iii) the restoration of governance and decision making processes; and (iv) the reduction of risks.



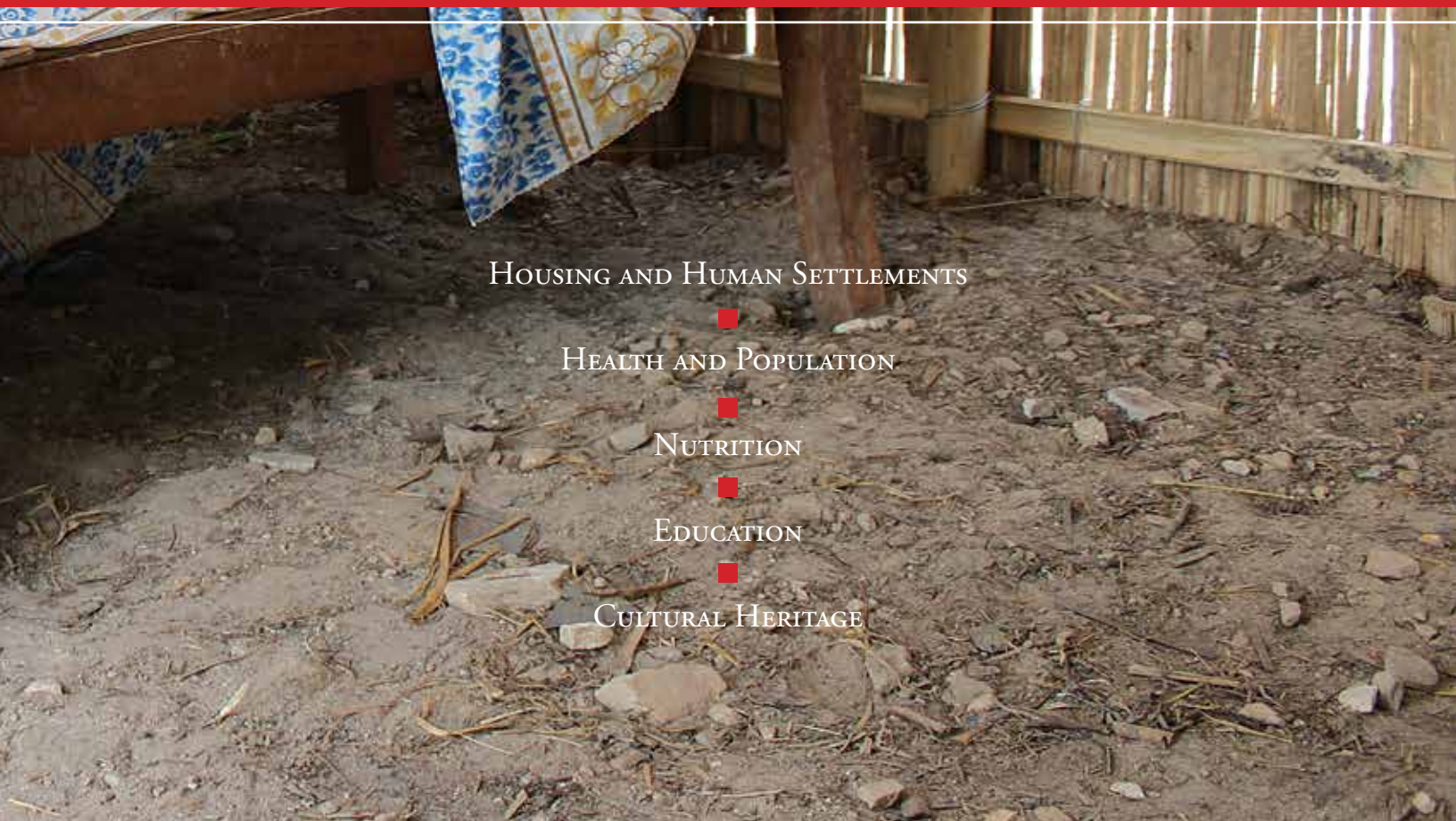








# SOCIAL SECTORS



HOUSING AND HUMAN SETTLEMENTS



HEALTH AND POPULATION



NUTRITION



EDUCATION



CULTURAL HERITAGE







# I. Housing and Human Settlements

## Summary

The sector of housing and human settlements was affected the most. The total effects (damages and losses) are valued at NPR 350,379 million, with the total damages amounting to NPR 303,631 million and the total losses estimated at NPR 46,748 million.

**Computing Damages and Losses:** Damages are defined as the combined replacement cost of destroyed houses, the repair cost of partially damaged houses, the replacement cost of household goods destroyed, and damages to the real estate sector. Losses are the combined cost of demolition and clearing, costs of provision of transitional shelter, rental losses, and losses sustained by the real estate sector.

The assessment targeted the 31 districts that were declared affected by the Government of Nepal (GoN). The 2011 Census provided the baseline and the Nepal Government Disaster Risk

Reduction Portal (<http://drrportal.gov.np/>)<sup>1</sup> of the Ministry of Home Affairs (MoHA) provided information on housing damage. A total of 498,852 houses were categorized as fully collapsed or damaged beyond repair and 256,697 houses were partly damaged. The estimated damage and losses are presented in Table 1.1.

**Recovery and Reconstruction Needs:** Based on the damages and losses, the recovery and reconstruction needs were estimated to be NPR 327,762 million. These include the costs of providing transitional sheltering, permanent housing reconstruction with structural resilience, demolition and debris clearance, repairs and retrofitting, clustering of dwellings to safe locations, training and facilitation, and urban planning, including heritage settlement planning. Housing and settlements have been reviewed to ensure the disaster resilience of the entire community keeping in mind aspects of location-based vulnerability. The data for

**TABLE 1.1: TOTAL DAMAGES AND LOSSES**

Details		Number of houses	Damages and losses (NPR million)	
Collapsed houses	Low-strength masonry	474,025	199,091	258,442
	Cement based masonry	18,214	19,671	
	RC frame	6,613	39,680	
	<b>Total</b>	<b>498,852</b>		
Damages	Low-strength masonry	173,867	7,302	24,597
	Cement based masonry	65,859	7,113	
	RC frame	16,971	10,182	
	<b>Total</b>	<b>256,697</b>		
	HH goods		16,382	
	Real estate sector		4,210	
	<b>Total damages</b>		<b>303,631</b>	
Losses	Demolition and debris clearance		9,941	
	Transitional shelters		14,968	
	Rental Loss		1,999	
	Real estate		20,000	
	<b>Total loss</b>		<b>46,908</b>	
<b>Total effects (Damages and losses)</b>			<b>350,540</b>	

<sup>8</sup> The damage data on private housing was captured as of May 28, 2015.

clustering of dwellings to safe locations in all the affected districts could not be verified at the time of preparation of PDNA. Clustering cases require careful and detailed analysis of landslide risks and socio-economic impacts, along with close consultation with impacted communities.

The recovery of the housing sector would be based on the principles of equity, inclusion and community participation through an owner-driven reconstruction (ODR) approach to build back better. Depending on the extent of damage, affected families will receive support in reconstructing, repairing and retrofitting their houses, in the form of financial assistance, technical guidance, social mobilization and skill upgrade. Financial assistance in tranches will be based on compliance with disaster-resistant construction guidelines as laid down by GoN.

For remote areas, heritage settlements and urban areas, special assistance packages may be considered over and above the basic recovery package. Providing handholding support to owners will require a well-defined human resource set-up of master artisans, junior and senior engineers, and community organizers, coordinated at the Village Development Committee (VDC), district and national levels, respectively, and guided by a Technical Committee. This will also help regenerate the local economy. Further, clustering of communities should be exercised only in special circumstances. House owners will have an opportunity to con-

struct their houses in the building typology and size of their choice by adding resources from their own savings or labour provided the construction complies with GoN's disaster-resistant construction guidelines. From a settlement planning view, reconstruction also presents an opportunity to upgrade living conditions.

The total number of houses to be reconstructed has been calculated on the basis of number of households made homeless. Considering the average number of households per house for each district, the total requirement came to 609,938 houses. This number may change after the much-needed household assessment of damages.

## Pre-Disaster Context and Baseline

### POLICIES ON HOUSING AND SETTLEMENTS

Several Constitutional Acts and policies are particularly relevant for the housing and settlements sector. The 2007 Interim Constitution of Nepal states the responsibility of the state to provide land to the economically weak and/or landless sections. The 2012 National Shelter Policy enunciates the right to safe and adequate housing for all. The 2007 National Urban Policy calls for settlement and economic activities that promote a balanced national urban structure; development of safe and prosperous settlement areas by increasing resilience against environmental shocks and stresses; and effective urban management through capacity development of local bodies.

**TABLE 1.2: TOTAL RECOVERY NEEDS**

Details		Unit rates (NPR/house)	Number of houses	Amount (NPR million)
Demolition	Low-strength	21,000	94,805	
	Cement-based	54,000	7,285	<b>3,971</b>
	RC frame	300,000	5,291	
Debris clearance	Low-strength	8,000	474,025	
	Cement-based	20,000	18,214	<b>5,810</b>
	RC frame	250,000	6,613	
Cost of equipment for demolition and debris removal				<b>160</b>
Transitional shelter		24,540	609,938	<b>14,968</b>
New house reconstruction (450 sqft/ unit)		405,000	609,938	<b>247,025</b>
Repairs and retrofitting		121,500	256,697	<b>31,189</b>
Clustering of houses			22,254	<b>10,525</b>
<b>Subtotal</b>				<b>313,649</b>
Training, facilitation and quality assurance costs		2.5%		<b>7,841</b>
Urban planning (including heritage settlement planning)		2%		<b>6,273</b>
<b>Total</b>				<b>327,762</b>



The 2012 National Land Use Policy classifies different categories of land, with a focus on optimal utilization and enforcement of land use control. It encourages relocation of settlements from hazard-prone areas and settlement development in hazard free, safer locations. The implementation of this policy is being strengthened with a three-tier participatory land use planning exercise.

The 1999 Local Self Governance Act (LSGA) provides a mandate to local bodies (VDC, District Development Committee [DDC], Ward Committee and Municipality [MNC]) mainly for development planning and budgeting, building local infrastructure, providing basic services, maintaining records and protecting public land, and mobilizing and coordinating local development partners. Local bodies are also responsible for implementing land use policy, enforcing and monitoring the building code, and ensuring the construction of disaster-resilient infrastructure at the local level. In addition, the 2013 Environment Friendly Local Governance (EFLG) Framework seeks to promote voluntary compliance in the environmental management sector at the local level. It elaborates the process, mechanism and motivation for achieving and recognizing a set of indicators for VDCs, DDCs and MNCs.

The 1999 Building Act promotes safer building practices covering four types of buildings, namely those that are state of the art; professionally engineered; constructed according to the mandatory rule of thumb (MRT); and rural buildings. The Nepal National Building Code (NBC), too, has been developed along these lines. The Department of Urban Development and Building Construction (DUDBC) is recognized as the central institution for implementation of the building code and monitoring local bodies.

DUDBC is also the implementing and monitoring authority for apartments in the country. The 1997 Apartment Act promotes apartment living as one of the ways to solve the increasing demand for housing.

The 1999 Nepal Engineers Act provides the basis for a registration system for engineers through the Nepal Engineering Council (NEC), which has put in place a system of competency-based registration with periodic renewal in order to bring a positive change in the current engi-

neering practice. However, the current Act does not include any liability provision. The National Plan of Action for Safer Building Construction is a comprehensive action plan, which is currently in a draft stage.

#### **ISSUES RELATED TO LAND TENURE**

The existing land administration in Nepal is parcel based. The land registration system, introduced in 1965, is based on cadastral maps with a unique real estate identifier or parcel number. Different tenure systems (among them, statutory, customary, religious and informal, urban and rural) co-exist in Nepal. Almost all cultivable land, 27 percent of the total land mass comprising about 30 million parcels, is registered with formal tenure.

There are three official land tenure systems in Nepal. These include state-owned land (land owned by government agencies, and public land owned by local bodies), rural marketplaces, cemeteries, temples and playgrounds, among others; private land, where the ownership certificate or title ensures formal rights to all owner-registered land; and Guthi land which is owned by trusts and community groups, which, as a tenure system, may be of significance for addressing issues of heritage settlements.

In addition to these, there are several religious and traditional types of tenure that are not recorded in the land register; informal and squatter settlements, as well as dual ownership with tenancy.

The residential and agricultural land of almost all earthquake-affected areas is mapped and registered with formal titles. Some land parcels in newly settled areas on the periphery of villages may be unmapped or unregistered and hence may lack formal title.

Men own most of the houses. Less than 20 percent of land parcels (including houses) are owned by women, the majority of which are in urban areas.

#### **URBAN GROWTH AND CURRENT PLANNING INITIATIVES**

##### **Urban Settlements and Population Influx**

Nepal, a predominantly rural country, has experienced increased urbanization in recent decades, with a current urbanization level of about 38 percent and a decadal urban growth rate of 6.4

percent from 2001 to 2011. In the same period, Kathmandu alone has had a 61 percent decadal growth, with a disproportionate influx from rural areas. This raises concerns of disaster risks to cities. The 2015 earthquake affected a total of 41 municipalities and many market areas.

#### **URBAN PLANNING AND DEVELOPMENT -- A CASE OF KATHMANDU VALLEY**

Land use change modelling and analysis has shown that the urban morphology of Kathmandu Valley has changed drastically in the past two decades, with a 211 percent increase in built-up area between 1992 and 2012. This has occurred through an equivalent loss of cultivated land and significant encroachment of open spaces. This, coupled with significantly increasing density, has increased the urban risks in Kathmandu Valley.

The Kathmandu Valley Development Authority (KVDA) is in the process of implementing a 20-year (2015-2035) Strategic Development Master Plan. Its four major focus areas include infrastructure improvements, environmental improvements, urban regeneration, and land use planning with a focus on risk-sensitive land use planning (RSLUP).

#### **NATIONAL URBAN DEVELOPMENT STRATEGY**

The National Urban Development Strategy (at present in the approval phase) seeks to promote resilience in urban development by means of climate change adaptation; development in safer locations; review and enforcement of building codes, regulations, guidelines and planning by-laws; and building the capacity of government institutions and local bodies. Some immediate proposed programmes for fostering resilience in urban development include the following: preparation of RSLUP; completion of the Kathmandu Urban Transport Master Plan (KUTMP); revision of building by-laws; establishment of a hierarchy of road networks; modification in land readjustment regulations; regeneration of traditional agropolitan settlements; development, conservation and management of multipurpose open spaces; and institutional and capacity-building of KVDA for planning and implementation.

#### **HOUSE CONSTRUCTION PROCESS AND BUILDING TYPOLOGIES**

A large majority of houses in Nepal are non-engineered and constructed by owners themselves through the non-formal sector. In rural

and semi-rural areas, where there is no building permit system or compliance mechanism, local artisans provide all the necessary technical and management support for construction, with the house owner's family pitching in with labour. The house grows incrementally over a period of time.

In the urban areas, the role of the house owner changes to managing construction materials and labour, and the whole construction process requires a much larger cash flow. Construction in urban areas involves petty contractors and, sometimes, engineers and architects. Municipal areas have mandated building permit and compliance systems.

Based on the predominant building types in the affected areas, housing can be categorized into four main types based on their vertical and lateral load-bearing systems, in line with the 2011 Census:

- Low-strength masonry buildings are constructed locally (in available stone, fired brick and sun-dried brick) in mud mortar. They are typically two-storey buildings excluding the attic, with timber or bamboo floors overlaid with mud. The roofs are mostly of timber or bamboo covered with tiles, slate, shingles or corrugated galvanized iron (CGI) sheets. The walls tend to be very thick, depending upon the type of walling units. The seismic capacity of these buildings is very low, limited by the integrity of structural components, strength of walls, and lack of elements tying the structure together (ring beams at wall or roof level). Vertical and horizontal wooden elements are sometimes embedded in walls, providing some level of earthquake resistance, but this is very uncommon.
- Cement-mortared masonry buildings have walls of fired brick, concrete block or stone in cement-sand mortar and are usually constructed up to three storeys. The floors and roofs are made of reinforced concrete or reinforced brick concrete. Despite the use of high-quality materials, these buildings suffer from deficient construction practices. Provision of earthquake-resistant features is not commonly found in these buildings.
- Reinforced concrete frames with masonry infill consist of cast-in-situ concrete frames with masonry partition and infill walls (brick, block or stone masonry) that are not tied to the frame. With floors and roofs of

reinforced concrete slabs, these buildings are usually constructed up to four storeys, but buildings up to even 20 storeys have been observed. Despite the use of high quality materials and the fact that seismic detailing has become more common in recent years, the vast majority of these buildings suffer from deficient construction practices.

- Wood and bamboo buildings are constructed with wooden planks, thatch or bamboo strip walling materials, with flexible floors and roof. These suffered less damage from the earthquake due to their light weight.

## Post-Disaster Context

### ANALYSIS OF BUILDING DAMAGE

A large-scale survey by MoHA during the month following the earthquake showed that a total of 498,852 houses collapsed fully or were damaged beyond repair and 256,697 houses were partly damaged. However, this rapid assessment is not a technical assessment and does not categorize the damage by building type or urban/rural context. For operationalizing the recovery strategy, a more rigorous technical household assessment will be undertaken.

The catastrophic effects of the earthquake on the built environment of Nepal was primarily the result of the significant seismic vulnerability of unreinforced masonry buildings that predominate throughout the country. There is a general lack of awareness of seismic risk in communities, coupled with a lack of dissemination of improved construction practices (particularly in rural areas), and a slow mechanism for enforcement of the relevant building codes.

Most of the areas where buildings suffered damage were not subject to enforcement of the NBC and standards. Even in municipal areas where compliance with the NBC is required for new buildings, the implementation mechanism is weak. Most of the buildings that suffered damage were old constructions in mud mortar, without adequate seismic-resilient detailing; buildings marked by deficient construction practices, whether cement

mortar or reinforced concrete; and non-engineered buildings. Efforts to improve the building stock were mostly concentrated in urban areas, with little dissemination of knowledge in rural areas where most of the houses are constructed with traditional materials.

Additionally, there is a strong culture of extending the house both vertically and horizontally, with no consideration given to the structural strength of the original building. This issue is particularly relevant for vertical extensions. Further, this problem has been exacerbated by a lack of maintenance of old buildings.

### TYPES OF BUILDING DAMAGE

The 498,852 houses that are either fully collapsed or damaged beyond repair as well as the 256,697 partially damaged houses have been distributed in the three building typologies of low-strength masonry, cement-based masonry and reinforced concrete frame. The extent of physical damage to the three building types was calculated on the basis of vulnerability curves developed by the National Society for Earthquake Technology (NSET). Based on the field observation, the main types of physical damage were identified as follows:

#### MAIN TYPES OF DAMAGE IN MASONRY BUILDINGS

Lack of integrity between different structural members and inherent weak properties of the materials was the main cause of failures in masonry buildings. This resulted in parapet and gable wall toppling; delamination of low-strength masonry walls; out-of-plane toppling of walls; corner separation of walls; various types of wall failures under in-plane loading such as diagonal cracks, sliding cracks, crushing of piers, failure of spandrels; and collapse of floor and roof due to loss of vertical load-bearing elements such as walls.

#### MAIN TYPES OF DAMAGE IN REINFORCED CONCRETE (RC) BUILDINGS

Damage to RC buildings was predominantly due to lack of strength and ductility. This resulted in toppling of parapets, infill walls and

**TABLE 1.3: EXISTING BUILDING TYPOLOGIES IN THE 31 AFFECTED DISTRICTS (REF CBS 2011)**

Low-strength masonry	Cement-based masonry	Reinforced concrete frame	Wood and bamboo based
58%	21%	15%	6%

partition walls; damage to infill-walls; diagonal, sliding cracks, crushing of piers in infill walls; soft storey failure (collapse of building due to concentration of damage in a particular storey); failure of beam-column joint; short column problem; shear/flexure cracks in column and beam members; and poor workmanship.

## Recovery and Reconstruction Strategy

### RECOVERY PRINCIPLES

The following guiding principles should form the basis of strategy and planning of post-disaster recovery:

1. Encourage the participation of communities by empowering them to take control of reconstruction of their houses and ensuring facilitation of ODR.
2. A comprehensive view of housing reconstruction should include holistic habitat development, with basic services and community infrastructure. The principle of build back better (BBB) should translate into a concept of safer settlements.
3. Reconstruction should be seen as a vehicle to build long-term community resilience by reducing vulnerabilities and strengthening community capacities to mitigate future disasters through improved construction practices for the majority of the building stock in the country.
4. Strengthen the local economy through reconstruction and processes that work to the benefit of the poor and marginalized sections who are mostly in the informal sector. Reconstruction should provide an opportunity for the poor to upgrade their living conditions.
5. Ensure sustainable and environment-friendly reconstruction processes, taking note of climate change, natural resource management and scientific risk assessments.
6. Ensure that rehabilitation is equitable and inclusive.

### GENDER AND SOCIAL INCLUSION

The recovery and reconstruction process must pay considerable attention to women-headed households, whose presence is significant in the earthquake-affected districts. Women heading the family are already overburdened with their routine household activities, which include accessing basic services, and their contribution to the farm and other livelihoods. In such circumstances, any role in the recovery and reconstruction process will only add to their responsibilities and raise their workload to unsustainable levels. Further, the average literacy rate of women is 45 percent, and even lower in the remote earthquake-affected areas. This should be factored in while developing the construction management plan both for transitional and permanent shelter. Skill development and capacity building should be conceived in a way that allows partially literate women to better manage their money, labour and material purchases as well as supervise the reconstruction process.

The settlement planning and design of shelters and services should also integrate social and protection issues generally faced by women in remote environments. The reconstruction may further present an opportunity to demonstrate women's right to equality by ensuring that they are accorded equal rights to their land and property. The government can make joint ownership a compulsory condition for receiving government-aided recovery and reconstruction support.

Technical and construction committees (community-level user committees) should ensure participation of women not only at the level of work (labour) but also at the level of decision-making, management and monitoring/supervision.

During construction, there will be a need for skilled labour and this will create employment opportunities. Priority should be given to women while providing skills training and employment during construction.

**TABLE 1.4: BUILDING TYPOLOGIES AND DAMAGE**

Typology of buildings	Fully collapsed or beyond repairs	Partially damaged (can be repaired/ retrofitted)
Low-strength masonry	474,025 (95%)	173,867 (67.7%)
Cement-based masonry	18,214 (3.7%)	65,859 (25.6%)
Reinforced concrete frame	6,613 (1.7%)	16,971 (6.7%)
<b>Total</b>	<b>498,852</b>	<b>256,697</b>

### **Disadvantaged Groups**

A sizeable percentage of adult Dalits migrate abroad (59.5 percent), to Kathmandu (23 percent), and a few to nearby urban areas, mostly in search of jobs. Accordingly, labour mobility is quite high among them, triggered by a need to escape caste discrimination in the domestic labour market ('Dalits and Labour in Nepal: Discrimination and Forced Labour, ILO, 2005'). Amongst Dalits living in hilly areas, the Kami, Damai and Sarki are the most marginalized and are likely to experience high migration. Amongst Dalits in the Tarai, the Doms, Chamar, Satar, Tatmas, Dushads, Mushars, Dhanker and amongst the indigenous communities, the Santhal, Munda, Jhangad and Kisan, constitute the largest part of the landless sections. Women-headed households of Dalit communities would be the most vulnerable. Similarly, households comprising only the elderly or people living with disabilities (PLWD) are more vulnerable. It is therefore necessary to facilitate and monitor the progress of recovery of these groups.

### **LAND USE AND CLUSTERING OF HOUSING**

In a post-disaster scenario, the clustering/relocation of settlements whose present location is at high risk should be considered. Additionally, it is likely that some households may have lost their land in the earthquake and may need clustering. However, before considering the option of clustering, the following points should be kept in mind: The alternate low-risk location should be selected as close as possible to the original location; beneficiary families should be consulted while developing the relocation plan and programmes; the relocation plan should see to it that the livelihood opportunities of the beneficiaries are not compromised at any cost; additional incentives should be provided to the relocated community in the form of monetary, material, technical and labour resources for reconstruction; overall living standards should be improved through the provision of community services such as schools, health centres and local roads; and temporary access routes to the original site should be provided to facilitate the return of the communities to their places of origin to observe ethnic and religious practices.

However, relocation of settlements should be conducted only when no other in-situ solution is

possible. Land acquisition for relocation or clustering is likely to be complicated, difficult and disputed if the lands considered safe are privately owned or come under forest land. Moreover, the costs of relocation are likely to be very high. The government has identified a need for clustering 22,256 households, along with infrastructure provision and settlement planning, at the cost of NPR10,525 million. There will be a rigorous multi-hazard study of each site.

### **SETTLEMENT PLANNING APPROACH FOR RURAL HOUSING**

It is important that housing reconstruction is viewed in larger terms to include community infrastructure within the settlements such as access to water, sanitation, waste disposal, energy, risk mitigation measures and others. At the local level, consultative processes with the community should be undertaken to identify the community infrastructure that needs to be built, repaired, improved, augmented, or enhanced, and mechanisms should be developed for implementation. Efforts should also be made to promote planning principles.

### **NATIONAL GEODETIC NETWORK**

The National Geodetic Network, which comes under the Survey Department of the Ministry of Land Reforms and Management, plays an important role in development and infrastructure planning for the country. The Geodetic Network suffered significant damage to the Horizontal Geodetic Control Network, the National Level Network and the National Gravity Network, and their respective sub-components. Additionally, keeping in mind present and future needs, the National Geodetic Network also needs further densification. This work is proposed to be undertaken as part of settlement planning for which a separate budget has been allocated.

### **RISK-SENSITIVE PLANNING FOR URBAN AREAS**

The Ministry of Urban Development (MoUD) is conceptualizing the norms and standards for safer settlements, among them the integration of indigenous and technical knowledge to identify and mitigate multi-hazard risks. Appropriate policy initiatives will be required to address both the urban and rural contexts, reflecting their inherent differences, the level of impact of the earthquakes as well as the needs for recovery based on the principle of building back better.

Besides, long-term comprehensive urban recovery planning should keep in mind projections of population, urban structures, risk-sensitive land use plan, transport plan, and risk assessment. This requires a review of future seismic hazards based on the latest knowledge of seismology and geo-tech studies, including an analysis of recorded data of the 2015 Nepal earthquake, and seismic specifications for structures as in NBC 105 and NBC 108, among others. This exercise should also take into account other hazards such as flooding and landslides.

Within the urban environment, three distinct urban categories are emerging and each one demands well targeted and specialized interventions. These include the Kathmandu Valley metropolitan and sub-metropolitan areas, heritage settlements, and smaller and relatively newer municipalities. Settlements with heritage importance will require a special focus to ensure improvement in the housing stock while retaining their heritage value. Similarly, infrastructural needs of small and new municipal areas need to be identified and planned during reconstruction. There is an urgent need for balanced growth by developing smaller municipalities on the basis of a regional planning perspective. Housing reconstruction should follow this overall framework.

On the other hand, to mitigate the effect of disasters on high-rise buildings, a building code regulation on anti-seismic high-rise structures, with regulations covering the height of buildings, proportion of floor space to the occupied ground, along with appropriate development control rules with institutional enforcement and management capacity, is required.

#### **STRATEGY FOR TRANSITION AND RECONSTRUCTION PHASE**

##### **Strategy for the Transitional Phase**

In the short term, the focus of the recovery strategy will be:

- on addressing the immediate needs of the affected people during the transitional phase; and
- on planning, preparing and commencing the reconstruction phase.

Solutions for transitional shelter are needed so that people can live with a certain degree of comfort and dignity until permanent reconstruction or repair and retrofitting work is com-

pleted. People must be informed of ways to improve the transitional shelters as they may have to inhabit them for a couple of years.

##### **Demolition, Debris Clearance and Salvaging Material**

This process needs to be undertaken at the earliest before owners can go ahead with reconstruction. It provides an opportunity for house owners to salvage materials as well. Field observations have shown that owners of low-strength masonry buildings were able to quickly demolish and salvage materials, and that a significant portion of such houses was, in fact, salvageable. Owners of RC frame buildings are in a more difficult situation as damaged buildings that are still standing may be in a perilous state and may require special skills and tools for demolition. Moreover, debris disposal will have to be carefully planned keeping in mind environmental considerations, so as to avoid blocking waterways or damaging agricultural lands.

##### **Planning for Reconstruction**

A comprehensive, rigorous and transparent household damage assessment and eligibility survey are required to understand the nature and extent of damage and formulate eligibility criteria for the government to plan its reconstruction assistance programme. Detailed policy packages for house reconstruction, repair and retrofitting will be required for all affected social groups, particularly the poor and vulnerable, tenants, women-headed households, and families living in remote areas. Important early activities for long-term recovery include large-scale communication of the reconstruction programme, communication of safe construction practices (since many have already started rebuilding) and the setting up of a cascading social-technical facilitation mechanism for recovery (at the national, district and local level).

#### **STRATEGY FOR THE RECONSTRUCTION PHASE**

The entire housing reconstruction process is likely to take up to five years. The reconstruction process will empower communities and households to take charge of their own recovery through the ODR approach wherever possible. Households will be facilitated with significant technical assistance to manage reconstruction. Housing reconstruction grants will be provided in tranches, based on compliance with GoN's disaster-resistant construction guidelines. Cas-



cading training programmes will be needed on a large scale to build the necessary pool of trained masons, carpenters and artisans.

Specific strategies will be required to address the complex process of recovery of urban environments, among them the management of demolition in dense neighbourhoods, fragmentation of building ownership, high level of tenancies, the heterogeneity of community structures and, particularly, the dynamic migration patterns of urban populations. The tools and activities to support urban recovery would include monitoring systems for urban displacement and migration; detailed hazard mapping; participatory planning exercises; rapid urban expansion studies; facilitated management structures (bringing together communities, government and the private sector); and rental stock support plans.

Apart from ensuring that all homes are rebuilt to hazard-resilient standards, reconstruction aims to start addressing underlying processes that create vulnerability, going beyond the areas affected by the earthquake. As such, recovery should foster reformative rather than restorative processes by tackling the underlying causes of vulnerability and risks, based on in-depth studies. Common causes of vulnerability include the lack of dissemination of knowledge, leading to low risk awareness; inadequate training among artisans and builders in safe construction practices; lax

enforcement of building standards; and the lack of high-technical capacities in private engineering practice, among others.

Overall 609,938 housing units will need to be constructed and 256,697 houses will require repair and retrofitting in the course of the reconstruction programme.

### Implementation Arrangements

The success of the recovery strategy will depend on its implementation mechanism and modalities. The main components of the strategy are to:

- ensure identification of affected households through transparent and comprehensive criteria, accompanied by a robust mechanism of vetting and redressing grievances; and
- empower and facilitate house owners through an owner-led reconstruction mechanism.

Careful consideration will be required for houses accommodating more than one family or comprising absentee members, women-headed households or those belonging to marginalized caste groups. Affected communities in remote areas may also require more attention, particularly for transport of material, cash transfers, technical facilitation, and monitoring.

### BUILDING DAMAGE AND ELIGIBILITY SURVEY

A household damage assessment and eligibility survey is critical for identifying specific damages

**TABLE 1.5: RECOVERY AND RECONSTRUCTION COSTS**

Details		Unit rates (NPR/unit)	Number of houses	Amount (NPR million)
Demolition	Low-strength	21,000	94,805	<b>3,971</b>
	Cement-based	54,000	7,285	
	RC frame	300,000	5,291	
Debris clearance	Low-strength	8,000	474,025	<b>5,810</b>
	Cement-based	20,000	18,214	
	RC frame	250,000	6,613	
Cost of equipment for demolition and debris removal				<b>160</b>
Temporary shelter		24,540	609,938	<b>14,968</b>
New house reconstruction (450 sqft/ unit)		405,000	609,938	<b>247,025</b>
Repairs and retrofitting		121,500	256,697	<b>31,189</b>
Clustering of houses			22254	<b>10,525</b>
			Subtotal	<b>313,649</b>
Training, facilitation and quality assurance costs		2.5%		<b>7,841</b>
Urban planning (including heritage settlement planning)		2%		<b>6,273</b>
<b>Total</b>				<b>327,762</b>

to housing in order to ascertain the eligibility for housing recovery assistance in a uniform and transparent manner. The survey should be conducted at the earliest, namely before households commence the process of demolition and follow it up with the construction of new houses in their efforts at self-recovery.

The assessment will link a particular aspect of damage and building typology to a specific safe reconstruction activity (such as the repair of a wall or complete reconstruction of a building of a certain type) and assistance package. Information gathered from the survey can further serve as the basis for a powerful management information system (MIS) to monitor recovery. Modern GPS-enabled electronic tablets can be leveraged to streamline the data-gathering process and mapping of activities and needs.

The assessment will also play a key communicating role in appraising households with the steps of recovery, among them the signing of a mutual agreement between the government and the

household (through an MoU), committing to the roles and responsibilities of the household, such as abiding by officially approved standards and using assistance only for housing construction, opening a bank account to receive assistance, and receiving training on reconstruction practices.

#### **BUILDING CONSTRUCTION TECHNOLOGIES, MATERIALS AND LABOUR**

##### **Building Construction Technologies**

Enhancements are required to ensure that reconstruction adheres to practices that build back better. Most heavily damaged buildings did not comply with any of the national building regulations and guidelines.

Adherence to basic disaster-resistant elements (corner stitches, vertical reinforcement, diagonal bracing and horizontal bands, among others), coupled with adherence to proper masonry construction practices, should be made mandatory. The mandatory rule of thumb of NBC should be put into practice and enforced where applicable. Reinforced concrete

**TABLE 1.6: LIKELY BUILDING CONSTRUCTION TECHNOLOGY OPTIONS FOR RECONSTRUCTION**

Major building components	Building typology				
	Low-strength masonry		Cement-based masonry		RC frame (for small to medium size building)
	Stone masonry	Brick masonry	Brick masonry	Blocks masonry	
Foundation				Linear wall footing	Isolated column footing tied together by foundation beams/ raft
Wall material	Stone	Brick	Brick	Concrete block Soil stabilized block	Brick or concrete block infill in cement mortar
Upper floor/ Attic		<ul style="list-style-type: none"> <li>Stabilized mud on timber joist and planking</li> <li>RC/ RB slab</li> </ul>		<ul style="list-style-type: none"> <li>RC slab</li> <li>RB slab</li> </ul>	RC slab
Roof		<ul style="list-style-type: none"> <li>CGI sheet</li> <li>RC/ RB slab</li> </ul>		<ul style="list-style-type: none"> <li>CGI sheet</li> <li>RC/ RB slab</li> </ul>	RC slab
Seismic resistant elements		<ul style="list-style-type: none"> <li>Wooden/ bamboo bands,</li> <li>RC band, ties and stitches wherever possible</li> </ul>		RC bands, vertical reinforcements, stitches	RC frame with full compliance with ductile detailing
Indicative cost per sq ft of plinth area, NPR		900		1500	2000
Likely proportion of reconstruction (KTM Valley)*		24%		38%	38%
Likely proportion of reconstruction (Other districts)*		77%		15%	8%

*Timber could be preserved and used efficiently through simple innovations*

*\* Based on proportional distribution of typologies in 2011 Census accepted as trend*



building construction should incorporate proper seismic (ductile) detailing. For small buildings, 'confined masonry' should be encouraged in favour of concrete frame with masonry infill, as confined masonry has shown better seismic performance. For heritage settlements, special technology options and guidelines, including those for repair and retrofitting, should be developed. A summary of likely building technology options is shown in Table 1.6.

### Requirement of Construction Materials

With over 600,000 houses to be constructed and about 250,000 to be repaired and retrofitted, there will be a huge rise in building construction activities spread over several years. Two critical potential bottlenecks for effective reconstruction are availability of construction materials and labour (in addition to availability of finance). Mechanisms will be needed to ensure that materials are available at a reasonable price and are accessible in locations where needed.

The total annual production capacity of the various materials against the total likely requirement of post-earthquake housing reconstruction is shown below.

The materials salvaged from collapsed houses are likely to result in recycling of 80 percent stone, 30 percent wood and 25 percent brick in reconstruction. This will help speed up reconstruction by reducing financial and transport burdens. Appropriate guidelines about reuse of salvaged materials should be developed and disseminated to house owners to ensure good quality construction.

### Labour Requirements

Housing reconstruction on such a large scale will require a significant workforce (estimated at 352 million workdays). Assuming that the bulk of construction will occur in the first three years, it is estimated that the labour requirement will peak at 0.7 million workers only for reconstruction. According to current estimates there are one million workers already involved in the housing sector (ILO). Hence, a significant amount of unskilled work will likely be undertaken by family members themselves, which will alleviate this need to some extent.

The main concern is with regard to the skilled workforce, which constitutes around 46 percent of the labour force required. The housing component alone may need over 20,000 masons, many of whom either engage in part-time labour or travel between Nepal, India and the Middle East. This sector of the labour market needs to be augmented through a large scale training programme with a wide geographic spread.

### FINANCIAL AND SOCIO-TECHNICAL FACILITATION

#### Financial Facilitation

The government will devise a financing policy clearly stating the modalities of grants and loans as well as the owner contribution expected for rebuilding private houses.

A robust and fully transparent system will have to be developed for transparent and timely cash transfers of assistance packages while ensur-

**TABLE 1.7: EXPECTED TOTAL DEMAND FOR HOUSING MATERIALS**

No.	Item	Unit	Annual production for Nepal (Pre-disaster scenario)	Total projected demand for Housing reconstruction (post-disaster scenario)
1	Ordinary portland cement	Million Ton	3.5	2.01
2	Deformed steel bars - 10-25mm	Million Ton	0.75	0.14
3	CGI Sheets - 26 G medium	Million Ton	0.8	0.09
4	Burnt bricks	Million No.	430*	1193
5	Timber	Million m3		0.55
6	Quarry stone/ rubble	Million m3		22.15
7	River sand	Million m3.		2.61
8	Aggregates - 10-20mm	Million m3		0.83
9	Galvanized welded wire mesh (WWM) - 13 G 25mmx25mm	Million Ton		0.01

Note: \* Production estimate pertaining only to the Kathmandu Valley

ing compliance with standards and guidelines for disaster-resistant construction. A system to certify progress and quality of construction will be put in place at the local level. Typically, the financial assistance is provided in three or four stages: The first or initial tranche is given for mobilization of construction work, the second, on completion of plinth level construction, the third on completion of walls and the fourth and final tranche on completion of construction. Usually, the first three tranches go towards supporting the construction work, with the final tranche (the smallest in amount) used more as an incentive to owners for timely completion of construction. For remote areas, heritage settlements and urban areas, special assistance packages over and above the basic recovery package may be defined.

#### **Socio-technical Facilitation**

As recovery efforts are likely to be largely owner-led, it is critical to provide house owners with on-site guidance and technical assistance in reconstruction, repairs and retrofitting to promote safer housing. It is necessary to ensure that this aspect of the recovery programme is not weak. Communities will have to be mobilized to undertake reconstruction as per the policy and plans put in place by the government. The entire mechanism and modalities will have to be explained to them.

A socio-technical facilitation team should be in place to provide interface between the owners and the government-assisted reconstruction programme. This mechanism will support the owners at each stage of construction, making them aware of the recovery programme and their entitlement, handholding them through the administrative processes to avail assistance as per the modalities defined by government policy; provide appropriate social and technical advice at the time of construction; identify and support owners who require redress of grievances; and assist in certification of stages of construction for financial disbursement.

About 22,250 houses were identified for the process of clustering due to the likelihood of hazards at their present locations. Any such effort will have to be evolved only with community involvement and consensus, as the place of residence is strongly linked to agriculture and other forms of livelihood, beliefs, associations and sentiments.

#### **Management Structure for Recovery**

The success of any recovery effort hinges on the availability of adequate numbers of trained human resources to provide support and undertake a variety of tasks. For instance, a socio-technical support team led by a coordinator at the VDC level, with Junior Engineers/ sub-overseers, master artisans, and male and female community organizers that can support a certain number of families in the reconstruction process, can ensure quality assurance and compliance with guidelines. The total number of such teams and their work responsibility may be decided on the basis of the geographic spread of affected households in the VDCs and MNCs. Further, these field teams will have to be coordinated at the district level by socio-technical teams comprising Senior Engineers, information managers, communication staff, and district coordinators.

The human resources required for the facilitation of such a large recovery effort will have to be managed by the proposed extraordinary mechanism. The total five-year budget for the cost of the socio-technical facilitation, including human resources, training, quality assurance and other governance functions, is estimated to be 2.5 percent of total needs.

#### **Role of the Technical Committee**

Identification of the causes of heavy damage to buildings (soil profiles, improper design and detailing, poor construction practice, among others) will form the basis for the development of feasible, technical solutions for building back better. Appropriate measures will be identified for reconstruction to cover all the prevalent building typologies. Similarly, simple methods will be evolved to repair and retrofit non-engineered buildings, along with simple equipment that can also be used in remote areas.

Considering the complexities of building stock in the earthquake-affected areas, a Technical Committee headed by an earthquake engineering advisor could be considered to anchor the vast variety of technical issues expected to arise during the reconstruction programme. The group will reflect a broad range of experience in post-disaster recovery efforts – from an understanding of Nepali building typologies and materials, building codes and standards to the geography of Nepal; from an expertise in geo-

technical aspects to the socio-cultural landscape of the country, as well as capacity building.

The technical committee will formulate:

- illustrative guidelines on construction, repair, remediation and seismic improvements for each building typology;
- illustrative training guidelines for trainers who will conduct training programmes for engineers, junior engineers, supervisors and artisans such as stone masons, brick masons and carpenters, among others);
- guidelines on building inspection, also reproducing them in an audio-visual format; and
- methods for dissemination of information.

#### **Capacity-building of Community Organizers, Artisans and Engineers**

Over 25,000 resource persons including masons, carpenters, junior engineers, community organizers, coordinators and higher-level staff will be involved in providing construction services to house owners. They have to be trained in disaster-resistant construction. A large capacity development programme will have to be instituted as part of the socio-technical facilitation mechanism. This will also involve training the trainers (community organizers, engineers and master masons) who will conduct the training programmes:

**Tier 1** training will provide engineers, junior engineers, foremen, and artisans with basic training on assessment, repair, remediation and seismic improvements. Practical and hands-on training following MRT should be able to address the concerns of simple and small buildings.

**Tier 2** training will provide structural engineers with skills on quantitative assessment and strengthening of various categories of small to mid-height buildings. The training should be practical and hands-on so that it can be immediately used to give advice on such buildings during reconstruction.

**Tier 3** training will provide skills on quantitative assessment and strengthening of complex medium-to-large buildings to limited number of senior professionals from the fraternity of structural engineers. The training should be practical and hands-on so that it can be immediately used to give advice on such buildings during reconstruction.

Separate trainings on social facilitation for community organizers will be developed and implemented. These trainings will include simple modules on key technical aspects for the technical orientation of community organizers. Similarly, the technical trainings would have simple modules on key aspects of social mobilization for the proper orientation of technical staff.

#### **Certification of Trainees**

Candidates meeting the minimum requirements would be awarded certificates. Only such artisans should be encouraged to work as lead artisans on the construction site. Engineers/junior engineers/ sub-engineers/ master masons working on the programme must also be certified accordingly. This requires instituting a training certification programme at the earliest so that an adequate number of artisans are trained before reconstruction takes off.

#### **Awareness Programme for House Owners**

As the recovery effort is going to be largely owner-led, it is essential to make them aware of need of disaster-resistant construction. They will require guidance on the choice of building typologies, materials and costing in addition to the minimum disaster-resistant features to be adopted. To hire artisans and decide on the type of material and construction system, owners need a degree of awareness. Dissemination of required information on reconstruction, repairs and retrofitting to them is very important

#### **Concurrent Monitoring and Quality Assurance**

Independent technical monitoring and auditing of house construction as well as repairs and retrofitting is essential. It is important to ensure that such quality assurance mechanisms are activated during the reconstruction phase for timely reporting on the progress and quality of work achieved so that any redress of deficiency, if present, is addressed. It is necessary to see that independent professional institutions are involved in concurrent quality assurance to provide this feedback so that the government mechanism can then take appropriate decisions to redress the issues that come up.

#### **Risk Coverage through Insurance**

Insurance coverage for housing stock is almost non-existent in the context of Nepal. Inevitably, such liabilities end up with the government act-



ing as guarantor of last resort. Hence the need for some form of direct assistance necessitated by the lack of insurance cover, scarcity of savings, and higher poverty levels. A beginning can be made by encouraging insurance coverage of all the houses that will be rebuilt or retrofitted. The government will make an effort to identify an appropriate policy framework and mechanism to see that the houses created in the course of reconstruction and recovery initiatives are insured.

### Assessment Methodology

The assessment of damages, losses and recovery needs is based on overall damage data provided by MoHA on the DRR portal. The data, collected through the District Disaster Relief Committee (DDRC) from VDCs, categorizes affected houses as fully collapsed and partially damaged. As per the damage data, 498,852 houses collapsed fully or were damaged beyond repair, and 256,697 houses sustained partial damage.

Field visits were made to Chautara (Sindhupalchowk District), Khokna (Lalitpur District); Bhaktapur (Bhaktapur District), Gorkha (Gorkha District), and Gangabhu and Sankhu (Kathmandu District), to understand the type and extent of damage to houses. Discussions with government officials involved in damage data collection at the district level indicated that buildings deemed damaged to the point that repair would be too expensive were counted as fully damaged. The same was reflected in the way the damage data was interpreted.

### HOUSING DAMAGE CALCULATION

Going by the 2011 Census, the building types in each district were categorized as low-strength (mud mortar-based) masonry; cement-based masonry; and reinforced concrete frame structures. The extent of physical damage to the three building types was calculated on the basis of vulnerability curves developed by NSET. On the basis of the Nepal Living Standards Survey 2010-2011, the average sizes of the three building types were calculated at 600 sq feet (low strength masonry houses); 900 sq ft (cement mortared houses, reflecting more well-to-do households), and 3,000 sq ft (reinforced concrete buildings, predominantly urban and multi-storeyed). In the same order, based on prevailing market rates, the cost per sq ft was NPR700, NPR1,200 and NPR2,000, respectively.

On the basis of the above mentioned values, the total damages were calculated as the replacement cost of fully destroyed buildings as well as repair cost (return to previous state) of partially damaged buildings estimated at 10 percent of replacement cost.

### Damage to Household Goods Calculation

Damage to household goods was based on an estimated value of household goods by building type. It was further estimated that in fully damaged houses, 60 percent of household goods were destroyed and in partially damaged houses 20 percent of the household goods were destroyed.

### Calculation of the Cost of Demolition and Debris Clearance

Many of the houses categorized as fully damaged are still standing in some form and need to be demolished at the earliest. It was estimated that in the category of fully damaged residential buildings, 20 percent of the low-strength masonry houses, 40 percent of cement-based masonry houses, and 80 percent of houses with RC frames needed to be demolished. The demolition costs were put at 5 percent of replacement costs, while clearance was pegged at NPR8,000, NPR20,000 and NPR250,000, respectively, for the three building types.

### Calculations of Real Estate Damages and Losses

Altogether, 10,700 units from 83 high-rise buildings and 2,881 bungalows from 45 colonies suffered varying levels of physical damage. Based on an understanding of the real estate sector market and prevalent market rates, the damages and losses were NPR4,210 million and NPR20,000 million, respectively.

### Rental Loss Calculations

Data on the number of rented apartments that collapsed is not available yet. Therefore, it is difficult to assess the loss of rental income. The most prevalent conditions that renters are in are as follows: they are being hosted by families and friends; have returned to their houses in their respective villages; or have found an alternate place on rent; or are staying in temporary shelters in camps. The assessment is based on the assumption that the option of alternate rented accommodation is minimal and there is loss of gross rental income. This will have to be confirmed by a detailed survey. The proportion of rental versus ownership was obtained from the 2011 Census. Rent scenarios and rates for ur-

**TABLE 1.8: CALCULATION OF RENTAL LOSS**

Districts	Average monthly rent (NPR)	Damaged rental units	Destroyed rental units
Kathmandu	21,350	30,182	21,988
Bhaktapur, Lalitpur, Patan	14,850	5,415	13,063
Other districts	4,200	20,492	7,958

ban and rural areas were obtained based on various sources. For partially damaged units, the rental loss was assumed as half the rent. Annual losses would be reduced over time as reconstruction proceeds and rental units are repaired, reconstructed and ready for occupation.

#### Cost Calculation of Transitional Shelters

The number of transitional shelters required is based on the number of households whose houses were fully destroyed. As mentioned earlier in this chapter, based on the damage data and the number of households per house, 609,938 households will need some form of transitional shelter.

Cost estimations of transitional shelter are based on the shelter package guide prepared by the National Planning Commission (NPC). Accordingly, the package should provide approximately 300 sq ft of covered space, roofed by two bundles of CGI sheets, and leveraging salvageable materials. Allowing for the use of salvaged materials, a cost of NPR 24,540 would be required for such a shelter.

#### Needs for Housing Reconstruction and Retrofitting Calculation

As mentioned earlier, while the current number for the houses that have to be rebuilt stand at 609,938, this number may change after detailed information becomes available following the household-level damage assessment.

The need for housing recovery is based on a uniform assumed need per household (not based on pre-existing houses) of a 450 sq ft core house built to seismic-resilient standards. The cost of construction was estimated at NPR900 per sq ft, equivalent to an increase of approximately 30 percent from the base replacement cost. The cost per house is, therefore, estimated at NPR. 405,000. This amount is the basis for defining needs, but does not suggest

that affected households will need to construct such houses. Besides, the amount required for constructing houses in remote areas and heritage settlements may be higher, and this aspect would be factored into the calculations. The government acknowledges that the house owner will exercise her/his choice of building type and house size at the time of reconstruction, conditional on compliance with seismic-resistant standards. In order to estimate construction material needs, it is assumed that the choice of rebuilding will shift slightly away from low-strength masonry buildings in favour of cement mortared and reinforced concrete buildings.

A total of 256,697 partially damaged buildings need repair and seismic retrofitting. The cost for retrofitting is estimated at 30 percent of the cost of a core house, and comes to NPR 121,500 per house.

**The recovery needs for clustering houses** have been calculated on the basis of initial information available from MoUD. Accordingly, about 22,254 houses require clustering. The costs have been calculated based on a district-wise average cost of clustering, shifting, provision of basic services, settlement planning, as well as the cost of land. The estimated costs come to NPR 10,525 million. The exact figures and costs would need to be updated by means of a more specific and rigorous assessment of ground conditions.

Training, Facilitation and Quality Assurance Costs: The total five-year budget for the cost of the socio-technical facilitation, including human resources, training, quality assurance, communication and other governance functions is estimated to be 2.5 percent of total needs.

The needs for urban planning, including heritage settlement planning are estimated at 2 percent of the total needs.





## 2. Health And Population

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### Summary

Severe damages and losses to health infrastructure, disruption of healthcare service delivery, more than 8,000 deaths and injuries to upwards of 20,000 individuals testify to the severe manner in which the health and population sector was affected. Over 80 percent of the affected health facilities were from the most affected districts and this affected the ability of these facilities to respond to the healthcare needs of vulnerable populations, including disaster victims, particularly in remote areas. The overwhelming share of damages and losses was borne by the public sector.

The first priority for the Ministry of Health and Population (MoHP) and District Health Offices (DHO) was to put the disrupted health services back on the rails to address the demands of an increased patient flow in the affected areas. In the aftermath of the earthquake, temporary structures had to be rented, drugs and supplies were needed, an outbreak of vector-borne diseases had to be prevented, and those affected by the earthquake required immediate treatment. Such activities have already been initiated by MoHP. Further, a comprehensive plan of activities has been developed for continued treatment of the injured, regularization of health services delivery, and repair and reconstruction of damaged health facilities, with the objective of making the sector better prepared for disasters.

**Recovery and Reconstruction Needs:** MoHP has adopted a three-pillared strategy for recovery and reconstruction that covers the immediate term (until mid-July 2015), intermediate term (over FY 2015-2016) and medium term (FY 2015-2016 to 2019-2020):

- The immediate-term strategy is to treat the injured and resume health services.
- The intermediate-term strategy is to replace the temporary arrangements (e.g. sheds on rent) with short-term arrangements to ensure the continuity of service delivery, cater to the changing pattern of healthcare needs, and provide routine services in an uninterrupted manner. This phase would also include de-

molition of damaged buildings, accomplishment of repair works and reinstatement of health facilities by setting up pre-fabricated structures. Moreover, work for setting up hospitals and rehabilitation centres, and strengthening institutional capacities of disaster preparedness, will be initiated.

- The medium-term strategy will focus on the reconstruction of the sector from a longer-term perspective of building back better. This would entail the reconstruction of buildings for health facilities after a more rigorous assessment of the existing network of health facilities and their capacities, giving due consideration to geography and the size of the concerned catchment population.

Of the total estimated budgetary needs of NPR 14.7 billion for recovery and reconstruction, the percentage allocation in successive years, starting from the current FY 2014-2015 to 2019-2020 is 1 percent, 17.3 percent, 22.6 percent, 20.1 percent, 19.6 percent and 19.5 percent, respectively.

**Implementation Arrangements:** Recovery and reconstruction of the sector will be guided by a Central Coordination Committee for Recovery and Reconstruction led by MoHP and will include development partners. Based on the finalized implementation plans, budgets will be allocated to districts on the basis of identified needs and resource availability. While major infrastructure and equipment, routine drugs and supplies as well as major human resources will be provided by the central government, the remaining activities will be accomplished by the concerned districts based on guidelines to be developed by MoHP.

### Pre-Disaster Context and Baseline

MoHP has a network of 4,118 health facilities ranging from central level specialized hospitals to Health Posts and Urban Health Centres at the Village Development Committee (VDC) and Municipality (MNC) levels, respectively. Out of the total public health facilities of the country, 19 percent are located in the 14 most-affected dis-



districts and 23 percent are located in the 17 moderately affected districts, as summarized in Table 2.1 (Department of Health Services, 2014). Similarly, there are more than 350 private sector health facilities that cater to the health care demands of the population, a majority of them being in Kathmandu Valley and other urban cities.

In addition, health services are delivered through 61 district Ayurvedic health centres, 14 zonal Aushadhalayas and 214 Aushadhalayas that come under the central government.

MoHP is responsible for the provision and regulation of health service delivery. In its latter role, the Ministry regulates the sector through regional Health Directorates, Medical Stores, Training Centres and Drug Administration Offices; and (Public) Health Offices at the district level.

#### POPULATION PROFILE

The population profile of the country shows that the highly and moderately affected districts constitute 20 percent and 17 percent of the total population (Department of Health Services, 2014/15). Similarly, the population profile of 2014-2015 shows that 21.1 percent and 16.6

percent of women who are pregnant at present reside in the highly and moderately affected districts, respectively. The distribution of the population by age group, including pregnant women and expected live births, is presented in the Table 2.2 below.

#### KEY MACRO INDICATORS

Consider Nepal's on track progress with respect to the targets of health-related millennium development goals (MDGs) as of 2013: the under-five mortality rate was 40 per 1000 live births (Central Bureau of Statistics, 2014), a 73 percent decline from the 1990 figure of 142 per 1000 live births in 1990. The infant mortality rate was 33 per 1000 live births (Central Bureau of Statistics, 2014), a 63 percent decrease from the 1990 figure of 99 per 1000 live births. As of 2014 the maternal mortality rate was 190 per 100,000 live births, down from 790 in 1996 (WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division, 2014). Moreover, in 2011, the total fertility rate was 2.6 births per women, a significant decline from 5 births per women in 1990 (Ministry of Health and Population, New ERA, and ICF International Inc., 2011).

**TABLE 2.1: NUMBER OF PUBLIC HEALTH FACILITIES**

District category	Hospitals	PHCCs	HPs	Total
Highly-affected districts (14)	26	44	723	793
Moderately-affected districts (17)	20	44	882	946
Other districts (44)	58	120	2,201	2,379
Total	104	208	3,806	4,118

Source: Annual Report 2070/71, DoHS

**TABLE 2.2: POPULATION PROFILE IN AFFECTED DISTRICTS figures in thousands**

District category	Total	Population of 0-11 months	Population of 0-4 years	Female population of 15-44 years	Currently pregnant women*	Adolescent population (10-19 years)	Expected live birth per month*	Pregnant women experiencing obstetric complications each month*
Highly affected (14)	5,633	116	535	1,449	93	1,285	10	1.5
Moderately affected (17)	4,651	100	460	1,259	73	1,077	8	1.2
Others (44)	17,439	392	1,825	4,435	274	4,005	30	41
Total	27,723	609	2,820	7,144	440	6,366	48	43.7

Source: Health Management Information System, 2014/15, DoHS

\*Estimates from MISP calculator based on total population

The percentage of households staying within 30 minutes of travel time to Health Posts (HPs), Public Health Care Centres (PHCC)/public hospitals and private clinics/hospitals is 61.8 percent, 33.6 percent and 53.4 percent of the total, respectively (Central Bureau of Statistics, 2011). Similarly, the percentage of consultations taking place for acute illnesses at public facilities and private facilities (including pharmacies) is 37 percent and 63 percent of total consultations (Central Bureau of Statistics, 2011). The Population Census of 2011 also shows that percentage of disability among males and females is 2.2 percent and 1.7 percent, respectively (Central Bureau of Statistics, 2014).

The exemption of users' fees at lower tiers of public health facilities, including free provision of delivery services, have contributed to pro-poor orientation of public health subsidies in Nepal. However, the distribution of Human Resources (HR) has been persistently inequitable. Out of a 32,809 strong public health workforce in Nepal, 45 percent are concentrated in the Central Region whereas only 7 percent are in the Far-Western Region (Ministry of Health and Population, 2013). Per capita government expenditure on health was NPR 827 in 2013-2014 (Ministry of Finance, 2014) while the per capita total health expenditure was estimated at US\$ 39 for 2013 (World Health Organization, 2015).

#### **DISASTER PREPAREDNESS**

In 2013, as part of its disaster preparedness effort MoHP set up a Health Emergency Operation Centre (HEOC) in its premises (with support from WHO and development partners), which proved to be very helpful in managing the health sector response in the aftermath of the earthquake.

#### **EMERGENCY MANAGEMENT OF HEALTH CARE NEEDS**

Similarly, hub hospitals and satellite centres were identified for the emergency management of health care needs, and early deployment training was provided to the hospital staff in Kathmandu Valley. GIS mapping of health facilities was also carried out which helped in checking the status of health facilities after the earthquake. Medical logistics (especially medical tents, inter-agency emergency health kit, diarrhoeal treatment

kits, surgical kits and reproductive health kits) were pre-positioned in strategic locations such as the Department of Health Services (DoHS) complex, Tribhuvan University Teaching Hospital (TUTH) and Patan Hospital. MoHP also engaged in building the capacities of staff with regard to Mass Casualty Management (MCM), Hospital Preparedness for Emergencies.

Similarly, over the last couple of years, MoHP initiated structural and non-structural assessment of health facilities to minimize the risk of potential disasters. Assessment of all fast track/priority hospitals, nine health facilities (one Primary Health Care Centre [PHCC], one Health Post [HP] and one sub-health post each selected from Kathmandu, Lalitpur and Bhaktapur districts) was also carried out before the earthquake. Non-structural mitigation, including retrofitting, was conducted in TUTH, Patan Hospital, Bhaktapur Hospital and Civil Service Hospital.

#### **PROTOCOLS AND GUIDELINES**

In addition, standards for public health emergency management (mass casualty management strategy), protocols, referral and early deployment guidelines, and Rapid Response Team guidelines were developed. These initiatives contributed to the overall effectiveness of the health sector response in the aftermath of the earthquake. The trauma protocols helped the international and national medical teams use a common approach for the treatment of the seriously injured. Further, HEOC remained the command centre of MoHP during the first few weeks following the earthquake. At the district level, the DHO represented the health sector in the District Disaster Response Committee (DDRC).

### **Post-Disaster Context**

#### **DAMAGE TO HEALTH INFRASTRUCTURE AND CASUALTIES**

A total of 446 public health facilities were completely destroyed. Among them were five hospitals, 12 Primary Health Care Centres (PHCCs), 417 HPs and 12 others. In the private sector, including non-governmental and community institutions, 16 health facilities were completely destroyed. A total of 8,702 deaths and 22,303 injuries were reported, requiring an

immediate response from the health sector for the treatment of those injured and resumption of regular health services.

The largest number of completely destroyed health facilities was in Sindhupalchowk, Nuwakot and Gorkha districts. The damage status of public health facilities was reported by the respective District (Public) Health Offices (DPHOs). This was validated during the assessment team's field visit in the course of consultations with the concerned focal persons at the district level. In addition to the completely damaged 446 district and sub-district public health facilities, certain buildings of central hospitals (such as Maternity

Hospital and Bir Hospital, both in Kathmandu) were also severely damaged, causing an interruption in the delivery of health services. A total of 701 public facility structures and 64 private facilities reported partial damage. The status of health facilities is presented in Table 3.

#### IMMEDIATE RESPONSE

Immediately after the earthquake, MoHP organized a meeting to manage the health sector response and activated HEOC. A high-level committee chaired by the Secretary, MoHP, was formed on 25 April to oversee and guide the overall health sector response in the aftermath of the disaster.

**TABLE 2.3: DAMAGE STATUS OF HEALTH FACILITIES**

Districts	Hospital		PHCC		HP		Others		Private sector facilities	
	Completely damaged	Partially damaged	Completely damaged	Partially damaged	Completely damaged	Partially damaged	Completely damaged	Partially damaged	Completely damaged	Partially damaged
Bhaktapur	0	1	1	1	6	9	0	0	0	6
Dhading	0	1	1	1	33	12	1	1	3	5
Dolakha	1	1	0	1	33	16	1	0	3	2
Gorkha	0	1	1	2	35	24	6	6	3	3
Kathmandu	0	0	1	7	7	33	0	0	0	24
Kavre	0	1	1	2	32	50	0	1	0	2
Lalitpur	0	0	0	2	9	20	1	0	0	12
Makawanpur	0	0	1	2	14	13	0	0	3	6
Nuwakot	1	0	1	1	43	19	1	1	0	0
Okhaldhunga	0	0	0	0	17	17	0	0	0	0
Ramechhap	1	0	1	1	20	28	0	1	0	0
Rasuwa	1	0	0	1	14	3	1	0	1	2
Sindhuli	0	1	1	3	23	7	0	0	1	2
Sindhupalchowk	1	0	1	2	62	17	1	0	2	0
Total (14 districts)	5	6	10	26	348	268	12	10	16	64
Other districts	0	13	2	28	69	330	0	0	0	0
Central and regional level hospital/ administrative blocks		20	0	0	0	0	0	0	0	0
Total	5	39	12	54	417	598	12	10	16	64

Source: Field assessment for 14 districts; D(P)HO reporting for other districts; reporting by individual hospitals and associations for the private sector.

HEOC, situated in the premises of MoHP, coordinated with the affected districts for regular updates on the effects of the earthquake and immediate needs which helped in making decisions on the deployment of medical teams, supply of drugs and other logistics. The six emergency hub hospitals in Kathmandu Valley were activated to provide medical services to the injured, including those referred from other districts. The high level committee mobilized teams at the hubs and sent officials to the highly-affected districts to ensure that the response to immediate needs was properly coordinated.

A central Information Management Unit was set up under HEOC to compile health services-related information and a hospital-based surveillance system was initiated. A toll free number (1660 01 33 444) was also set up at HEOC to help people access information about treatment and address their grievances. Similarly, a customs release desk for medicines and equipment was established on 1 May 2015 at Tribhuvan International Airport to facilitate the speedy release of drugs and medical equipment at the customs office and channel other health-related international support measures. From 1 May onwards, HEOC started producing situation update reports on a daily basis.

## HEALTH SERVICES DELIVERY AND ACCESS

### Assessment of Situation and Medical Needs

Damage to infrastructure and assets disrupted the delivery of services at a time when the demand for services increased due to the large numbers of people getting injured. Eighteen health workers and volunteers lost their lives while 75 sustained injuries, adding to the challenges of delivering health services. Public health and medical officials of MoHP were sent to the highly-affected districts to help the district offices resume their health services.

Apart from the interruption of some services in severely-affected HPs and PHCCs, basic and emergency health services were being delivered. Public and private health facilities that were not damaged continued to provide routine health services even as national and foreign medical teams provided medical services in different locations. In the most-affected districts, Dis-

trict (Public) Health Offices (D[P]HO), with the support of partners, also conducted mobile health camps, particularly focusing on a set of priority life-saving services. Public and private facilities also extended their health services in tents where facilities were completely damaged or the existing space was not sufficient due to the high patient flow. Besides the emphasis on delivery of routine health services, dignity kits, hygiene kits and reproductive health kits were provided in the severely-affected districts. In addition to ensuring regular services at damaged facilities, there is now a demand for other services such as psychosocial counselling with effective referral linkages.

### Provision of Free Treatment

The Government of Nepal (GoN) made a decision to bear the cost of treatment of all the people injured in the earthquake to ensure timely treatment and save affected households the additional financial burden. Hospitals were instructed to provide free treatment to all the injured. However, there were some complaints at HEOC that some private hospitals were charging a fee from earthquake victims. At the time of preparation of this assessment, MoHP was in the process of collecting data on the patients treated by hospitals and reimbursing them for providing those services free of charge.

### Deployment of Medical Teams and Establishment of Field Hospitals

In addition to public health facilities and designated private hospitals, delivery of free services was extended through temporarily established field hospitals as well as national medical teams (NMTs) and foreign medical teams (FMTs). By 2 June, a total of 20 temporary field hospitals, 47 national medical teams and 133 foreign medical teams (FMTs) had provided health services in the affected districts. As shown in Table 2.4, a total of 2,385 foreign medical personnel, including 1,068 doctors, were deployed, many of them in hard-to-reach areas, with the necessary logistics. Patients requiring care at a higher level of health facility were air-lifted to Kathmandu.

As of 2 June 2015, a total of 25 FMTs were providing health care services in the earthquake-affected districts. Temporary field hospitals established by different foreign teams also played



an important role in delivering inpatient and outpatient services. Other medical teams mainly focused on emergency and outpatient treatment services and referred the complicated cases to the nearby hospitals. Different organizations also provided logistics such as tents, medicines and supplies, and health kits (dignity kit, reproductive health kit, hygiene kit).

Thus, foreign and national medical teams played an important role in meeting the immediate health care needs of the injured people. However, coordination with DHOs presented a challenge, particularly for teams in remote areas far from the district offices. Table 2.5 shows the cumulative data of health services delivery (outpatient and inpatient services, including surgeries and trauma cases) as reported by the health facilities monitored in the 14 highly-affected districts until 8 June 2015.

#### Trauma Management

A Casualty Triage Desk was also established at the Tribhuvan International Airport on 29 April 2015 to accord priority to critical patients who brought by air for the initial and basic symptomatic management before referring them to the appropriate higher-level hospitals. By 2 June 2015, a total of 443 casualties had been referred by the Casualty Triage Desk. Trauma cases were mainly

handled by the six emergency medical hubs of the Kathmandu Valley and other hospitals.

#### Management of Dead Bodies

Of the 8,702 deaths reported by 02 June 2015, 45 percent were male and 55 percent were female. This shows that the female population was more affected by the quake than the male population. Table 2.6 provides figures of deaths and injuries by gender and district.

Timely identification and handing over the bodily remains to the concerned families was immensely important to minimize the stress and emotional trauma of affected families. As of 2 June, 8,672 dead bodies had been handed over to the next of kin.

#### PUBLIC HEALTH GOVERNANCE

##### District Capacity and Human Resource Situation

The existing capacity of MoHP in general and that of concerned DHOS were stretched to ensure the resumption of disrupted health services delivery, coordinate with concerned partner agencies and stakeholders to manage the increased flow of patients. DHOs coordinated closely with DDRCs and Health, Water Sanitation & Hygiene, Nutrition and Protection clus-

**TABLE 2.4: DISTRICT-WISE DEPLOYMENT OF FOREIGN MEDICAL TEAMS**

Districts	Number of FMTs	Number of doctors	Number of nurses	Number of other team members	Total team members
Bhaktapur	11	41	52	120	213
Dhading	13	53	26	47	126
Dolakha	5	42	6	36	84
Gorkha	10	41	23	31	95
Kathmandu	26	452	62	258	772
Kavrepalanchowk	15	116	46	111	273
Lalitpur	10	78	10	110	198
Lamjung	1	5		0	5
Makawanpur	1	3	2	4	9
Nuwakot	9	43	32	70	145
Ramechhap	2	4	6	4	14
Rasuwa	4	24		6	30
Sindhupalchowk	26	166	100	155	421
Grand total	133	1,068	365	952	2,385

Note: Data as of 02 June. Source: HEOC, MoHP

ters, as well as FMTs and NMTs. MoHP also provided the necessary budget to the districts to procure urgently required items such as medicines, create power back-ups, and pay rent for the buildings.

Public health facility staff was instructed to continue in their work stations and regularize the delivery of health services. However, the assessment team noted that a significant percentage of sanctioned posts of health workers are currently vacant. For instance, out of the 306 sanctioned posts for health workers in Sindhuli, only 185 were filled. This meant that many among the available health workers had to work overtime to manage the increased patient flow even though their own shelter was damaged and family members were directly affected by the earthquake. Health workers in districts reported that they were overworked and sometimes not be able to sufficiently cater to the surge in the patient flow. Considering this, MoHP has already sent 58 additional medical doctors in the affected districts. Motivating health workers possibly through financial and incentives in kind, and keeping their morale high is very crucial for better management of any disaster.

#### Information Management System

Routine information systems such as the health management information system (HMIS) were affected by the earthquake. Reporting forms and formats were not to be found at some health facilities. Some facilities even lost their service register, making follow-up difficult, particularly of those with communicable diseases such as tuberculosis. This will also add to the challenges in effective management of health services in the affected areas. The pattern of healthcare needs, too, will vary across affected areas due to the mi-

gration of people and high numbers of injuries. The important health indicators that guide health service delivery (e.g. expected number of pregnancies/deliveries) are expected to change because of population migration from one catchment area to another. These aspects will have to be taken into account while planning the implementation of activities at the district level.

#### RISK AND VULNERABILITY

##### Hospital-based Post-earthquake Surveillance System

Considering the risk of epidemic and disease outbreak, HEOC established a hospital-based post-earthquake surveillance system to cover public and private hospitals in the 14 highly-affected districts. Initially, this surveillance system covered 96 treatment sites, including 66 hospitals and temporary camps within the Kathmandu Valley and 30 hospitals and temporary camps outside. From 28 May, the number of sentinel hospital sites was reduced to 38 in the 14 most-affected districts.

The surveillance system is important to ensure that outbreaks are not missed. The number of syndromes crossing the threshold level (doubling of the average of the previous seven days, with a minimum of five cases) gives signals to be in an alert position. Four outbreak-prone conditions, namely acute respiratory illness, watery diarrhoea, bloody diarrhoea, and fever of unknown origin, were been routinely monitored by MoHP. No outbreaks were reported as of 2 June 2015.

##### High-risk Population Groups

Access to health facilities has deteriorated in remote areas. Pregnant women, women in a

**TABLE 2.5: TOTAL NUMBER OF SERVICES PROVIDED IN THE 14 MOST-AFFECTED DISTRICTS**

Category	Public	Private	Community/NGO	Temporary hospital	Total
Outpatient	67,762	31,686	12,191	5,339	116,978
Inpatient	22,062	11,690	6,757	690	41,199
Major surgeries	1,739	916	485	81	3,221
Minor surgeries	2,630	802	361	310	4,103
Trauma cases	9,320	3,629	2,244	174	15,367

*Note: Data as of 2 June as reported by health facilities being monitored.*

*Source: Health facility-based surveillance system, HEOC*

post-natal condition and newborns are the single biggest vulnerable group considering their usual needs of health care services. This assessment estimated around 30,000 deliveries and a corresponding number of newborns who would be directly affected in the three months following the earthquake. Any barrier in health services delivery exposes the vulnerable people to further risk. Similarly, those suffering from chronic conditions (TB, HIV, leprosy and non-communicable diseases), severely injured persons, and people living with disabilities (PLWD), children, elderly, and adolescents are also vulnerable to health risks in such a post-disaster scenario, requiring special attention in the recovery plan. With 1.94 percent of disability (Central Bureau of Statistics, 2014), total number of people with disability is estimated to be above 100,000 in the 14 most-affected districts. The number of disabilities will increase following the earthquake.

#### Health Facilities at Risk

As there is a risk of landslides and other threats such as floods during the monsoon season, some of the health facilities may also be exposed to risks particularly those located in remote,

mountainous areas, which run the risk of losing contact with the district headquarters and even from Kathmandu Valley due to road blockades by landslides. Problems are also caused by power cuts (directly affecting the cold chain, among others); relative lack of safe drinking water and hygiene facilities in the affected communities, which increases the risk of waterborne diseases. These scenarios imply that district offices and the centre have to be prepared for rapid response to manage possible future disasters along with the maintenance of minimum stock of drugs and other supplies in strategic locations.

#### DAMAGES AND LOSSES

##### Estimating Damages and Losses of Infrastructure by Type

Based on the data reported by district offices and field assessment in the 14 most-affected districts, inventories of physical damage to buildings, equipment, instruments, furniture, and drugs and supplies were created. The damages of health facilities were calculated by applying the unit price of each type of health facility separately for complete and partial damage.

**TABLE 2.6: DISTRICT-WISE NUMBERS OF LOSS OF LIVES AND INJURIES**

District	Death			Total	Injured
	Male	Female	Unknown		
Sindhupalchowk	1,497	1,943	0	3,440	2,101
Kathmandu	621	600	1	1,222	1,218
Nuwakot	459	627	0	1,086	662
Dhading	340	393	0	733	952
Rasuwa	287	310	0	597	7,949
Gorkha	213	230	0	443	1,179
Bhaktapur	118	215	0	333	3,052
Kavrepalanchowk	129	189	0	318	229
Lalitpur	67	107	0	174	1,051
Dolakha	84	85	1	170	61
Ramechhap	16	23	0	39	135
Makawanpur	16	17	0	33	771
Okhaldhunga	10	10	0	20	230
Sindhuli	5	10	0	15	1,571
Total of 14 districts	3,862	4,759	2	8,623	21,161
Moderately affected 17 districts	25	19	0	44	1,142
Other districts	12	23	0	35	
<b>Total</b>	<b>3,899</b>	<b>4,801</b>	<b>2</b>	<b>8,702</b>	<b>22,303</b>

Source: DRR Portal, MoHA

Similarly, the amount of losses was estimated under three broad categories, namely treatment services to the injured, other service provisions for the affected population, and governance and risk management. The unit cost was defined in consultation with respective technical experts based on which the cost of damages and losses was estimated as shown in Table 2.7.

The total value of disaster effects (damages and losses) is estimated to be NPR 7.54 billion, 85.1 percent of which constitutes damages and 14.9 percent amount to losses. The public sector accounted for 81.5 percent of the disaster effects, as there is a greater presence of public health facilities as compared to private facilities.

#### **DISTRICT-WISE ESTIMATION OF DAMAGES AND LOSSES**

An attempt was made to disaggregate the value of damages and losses by district, which is summarized in Table 2.8. The districts of Gorkha, Sindhupalchowk and Dolakha are the hardest hit in terms of the disaster effects of the earthquake, with a combined share of 20.3 percent of the damages and losses, following central health infrastructure which alone accounted for 32.8 percent of the total value of the disaster effects.

#### **Impact on Development Goals**

The effect on the health spectrum was quite diverse, leaving many with long-term problems. Many people who have undergone major surgeries like amputation or severe spinal injury will suffer from long-term disability, which holds heavy financial implications for concerned families and larger society. Deaths and rise in disability will have a detrimental effect on people's health, with many years lost in adjusting to conditions of disability. Also, the earthquake, followed by hundreds of aftershocks, has left a significant proportion of the Nepali population mentally traumatized to some degree.

The fact that basic health service like ante-natal check-up, medical care and continuity of services to those with communicable diseases, child and neonatal health services and many other public health programmes will be affected for some time to come, is bound to have a socio-economic impact in the longer term. Deteriorating access to health care may lead to a high morbidity and

mortality rate of diseases. The negative impact on health is also expected due to the effect on the nutritional status of the vulnerable population in affected districts. The earthquake will cause mortality rates for the current year to increase and life expectancy to decrease. However, the years lost due to injuries and other longer term socio-economic impacts of the earthquake in the health and population sector have not been estimated in terms of monetary value.

### **Recovery and Reconstruction Strategy**

MoHP formed a coordination committee for the assessment of needs and planning for recovery and reconstruction of the health sector under the chief of its Policy, Planning and International Cooperation Division. Based on the information available from the districts, an initial set of necessary activities was defined before the actual PDNA process was initiated. However, a concrete strategy for recovery and reconstruction was worked out following the PDNA process that was carried out together with concerned DPHOs.

While the proper reconstruction of the sector may take many years, the prime concern at present is to resume health services to address the immediate health care needs of the population. Considering this scenario, MoHP has adopted a **three-pillared strategy for recovery and reconstruction** for the immediate term (until mid-July 2015); the intermediate term (over FY 2015-2016) and medium term (FY 2015-2016 to 2019-2020).

**The immediate-term strategy (until mid-July 2015) is to furnish the districts with necessary logistics and human resources** within the current fiscal year to resume essential health services, organize health camps and enable district offices and facilities to deal with imminent risks and vulnerabilities such as those resulting from the monsoon, landslides and possible disease outbreaks.

This phase also includes a technical assessment of buildings, demolition of completely damaged structures and quick repairs so that services can be resumed. This strategy also includes managing the exit of medical teams and temporary



**TABLE 2.7: ESTIMATES OF DAMAGES AND LOSSES BY TYPE**

amount in NPR million

<b>Estimation of damages</b>			
<b>Facilities completely destroyed</b>	<b>Public</b>	<b>Private</b>	<b>Total</b>
Hospitals and administrative buildings	2,102	760	2,862
Primary healthcare centres	120		120
Health posts	1,877		1,877
Others	45		45
<b>Sub total</b>	<b>4,144</b>	<b>760</b>	<b>4,904</b>
<b>Facilities partially destroyed</b>			
Hospitals and administrative buildings	198	456	654
Primary healthcare centres	81		81
Health posts	404		404
Others	20		20
<b>Sub total</b>	<b>703</b>	<b>456</b>	<b>1,159</b>
<b>Equipment and logistics</b>			
Equipment	284		284
Office equipment and furniture	41		41
Medications and supplies destroyed	13		13
Other medical logistics and supplies( e.g. instruments, HMIS forms)	22		22
<b>Sub total</b>	<b>360</b>	<b>0</b>	<b>360</b>
<b>Total damages</b>	<b>5,206</b>	<b>1,216</b>	<b>6,422</b>
<b>Estimation of Losses</b>			
<b>Demolition and removal of debris</b>			
Hospitals	17	16	33
Primary healthcare centres	2	0	2
Health posts	42	0	42
Others	3	0	3
<b>Sub total</b>	<b>63</b>	<b>16</b>	<b>79</b>
<b>Treatment services for injured</b>			
Reimbursement for treatment of seriously injured	121	0	121
Transportation for the referral to higher level of facilities	13	0	13
Revenue lost due to waiver of users fees (outpatient treatment)	32	37	69
Payment for treatment services (user fee)	120	125	245
Rehabilitation services for those having disability	155	0	155
Budget allocation by MoHP for management of service delivery	67	0	67
Psychosocial counselling	1	0	1
Referral for those needing rehabilitation services	1	0	1
<b>Sub total</b>	<b>509</b>	<b>162</b>	<b>671</b>
<b>Other service provisions for affected population</b>			
MBBS doctor in highly affected areas	21	0	21
Establish five step down hospital and rehabilitation centres	28	0	28
Subside contribution to affected population for enrolment in health insurance	200	0	200
Establish geriatric ward in highly-affected hospitals	17	0	17
Temporary arrangement for health facility building (e.g. shed & rent)	10	0	10

<b>Estimation of damages</b>			
<b>Facilities completely destroyed</b>	<b>Public</b>	<b>Private</b>	<b>Total</b>
Resuming utility services at damaged facilities	10	0	10
Mobile services through mobile camps	10	0	10
Reproductive health and geriatric care	2	0	2
<b>Sub total</b>	<b>297</b>	<b>0</b>	<b>297</b>
<b>Governance and risk management</b>			
Public awareness through media and IEC and BCC activities	5	0	5
Water and sanitation campaigns	7	0	7
Pre-positioning of medicine for monsoons and for outbreaks	3	0	3
Outbreak investigation and response team at the central level	1	0	1
Public health inspector - to monitor the situation and responses	48	0	48
Outbreak prevention and response at the district level	3	0	3
Monitoring and supervision	4	0	4
Information management (HMIS/LMIS tools, data recovery)	0	0	0
Support and mobilize DRRT (in 14+21 districts)	1	0	1
Monitoring and management of information, disease surveillance	2	0	2
<b>Sub total</b>	<b>74</b>	<b>0</b>	<b>74</b>
<b>Total losses</b>	<b>944</b>	<b>178</b>	<b>1,122</b>
<b>Grand total (effects of earthquake)</b>	<b>6,150</b>	<b>1,394</b>	<b>7,544</b>

Source: Estimation by Assessment Team based on data of damages and losses.

**TABLE 2.8: ESTIMATES OF DAMAGES AND LOSSES BY DISTRICT** Amount in NPR million

<b>Districts</b>	<b>Infrastructure</b>	<b>Medical equipment</b>	<b>Office equipment</b>	<b>Medicines &amp; supplies</b>	<b>Other logistics</b>	<b>Others losses</b>	<b>Total</b>	<b>Total (%)</b>
Bhaktapur	95	3	0	-	1	16	115	1.5
Dhading	365	2	2	-	0	61	431	5.7
Dolakha	384	7	3	2	1	66	465	6.2
Gorkha	396	16	12	4	3	72	503	6.7
Kathmandu	246	2	5	-	0	42	296	3.9
Kavre	223	8	1	0	2	39	272	3.6
Lalitpur	148	0	1	-	0	25	174	2.3
Makawanpur	275	-	-	-	-	46	320	4.2
Nuwakot	279	2	3	0	1	47	332	4.4
Okhaldhunga	90	0	0	1	0	15	106	1.4
Ramechhap	178	8	1	0	3	32	221	2.9
Rasuwa	178	3	3	1	2	31	218	2.9
Sindhuli	195	0	1	0	0	33	229	3.0
Sindhupalchowk	456	10	6	2	5	80	559	7.4
Total of 14 districts	3,507	62	38	12	19	603	4,241	56.2
Other districts	695	6	4	1	3	118	826	11.0
Central hospitals/ buildings	1,940	216	-	-	-	322	2,477	32.8
<b>Grand Total</b>	<b>6,357</b>	<b>284</b>	<b>41</b>	<b>13</b>	<b>22</b>	<b>1,043</b>	<b>7,544</b>	<b>100</b>

Source: Estimation by Assessment Team based on data of damages and losses.

field hospitals established in different locations by FMTs to address the urgent needs of the population. Priority will be given for the utilization of available local resources and the budget received for disaster risk reduction (DRR).

More specifically, the demolition of damaged buildings, temporary arrangements for taking sheds on rent, purchase of medical instruments and office materials, resumption of utility services such as electricity, water, communication, and internet are to be accomplished by mid-July 2015. Similarly, doctors would be deployed in needy districts, and medicines would be kept in strategic locations for the monsoon, possible disease outbreaks and disasters in the near future.

Besides the existing structures and temporary set-ups, health services will also be delivered through mobile camps with a special focus on reproductive health, psychosocial counselling and rehabilitation. Provision of treatment, physiotherapy and peer counselling needs to be included into plan and costing. Another immediate priority is the rehabilitation of birth centres most of which were damaged by the earthquake. At the central level, strengthening of surveillance and response system and awareness campaigns will be carried out.

**The strategy for the intermediate term** is to replace the temporary provisions with short-term arrangements to ensure the continuity of service delivery and address the changing pattern of healthcare needs in the fiscal year 2015-2015. Continuing the demolition of remaining damaged buildings, retrofitting and reinstating health facilities by setting up pre-fabricated structures are some of the key initiatives that are earmarked for this phase. In specific terms, 25 percent of the fully damaged HPs and PHCCs and hospitals will be constructed with pre-fabricated materials to regularize services.

Based on the technical assessment of the buildings, the reconstruction process will also be initiated for concrete infrastructure. Other activities such as purchase of medical equipment, management of outbreak prevention and response and continuation of service delivery will be carried out over the fiscal year 2015-2016.

While the first and second strategies aim to address the immediate and intermediate needs for the recovery, **the third, medium-term strategy will focus mainly on the reconstruction of the sector from a longer term perspective.** In this period (FY 2015-2016 to FY 2019-2020), the existing network of health facilities and their capacity will be assessed in terms of the geographic spread of needs and population size. Based on this assessment, the plan for the medium-term plan will be further refined to include the construction of new physical infrastructure for health facilities, along with necessary equipment. Further, a comprehensive set of activities for disaster preparedness, response mechanism and governance structure are included under this medium-term strategy.

During this phase, concrete buildings will be constructed for HPs not constructed in pre-fabricated materials, and PHCC and hospitals. Establishment of emergency health centres at the zonal level and geriatric-friendly services in hospitals in the affected districts will also be considered during this phase. Following the principle of building back better, reconstruction plans for the medium-term will be built into the routine plans and strategies of MoHP including in the five-year health sector strategy that is being developed.

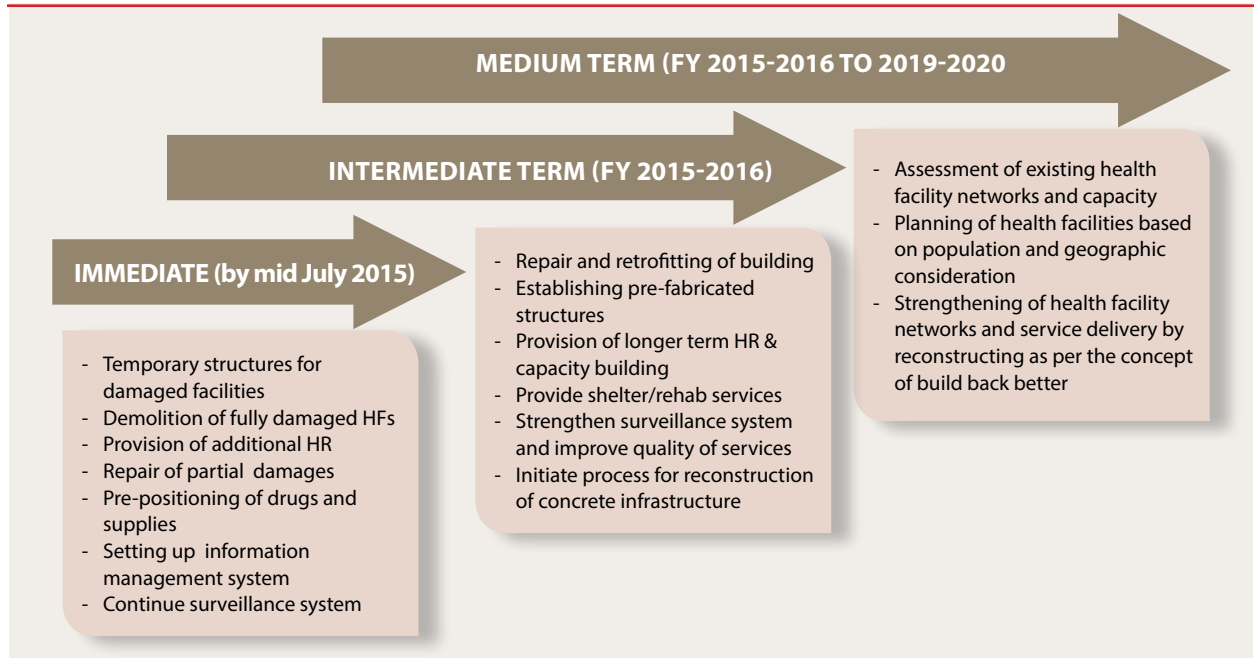
With the increased share of Persons with Disabilities (PLWD) as a result of earthquake, all short, medium and long-term infrastructure for health services will be disability friendly that ensures access of medical services and health facilities for PLWD.

Post-earthquake recovery also needs to address the demand for mental health treatment and psychosocial counselling and therefore needs to be integrated into all short, medium and long-term health strategies.

#### **RECOVERY PLAN AND BUDGET**

MoHP has developed a comprehensive plan for immediate resumption of health services by reconstructing damaged health facilities and, where appropriate, expanding services to new settlements through mobile camps. It includes a package of services for targeted vulnerable population groups, from pregnant mothers and newborns to senior citizens, and additional services to meet urgent health needs such as

**FIGURE 2.1: RECOVERY AND RECONSTRUCTION STRATEGY**



mental health, and rehabilitation, among others. Through this plan the MoHP also seeks to strengthen disease surveillance to protect communities from risk of outbreaks and disasters.

In the immediate plan, treatment of the injured and resumption of health services are mainly covered. In the intermediate plan, construction of prefabricated structure, strengthening of services, repair and maintenance and disaster preparedness and governance systems are included. Finally, the plan for the medium term mainly consists of reconstruction of damaged facilities, setting up of health emergency centres, purchase of land for selected HPs and other measures of disaster preparedness and service delivery. Recovery and reconstruction plan consist of district and central-level activities, which are summarized in Table 2.9 and Table 2.10.

The overall budgetary need for recovery and reconstruction is estimated at NPR 14.69 billion out of which NPR 6.28 billion NPR is needed for central-level activities and district-level activities require NPR 8.40 billion. The budgetary need estimated for recovery and reconstruction is almost double the value of damages and losses. This is mainly because of the larger scale of infrastructure that is being planned in view of the increased size of the catchment popula-

tion. Similarly, strengthening institutional capacity and disaster preparedness for the future will also result in higher needs for recovery and reconstruction. However, reconstruction and associated activities are based on the prevailing network of health facilities. Any major resettlement of population might have implications for the number of health facilities and their capacity, requiring a change in the estimate of needs.

**District-level Recovery and Reconstruction Needs**

The district-level recovery and reconstruction plan and related budget are summarized in Table 2.9. The total budgetary need for district-level activities is estimated to be NPR 8.4 billion out of which the percentage shares of needs for the immediate, intermediate and medium terms are 1 percent, 13.7 percent and 85.3 percent, respectively.

**Central-level Recovery and Reconstruction Needs**

The Central-level recovery and reconstruction plan and associated budget are summarized in Table 2.10. The total budgetary needs for central-level activities is estimated at NPR 6.28 billion out of which the shares for the immediate, intermediate and medium term plans are 1.7 percent, 3.1 percent and 95.1 percent, respectively.



## Implementation Arrangements

### STRATEGY FOR IMPLEMENTATION

Recovery and reconstruction of the health and population sector will be guided by a Joint Co-ordination Committee for Health Sector Recovery and Reconstruction led by the chief of Policy, Planning and International Cooperation Division of MoHP. It includes members of develop-

ment partners. The Committee will oversee the standards and specifications for health infrastructure and will be responsible for the implementation of the recovery and reconstruction plan.

After the finalization of the implementation plan, the budget will be allocated to the districts keeping in mind identified needs and resource availability. While major equipment and com-

**TABLE 2.9: DISTRICT-LEVEL RECOVERY AND RECONSTRUCTION NEEDS**

Activities	Amount in NPR million
	Estimated budget
<b>Immediate (until mid-July, 2015)</b>	
Demolition of damaged buildings	50
Temporary arrangement of building & rent	10
Arrangement of utility services	10
Medical instruments and office materials	2
Pre-positioning of medicine for monsoons and possible outbreaks	3
Health services through camps	1
Reproductive health and geriatric care	2
Psychosocial counselling	1
Rehabilitation services	1
Outbreak prevention and response	3
Monitoring and supervision	3
Information management (HMIS/LMIS tools, data recovery)	0
<b>Immediate need</b>	<b>86</b>
<b>Intermediate term (FY 2015/2016)</b>	-
Construction of health facilities (prefab structure)	697
Repair and maintenance of facilities	74
Equipment and drugs	339
Health services through camps	8
Reproductive health and geriatric care	12
Psychosocial counselling	7
Rehabilitation services	6
Monitoring, supervision and public hearings	8
<b>Intermediate-term need</b>	<b>1,150</b>
<b>Medium term (FY 2016/2017 to 2019/20)</b>	-
Construction of health facilities (concrete structure)	6,944
Purchase of land for health facilities	227
<b>Medium-term need</b>	<b>7,171</b>
<b>Total of district-level need</b>	<b>8,407</b>

Note: Some of the activities reflected in the intermediate plans will also be continued beyond the one year period  
Source: Estimation by the assessment team based on district assessment and activity plan

mon supplies and major human resources will be provided from the centre, the remaining activities will be accomplished by the districts based on a guideline to be developed by MoHP.

#### YEAR-WISE BUDGET IMPLICATIONS

A tentative timeline of the implementation of activities over the next five years is presented in

Table 2.11. Recovery and reconstruction activities have already been initiated. Of the total estimated budgetary need of 14.69 billion NPR for recovery and reconstruction, the percentage allocation in successive years starting from the current FY 2014-2015 to 2019-2020 is 1 percent, 17.3 percent, 22.6 percent, 20.1 percent, 19.6 percent and 19.5 percent, respectively.

<b>Activities</b>	<b>Amount in NPR million</b>
	<b>Estimated budget</b>
<b>Immediate term (until mid-July 2015)</b>	
Payment to hospitals for treatment	63
Doctor in the health facilities of highly affected areas	21
Data collection from hospitals and develop a treatment plan for injured	10
Strengthen the surveillance system	2
Support and mobilize rapid response team	0
Create public awareness through media and IEC and BCC activities	5
Outbreak investigation and response team	1
Water and sanitation campaign	7
<b>Immediate need</b>	<b>109</b>
<b>Intermediate term (FY 2015/2016)</b>	
Public Health inspector - to monitor the situation and responses	48
Establish step down hospital and rehabilitation centres	28
Establish monitoring mechanism and systems	1
Strengthening HMIS - printing tools, distribution and training	14
Strengthen central surveillance unit	2
Human resources for Health Emergency Operation Centre (HEOC)	50
Maintain minimum level of logistics requirement at different levels	0
Establishment of two-tier M & E mechanism	5
Strengthen information management for disaster preparedness	1
Demolition of central level hospital and administrative blocks	12
Retrofitting of partially damaged hospital and administrative blocks	36
<b>Intermediate term need</b>	<b>197</b>
<b>Medium term (FY 2016/2017 to 2019/20)</b>	
Contribution for affected families for their enrolment in insurance	200
Establish geriatric ward in highly affected hospitals	17
Reconstruction of central hospitals	3,750
Reconstruction of regional hospitals	1,200
Reconstruction of administrative buildings	180
Retrofitting of partially damaged building	560
Establishment of 9 Richter seismic resistance emergency centre at zonal level	70
<b>Medium-term need</b>	<b>5,977</b>
<b>Total of central-level need</b>	<b>6,283</b>

*Note: Some of the activities reflected in intermediate plans will also be continued beyond one year period  
Source: Estimation by Assessment Team based on district assessment and activity plan*

## Assessment Methodology

### SCOPE OF ASSESSMENT

Following the PDNA orientation, a working team was formed at the central level, led by Dr. Yagya Bahadur Kharki, honourable Member of the National Planning Commission (NPC). The central-level working team drafted the scope of work, working timeline, assessment tools for the assessment of infrastructure, service delivery, governance and risks as well as the planning template for recovery and reconstruction. Assessment tools mainly covered three aspects of work: validation of data already compiled at the centre, collection of additional information on the physical damage and its effects, and identification of recovery and reconstruction needs.

### FIELD VISIT IN 14 DISTRICTS

Fourteen teams were formed for each of the 14 most-affected districts. These teams were led by senior officials of MoHP and co-facilitated by representatives of partner agencies. An orientation session was organized for the field teams on 23 May following which the teams were dispatched to the field on 24, where they worked until 27 May. The field assessment teams consulted with the D(P)HO officials, health facility staff as well as other key stakeholders and collected information on the status of damages and

needs as per the provided templates. Collected information and field observations were shared by each of field team on 28 May.

### DATA COMPILATION, CLEANING AND ANALYSIS

While the field teams were compiling data from the districts, the central team started drafting the assessment report based on the secondary data that was already available. All the data collected from the districts was compiled, cleaned and analyzed to produce the summary tables.

### ESTIMATION APPROACH AND ASSUMPTIONS

Overall estimates of the damages and losses consist of the replacement cost of fully as well as partially damaged buildings, equipment and other logistics plus losses incurred as an effect of earthquake in terms of cost of treatment and management of response of the health and population sector. Estimation of the damages has been disaggregated by the level of health facilities (i.e. HP, PHCC, district hospitals and central hospitals in the public sector as well as private sector hospitals) and by district. In consultation with private sector service providers and data reported by hospital associations and individual hospitals, an estimate of the damages in the private sector was arrived at. Field assessment data pertaining to the 14 severely-affected districts was used as a reference for the estimation of damages and losses

**TABLE 2.11: YEAR-WISE BUDGETARY NEEDS FOR RECOVERY AND RECONSTRUCTION**

	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Total
Centre	109	447	1,694	1,350	1,350	1,333	6,283
District	42	2,094	1,620	1,596	1,528	1,528	8,407
Total	152	2,541	3,314	2,946	2,878	2,860	14,690
Total (%)	1.0	17.3	22.6	20.1	19.6	19.5	100.0

Source: Estimation by Assessment Team based on district assessment and activity plan

**TABLE 2.12: UNIT COST FOR THE ESTIMATION OF DAMAGES OF INFRASTRUCTURE**

Unit cost	Amount in NPR		
	Demolition cost	Value of building	Partial damage
HP	100,000	4,500,000	675,000
PHCC	150,000	10,000,000	1,500,000
District hospital	1,000,000	47,500,000	7,125,000
Central hospital block	1,500,000	35,000,000	5,250,000
Private facilities	1,000,000	47,500,000	7,125,000

in other districts in addition to reported data by the respective districts. Unit price, defined in consultation with technical experts, was applied to estimate the damages, losses and reconstruction of buildings (see Table 2.12).

However there are certain limitations in the estimation of damages, losses and needs. Firstly, years of life lost due to premature death, socio-economic impact of disability and other longer term impacts in society have not been included in the estimation of losses due to the complicated methodology involved. Secondly, losses incurred in terms of health workers not being able to work due to the disaster remain unaccounted for as reliable information was not available for such estimation. Thirdly, information on damages as of 9 June 2015 are only captured in the estimation of the damages and losses. Fourthly, the recovery and reconstruction plan covers only the public sector and estimates of budgetary need are at current market price without considering inflation in the years to come. Due to these limitations, the overall volume of damage and losses and budgetary needs for recovery and reconstruction may have been underestimated.

The estimates of the damages and losses as well as recovery and reconstruction needs were discussed within MoHP and with NPC and the PDNA secretariat in different rounds. The preliminary estimates of damages, losses and needs

were refined based on the suggestions received. Finally, a draft report was produced, discussed and finalized based on the feedback received.

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# 3. Nutrition

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## Summary

Undernutrition has been a longstanding problem in Nepal. The key indicators of child undernutrition such as stunted growth and wasting currently stand at 37.5 percent and 11.3 percent respectively at the national level. The most recently available pre-earthquake data collated from the 2014 Multiple Indicator Cluster Survey (MICS) and the 2014 Small Area Estimation (SAE) indicates a high rate of child undernutrition in the affected districts. Infant and Young Child Feeding (IYCF) practices were also found to be sub-optimal in those districts.

Given its cross-cutting nature, the nutrition sector does not have a separate infrastructure to operate nutrition programmes. Nutrition-specific interventions are provided through the health facilities and community-based extension services provided by Female Community Health Volunteers (FCHVs). Nutrition-sensitive interventions are provided through related sectors such as education, agriculture, and water, sanitation and hygiene. Hence, the damage caused by the earthquake to these sectors is bound to have an impact on nutrition levels as well.

A post-earthquake assessment found that food consumption practices have worsened in the affected districts compared with the levels recorded in the pre-earthquake assessment data. This will directly impact the nutritional status of the population, especially children under the age of five, and pregnant and lactating women who constitute the primary vulnerable groups as far as undernutrition is concerned. Around 250,000 children from the ages of six months to 59 months, and 135,000 pregnant and lactating women are estimated to have been affected by the earthquake in the 14 most-affected districts.

As of now, there are no first hand statistics on the impact of the earthquake on the nutritional levels of the affected population in Nepal. Experiences from other countries show that underlying factors such as food insecurity, poor quality of drinking water, sanitation and hygiene as well

as poor caring practices and disease outbreaks inevitably have a gradual impact on the nutritional status of a disaster-affected. Hence, the immediate concern is to prevent the deterioration of nutritional levels among the affected population, with a particular focus on pregnant and lactating women as well as young children as these sections have specific nutritional needs.

Recovery and reconstruction activities have been proposed to address immediate as well as longer-term needs. Supplementary food assistance and Multiple Micronutrient Powder (MNP) supplementation has been planned for vulnerable sections in the initial year. These activities will take place in conjunction with routine nutrition services provided by the health system, homestead food production, enhanced education and counselling on optimal Maternal Infant and Young Child Nutrition (MIYCN), management of severe acute malnutrition (SAM), promotion of efforts to increase production and utilize nutrient-rich agriculture, including livestock products, and capacity enhancement, all of which will continue as measures for the medium as well as long term. Nutrition assessments to monitor and guide the interventions have also been planned. The total recovery needs are estimated to be NPR 5,036 million (US\$ 50.4 million).

The overall recovery strategy will be aligned with Nepal's Multi-sector Nutrition Plan (MSNP) through multi-sector, multi-stakeholder and multi-level coordination and collaboration.

## Pre-Disaster Context and Baseline

### A PERSISTENT PROBLEM

Undernutrition has been a persistent problem in Nepal, particularly amongst children under the age of five years, and pregnant and lactating women. The 2014 MICS provides the latest statistics on child undernutrition which put the rates of stunted growth, underweight and wasting at 37.5 percent, 30.1 percent and 11.3 percent, respectively.<sup>9</sup>

<sup>9</sup> Government of Nepal, National Planning Commission (NPC) Secretariat, Central Bureau of Statistics and UNICEF (2015). Nepal Multiple Indicator Cluster Survey 2014, Key Findings and Tables.



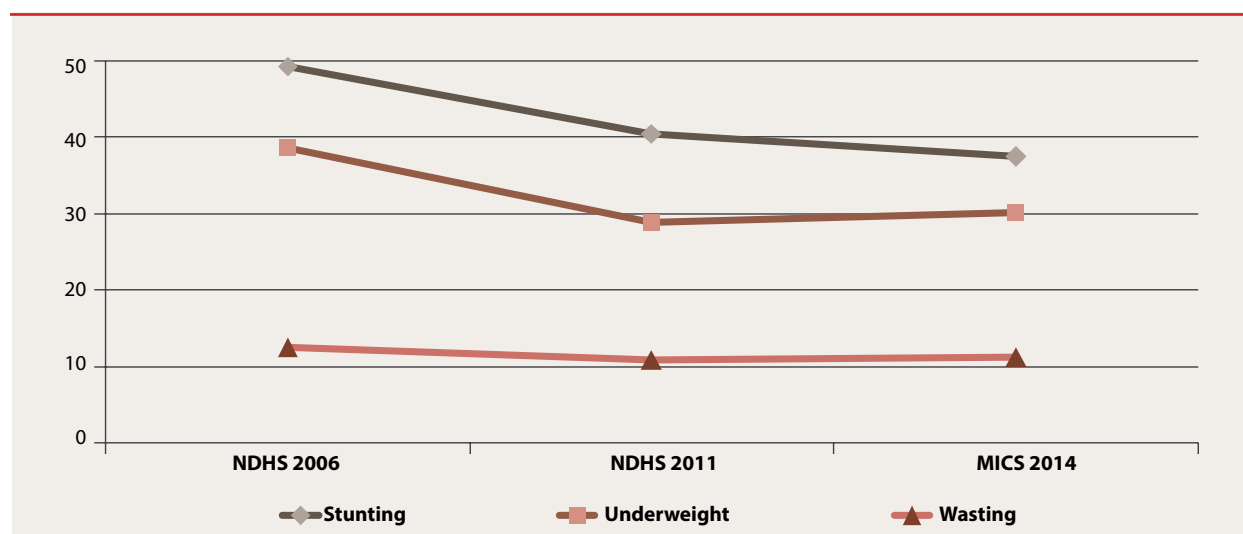
Figure 3.1 shows a comparison of the findings of MICS with the situation five and 10 years ago as recorded in the 2011 Nepal Demographic and Health Survey (NDHS)<sup>10</sup> and 2006<sup>11</sup>. Though the prevalence of stunting seems to be declining, it is still considered very high according to the World Health Organization’s (WHO) Categorization of the Public Health Significance of Undernutrition Indicators. In the past five years, the prevalence of underweight (a Millennium Development Goal indicator for nutrition) and wasting have increased.

MICS did not collect information on the micro-nutrient or nutrition status of women. However, the high rate of anaemia (48 percent among pregnant women as recorded in the 2011 NDHS) is a pointer to the widespread poor maternal nutrition status in Nepal. The same survey also found that 46 percent of children from the age of six months to 59 months were anaemic, the figure rising to almost 70 percent amongst children from the ages of six months to 23 months. The survey also shows that nearly a quarter of children (24.2 percent) are born with low birth weight. Table 3.1 provides a summary of key nutrition indicators taken from MICS as baseline information of the situation prior to the earthquake.

A recently released SAE of undernutrition (2014)<sup>12</sup>, based on the 2011 NDHS and the 2011 Census, fills the paucity of data at district and sub-district level. Figures 3.2, 3.3 and 3.4 show a comparison of data from the two sources for stunting, wasting and severe wasting prevailing in the 14 districts that were subsequently most affected by the disaster.

Overall, the findings of MICS are lower than the estimation of SAE except for the indicator of prevalence of severe wasting. It can be seen from the graphs that stunting, which reflects chronic undernutrition, follows the usual pattern seen in Nepal of being the highest in the mountain areas. The three mountain districts of Dolakha, Rasuwa and Sindhupalchowk have the highest child stunting rates. Wasting was found to be higher than 5 percent in all districts by the MICS and higher than 7 percent in all districts by the SAE. Moreover, both studies found the wasting rates above 10 percent in the districts of Makawanpur, Nuwakot, Sindhuli and Sindhupalchowk. The MICS found alarmingly high levels of severe wasting, above or almost 4 percent in all central hill districts, Okhaldhunga and Gorkha.

**FIGURE 3.1: CHILD UNDERNUTRITION RATES (%)**



<sup>10</sup> Nepal Demographic and Health Survey (2011)

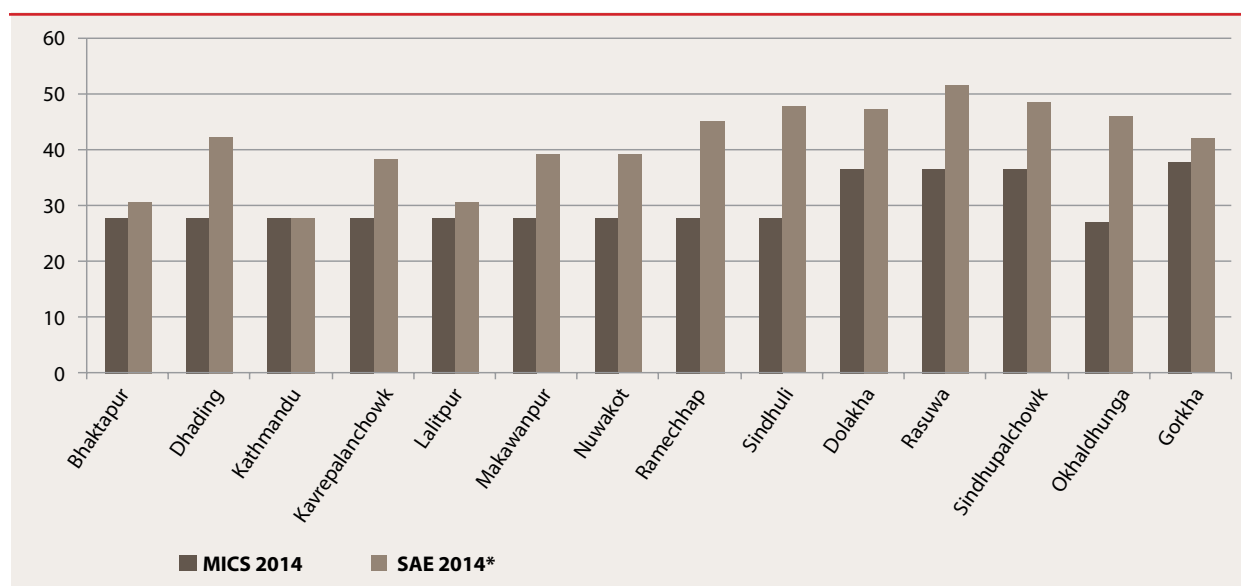
<sup>11</sup> Nepal Demographic and Health Survey (2006)

<sup>12</sup> Haslett, S., Jones, G., Isidro, M., and Sefton, A. (2014) Small Area Estimation of Food Insecurity and Undernutrition in Nepal, Central Bureau of Statistics, National Planning Commission’s Secretariat, World Food Programme, UNICEF and World Bank, Kathmandu, Nepal, December 2014.

**TABLE 3.1: SUMMARY OF KEY NUTRITION INDICATORS IN THE 14 SEVERELY-AFFECTED DISTRICTS BEFORE THE EARTHQUAKE, 2014 MULTIPLE INDICATOR CLUSTER SURVEY (MICS)**

S. N.	District	Eco-dev region	Low birth weight (%)	Anthropometry, children 0-59 months (%)				Infant and young child feeding (iycf) (%)		
				Stunting below -2SD	Severe stunting below -3SD	Wasting below -2SD	Severe wasting below -3SD	Initial bf within an hour of birth	Exclusive BF	Minimum acceptable diet
1	Bhaktapur	Central Hill	23.7	27.7	11.5	5.9	4.4	45.6	54.3	38.6
2	Dhading									
3	Kathmandu									
4	Kavrepalanchowk									
5	Lalitpur									
6	Makawanpur									
7	Nuwakot	Cental Mountain								
8	Ramechhap									
9	Sindhuli									
10	Dolakha									
11	Rasuwa	Eastern Hill	21.0	36.6	16.4	7.3	1.2	74.6	38.9	20.3
12	Sindhupalchowk									
13	Okhaldhunga									
14	Gorkha	Western Hill	26.6	26.9	9.9	10.8	4.2	43.9	35.5	46.8
			23.3	37.6	12.9	7.4	3.8	45.3	68.9	41.5

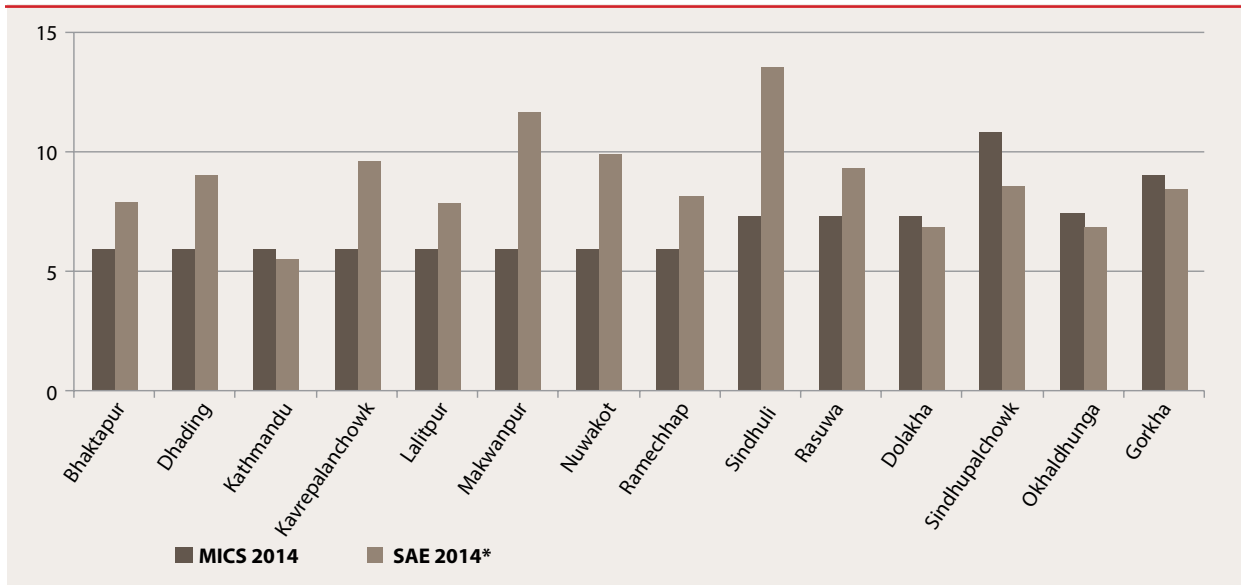
Source: MICS, 2014

**FIGURE 3.2: STUNTING PREVALENCE (%)**


\* Data sources: NDHS 2011 and Population Census 2011

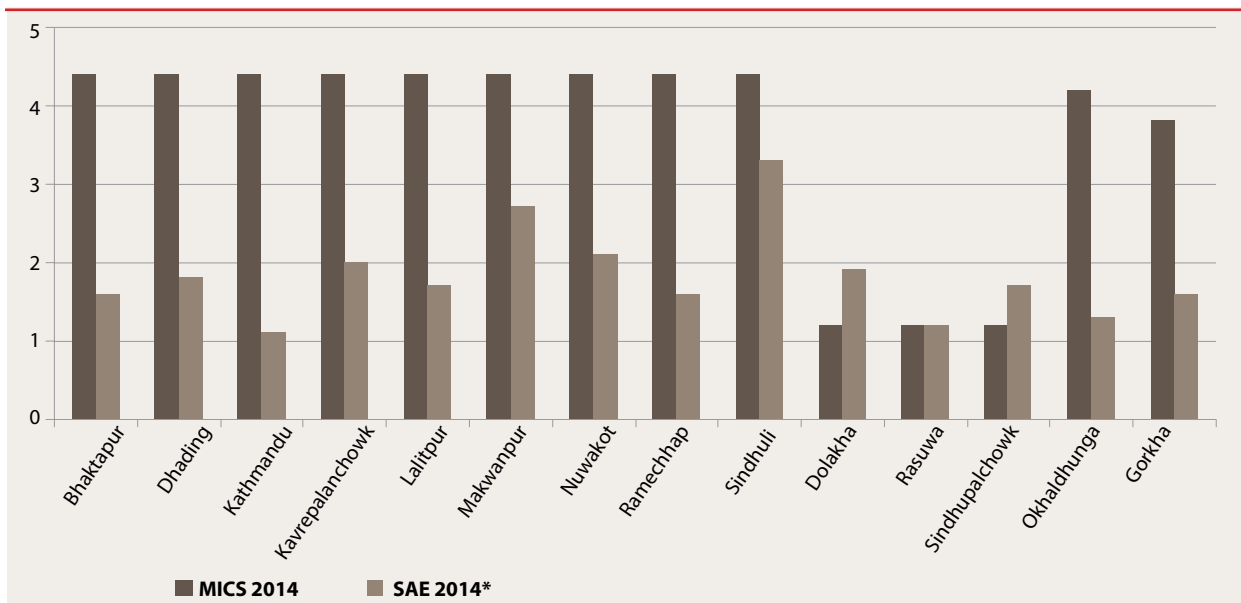


**FIGURE 3.3: WASTING PREVALENCE (%)**



\* Data sources: NDHS 2011 and Population Census 2011

**FIGURE 3.4: SEVERE WASTING PREVALENCE (%)**



\* Data sources: NDHS 2011 and Population Census 2011

Infant and Young Child Feeding (IYCF) practices, as demonstrated by MICS show that half of the children were initiated into breastfeeding within an hour of birth and half of the infants were breastfed exclusively during the first six months of life. Less than 40 percent of children were able to meet the recommended minimum acceptable diet which was even lower at 20 percent in the case of the three central hill districts of Dolakha, Rasuwa and Sindhupalchowk.

### Post-Disaster Context

As mentioned earlier, the nutrition sector does not have a separate infrastructure to operate nutrition programmes. Nutrition-specific interventions are provided through regular health facilities and community-based extension services provided by FCHVs. According to available figures, eight health workers and 10 FCHVs lost their lives in the earthquake, 68 health workers and seven FCHVs were injured, and two health workers were reported missing<sup>13</sup>. Nearly 80 percent of public health facilities are damaged and many of the government offices providing social services have been destroyed<sup>14</sup>. While a relatively small number of FCHVs died or were injured, many of them are under a great deal of stress and may not be able to function as before. All these developments are bound to have a negative impact on nutrition services. Primary health care and outreach clinics are still functional in most of the places.

There are approximately 73,000 pregnant women and 62,000 lactating women in the earthquake-affected areas. During the field visit the assessment team observed that many of these women are suffering from reduced food intake and dietary diversity and the trauma caused by the earthquake, along with the attendant disruptions caused in their lives. This is likely to affect not only their own nutritional status but also impact their ability to continue to exclusively breastfeed their children. Unsolicited distribution of infant formula for children under the age of five years was observed in Gorkha and Sindhupalchowk districts after the earthquake, which further threatens breastfeeding practices. In response to this, as an important part of the immediate response plan, the Nutrition Cluster has accorded priority to creating designated

spaces where mothers can access safe areas to breastfeed, rest, eat and receive skilled counselling and targeted advice about breastfeeding and nutrition.

Many of the water supply systems are affected and toilets are destroyed at the household level.<sup>15</sup> It is estimated that half the population in the affected districts need support to meet their needs for water, sanitation and hygiene. In areas where the water system was severely damaged, women have had to walk long distances (one hour to three hours away) to collect water from alternate sources. The collection of water for household purposes and for livestock, incurs time, energy and childcare costs. The nutritional status can be negatively impacted by reduced access to sanitation, possible increase in open defecation, reduced production of vegetables and other nutritious food as a result of damaged irrigation systems, and increased energy expended by walking longer distances for the task of water collection.

A majority of schools and Early Childhood Development (ECD) centres, including their water and sanitation facilities, have been damaged in the 14 most-affected districts. The effect on the education sector is likely to have a direct and indirect effect on the nutrition sector as well. Damaged water and sanitation facilities may be linked to outbreaks of diseases such as diarrhoea which can negatively impact of the nutritional status of children.

The provision of mid-day meals supports the nutritional needs of children in pre-school (three to five years of age) and primary school (six to 10 years of age). In addition to supporting the nutritional needs of school-going children, mid-day meals also reduce the food requirement at the household level, helping retain children in schools. This has a longer-term benefit on nutrition as well, as there is a direct correlation between education attainment of a mother and her child's nutritional status.

### EMERGENCY NUTRITION RESPONSE

To prevent malnutrition, District Health Offices (DHOs), with the assistance of the District Level Support Agency (DLSA), have already initiated

<sup>13</sup> HEOC Report, May 29, 2015

<sup>14</sup> HEOC Report, May 29, 2015

<sup>15</sup> WASH Sector Report, June 2015

emergency nutrition response activities through the approach of community management of acute malnutrition (CMAM) and mother-baby areas. These efforts include Infant and Young Child Feeding (IYCF) counselling, monitoring the application of the code of breast milk substitutes, and the establishment of Outpatient Treatment Programmes (OTPs) in health facilities located in the affected districts. A blanket supplementary feeding programme for pregnant and lactating women and children between the ages of six months and 23 months was implemented in June 2015.

#### FOOD ACCESS

Regarding food access, a post-earthquake assessment of 1,010 households in 11 affected districts outside of Kathmandu Valley confirmed widespread losses of household food stocks, seeds, and agricultural tools, affecting food security prospects in the immediate as well as longer term<sup>16</sup>. Affected households have lost a total estimated 52,000 metric tonnes (mt) of grain, and 80 percent of households in the most food-insecure areas reported losing their entire food stocks. Pre-earthquake monitoring data shows that all 627 VDCs in the affected districts were classified as minimally food-insecure. Post-earthquake data shows that 80 VDCs are now severely food insecure, 277 VDCs are highly food insecure, and 172 VDCs are moderately food insecure, with the most severely affected VDCs located in Gorkha, Sindhupalchowk, Dhading, Dolakha, Rasuwa, Nuwakot and Kavrepalanchowk<sup>17</sup>. It was observed that affected communities were provided externally aided food items, some of which are less nutritious than locally produced foods. It was also observed that many among the affected were more interested in receiving such food donations rather than consuming their own local products.

Nineteen percent of households reported poor food consumption practices as compared to 7.6 percent households prior to the earthquake. In addition, 35 percent of households are limiting their food intake by reducing their meal portion or number of meals as a coping strategy.

Regarding incomes, households dependent on daily labour and trade are among the most affected with over two-thirds reporting income losses of over 30 percent since the earthquake. People reported a decrease in household expenditures by an average of 13 percent, with a decrease of 43 percent in the mountainous areas. These declines match the reduced food consumption.

Markets are functional in less-affected areas and quickly recovering along the seismic belt but remain largely closed in the remote mountain areas (only 5 percent of households are able to find cereals and pulses in the nearest market). Prices of staple foods are expected to rise in the coming months due to higher transport costs with the arrival of the monsoon and decline in international relief as well.

#### DAMAGES AND LOSSES

While the nutrition sector does not have a separate infrastructure on the basis of specific damages and losses can be calculated, it is possible to arrive at a figure for affected sections of the population who are vulnerable to undernutrition. Since the exact number of affected children under the age of five years, pregnant women and lactating women are not available per affected district, an estimation has been made based on two primary government sources: the number of affected households have been sourced from the Disaster Risk Reduction (DRR) portal (Ministry of Home Affairs' [MoHA]), and the estimated target population from the Department of Health Services ([DoHS], 'Estimated Target Population Fiscal Year 2071/72 [2014-2015]')<sup>18</sup>.

Using the data available on the DRR portal, the percentage of affected households was multiplied with the estimated target population from DoHS to arrive at estimated numbers of affected children less than two years (6 months to 23 months), less than five years (six months to 59 months), as well as pregnant and lactating women. The figures for estimated live births were used to estimate the total number of affected lactating women (which refers to women with children less than six months of age).

<sup>16</sup> Nepal: A report on the food security impact of the 2015 earthquake. Assessment conducted by the Nepal Food Security Monitoring System (NeKSAP). Food Security Cluster, May 2015.

<sup>17</sup> DHS 2011 data and the resulting small area estimation report shows that these 7 districts have a pre-existing global acute malnutrition prevalence of 6.8% (Dolakha), 8.4% (Gorkha), 8.5% (Sindhupalchowk), 9% (Dhading), 9.3% (Rasuwa), 9.6% (Kavre), and 9.9% (Nuwakot).

### DISASTER EFFECTS AND IMPACTS

The nutritional status of vulnerable populations is not immediately affected due to a disaster. However, a combination of underlying factors (food insecurity, poor quality of water, sanitation, hygiene, and caring practices as well as disease outbreaks) will gradually have an impact. As of now, there are no firsthand statistics on the nutrition impact of the earthquake amongst the affected population in Nepal. Experiences from other countries show that in the month after a natural disaster occurs, the likelihood of acute illness, such as acute respiratory infections, diarrhoea and fever increase by 9-18 percent in children under the age of five.<sup>18</sup>

The negative impact of natural disasters on linear growth is also well documented in countries such as China, Indonesia, Ethiopia, and Zimbabwe.<sup>19</sup> In the year after a natural disaster, the likelihood of stunting increases by 7 percent and

the likelihood of full-immunization decreases by 18 percent. Two years after experiencing the shock of a disaster, women who were in the second and third trimester of pregnancy when the disaster occurred would have children significantly shorter compared to women who did not experience the shock.<sup>20</sup> Furthermore, shocks can also negatively impact maternal health, increasing mortality and low birth weight.<sup>21</sup>

Assessments by other sectors reported large-scale losses of food stocks and agricultural assets, household assets, disruption of water systems and damage to sanitation facilities and health infrastructure. Income that typically may have been earmarked for the purchase of household food may be redirected towards materials and labour to rebuild homes, replace lost household items or support the extended family. Food-related coping strategies, such as reducing the size or number of meals consumed, was reported by

**TABLE 3.2: ESTIMATED NUMBER OF AFFECTED CHILDREN UNDER FIVE YEARS, AND PREGNANT AND LACTATING WOMEN**

SN	District	Children <2 years*	Children 6-23 months	Children <5 years	Children 6-59 months	Pregnant women	Lactating women
1	Sindhupalchowk	11873	8810	28158	25097	7351	6230
2	Kathmandu	73560	54686	35166	31371	8969	7606
3	Nuwakot	11379	8445	28312	25232	7380	6258
4	Dhading	14452	10723	28859	25705	7517	6375
5	Rasuwa	1850	1372	4199	3737	1113	944
6	Gorkha	11029	8163	22488	19977	6036	5116
7	Bhaktapur	12763	9465	12220	10875	3187	2702
8	Kavrepalanchowk	15499	11496	33449	29796	8765	7432
9	Lalitpur	19264	14315	10635	9485	2729	2314
10	Dolakha	7738	5740	20794	18519	5461	4632
11	Ramechhap	8302	6160	20251	18046	5302	4497
12	Makawanpur	18346	13632	16255	14501	4169	3536
13	Okhaldhunga	6433	4767	6102	5428	1629	1381
14	Sindhuli	13181	9794	12343	11013	3176	2693
<b>Total</b>		<b>225669</b>	<b>167568</b>	<b>279231</b>	<b>248783</b>	<b>72784</b>	<b>61715</b>

Source: MoHA DRR Portal and DOHS HMIS report 2014

\* Also gives an estimation of the number of mothers breastfeeding children under two years of age

<sup>18</sup> Datar A, Liu J, Linnemayr S, Stecher C. The Impact of Natural Disasters on Child Health and Investments in Rural India. *Social science & medicine* (1982). 2013;76(1):83-91. doi:10.1016/j.socscimed.2012.10.008.

<sup>19</sup> IZA (2010) Do natural disasters affect human capital? An assessment based on existing empirical evidence. DP No. 5164

<sup>20</sup> E. Frankenburg, J. Friedman, N. Ingwersen, & D. Thomas (2013). Child Height After a Natural Disaster.

<sup>21</sup> J.K. Antilla – Hughes & S.M. Hsiang (2013). Destruction, Divestment and Death: Economic and Human Losses Following Environmental Disaster.



more than a third of households in the affected areas (35 percent). Overall loss of income from lost assets, savings and reduced opportunities to be paid for daily labour, reduces the purchasing power of families to provide quality meals in sufficient quantity. Disrupted water systems and sanitation facilities heighten the risk of disease among affected populations. It is also possible that increased financial strain on households may promote increased workloads among family members, including pregnant and lactating women, which could negatively impact a woman's health during pregnancy and affect mothers' caring practices with regard to their children. Similarly, longer walks to collect water or other household needs may have the same effect on women's health and nutritional status, reducing the time available for child care.

Hence, the immediate concern is to prevent a deterioration of the nutritional status of the affected population with a particular focus on pregnant and lactating women, and young children as this population has specific nutritional needs. In addition, recovery efforts will also aim to support the rehabilitation of systems and services that address underlying factors contributing to both acute and chronic malnutrition.

Research confirms that a child's first 1,000 days, from conception to the first two years of life, is a critical period for growth and development. Challenges affecting optimal growth and development during this window have lifelong effects on a child's physical and cognitive growth. Inadequate access to nutritious food, safe and hygienic environments, quality health services and caring practices may result in an increased risk of morbidity and mortality in childhood, reduced learning capacity and school performance, increased risk of obesity and non-communicable diseases later in life and overall lower earning potential and decreased work capacity<sup>22</sup>.

This is a unique opportunity for emergency response and development programmes to work synergistically to improve nutrition among women and children. Emergency response pro-

grammes provide an important platform for nutrition and food security activities but the interventions are typically short-term and supply-driven, such as therapeutic feeding, general food aid and seed distribution. However, it is important to give greater emphasis to addressing the root causes of vulnerability and prevention of malnutrition, which is what recovery programmes should do. Hence, it is advisable to orient all reconstruction efforts towards a more sustainable approach that addresses both immediate and underlying causes of undernutrition through integrated agriculture and other sectoral activities.

### Recovery Needs and Strategy

Achieving nutrition and food security is a cross-cutting goal that requires action from various sectors. Recognizing the need for a multi-sectoral approach and for a strengthened multi-sectoral policy guidance and coordination, Nepal endorsed a Multi-Sector Nutrition Plan (MSNP) in 2012. A High Level National Nutrition and Food Security Steering Committee (HLNFSSC), has been established at the National Planning Commission (NPC), and coordination architecture has also been set up. Existing policies on nutrition specific and nutrition sensitive programmes and interventions will be strengthened with the involvement of all relevant sectors and stakeholders. All nutrition service providers will work with the existing nutrition architecture at the district and national level.

Post-earthquake nutrition activities will include the following:

1. Continuation of services to prevent and treat acute malnutrition alongside increased efforts to improve systems and services contributing to longer-term nutritional gains, focusing on a multi-sectoral approach.
2. External support should be built on local food and nutrition practices.
3. Rural, urban and slum areas need to be covered by government and non-government programmes/interventions, and the existing nutrition and food security programmes in the 14 most-affected districts should be further strengthened.

<sup>22</sup> Maternal and Child Nutrition series. The Lancet. 2013.

4. Coordination (multi-sector, multi-stakeholders and multi-level) with various sectors and stakeholders should be strengthened and ensured at all levels for effective implementation of nutrition interventions.
5. Overall, the post-disaster nutrition strategy should complement the knowledge and practices that the communities already possess, and be implemented in the spirit of strengthening local resilience.

The nutrition activities for recovery have been identified for the short and medium term and are aimed at all pregnant and lactating women and children under five years. Special efforts will be made to work through community leaders and Health Facility Management Committee as well as FCHVs to ensure that the most vulnerable groups (Dalits and female-headed households, among others) are included. The suggested list of activities in this report is only tentative, based on the limited information available. Hence, the recommendations/activities will be updated to reflect the enhanced coordination among relevant sectors.

#### ACTIVITIES IN THE MEDIUM AND LONG TERM

The medium and long-term activities, to be continued beyond one year, are as follows:

- Promote the production and utilization of indigenous crops (such as millet, buckwheat and amaranth) as well as protein and micronutrient rich crops (legumes, vegetables, fruits, livestock products (including meat, fish, milk and eggs) through the agriculture sector.
- Intensify homestead food production including poultry amongst existing and returnee households.
- Continue to monitoring compliance with Nepal Breast Milk Substitute (BMS) Act & Regulation, the law regulating sale and distribution of breast milk substitutes.
- Continue to implement strategies to ensure adequate micronutrient intake among the affected population (may include promotion of micronutrient rich foods, expanding fortification initiatives and ongoing provision of micronutrient supplementation based on need).
- Continue the intensified promotion of optimal MIYCN and hygiene.
- Continue the management of severe acute malnutrition in all districts based on need.
- Ensure that nutrition topics are covered in training/on-site coaching of new FCVHs and in refresher training for existing FCHVs

### Implementation Arrangements

The measures listed above will be implemented by the sectoral ministries ensuring intra and inter-sectoral coordination within the government system. For instance, food production activities will be led by the agriculture sector, with strong collaboration, advocacy and promotion activities on the part of the health sector. The health sector will conduct child care activities in close collaboration with the sectors of education, and women, children and social welfare Resources will be mobilized through effective partnership with development partners.

### Assessment Methodology

This assessment is part of the broader PDNA conducted for all sectors under the overall leadership of NPC. It is a joint exercise of the Government and development partners. It has employed a combination of qualitative and quantitative tools from primary as well as secondary sources.

On 24 May 2015, NPC deployed four teams to Gorkha, Dhading, Sindhuli, Ramechhap, Rasuwa, Nuwakot, Sindhupalchowk and Kavrepalanchowk to verify the available baseline information and collect relevant information on the nutrition needs of affected pregnant and lactating women, and children under five. The team selected VDCs, sites and respondents from the categories mentioned above and employed the methods listed below:

- Collection of basic information from the Nepal Government Disaster Risk Reduction (DRR Portal) (<http://drrportal.gov.np>) on affected households and other nutrition-related information from MICS, SAE, Health Management and Information

- System (HMIS) and Logistic Management and Information System (LMIS).
- Consultative meetings with the district line agencies and health workers, FCHVs and volunteers.
- Focused group discussions with pregnant, lactating women as well as other community members.
- Observation visits to the affected VDCs and wards, health facilities and outpatient treatment programme centres.
- An analysis of secondary data from the 2014 MICS, 2011 NDHS and 2014 SAE and assessments from other sectors provided key information on both the pre and post-disaster contexts related to nutrition.

**TABLE 3.3: PROPOSED NUTRITION INTERVENTIONS AND TENTATIVE COST ESTIMATES (SHORT-TERM ACTIVITIES FOR UP TO ONE YEAR)**

Intervention	Quantity	Unit Description	Cost per Unit (NPR)	Total (NPR)	Total (US\$) Exchange rate: 1 US\$ = 100 NPR	Assumptions
<b>Short-term Activities</b>						
<b>Supplementary food assistance</b>						
Provide assistance to increase access to supplementary food to children aged 6 months to 59 months, pregnant and lactating women, through health facilities to prevent deterioration of nutritional status as well as increase health service utilization, including enhanced nutrition counselling. The assistance can be in the form of cash, vouchers or food (e.g. fortified blended food, locally procured as much as possible) and provided for up to one year. Assessments such as those produced by or in collaboration with Nepal Food Security Monitoring System (NeKSAP) on the impact of earthquake on food security will be used to guide the form of assistance provided to the different affected areas.	385 000	Person	8000	3 080 000 000	30 800 000	Local producers of fortified supplementary food will be able to meet the requirements of the target population requiring food-based assistance; market assessments and necessary banking infrastructure will support cash-based assistance in other affected areas. Weather or other environmental factors will not prevent the delivery of assistance.
<b>Promotion of production and utilization of local foods</b>						
Promote the production and utilization of indigenous crops, rich in macro and micronutrients, of plant and animal origin *	400 000	households	100	40 000 000	400 000	Nutrient-rich foods will be available and accessible to promote for consumption.
Initiate homestead food production including poultry amongst existing and returnee households**	400 000	households	4000	1 600 000 000	16 000 000	
<b>Maternal Infant and Young Child Nutrition (MIYCN)</b>						
Promote optimal child development through implementation of child care activities, in coordination with Ministry of Women Children and Social Welfare (MoWCSW)	279 231	children under five years	100	27 923 100	279 231	
Intensify the promotion of optimal Maternal Infant and Young Child Nutrition (MIYCN) and hygiene, including Behaviour Change Communication (BCC). [Breastfeeding and complementary feeding]				10 000 000	100 000	

Intervention	Quantity	Unit Description	Cost per Unit (NPR)	Total (NPR)	Total (US\$) Exchange rate: 1 US\$ = 100 NPR	Assumptions
Intensify monitoring of compliance and Nepal Breast Milk Substitute (BMS) Act & Regulation to ensure that unsolicited BMS is not distributed and used	14	Districts	1 000 000	14 000 000	140 000	
Management of severe acute malnutrition						
Establish and maintain management of severe acute malnutrition (SAM), including preventive and treatment services	10 000	children under 5 years	15 000	150 000 000	1 500 000	Caseload of SAM patients requires ongoing treatment services and commodities are available to support this treatment.
Micronutrient supplementation						
Replenish the lost stock of micronutrient supplements (Vitamin A, Iron Folic Acid and deworming tablets as well as zinc tablets and ORS for treatment of diarrhoea) in the health facilities and provided to FCHVs				5 000 000	50 000	Sufficient supply of stock is available and able to be distributed in the affected areas.
Provide Multiple Micronutrient Powder (MNP) supplementation during the first year to children aged 6-59 months in areas where fortified supplementary food will not be provided.	125 000	Child	500	62 500 000	625 000	Sufficient supply of stock is available for distribution in the affected areas.
Training/capacity enhancement						
Ensure that nutrition topics are covered in the training/on-site coaching of new FCHVs and in refresher training for the existing FCHVs	14 000	FCHVs	500	7 000 000	70 000	Adequate staffing is available and environmental conditions do not inhibit training or onsite coaching plans.
Nutrition survey/assessment and monitoring activities						
Conduct a rapid SMART or other nutrition survey to obtain primary district level estimate of nutrition situation in all 14 severely affected districts	1	Survey	25 000 000	25 000 000	250 000	Adequate staffing is available and environmental conditions do not inhibit completion of the survey.
Regular monitoring of all nutrition activities conducted in the affected districts				5 000 000	50 000	Adequate staffing is available and environmental conditions do not inhibit regular monitoring of activities.
Establish a nutrition surveillance mechanism in 14 districts through health facilities				10 000 000	100 000	
<b>Total</b>				<b>5 036 423 100</b>	<b>50 364 231</b>	

\* Production activities will be budgeted under the agriculture sector. Advocacy and promotional activities will be conducted by the nutrition sector in collaboration with health and other sectors.

\*\* Based on the number of fully destroyed households excluding partially destroyed households. Furthermore, only 50 percent of the households have been taken for the four districts with high proportion of urban areas (Kathmandu, Lalitpur, Bhaktapur and Kavre)

\*\*\*Based on the SAM prevalence estimate of 2.6 percent from NDHS 2011 as the ongoing programmatic experience as well as field observations differ from the high Severe Wasting levels from MICS 2014



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## 4. Education

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### Summary

The PDNA for the education sector is part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission (NPC). It is a joint exercise of the Government of Nepal (GoN) and development partners, and has been led by the Ministry of Education (MoE).

The overall objective of this assessment is to take stock of the damages and losses faced by the sector and provide estimates of the recovery and reconstruction needs using the principle of building back better. The assessment covers the entire sector, which includes early childhood education and development (ECED), school education (grades one to 12), technical and vocational education and training (TVET), higher education, and non-formal education/life-long learning. The damages and losses for the sector are based on the data and information provided to the MoE by the various subsectors—Department of Education (DoE) for ECED and school education, Council for Technical Education and Vocational Training (CTEVT) for TVET, University Grants Commission for higher education, and Non-Formal Education Centre for non-formal education/life-long learning (including community learning centres). Data on damages and losses to public and institutional libraries is also included. Additionally, the sector assessment team undertook field visits and held consultations with representatives of all central line agencies, including CTEVT and University Grants Commission, representatives of private schools, and various teacher organizations to understand the effects of the disaster on the functioning of the education system and to solicit their suggestions for potential recovery strategies and interventions.

The net value of the total damages and losses to the education sector is estimated at NPR 31,317.9 million (US\$313.2 million) at pre-disaster prices. Of this, the damage to infra-

structure and physical assets is estimated at NPR 28,063.8 million (US\$ 280.6 million). Further, the sector encountered losses of NPR 3,254.2 million (US\$ 32.5 million). Overall, the public sector suffered more in terms of damages and losses when compared to private sector. Of the total effect, 92 percent accrues to the public sector and only 8 percent to the private sector.

The total recovery and reconstruction needs for the education sector for the next five years (Fiscal Years 2015–2019) using the principle of building back better is estimated at NPR 39,705.8 million (US\$ 397.1 million), of which the majority (91 percent) is needed for the recovery and reconstruction of the school subsector. The recovery strategies and specific short, medium and long-term needs are described in the main text.

### Pre-Disaster Context and Baseline

#### SECTOR OVERVIEW

Nepal's education sector is one of the largest government departments both in terms of size of the population served and the annual government budgetary allocations. The sector consists of pre-primary (ECED), school, Technical and Vocational Education and Training (TVET) and higher education subsectors. Table 4.1 below provides a summary of the size of the various subsectors.

School education comprises at least one year of pre-primary/ECED, five years of primary, three years of lower secondary, two years of secondary and two years of higher secondary education.<sup>23</sup> School education is offered through at least two types of schools—public and private. With the Seventh Amendment to the Education Act 1971 in 2001, all public schools are called 'community' schools and private schools 'institutional' schools. The majority of children attend public schools; however, there has been a dramatic in-

<sup>23</sup> The ongoing School Sector Reform Programme aims to restructure school education into eight years of basic and four years of secondary schooling. This will require amendments to the Education Act.

crease in private education institutions in recent years. At the secondary school level, about 15 percent of all children attend private schools, and their presence increases to almost 27 percent if higher secondary education is also included.

The vast majority of community schools receive support from the government in the form of teachers' salaries, recurrent grants for school administration and management, student grants for textbooks and scholarships, and grants for construction of classrooms and toilets. However, only very few private schools (those that operate as trusts) are eligible to receive such grants. The majority of private schools are registered as companies and operate through user fees

The TVET subsector includes school-based technical schools (general schools with technical stream) as well as non-school-based technical institutions overseen by CTEVT, which has 21 constituent (public) and 400 affiliated (private) technical institutions that offer short-term, technical school leaving certificate (TSLC) and diploma courses. More than 90,000 people graduate from these courses annually.

Higher education is offered through nine universities and four medical science academies, all of which receive public funds in varying degrees. All universities have constituent and affiliated colleges that are spread across the country. While curriculum and examinations for affiliated campuses come under the jurisdiction of the affiliating university, affiliated campuses are independent vis-à-vis financing and administration.

Affiliated campuses are further classified into community and private campuses.

Community campuses, which are not for profit, are established through community initiatives and resources and also receive some financial support from the government, although levels of support are significantly lower than for constituent campuses. Private campuses are established through private investments and receive no public grants. In 2012-2013, there were 96 constituent, 429 community and 751 private campuses accounting for about 37 percent, 30 percent and 33 percent of the total higher education enrolment of 569,000, respectively. Tribhuvan University, the largest university in the country, accounted for nearly 88 percent of this enrolment.

#### MAKING STRIDES IN EDUCATION

Nepal has made good progress in enhancing access, equity and efficiency in school education, and remains committed to the achievement of the Millennium Development Goals (MDG) and Education for All (EFA) targets.

The percentage of children between the ages of three to five years accessing ECED increased to 77.7 percent in 2014-2015, and nearly 60 percent of the new entrants in grade one have ECED experience. The net enrolment rate has reached 96.1 at primary and 87.6 at the basic level. Likewise, gender parity in enrolments has been achieved at all levels of schooling. The share of hitherto marginalized groups such as Dalits and Janajatis has also increased in the total student population. Dalit children account for more than 20 percent of all children enrolled in primary education and Janajatis account for more than 36 percent of all enrolled children, which is more than their proportional representation in the total population according to the 2011 Census. However, the share of Dalits grad-

**TABLE 4.1: EDUCATION SECTOR AT A GLANCE**

Subsector	No. of years	Share of total education budget	No. of students	Type and no. of institutions		
				Total	Public	Private
ECED/PPC	1	a	1,014,339	35,121	30,034 <sup>b</sup>	5,087
School	12	82.0	7,488,248	34,335 <sup>c</sup>	34,270	8,429
TVET	0.3-3	4.1	~90,000	421 <sup>d</sup>	21	400
Higher	3-6	8.1	569,665	1,276	96	1,180 <sup>e</sup>

*Note the following:*

<sup>a</sup>ECED budget is included in the school subsector

<sup>b</sup>Includes school and community-based ECD centres

<sup>c</sup>No. of schools are counted by levels therefore may not add up to total

<sup>d</sup>Does not include many short-term training institutions registered with authorities other than CTEVT

<sup>e</sup>Includes 429 community-run and 751 private campuses



ually decreases to 14.6 in lower secondary, 10.5 in secondary and only 6.8 in higher secondary education, indicating that many Dalit children do not progress in the education ladder<sup>24</sup>.

The overall literacy rate for the population aged five years and above has also increased from 54.1 percent in 2001 to 65.9 percent in 2011<sup>25</sup>. However, there are marked gender disparities in literacy rates: 75.1 percent of males are literate as compared with 57.4 percent of females. These differences are expected to narrow down as there is an increasing trend of more girls attending and completing basic education.

While school education has made significant progress in enhancing access, the system suffers from low quality and relevance of education. Further, school education is not completely free despite constitutional provisions of free education up to secondary level, affecting the full participation of children, particularly from the poorest segments.

In TVET, more than 90,000 people graduate annually from various non-degree short-term and long-term degree courses (Technical School Leaving Certificate or TSLC and diploma), which represents a gradual increase over the years. Mechanisms have also been instituted for skills testing of these graduates. However, the employability of the TVET graduates remains low and there are challenges in responding to market needs.

In higher education, total student enrolment increased from 173,546 in 2005-2006 to 569,665 in 2012-2013, with an average annual growth rate of 14.7 percent. Of this, approximately 40 percent are girls. The number of graduates increased from 25,900 in 2005-2006 to 63,642 during the same period. The gross enrolment rate reached 17.1 in 2012-2013, which is higher than that of most countries at comparable levels of economic development. Despite significant achievements over the past decade, factors such as low relevance and quality, internal inefficiencies, inequity and inadequate financing continue to pose major challenges in higher education.

## SECTOR FINANCING AND COORDINATION

Education is a priority sector for the GoN. The sector has been receiving the largest share (around 14 percent) of the government budget allocation in recent years. Furthermore, public investment in education as a fraction of Gross Domestic Product (GDP) increased from less than 2.9 percent in 1999 to 4.2 percent in 2014. More than 80 percent of the government's education budget is allocated to school education, and within that about 60 percent goes to basic education. This is in line with the global commitments made by the government to achieve MDG and EFA targets. But this has also led to the under-financing of tertiary education. Foreign aid has been an important component of the total government spending in education. On average, development partners have accounted for more than 22 percent of the total education budget although it decreased to 13 percent in FY2015.

The school subsector demonstrates good evidence of a sector-wide approach involving the pooling of government and development partners' funds to support a jointly agreed national School Sector Reform Programme (SSRP) through direct budgetary support.<sup>26</sup> In TVET too, there is good evidence of coordination amongst the government and different development partners supporting the subsector, albeit in project mode. The major development partners supporting TVET include Asian Development Bank (ADB), Department for International Development (DfID), the European Union (EU), Korea International Cooperation Agency (KOICA), Swiss Agency for Development and Cooperation (SDC), USAID, World Bank (WB), and Finland, with interagency coordination by SDC. However, development partners' engagement in higher education is limited to WB.

## DISASTER RISK REDUCTION

Under SSRP, efforts have been undertaken to mainstream disaster risk reduction (DRR) and safety in school education. In 2012, MoE prepared a pilot school safety action plan to undertake retrofitting of 260 school buildings in Kathmandu Valley. It involved training

<sup>24</sup> Within Dalits, the share of girls slightly decreases in secondary (49.1%) and higher secondary (48.5%) levels.

<sup>25</sup> Central Bureau of Statistics. 2011. Nepal Population and Housing Census 2011: Main Report. Kathmandu: Central Bureau of Statistics.

<sup>26</sup> The development partners supporting the SSRP include Australia, ADB, EU, Finland, JICA, Norway, UNICEF and the World Bank, including funds from the Global Partnership for Education.

1050 masons on retrofitting, 30 Department of Education (DoE) and District Education Office (DEO) engineers and sub-engineers, and 150 other engineers on detailed vulnerability assessment and design. Further, the action plan included earthquake awareness safety orientation for 50,000 students and 4,000 teachers.

To date, the government has retrofitted 160 school buildings none of which experienced any damage due to the earthquake. The capacity development of 180 DOE and DEO engineers and sub-engineers has been completed. More than 50,000 students and 3,417 teachers have been given safety awareness orientation. Training has been provided to 693 masons. Based on the lessons learnt from the pilot, in 2014 the MoE approved a comprehensive strategy for schools in Nepal which includes nine stand-alone and six linked actions to reduce the risk of disaster in schools and has an estimated budget of US\$ 560 million for a 10-year period.

However, the strategy and plan need to be revisited in the context of the current disaster and included in the post-SSRP education sector plan (School Sector Development Plan or SSDP) that is currently being formulated. Elements of DRR and education in emergencies have been incorporated in the school curriculum and textbooks, and a school emergency contingency plan has also been prepared. There are also dedicated courses on disaster risk management (DRM) and earthquake engineering in various institutes of engineering.

## Post-Disaster Context

### DISASTER EFFECTS AND IMPACTS

This section describes the effects, including damages and losses, of the earthquake on Nepal's education sector. It should be noted that the effects of the earthquake could have been much more severe had it not struck on a Saturday afternoon, the weekly holiday. Had it struck on a weekday, the loss of human lives would have been much higher, particularly if it had occurred at a time when children and teachers were at school.<sup>27</sup>

### EFFECTS ON INFRASTRUCTURE AND PHYSICAL ASSETS

Table 4.2 below provides a summary of the losses to infrastructure and physical assets in the education sector. The extent of damages and losses is the highest in school education, with the subsector accounting for 88.8 percent of the total damages and losses faced by the entire sector. More specifically, 8,242 community (public) schools have been affected by the earthquake: 25,134 classrooms were fully destroyed and another 22,097 were partially damaged. Institutional (private) schools also experienced significant infrastructure damage: 956 classrooms were fully destroyed and 3,983 classrooms were partially damaged. In addition, 4,416 toilets, and water, sanitation and hygiene (WASH) facilities, and 1,791 compound walls were damaged. The damage to ECD centres, furniture, libraries and laboratories, computers and other equipment was proportional to the damage faced by the schools.

Likewise, in the TVET subsector, most of the reported damage was faced by the Jiri Technical School in Dolakha, which was completely damaged. A total of 356 TVET classrooms were fully destroyed and another 184 were partially damaged. There was significant damage to equipment and other assets. However, as pointed out in the section on methodology, this may not be a true reflection of the actual damages and losses faced by the subsector since complete information on the damages and losses faced by CTEVT-affiliated public and private technical institutions is not available as yet.

In higher education, 1,292 classrooms were completely destroyed and another 3,040 were partially damaged. Likewise, there was a very high loss to equipment as a result of damages to research laboratories. Further, there was major damage to the administrative buildings of three major universities – Tribhuvan University, Kathmandu University, and Nepal Sanskrit University. The cumulative value of damages to higher education institutions has been estimated at NPR 28 billion. However, the actual damages and losses faced by the sector could climb much

<sup>27</sup> It is reported that 584 students (571 studying in school and 13 in higher education) lost their lives. 49 teachers from schools and colleges were killed.



higher when complete information from private institutions affiliated with the various universities is made available.

The sector also witnessed losses to community learning centres, public libraries and community-based ECD centres. Again, however, it was impossible for the Sector Assessment Team to reflect the true extent of damages and losses faced by such institutions in the absence of mechanisms to systematically collect and supply such information.

#### EFFECTS ON TEACHING AND LEARNING

While the effects of the quake on infrastructure and physical assets are relatively easy to estimate in monetary terms, it is more difficult to estimate the financial implications of the quake on teaching and learning processes. The earthquake and its aftershocks led to the complete closure of schools and colleges for more than a month (26 April–30 May) in the severely-affected districts, forcing more than two million children and youth to stay out of educational institutions for a significant period of time at a time when the academic year had just started.<sup>28</sup> The standard school opening days per year is 220, with 190 days for teaching-learning and the rest for examinations, extracurricular activities, and other non-teaching functions.

During meetings with the assessment team, DEOs and central agencies emphasized that the number of days lost would eventually be covered through cuts in summer vacation and

annual festivals. However, even as the schools reopened, it would be a while before regular teaching-learning can take place. Most schools in the highly-affected districts will not hold full-day classes for at least one month, leading to loss of learning time.

More importantly, the destruction of houses and displacement of families has had a severely negative impact on the learning environment at home. Children reported that they have lost the motivation and confidence to study as their learning habits have been disrupted. They are assailed by anxiety that they might have forgotten what they had learnt and so they may find it difficult to pass their examinations (particularly children in grades 8 and 10 who need to take the district and national level board examinations). It is, therefore, likely that affected schools might experience a decline in learning outcomes in the short to medium term.

There are other effects to watch out for as well. For instance, the effects on enrolment, attendance and internal efficiency could lead to an increase in the number of out-of-school children. There could also be an increase in the number of children with disabilities or significant injuries for whom the temporary or transitional learning centres (TLCs) could be less than accessible. With the demand for additional labour both at home and in the market, it is reasonable to assume that some children, particularly in the higher grades, might be less regular or drop out eventually, and there might also be a decrease in their motivation

**TABLE 4.2: ESTIMATION OF DAMAGES TO INFRASTRUCTURE AND PHYSICAL ASSETS BY SUBSECTOR**

	ECD	School	TVET	Higher education	NFE/LLL
No. of classrooms/rooms fully destroyed	784	26,090	356	1,292	40
Number of classrooms/rooms partially destroyed	-	26,080	184	3,040	7
Number of toilets and WASH facilities	-	4,416	-	-	-
Number of compound walls	-	1,791	-	6	-
Equipment (in Million NPR)	-	140.4	90.0	155.5	-
Furniture (in Million NPR)	-	1,867.6	4.5	5.6	0.6
Other assets (textbooks, education materials, uniforms) (in Million NPR)	9.8	2,086.5	1.3	16.7	0.4

<sup>28</sup> The schools in the affected districts reopened on 31 May and colleges affiliated to Tribhuvan University reopened on 5 June.

to learn (these implications are discussed separately in the section on risks and vulnerabilities below). It is, however, impossible at the moment to gauge the effects of the quake on these parameters and quantify the resulting efficiency losses.

#### EFFECTS ON TEACHERS AND EDUCATION PERSONNEL

The total casualties among teachers were reported to be 49 (including two in higher education). While there was no reported casualty among non-teaching personnel, many teachers from the affected areas lost their homes and family members. The household burden for female teachers increased. In interactions during the team's field visits, teachers stated that they would be able to resume teaching-learning activities once schools reopened but, simultaneously, they raised concerns regarding the availability of housing, need for advance payment, and additional training to facilitate children's return to schools, psycho-social counselling, and their management in multi-grade settings.

#### EFFECTS ON SERVICE DELIVERY AND GOVERNANCE MECHANISMS

No major damages to physical infrastructures of central-level institutions were reported during meetings with the team. Hence, the effect on the functioning of key central-level agencies was deemed to be minimal. At the district level, there was some damage to DEOs, particularly in the most-affected districts. The cumulative value of these damages has been estimated at NPR 79.4 million. There was major damage to the administrative buildings of three major universities – Tribhuvan University, Kathmandu University, and Nepal Sanskrit University – which affected their day-to-day operations.

Universities, the Higher Secondary Education Board and the Teacher Service Commission post either postponed or rescheduled their examinations. But this is unlikely to affect the schedules planned for next year.

It is probable that there will be some effects on the normal functioning of school management committees, as many experienced loss of lives and incurred property losses as well. Further, given that education personnel have been redeployed for structural assessments and relief works, service delivery at central and local levels is likely to be affected for some time.

#### EMERGING RISKS AND VULNERABILITIES

Disasters affect different segments of society in disproportionate ways. Nepal is a highly diverse country in terms of geography, demography, language and socio-economic status, and certain areas and groups tend to be more vulnerable to disasters than others. The vulnerabilities are likely to be exacerbated by the internal displacement of people and increased risks of flooding and landslides in the rainy season.

The assessment uses pre-disaster indicators to predict education-related vulnerabilities (out-of-school, drop-out, repetition and non-completion) in districts categorized as most affected, major and minor affected districts. It shows that there is relatively lower risk at the primary level and higher risk at the basic level in the most-affected districts, whereas there is a reversal of pattern in the major affected districts (Table 4.3).

Likewise, analysis of vulnerabilities in the most-affected districts shows that they have a high number of children with disabilities in ECED,

**TABLE 4.3: PREDICTION OF INTERNAL EFFICIENCY IN AFFECTED DISTRICTS**

Drop-out Predictors	Grade 1						Grade 8					
	Drop-out		Promotion		Repetition		Drop-out		Promotion		Repetition	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
National	6.5		78.4		15.2		6.0		89.5		4.5	
Most Affected Districts	5.7	Low	79.4	High	14.9	Low	6.9	High	87.9	Low	5.2	High
Major Affected Districts	7.2	High	76.8	Low	30.4	High	5.8	Low	89.3	Low	5.0	High
Minor Affected Districts	7.1	High	78.8	Low	14.1	Low	5.8	Low	88.1	Low	6.2	High

requiring a special focus on this group and its transition to the primary level. However, a higher level of vulnerability at both basic and secondary levels is observed in the minor-affected areas, emphasizing the need for a balanced focus that accommodates historic vulnerabilities with emerging needs. Given that the internal efficiency of the most-affected districts is higher at primary level compared to the secondary level, special attention needs to be paid to girls' and minority groups' drop-out and learning outcomes of at the secondary level.

#### DAMAGES AND LOSSES

The total value of the damages and losses to the education sector is estimated at NPR 31,317.9 million (US\$ 313.2 million) at pre-disaster prices (Table 4.4). Of this, the damage to infrastructure and physical assets is estimated at NPR 28,063.8 million (US\$ 280.6 million). Further, the sector encountered a loss of NPR 3,254.2 million (US\$ 32.5 million), mainly on account of activities associated the establishment of temporary learning centres, child-friendly spaces and WASH facilities, demolition of destroyed buildings and removal of debris, and clean-up and minor repair costs associated with the use of 'intact' schools as temporary shelters. Overall, the public sector suffered more damages and losses compared to private sector, accounting for 92 percent of the total damages and losses.<sup>29</sup>

More than 80 percent of the damages and losses were in the 14 most-affected districts, with the damages amounting to NPR 22,375.1 million

(US\$ 223.8 million) and losses being NPR 2,629.1 million (US\$ 26.3 million). For the remaining 42 major and minor affected districts (including the 17 major-affected districts), the total damages and losses are NPR 5,688.7 million (US\$ 56.9 million) and NPR 625.1 (US\$ 6.3 million), respectively.

However, the damages and losses reported in this assessment should be viewed as lower bound estimates of the actual damages and losses experienced by the sector. The figures would increase substantially if the value of community contributions to classroom construction in the public (community) schools were to be included (at around 40 percent on top of the government's contribution).

#### Recovery Needs and Strategy

The estimation of needs covers the entire sector and includes the needs of the private sector as well. The total needs for recovery and reconstruction is estimated at NPR 39,705.8 million (US\$ 397.1 million). Of this amount, the majority (91 percent) is needed for the recovery and reconstruction of the school subsector (Table 4.5).

However, as in the case of damages and losses, the estimates of needs should also be viewed as lower bound estimates of the actual needs required for the recovery and reconstruction of the entire sector, mainly because of the limitations in the damage and loss assessment data described in the section on methodology. Further, the recovery and reconstruction needs will increase significantly if

**TABLE 4.4: DAMAGES AND LOSSES TO THE EDUCATION SECTOR (IN NPR MILLION)**

Subsector components	Disaster effect			Distribution by ownership	
	Damages	Losses	Total	Public	Private
ECD	401.8	11.8	413.5	111.6	301.9
School (1-12 grades)	24,642.1	3,190.7	27,832.8	26,670.6	1,162.2
TVET	487.3	6.7	494.0	483.9	10.1
Higher education	2,430.4	42.2	2,472.6	1,581.8	890.8
NFE/LLL	22.8	0.7	23.4	23.4	-
Administrative buildings (including libraries)	79.4	2.2	81.6	81.6	-
<b>Total (in million NPR)</b>	<b>28,063.8</b>	<b>3,254.3</b>	<b>31,317.9</b>	<b>28,952.9</b>	<b>2,365.0</b>
<b>Total (in million US\$)</b>	<b>280.6</b>	<b>32.5</b>	<b>313.2</b>	<b>289.5</b>	<b>23.7</b>

<sup>29</sup> Data on damages and losses to the private sector is limited, with the information provided only for 11 districts. Therefore, the value of the actual damages and losses to private sector is bound to be much higher.

the needs of private institutions are taken into account. Given that private education institutions (schools, TVET institutions and university colleges) are not funded by government resources, it is recommended that they be provided with access to soft loans for reconstruction in return for meeting the requisite safety standards.

**TABLE 4.5: ESTIMATES OF RECOVERY AND RECONSTRUCTION NEEDS (IN NPR MILLION)**

Subsector	Cost of needs
School sector (including ECD/PPCs)	36,105.3
TVET	710.0
Higher education	2,417.5
NFE/CLCs	42.1
General governance and administration	430.9
<b>Total (in NPR NPR)</b>	<b>39,705.8</b>
<b>Total (in US\$ million)</b>	<b>397.1</b>

**PRIORITIES OF RECOVERY AND STRATEGIES**

The overall focus of any recovery and reconstruction strategy in the education sector is to ensure uninterrupted education service delivery at all times. This calls for a focus on both the structural and non-structural aspects of the education system to ensure that all education institutions are resilient to multi-hazards and provide an enabling learning environment. The overall recovery strategy will prioritize the 56 affected districts, but will gradually move to include all education institutions across the country through incorporation of the DRR perspective in the subsectoral plans and programmes. The major elements of the strategy include:

- **Restructuring the MoE system:** Existing institutional arrangements at the central and local levels need to be restructured to respond more effectively to multi-hazards. This would require reviewing and revisiting existing policies related to the organization and management of the system.
- **Strengthening systemic capacity to deal effectively with post-disaster response and recovery and reconstruction:** These would include mechanisms to address the immediate needs described above as well as improve existing policies, guidelines and systems to

ensure that education buildings meet higher standards and levels of safety than residential buildings. It is important to set up independent quality control and inspection requirements for the construction of school buildings. Policies and guidelines to regulate safety standards for private schools through certification, technical and administrative support need to be introduced. Likewise, there should be adequate provisioning of human resources and technical capacity at the national and district levels to ensure safety and quality at all phases of construction. Higher education institutions could play a crucial role in these aspects.

- **Building back better:** All new education institutions should be resilient to future disasters (buildings with safe and adequately sized staircases, proper exits, furnishing and equipment such as to minimize potential harm to school occupants, displays and equipment for early warning and evacuation arrangements) and ensure the provision of minimum enabling conditions for enhanced learning (such as clean drinking water supply including the harvesting of rain water where applicable, separate sanitation facilities for girls and boys, energy and communication connectivity, libraries, laboratories and playgrounds). Retrofitting should be continued for prioritized vulnerable schools. Likewise, thought would be given to a clear policy and plan to replace all school buildings with stone and mud mortar masonry on a priority basis. Building back better will be done in close coordination with the local bodies and communities. However, the current model of building schools through community contribution should be revisited.
- **Interventions in non-structural aspects:** Enhancing disaster resilience is not only about building back better from a structural perspective. It requires interventions in non-structural aspects of the education system such as the curriculum and textbooks to ensure that teachers and students internalize safety issues and can act in times of need. This also requires strengthened disaster preparedness and response at the school and community level through school-based DRM and community-based DRM training and planning.



The range of specific needs in the short term, the medium term and long terms are described below.

#### SHORT-TERM NEEDS (0–1 YEARS)

These include the immediate and transitional needs that are required to resume the delivery of education services in the various subsectors until reconstruction and rehabilitation of permanent structures is completed.

In the **school subsector**, the short-term needs include the following:

- **For the resumption of education services**, it is estimated that nearly 15,000 temporary/transitional learning centres with teaching-learning and co-curricular and WASH facilities (including separate facilities for girls) need to be established in the affected districts.<sup>30</sup> Given that school reconstruction would require at least two to three years these structures require reinforcement and upgrading to withstand storms, snow, hail and rain to ensure uninterrupted education in a safe environment while undergoing reconstruction and retrofitting.
- **Debris removal and site clearance** of damaged schools to prepare the sites for set up of transitional classrooms and permanent buildings.
- **Provision of textbooks and teaching-learning materials** to ensure meaningful resumption of teaching-learning processes given the massive damage to textbooks and teaching-learning materials in the affected districts.
- **Detailed structural assessment** of damaged school buildings on a building-by-building basis, and soil tests to ascertain the true extent of damages and losses as well as feasibility of reconstruction/retrofitting in existing sites.
- **Development of appropriate designs and prototypes and institutional arrangements**, taking into account geography, climate, avail-

ability of land, cost effectiveness and other factors into account, is important for a timely reconstruction and rehabilitation of damaged school buildings. Further assessment of existing steel frame structure classrooms should be done to feed into the development of such prototypes to see if they could be the most cost-effective and resilient structures in case of earthquakes and others disasters.

- **Revisiting of the existing ‘Strategy for Disaster-Resilient Schools’** and mainstreaming of the reconstruction and recovery plan in the post-SSRP school sector development sector plan that is currently being formulated by the government.

In the **TVET and higher education subsectors**, there is an immediate need for the following:

- **Provision of temporary spaces to resume classes** and training programmes that were ongoing prior to the disaster. For this purpose, it is necessary that individual institutions are instructed and provided with the requisite resources by UGC, the respective universities, and CTEVT.
- **Flexible examination dates** for missed examinations.
- **Subsidized credit/loans for affected students** to ensure continuity of their higher education.
- **Provision of construction-oriented trades in short-term training programmes** offered by different ongoing TVET-related projects,<sup>31</sup> giving particular attention to training people in the affected communities. There is also a need to properly equip masons and other technicians (electricians, plumbers, etc.) trained for reconstruction work so that the idea of building back better can be translated into action quickly and effectively.
- **Facility-by-facility assessment of damages, risks and vulnerabilities** through mobilization of engineering students and graduates.

<sup>30</sup> The Education Cluster was immediately activated on 26 April and appealed for US\$ 24.1 million to enable the set-up of 4,668 TLCs, the provision of essential education-in-emergencies supplies, and the training of teachers on psychosocial support and life-saving messages relating to disaster preparedness, protection, sanitation and hygiene promotion, nutrition and health. The Education Cluster is also supporting the DOE with a structural assessment of 7,800 schools to designate them safe or unsafe for the resumption of learning. The Education Cluster is led by the DOE, under the supervision of the MOE, and co-led by UNICEF and Save the Children. It now consists of over 70 national and international organizations, including 37 International NGOs, 32 National NGOs and 4 UN Agencies.

<sup>31</sup> These include short-term training programs conducted by the government’s Enhanced Vocational Education and Training (EVENT) project, the Skills Development Project (SDP) and the Employment Fund.

**MEDIUM-TERM NEEDS (1-2 YEARS)**

Medium-term needs will be dominated by reconstruction and retrofitting activities in school/college buildings, and allied structures (DEOs, resource centres, administrative buildings, libraries, and laboratories). This will require reviewing and revising existing legal and oversight mechanisms for strengthening and ensuring safety in all types of educational facilities.

In the school subsector, the medium-term needs include:

- **Reconstruction of fully-destroyed schools** using principles of building back better with disaster resilience technology, better learning environment and service delivery and selective additional features such as solar lighting, water harvesting structures, and internet connectivity. Integrated school designs should be developed to replace fragmented, block-wise approach to buildings.
- **Review and rationalization of school locations (including school mergers), teacher deployment, unit costs, and incentive schemes** to ensure that limited resources are redirected to the most needed areas and communities.
- **Relocation of schools to safer locations:** It is estimated that around 5 percent of the schools in the most-affected districts need to be relocated. It is essential that provision for adequate land in a safe location made for such relocation.
- **Retrofitting and repair of partially destroyed schools** through a detailed assessment of partially destroyed buildings.
- **Provisioning additional skilled human resources and technical inputs**(including third party monitoring) at the national, district and school levels to ensure compliance and quality assurance at all phases of reconstruction/rehabilitation.
- **Carrying out curriculum and textbook reforms with DRR and resilience perspective** and teacher training on the new curriculum and textbooks through existing teacher training institutes.
- **Strengthening the education management information system (EMIS)** to incorporate a module on school safety and DRR.
- **Improving policies, guidelines and systems for new school buildings** to meet higher standards and levels of safety than

residential buildings. Existing school building guidelines needs to be reviewed to meet 'immediate occupancy' criteria. School buildings should double as evacuation shelters during disasters. It is important to set up independent quality control and inspection requirements for the construction of school buildings. Policies, guidelines and building codes to regulate safety standards for private schools through certification, technical and administrative support should be introduced.

- **Strengthening disaster preparedness and response at the school and community level** through school-based DRM and community-based DRM training and planning by enhancing the capacity and preparedness of SMCs/PTAs, child clubs, and communities in DRM. An emergency response plan needs to be developed, supplemented with improvement in the existing curriculum on disaster risk education and reduction to further raise the students' and teachers' awareness on earthquakes, floods, landslides and other key hazards and to guide them properly in responding and evacuation in the event of disasters. MoE/DoE and DEOs need to prepare school continuity plans in case of disruptions to the school calendar by disasters.

Many of the medium-term needs in the school subsector also apply to TVET and higher education. In TVET, the medium-term needs include:

- Reconstruction of TVET facilities and institutions using principles of building back better.
- **Training technical and skilled workers** is crucial as reconstruction will lead to a high demand for technical and skilled workers such as skilled masons, carpenters, bar benders and construction supervisors familiar with earthquake safety techniques. Hence, ongoing projects should be helped to meet this additional demand. CTEVT should also re-organize its schools to meet the demand for relevant Technical School Leaving Certificate (TSLC) and diploma-level training and increase the batches of training, which will require hiring of additional trainers.
- **Incorporation of DRR** in TVET programmes and training in DRR for instructors/facilitators.

Likewise, in **higher education**, the medium-

term needs include:

- **Reconstruction of damaged facilities and institutions** using principles of building back better. This would include provisions to build residential colleges.
- **Extension of courses on DRM and earthquake engineering** in all engineering colleges affiliated to various universities.
- **Strengthening of higher EMIS** to enhance its capacity to collect, analyze and disseminate information on all higher education institutions in the country.
- **Offering subsidized credit/loans for affected students** to ensure that they continue with their education

#### LONG-TERM NEEDS (BEYOND 2 YEARS)

In the long run, going beyond the response to the earthquake and reconstruction, this phase will focus on long-term development issues, particularly in developing a nation-wide policy and implementation plan for education safety across the country. Adequate policies and measures will be put in place to carry out multi-hazard preparedness of educational institutions and investing in making buildings resilient to different kinds of disasters. In the long term, all educational institutions need to be built back better, following state-of-the-art practices of school safety. Further, it is necessary that subsequent subsectoral plans and programmes take on board such long-term developmental measures to ensure that physical construction is extensively supported by interventions to increase the quality of education and enhance the learning environment. Major long-term needs include the following:

- Planning and risk assessment across schools to identify schools that need to be relocated to a safer location. Decisions to replace seismically vulnerable school buildings or retrofitting require thorough information on the risk levels of each building. The assessment should capture schools' exposure to other hazards (floods, landslides, fires, wind-storms, avalanches, rock falls) as well as availability of drinking water source and accessibility to communities.
- Strengthening the capacity of higher education for DRR/DRM research through the establishment of dedicated research centres in universities or by enhancing the capacity of existing centres within and outside

of universities, as also recommended by the proposed higher education policy. This needs to be closely tied to the provision of research grants for faculty to conduct research on related topics.

- Institutionalization of mechanisms to ensure that all educational institutions and facilities are disaster resilient which, among others, includes restructuring/realignment of units within the MoE system to ensure continued safety in the entire education sector, including private institutions that are affiliated to CTEVT and various universities.
- Strengthened disaster preparedness and response at the school and community level through school-based DRM and community-based DRM training and planning. An emergency response plan needs to be developed for each school, with improvement in the existing curriculum on disaster risk education and reduction to further raise students' and teachers' awareness on earthquakes, floods, landslides and other key hazards and to guide them properly in response and evacuation in the event of disasters. MoE/DoE and DEOs must prepare school continuity plans in case of disruptions to the school calendar by disasters.

#### NEEDS FOR ADDRESSING THE SOCIAL IMPACT OF THE DISASTER

As the disaster is likely to further exacerbate existing disparities in terms of access, retention and learning outcomes based on the level of vulnerability across the different equity dimensions (gender, caste, ethnicity, location, disability, socio economic status, etc.), and the availability and access to resources, it is necessary to ensure that the strategies to address these disparities take into account the changes in prevalence and severity of these disparities in the aftermath of the disaster. For this, the implementation of the Consolidated Equity Strategy for the School subsector – which includes the development and use of equity index for needs-based targeting of resources -- to balance emerging post-disaster needs with historic prevalence and severity in disparities of educational outcomes is both timely and crucial. There is also a need to adapt the following existing strategies to accommodate the emerging needs:

- **Incentive schemes:** as scholarships consume

a considerable part of the available resources, they present an opportunity to enhance access and retention in schools. Needs-based redirection of these incentives (in place of the current ‘blanket’ provision) would increase the amount of money available to the neediest children and thereby serve the immediate needs of those most vulnerable and most affected.

- **Health and nutrition programmes:** The midday meals programme supported by the government has demonstrated significant success in contributing to increased access and retention, especially among disadvantaged groups living in highly food insecure areas of Nepal in the far and mid-western hills and mountains. This scheme could be extended to the affected districts for a fixed time period to address the nutritional needs of the children attending schools. Likewise, there is a need to also extend the Multi-Sector Nutrition Strategy, under which iron folic acid and deworming tablets are offered to students, to the affected areas.
- **Advocacy and campaigns:** The ‘Welcome to School Campaign’ has been institutionalized as an annual reoccurring event to convince parents to enroll their children and ensure that children come to school from the start of the academic year. There is a need to build on established partnerships with national and local media to ensure that the campaign encourages affected children to return to school in the affected areas, as well as alert schools and communities in non-affected areas to cater to the additional needs of children that have migrated from the affected areas.
- **Alternate education:** In order to address the needs of those who are expected to drop out of formal education, the government’s non-formal education and skill-development programmes will have to adapt to increased needs based on the projection of increase of out-of-school children who are unlikely to return to formal education. This will require a need-based expansion of the School Outreach Programme (SOP), the Flexible Schooling Programme (FSP), and the Open Schooling Programme (OSP) within the affected areas.
- **Inclusion of children with disabilities:**

Current data on children with disabilities within the EMIS is limited but suggests that they are amongst the most marginalized groups with regard to access, retention and learning outcomes. It is crucial to strengthen the monitoring and evaluation of data on children with disabilities, and the diagnostic and referral mechanisms within the affected areas. Also, inclusion should be a core component of the build back better concept to ensure that safe schools also are inclusive in terms of access, acoustics and light.

### Implementation Arrangements

Implementation arrangements for reconstruction and recovery will vary according to the specific subsectors within the education sector. It is essential that dedicated mechanisms be instituted within MoE/DoE, CTEVT and universities (including third party verification) to ensure strict adherence to norms and standards in the design and construction of education facilities.

In the school subsector, there are a limited number of engineers and sub-engineers at DoE and DEOs. The damages and losses figures illustrate the importance of ensuring safety and quality by providing technical supervision at the school construction sites, testing materials, inspecting workmanship, and confirming that workers comply with design drawings during construction. The number of design and construction supervision engineers and sub-engineers should be increased by hiring additional human resources and technical inputs for speedy recovery, monitoring safety and quality. TVET and higher education subsectors need to establish coordination committees within their respective agencies and could assign specialized institutions within their ambit (such as the Institute of Engineering in the case of Tribhuvan University) to manage and oversee the overall safety of their institutions.

### Assessment Methodology

This PDNA for the education sector is part of the broader PDNA conducted for all sectors under the overall leadership of NPC. It is a joint exercise of the government and development partners and in the case of education is led by MoE.

### METHODS, TOOLS AND DATA SOURCES



The PDNA of the education sector utilizes a combination of quantitative and qualitative assessment tools. The major component of this assessment is the estimation of damages and losses for the entire sector, which includes early childhood education and development (ECED), school education (grades 1–12), technical and vocational education and training (TVET), higher education, and non-formal education/life-long learning. The estimation of damages and losses are categorized into the following four dimensions:

- destruction of infrastructure and assets
- disruption to service delivery and production
- disruption of governance
- emerging risks and vulnerabilities

The calculation of damages and losses for the sector are based on the data and information provided to MoE by the various subsectors – DoE for ECED and school education, CT-VET for TVET, UGC for higher education, and Non-Formal Education Centre for non-formal education/life-long learning (including community learning centres). Data on damages and losses to public and institutional libraries has also been included. For the school subsector, the PDNA Team built on the data that was compiled through the Nepal Education Cluster, which was activated to undertake the relief and initial response shortly after the earthquake.<sup>32</sup> Data on damages and losses was obtained from 57 districts, including the 14 most-affected districts. All calculations are based on the pre-disaster unit costs used by the MoE system in the planning and allocation of resources.

The Sector Assessment Team undertook field visits from 26–29 May 2015 in 10 variously affected districts<sup>33</sup> to gain additional insights into the extent of damage to physical infrastructure and assets, and to understand the broader effects of the disaster on:

- access and learning environment
- teaching and learning processes
- teachers and education personnel
- service delivery and governance mechanisms
- emerging risks and vulnerabilities

More importantly, however, these field visits were

used to understand local perspectives on how the education system can be built back better to reduce multi-hazard risks in the future. For these purposes, a standard questionnaire was developed by the Assessment Team to guide the interactions with various stakeholders. In each district, visits were made to ECD centres, general schools, technical schools, and universities/colleges. Discussions were held with the District Education Officers and staff, teachers, school management committee members, parents and children to the extent possible. Further, a series of interactions were held with representatives of all central line agencies including the CTEVT and UGC, representatives of private schools and various teacher organizations on 27 May to understand the effects of the disaster on the functioning of the education system and to solicit their suggestions for potential recovery strategies and interventions. Further consultations on the recovery strategies and interventions were carried out with these agencies and their suggestions have been incorporated in the report. In addition, the children's consultations organized by the Plan International, Save the Children, UNICEF and World Vision International, Nepal, from 25 May to 7 June 2015 have informed the PDNA education sector report by reflecting the voices of the children from the 14 most-affected districts.

#### KEY ASSUMPTIONS AND LIMITATIONS

Damages to infrastructure and assets in all subsectors have been estimated on the basis of the number of classrooms/rooms damaged (not on the basis of the number of building units damaged). As 'intact' classrooms in an unusable building<sup>34</sup> have generally not been included in the damage reports from the districts, the total number of classrooms rendered unusable is most likely higher than the figures used here. Whilst there was complete information on school-based ECD centres (which are included under school education), information on the extent of damage to community-based ECD centres was available only for the 14 most-affected districts. We have assumed that the damage to ECD centres in the remaining affected districts was proportionate to the damage to schools and have done the calculations accordingly.<sup>35</sup>

In the case of private education institutions,

<sup>32</sup> For details, see [www.humanitarianrelief.info/operations/nepal/education](http://www.humanitarianrelief.info/operations/nepal/education)

<sup>33</sup> These included Kathmandu, Lalitpur, Bhaktapur, Lamjung, Tanahu, Gorkha, Dhading, Sindhupalchowk, Kavrepalanchowk and Sindhuli.

<sup>34</sup> A number of such cases were observed during the field visit.

<sup>35</sup> We can generally assume that community-based ECD centers are typically located in less structurally sound buildings so this estimate of damages is also highly likely to be a lower bound estimate.



many of them operate in rented buildings and the damage to classrooms could be therefore seen as damage to be included under the housing sector PDNA. This is also the case with many community-based ECD centres and community-learning centres. However, we have included such damages as damages to the education sector. We have applied the same standard unit costs to all classrooms in different subsectors irrespective of the nature of construction (e.g., mud vs. RCC). It should be noted that complete data on damages to assets in many schools and educational institutions were not available. In such cases, we have assumed that total damage to classrooms also means total damage to furniture, equipment and other assets and estimated the total damages using average cost figures provided by the respective subsectoral institutions. In the case of facilities experiencing partial damage, we have assumed the loss at 50 percent of the value of the furniture, equipment and other assets owned by them.

Following the standard PDNA methodology, we have also included in the loss estimates the costs of demolition/debris removal and of setting up temporary learning spaces.<sup>36</sup>

Given the extremely tight timeline for the assessment, it was not possible to include data from the detailed structural assessment that is currently being undertaken in all affected districts.<sup>37</sup> The Team has, therefore, chosen to be conservative in its estimates of damages and losses. More specifically, it should be noted that damage and loss estimates reported in this assessment should be viewed as lower bound estimates of the actual damages and losses experienced by the sector for the following reasons:

- **Underreporting of damages in educational institutions run by the private sector:** Not all private education institutions were able to provide damage and loss data. This was also the case with TVET and higher educa-

<sup>36</sup> However, justifications could be made to include some of these 'losses' in the 'needs' part.

<sup>37</sup> However, the preliminary results of these assessments from 4 districts have been used to verify the data on damage that was reported through the District Education Officers.

tion subsectors that do not have systematic mechanisms in place to collect such data under a limited time frame. Therefore, a more systematic and comprehensive assessment of damaged buildings is needed to ascertain the true extent of damage.

- **Limitations in approach to reporting damages:** As damage reports show data on damaged classrooms as opposed to buildings, ‘intact’ classrooms in damaged buildings have not been accounted for even though they are unusable.
- **Limited information on damages to community-run institutions:** Data on damages to many institutions such as community-based ECD centres and community learning centres are not available.
- **Use of conservative unit cost figures:** The unit costs used by the government underestimate the actual costs of classrooms as most of construction in the education sector occurs through government-community partner-

ships and matching contributions from the communities and other organizations.

- **Non-inclusion of damages from storms following the earthquake:** As the PDNA was being undertaken, a series of highly destructive storms also hit the affected districts, causing additional damage to the already affected schools and communities. Roofing materials, particularly, were blown away in many schools. However, these damages could not be included in this analysis. Furthermore, the monsoon will bring with it torrential rains and increase the risks of flooding and landslides. In particular, five of the most-affected districts (Rasuwa, Sindhupalchowk, Dhadhing, Dolakha and Gorkha) have suffered from monsoon-related disasters in the past and it is highly likely that they will suffer from additional damages in the monsoon. Such potential future damages are also not included in this PDNA.







# 5. Cultural Heritage

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## Summary

In the aftermath of the 2015 earthquake, Nepal suffered its worst loss of heritage since the earthquake of 1934. Major monuments in Kathmandu's seven World Heritage Monument Zones were severely damaged and many collapsed completely. In addition, in more than 20 districts, thousands of private residences built on traditional lines, historic public buildings, ancient and recently built temples and monasteries, were affected by the disaster, 25 percent of which were destroyed completely. The total estimated damages to tangible heritage is NPR 16.9 billion (US\$ 169 million). The earthquake affected about 2,900 structures with a cultural, historical and religious heritage value. The list of affected structures was collated by the Ministry of Culture, Tourism and Civil Aviation (MoCTCA), the Pashupati Area Development Trust, and the Buddhist Philosophy Promotion and Monastery Development Committee.

The baseline information on the size and nature of damage to the buildings, and the effects on its occupants, varies widely. While detailed documentation is available on monuments within the Kathmandu Valley and some major sites in the districts, there is a lack of precise information on the condition of buildings in remote areas.

It is estimated that the decline in revenues from ticket sales at monuments within the Kathmandu Valley will amount to losses worth NPR 600 million (US\$ 6 million) over the next 12 months. Places of worship such as temples and monasteries also provide occasions for revenue generation, such as during religious festivals and performances when shrines receive substantial money offerings. The preliminary monetary loss was set at 10 percent of the physical damage or close to US\$ 17 million.

The long-term recovery plan envisages complete restoration of all damaged structures with a view to building back better through the use

of high grade materials, seismic-strengthening structural features. The cost of reconstruction has been calculated at the estimated value of damages plus 20 percent to build back better. The cost of recovery also includes the professional services provided by technical experts, capacity-building support to the Department of Archaeology (DoA), MoCTCA, and initiatives to document and revitalize the wide spectrum of crafts and cultural traditions that come under the rubric of intangible cultural heritage (ICH) by enabling craftspeople and local communities, among others.

Internationally supported restoration programmes on such a large scale will undoubtedly strengthen Nepal's professional corps and its institutions. Based on the principles of building back better, the restored historic monuments will get a fresh lease of life, captivating Nepali citizens and international visitors alike for years to come. The fillip provided to tourism, during the reconstruction phase would benefit local businesses such as hotels, bed and breakfasts, restaurants, and crafts stores.

One objective of this assessment is to provide a preliminary description of the damage caused to Nepal's heritage structures. This report provides an initial assessment of short, medium, and long-term intervention needs in the course of building resilience.

## Pre-Disaster Context and Baseline

MoCTCA accords great importance to the conservation of cultural heritage. It is a huge draw for tourism, which occupies a significant place in Nepal's economy. DoA, established in 1953, is the official executing agency for heritage conservation and also the custodian of Nepal's museums, among them the National Museum and Patan Museum. As per the provision of the Ancient Monument Preservation Act (1956), DoA is mandated to protect and preserve Ne-



pal's extensive cultural heritage, maintain inventories and provide technical assistance for conservation. Creating new museums, safeguarding moveable cultural property and raising awareness for the protection of cultural heritage, also comes within its ambit.

The Kathmandu Valley is home to seven World Heritage Monument Zones, which together have been declared a UNESCO World Heritage Site, namely the three town centres of the erstwhile royal cities of Kathmandu, Patan and Bhaktapur; the two important Buddhist monument sites of Boudha and Swayambhu; and the two major Hindu sites of Pashupatinath and Changu Narayan. In addition, the Government of Nepal (GoN) has listed Panauti, Gorkha and Dakshinkali as nationally protected monument zones. According to DoA there are close to 1,000 historic religious sites and heritage buildings within the Kathmandu Valley alone, which need to be inventoried. Moreover, most available records are in Nepali language and are dispersed across many locations.

Carl Pruscha's *Kathmandu Valley, The Preservation of Physical Environment and Cultural Heritage: A Protective Inventory*, published in 1975, is the most comprehensive record available to date and continues to serve as the prime source of information on the built heritage of the valley. The two volumes provide location drawings and photographic documentation of over 800 buildings and sites of heritage value. This data is important for future restoration work.

Records of heritage structures in Nepal's districts are relatively scarce with the exception of data for major sites such as Lo Mantang, Gorkha, Panauti, and Nuwakot. According to sources within DoA, there are approximately 1000 sites in the districts outside Kathmandu Valley that are classified as being of national, regional and local importance. In Nepal, tangible cultural heritage is inextricably associated with a living culture of daily worship and ancient festivals. Cultural sites are where people come to pray daily, interact socially, celebrate, and find solace.

The Kathmandu Valley has a number of museums with a wide range of collections. The internationally acclaimed Patan Museum, located in a former royal palace, features professionally

curated exhibitions on Hindu and Buddhist Art. The National Museum collections include some exquisite pieces but many exhibits are poorly displayed and labelled. The Hanuman Dhoka Royal Museum in Kathmandu displays mostly objects related to three erstwhile monarchs of Nepal (King Tribhuvan, King Mahendra, and King Birendra). The National Art Gallery and two small neglected museums featuring bronze and wood carving are located in the town of Bhaktapur. In general, all museums are in serious need of physical refurbishment and professional curation.

Intangible culture in Nepal, with its incredible richness of over 120 languages and countless cultural and religious traditions and festivals, has been widely researched by international scholars and extensively documented. The richness of expression in Kathmandu Valley, where rituals and processions can be observed on a daily basis, may be unmatched. However, there has been a decline in traditional cultural activity that is without a doubt connected to globalization, migration of people for reasons of livelihood, and compounded by the growing effects of consumerism. Nevertheless, the wealth of intangible cultural activity continues to be an aspect of national pride and an attraction for foreign visitors.

## Post-Disaster Context

### DISASTER EFFECTS AND IMPACTS

#### Effects on Infrastructure and Physical Assets

DoA, MoCCTA, was the prime source of information regarding the extent of destruction to historic sites, conducting extensive field visits and collecting data through its staff. According to the assessment, the earthquake affected a total of 691 buildings of historic value in 16 districts. Of these buildings, 131 were fully destroyed and 560 were damaged. DoA's researchers compiled information mostly in the form of handwritten notes with some digital photographs to support their remarks. The compilation of a consolidated digital database consisting of systematic description of damage and photographic documentation is still pending.

Several UNESCO teams, including volunteers, conducted independent surveys of historic sites in the Kathmandu Valley. UNESCO contracted

Kathmandu Living Labs, a Kathmandu-based private company that makes databases and mapping information available online through its open-source software for an interesting initiative. The idea was to train volunteers with backgrounds in architecture, engineering and art history to create reports on the condition of monuments and historic houses in cultural sites quickly and easily using smartphones.

The data collected includes information about sites, type of structures, level of damage, photographs, GPS coordinates, and local contact information. The purpose of this documentation is to start an interactive map and database for the benefit of DoA, researchers, the general public, and tourists. This recently collected data represents a follow-up to Pruscha's 1975 inventory, and will be useful for educational purposes, fundraising and generating public awareness about the cultural significance of the sites. Access to the website is currently restricted as sites are being secured and inventories are being made of valuable artefacts lying unprotected. Since it is a work in progress, not all the data could be included in this PDNA (to date, data has been collected on 1,145 monuments within the Kathmandu Valley). In addition several private religious organizations provided their own data of damage in remote districts and conveyed their findings to DoA that close to 1,400 monasteries in remote areas have suffered damage or collapse.

In the Kathmandu Valley, two cultural institutions (Nepal Academy and Nepal Academy of Fine Arts) and three museums (National Museum, Chauni; Hanuman Dhoka Palace Museum, Kathmandu; and the National Art Gallery, Bhaktapur), suffered major damage. All buildings will need extensive restoration works to bring back some semblance of their past glory; however, available data now indicates that the collections are unharmed.

Emergency response was initiated immediately after the earthquake and carried out with widely different results and speed in the seven locations within the World Heritage Site.

In Patan, for example, the temple-studded Durbar Square with the adjacent Royal Palace suffered considerable damage, but many recently restored palace buildings and temples survived the earth-

quake, with minor damage at most. DoA representatives took the lead in coordinating security and clean-up efforts immediately after the disaster. The remnants of three completely destroyed Pagoda temples were secured with the help of hundreds of volunteers, soldiers and police, and brought to safety in an adjacent palace courtyard. The remnants of structures and artefacts are now securely stored at the Patan Museum where they will be documented, inventoried and cleaned for future restoration. A team of master carpenters is currently engaged in re-assembling doors and windows that were damaged when the temples collapsed. A storage shed is under construction where all timber components and stone elements will be securely stored.

Progress at Kathmandu's Durbar Square was less evident as mounds of debris remained on the square more than a month after the earthquake. The fragile condition of the Royal Palace that houses the collection of the Hanuman Dhoka Museum, poses a difficult challenge to heritage conservationists. The building is yet to be secured to facilitate collection, removal and safe storage of items. Similar activities are underway at many other sites where temporary shoring and protection of buildings with tarpaulins need to be completed before the onset of the monsoon.

#### **Effects on Service Delivery and Access to Goods and Services**

The destruction of buildings has caused institutions such as libraries, museums and archives as well as places of worship to shut down. The lack of data made it difficult to assess the extent and duration of physical damage within the brief period of the PDNA. The closure will most likely be temporary with some noted exceptions like the National Museum in Chauni and the Hanuman Dhoka Palace Museum, where the extent of damage is such that a full recovery will take many years. More in-depth research is needed to assess the impact on thousands of religious institutions that are widely distributed, often in remote areas of affected districts. Pilgrimages have come to an almost complete halt as people are preoccupied with the immediate effects of the disaster on their livelihoods. Many roads and access trails to remote pilgrimage sites have been cut off. All seven World Heritage Zones in the Kathmandu Valley have been closed and ticket collection from tourists has been suspended.

### Effects on Governance

The effects on governance in the cultural sector have been limited. The closing of government offices and institutions, such as cultural centres and museums, has slowed down the implementation of ongoing restoration projects. The need to respond swiftly to the disaster took a priority over ongoing programme activities.

### Effects on Risks and Vulnerabilities

Preservation efforts in general are not well-funded. Recent urban development programmes within the city showed a shift from preservation to addressing issues of ‘modernization’. Even before the earthquake there was already a huge backlog of cultural sites that needed restoration. Over the years religious institutions have lost their land for various reasons. The loss of income from landholdings that traditionally supplied funds for religious activities caused further pauperization of historic sites. Some traditional festivals and rituals have suffered because of decrease in financial support from communities and the government.

### Effects on Intangible Cultural Heritage

The intangible cultural aspects of worship, rituals and festivals were severely interrupted at temples that completely collapsed. Loss of important tangible heritage is related to the loss of intangible heritage and identity, just as the loss of traditional family dwellings is bound to have an impact on the day-to-day lives of the people. Traditional architectural styles of building, just like clothing, are integral to ethnic and cultural identity of the people and the displacement of people will further weaken their links to community centres and rituals.

Significant economic losses will incur in communities that rely on the revenues generated in the course of ritual performances associated with temples. Such performances will be severely curtailed, or may not occur, which will lead to a potential loss of this intangible heritage. Stone and metal sculptures, often revered as living gods, will have to be relocated from badly damaged sites to new structures that are safe for worship. Inventorying, storing, and safeguarding valuable cultural objects associated with intangible heritage, including masks, costumes, ritual objects and jewellery used in ritual performances involve additional costs.

Temples have been badly damaged, which has affected daily worship and interrupted rituals and festival celebrations. While some structures have withstood the quake, many are no longer safe for devotees. Many communities will need to relocate their religious objects or build temporary structures to allow worship and festivals to continue. Safeguarding measures for the continuity of ritual public performances (essential for the cultural identity of a given community) must be undertaken.

Many public rest houses (*patis*) have either collapsed or been badly damaged. These community structures provide a meeting place for people of all generations to share news and stories. Damage to these structures could mean a loss in the continuation of oral narratives, which is intrinsically linked to community culture in Nepal.

### Effects on Cultural Industries

There could be some positive movement towards transmission of knowledge and implementation of traditional craftsmanship, as more artisans will be needed to restore the many historic houses, temples and monuments that were damaged. The opportunities presented for rebuilding on such a large scale could revitalize traditional masonry techniques, wood carving, stone-carving and metal repoussé techniques, among others. While Nepal does not have enough craftspeople to handle the current need, a small number of local master-craftsmen could take the lead in transmitting traditional knowledge to the next generation. If such efforts could be documented it would contribute to the retention of a knowledge economy that values cultural heritage. If adequate training can be conducted for aspiring craftspeople, their numbers would certainly grow and rebuilding would provide a source of livelihood for thousands of families.

Most of the buildings that collapsed were older structures built with traditional materials and had not been properly maintained. Following the earthquake, a concern that is widely shared is that local people may view traditional materials and craftsmanship as ‘unsafe’, displaying an inclination to accepting concrete structures as a safer alternative.

## DAMAGES AND LOSSES

### Estimation of Damages to Infrastructure and Physical Assets

The planning section of DoA, with inputs from the Ministry of Culture, the Pashupati Area Development Trust, and the Buddhist Philosophy Promotion and Monastery Development Committee, has estimated the total damages to cultural heritage properties at US\$ 169 million.

The total financial requirement for a full recovery comes to approximately US\$ 205 million. It is estimated that a budget of 20 percent over the damages would cover the substantial investments needed in retrofitting damaged buildings with earthquake-resilient, strengthening features. For structures that require rebuilding from ground-up, the costs of construction of proper earthquake-resistant foundations have also been included in the estimate.

### Estimation of Losses to Service Delivery and Access to Goods and Services

Losses from reduced revenues from the sale of tourist entry tickets to World Heritage Sites and museums is estimated at about NPR 600 million (US\$ 6 million) over the next 12 months. The calculation is based on a 75 percent reduction in income due to a drastic decline in tourism and the fact that no entry fees have been collected since the earthquake and all museums are closed for the time being.

There are many people whose livelihoods are dependent on temples and places of worship. The revenues they generate may come in the form of:

- direct income (salaries) from the shrines;
- share from the revenues of temples;
- money offerings during special festivals and performance of religious rites; and
- as income for communities during special occasions, subsidized by a place of worship

While this is something that cannot be quantified without a detailed survey, the preliminary monetary loss (allocated as ‘impact on livelihood’) was set at 10 percent of the physical damage, which amounts to approximately US\$ 17 million.

### Estimation of Governance Losses

Due to the closure of government cultural institutions such as museums, many employees

were unable to return to their workplace. Since all of them are permanently employed with the government, there has been no loss of income. The government should make provisions at the earliest to find other meaningful engagement for those employees such as joining restoration and conservation work-related activities.

The detailed damage, losses and reconstruction costs are given in Table 5.1 below.

## Recovery Needs and Strategy

A six-year recovery period (requiring on average of US\$ 34 million per year) is proposed for the restoration and reconstruction of all damaged and collapsed historic buildings including refurbishment of cultural institutions and museums.

The recovery plan would include substantial support to DoA in financing necessary equipment and additional professional staff over the next six years.

International and local experts will be needed in the fields of structural and seismic engineering, architecture, conservation, curation and museum design, as well as in areas of expertise related to preserving cultural heritage. There will be a need for specialists in intangible heritage (among them, anthropologists, art historians, linguists, and ethno-musicologists) to help communities identify ways to revitalize their traditions.

The recovery plan should include a strong commitment to conduct extensive training at all levels of project planning and restoration implementation. Educational support also needs to be provided for advanced studies in conservation-related professions.

### RESPONSE PHASE (JUNE – SEPTEMBER 2015)

During the response phase, the Earthquake Response Coordination Office (ERCO), established by DoA, will remain the coordination centre until all salvage and stabilization efforts have been completed and sites along with valuable art objects are fully secured and recorded. One of the most pressing needs is the protection of valuable rubble which is of immense archaeological value.

The Kathmandu site poses the biggest challenge with large parts of the royal palace destroyed or



threatened by collapse. For instance, the issue of removing the large collection of the Hanuman Dhoka Museum, particularly the very heavy 18th century royal thrones, needs to be addressed as soon as possible and a safe storage location needs to be found.

The partial opening of all World Heritage Monument Zones to the public by June 15, 2015 is an ambitious aim announced by the government. Unstable structures will need to be dismantled and unsafe areas fenced off in order to provide a safe environment for visitors.

The situation in remote areas has not been assessed professionally. Until now, the focus was on humanitarian relief. Collapsed or heavily damaged religious buildings were left for the communities to look after. A beginning needs to be made on this.

#### FIRST YEAR ACTIVITIES

##### (STARTING IN AUGUST 2015)

##### Creation of an Inventory, Including Reports on the Condition of Historic Sites and Buildings

DoA should create an inventory (preferably in digital form) of historic sites and buildings not only in the disaster-affected districts but from across the country.

**TABLE 5.1: DAMAGES, LOSSES AND RECONSTRUCTION COSTS**

Sr. No.	Districts	Damage USD	Losses USD	Losses USD	Losses USD	Cost of Recovery and Reconstruction USD
		Damage to physical assets and infrastructure	Impact on livelihood estimated at 10% of damage	Losses from tourist ticket sales	Total value	20% added for the cost of retrofitting and improved seismic design of new structures
1	Bhaktapur	\$5,330,000	\$533,000	\$2,275,849	\$2,808,849	\$6,396,000
2	Dhading	\$300,000	\$30,000		\$30,000	\$360,000
3	Dolkha	\$500,000	\$50,000		\$50,000	\$600,000
4	Gorkha	\$632,000	\$63,200		\$63,200	\$758,400
5	Kaski	\$150,000	\$15,000		\$15,000	\$180,000
6	Kathmandu	\$49,915,000	\$4,991,500	\$3,044,027	\$8,035,527	\$59,898,000
7	Kavrepalanchowk	\$2,082,000	\$208,200		\$208,200	\$2,498,400
8	Lalitpur	\$9,190,000	\$919,000	\$897,649	\$1,816,649	\$11,028,000
9	Lamjung	\$480,000	\$48,000		\$48,000	\$576,000
10	Makawanpur	\$200,000	\$20,000		\$20,000	\$240,000
11	Nuwakot	\$7,326,000	\$732,600		\$732,600	\$8,791,200
12	Ramechhap	\$325,000	\$32,500		\$32,500	\$390,000
13	Rasuwa	\$300,000	\$30,000		\$30,000	\$360,000
14	Sindhuli	\$320,000	\$32,000		\$32,000	\$384,000
15	Sindhupalchowk	\$1,500,000	\$150,000		\$150,000	\$1,800,000
16	Tanahun	\$200,000	\$20,000		\$20,000	\$240,000
17	Monasteries, historic structures (older than 100 years)	\$53,003,532	\$5,300,353		\$5,300,353	\$63,604,238
18	Monasteries less than 100 years old	\$28,345,340	\$2,834,534		\$2,834,534	\$34,014,408
19	Temples in remote areas	\$9,000,000	\$900,000		\$900,000	\$10,800,000
20	External technical experts					\$600,000
21	Capacity building work shops, specialized training, ICH conference, marketing training, festivals and exhibitions					\$650,000
22	Professional support to the Department of Archaeology: equipment and additional staff					\$1,500,000
<b>SUB TOTAL:</b>			<b>\$16,909,887</b>	<b>\$6,217,525</b>		
<b>TOTAL:</b>		<b>\$169,098,872</b>			<b>\$23,127,412</b>	<b>\$205,668,646</b>

**TABLE 5.2: ESTIMATED REVENUES FROM TICKET SALES AND MUSEUM ADMISSIONS IN FY 2013-2014**

Income of World Heritage sites and museum entrance fees					
Site/ Museum	Visitors for fiscal year 2013/14	Current ticket price NRs.	Sub total NRs.	Total NRs.	US\$
<b>Hanuman Dhoka ticket</b>					
SAARC	27,546	150	4,131,845		
Foreigners	258,553	750	193,914,998		
				<b>198,046,842</b>	<b>\$1,980,468</b>
<b>National Museum (Chauni)</b>					
SAARC	880	50	44,023		
Foreigners	2,425	150	363,689		
				<b>407,712</b>	<b>\$4,077</b>
<b>Swayambhu</b>					
SAARC	133,741	50	6,687,041		
Foreigners	268,092	200	53,618,418		
				<b>60,305,459</b>	<b>\$603,055</b>
<b>Boudha</b>					
SAARC	103,075	100	10,307,500		
Foreigners	223,174	250	55,793,500		
				<b>66,101,000</b>	<b>\$661,010</b>
<b>Pashupatinath</b>					
SAARC					
Foreigners	110,000	1,000	110,000,000		
				<b>110,000,000</b>	<b>\$1,100,000</b>
<b>TOTAL FOR KATHMANDU:</b>				<b>434,861,012</b>	<b>\$4,348,610</b>
<b>Patan</b>					
SAARC	100,000	200	20,000,000		
Foreigners	200,000	500	100,000,000		
				<b>120,000,000</b>	<b>\$1,200,000</b>
<b>Patan Museum</b>					
SAARC	6,560	250	1,640,000		
Foreigners	16,489	400	6,595,600		
				<b>8,235,600</b>	<b>\$82,356</b>
<b>TOTAL FOR PATAN:</b>				<b>128,235,600</b>	<b>\$1,282,356</b>
<b>Bhaktapur</b>					
SAARC	136,975	500	68,487,685		
Foreigners	169,016	1,500	253,524,600		
				<b>322,012,285</b>	<b>\$3,220,123</b>
<b>Changuu Narayan</b>					
SAARC	2,810	40	112,412		
Foreigners	23,582	100	2,358,223		
				<b>2,470,635</b>	<b>\$24,706</b>
<b>Living traditions museum</b>					
SAARC	399	100	39,900		
Foreigners	2,394	250	598,500		
				<b>638,400</b>	<b>\$6,384</b>
<b>TOTAL FOR BHAKTAPUR:</b>				<b>325,121,320</b>	<b>\$3,251,213</b>
<b>TOTAL VALUE</b>				<b>\$8,882,179</b>	

Given the large amount of research and data inputs necessary, additional staff and/or external experts would have to be hired.

A clear database establishing baseline information on each site, from location details (including GPS data) to photographic documentation, historical information, description of damage (if any); and a detailed needs assessment to support restoration planning. This database should be linked to other sources of information such as the DoA's own hand-written archive, Pruscha's 1975 inventory, and the 'Living Apps' online database.

#### **Creation of a Comprehensive Digital Inventory of all Museum Collections**

Most inventory records of Kathmandu's museums are handwritten, possibly incomplete and difficult to access. Only the Patan Museum publishes a printed museum guide book that records all objects and texts on display. Hence, it is of utmost importance to create complete, digitally accessible museum inventories for all museums as soon as possible. This will help safeguard the collections and help in evaluation and planning professional restoration of all objects.

#### **Master Plan Development and Project Planning**

DoA, with the support of UNESCO and international experts should develop a master plan/schedule for the repair, restoration and reconstruction of all collapsed and damaged monuments and sites. The master plan would be based on the comprehensive documentation of all affected 694 historic structures with detailed information regarding the type and degree of damage. The master plan needs to state a clear sequence of and a rationale for implementation. Restoration activities should be distributed between all districts, cities, and sites as evenly as possible. In general, priority should be given to repair and restore damaged structures before tackling ground-up reconstructions. Attention needs to be paid not only to sites on the World Heritage list but to smaller and significant monuments as well.

Detailed project proposals, customized to the requirement of each building, should address structural and seismic retrofitting solutions. Based on an analysis of the effectiveness of

past restorations in the face of the earthquake, DoA should seek the advice of international experts to develop methods for new earthquake resilient construction.

#### **Immediate Repair**

Many important monuments (e.g. Krishna Mandir, Vishveshvara and Bhimsen Temples in Patan, Svayambhu Stupa, Changu Narayan Temple) have been temporarily shored up but need immediate major restoration and structural interventions to ensure that they will not suffer more damage or collapse in a future earthquake.

Smaller restoration and repair schemes, which do not need much lead-time and large quantities of materials, should also be initiated immediately. Many smaller structures, monasteries and temples in outlying districts can often be restored with relatively modest amounts of funding and with community involvement.

#### **Material Procurement**

The large volumes of expected construction may cause bottlenecks in the supply of timber and special bricks used for restoration. It would be prudent to immediately research the feasibility of creating and supporting environmentally-friendly methods of brick production, as future restoration projects will require a ten-fold increase in bricks. Such bricks are unique to the valley and cannot be procured from anywhere else. As for the requirements of timber, the government will be sensitive to environmental concerns while addressing this need.

#### **Preservation of Museum Collections**

Conservation of artifacts and safeguarding of museum collections should start as soon as possible, preferably under the guidance of specialists in the field of metal, wood, ivory and painting restoration.

#### **Proposed Capacity-building Workshops and on-the-job Training for New DoA staff**

Workshops on data collection and management should be conducted for DoA's new staff to accelerate the production of an inventory of monuments and detailed condition reports. Many young professionals will be new to heritage field and will require adequate training to become familiar with principles and guidelines

in the conservation of heritage buildings. During the first year (2015-2016) many emergency repairs and smaller projects that do not require huge quantities of materials or time-consuming preparations will provide the perfect opportunity for new professionals to learn and familiarize themselves with ground realities.

#### **Workshops for Craftspeople and Artisans**

DoA, restoration contractors, and private agencies rely on a network of excellent craftspeople (carvers, carpenters, masons, metal workers, etc.) Hence, a comprehensive resource mapping of these artisans should be carried out immediately to ensure the knowledge, techniques and approaches are documented for future reference. It is expected that projects will face a severe shortage of craftspeople and will have to rely on less experienced artisans who will require adequate training before working on major projects. They should be provided on-the-job training so as work alongside the best in the trade and learn from them.

#### **Specialized Training for Structural Analysis, Seismic Retrofitting and Quake-resistant Construction**

Reputed structural engineers from within and outside Nepal should develop adequate structural solutions for safer reconstruction in some projects which could become models for others to follow.

#### **Design and Engineering Assistance to Communities and Public Awareness Campaigns**

Even though construction of private residences doesn't fall within the responsibility of the cultural heritage sector, it is highly recommended that lessons learned from cultural preservation activities be shared with historic towns and villages. The fabric of urban settlements surrounding monuments also needs to be considered. Several initiatives of young architects and engineers have already started this work with communities in Sankhu, Bungamati and Bhaktapur. A public awareness campaign would help to educate the public on ways in which traditional materials too can be used to be resilient provided there is adequate maintenance. Providing direct technical and design support coupled with extensive training programmes will be important to increase knowledge and capacity.

#### **Activities from the Second to the Sixth Year**

The activities of this period will be adjusted following achievements of the first year, the priorities of the master plan and of course will depend on the financing that is secured.

Restoration of all structurally threatened monuments will continue and only after this work is completed will ground-up reconstruction of fully collapsed structures should begin. The activities of the first year (inventory, planning, documentation) will lay the foundation for larger scale projects. Completed restoration projects must be professionally documented with a comprehensive historic structure report produced and shared with other projects. In order to disseminate information such data should be available online. An additional output would be publication of relevant training and conservation manuals.

Training programmes and specialized workshops as described in first-year activities should continue on a need to basis.

Restoration activities, including volunteer participation, hands-on restoration training, specialized workshops and guided tours, could be converted into a special attraction for both foreign and local visitors. Several thousands of jobs would be created over the years.

#### **Support to Preserve Intangible Cultural Heritage**

While costs associated with losses to ICH are more difficult to quantify than physical damage, significant immediate and long-term losses are predicted following the earthquake, particularly in social practices – rituals, worship, and festivals.

MoCTCA should expand its capacity to include professional staff with expertise necessary to properly monitor and evaluate losses to ICH. At present there are only three to four technical personnel working on this subject in the ministry number. A division dealing with ICH needs to be established, with capacity building workshops and staff training as a follow-up to the three workshops on implementation, inventorying and nomination held in Nepal between 2012-2013. Workshops should be held for different audiences with the participation of the line ministry, local officers, experts, INGOS and community members to enhance their capacity and knowledge. Community-based



workshops on ICH should provide hands-on technical training for conducting an inventory. Data management training is also required at central, district and local levels to efficiently map Nepal's intangible cultural heritage.

It is also necessary to create an awareness about ICH at the local level by working through Village Development Committees and the district administration. This will require training of local facilitators who can engage people of all ages (and youth in particular) in discussing community values and identifying key traditions and needs for sustaining these traditions. Furthermore, links should be established between communities and national institutions so that the latter are equipped to quantify and respond to these needs. A small grant fund could support activities such as purchase of musical instruments, digitalization of texts, or creation of small community museums.

#### **Community Fund for Safeguarding Intangible Heritage**

It is important to earmark funds that communities could apply for, as they identify needs, to allow worship and festivals to continue. The funds could be used to temporarily relocate and safeguard individual cultural objects necessary for worship, or entire festivals, performances, or other cultural events.

#### **National Recognition of Master Craftspeople**

Greater national recognition in the form of awards to master craftspeople, performers or bearers of traditional knowledge will raise their status and support the continued use of their skills.

#### **Educational Outreach**

A Kathmandu-based ICH conference that invites national and international scholars and student will encourage sharing of information about traditions that may be endangered, and methods for safeguarding and revitalizing them. The conference might also address establishment of an ICH digital archive, on the model of Digital Himalaya or other international digital archives. A programme should be instituted for scholars wherein they should be encouraged to work with vulnerable community groups who have suffered loss and seek to revive their heritage. This program could be supported through a programme of one or more of Nepal's universities.

Particular attention should be paid to involving youth in ICH programmes. As cultural heritage is a living phenomenon that is constantly recreated and transmitted from one generation to the next, there is a risk that the destruction of so many cultural sites could leave the younger generation feeling disconnected from their past and cultural heritage. The strength of a nation's tangible and intangible cultural heritage has a strong connection to cultural identity, continuity of community feeling and overall well-being. It is this strength that will help communities unite to rebuild their cultural sites as they rebuild their lives and homes.

#### **Cultural Industries**

Artists and craftspeople often depend on a tourist market. The tourist market is likely to decline for some time, and local purchases may also decline because of less disposable income. Support will be needed for organizations such as Fair Trade Group, Nepal, to reach markets overseas through participation in international trade fairs and folk art markets. A combination of training for artisans in skills and product development as well as market-readiness support can be provided by national and international experts.

#### **Gender issues**

Cultural activities developed around religion play an important role in providing support mechanisms for women and men individually and at the community level. The loss of livelihood assets centred around such activities could have a serious impact on the preservation of traditional skills in textile products such as the traditional Dhaka cloth weaving, which is predominantly practised by women, and metal work done by men. Indigenous and ethnic communities, too, have a strong and unique cultural heritage, which is an important part of their identity. Recovery interventions, particularly to do with housing and relocation should preserve rather than undermine these cultural heritages.

### **POLICY NEEDS AND RECOMMENDATIONS**

#### **Review of restoration and conservation by-laws**

The massive loss of life caused by collapsing historic buildings makes it mandatory to rethink existing conservation laws. Restrictions on modern materials in conservation work need to be re-

viewed defined anew according to the concepts of disaster risk reduction and building back better.

### **Professional Support to DoA**

It is estimated that DoA's workload will increase six fold over the coming six years. This will require upgrading of facilities and equipment (vehicles, computers, professional tools) and hiring of professional staff in all sectors. Modalities have to be found to allow DoA to recruit professionals from the free market, which will require competitive remuneration.

### **Review of Revenue Generation and Investments in Cultural Preservation**

Over the past decade Nepal has developed a system of not only charging entry fees to museums, cultural institutions and specific sites such as temples and palaces but also levying fees for visiting historic town centres and villages. Bhaktapur was the first of the three former royal cities in the Kathmandu Valley that started collecting tourist fees for entering the town. In Bhaktapur, the municipality oversees and manages the collection system and has been responsible for investing a good portion of the income for preservation work. An estimated yearly income of over US\$ 3 million has provided substantial progress in restoring and preserving historic monuments.

Kathmandu and Patan municipalities followed Bhaktapur's example and set up similar systems with estimated yearly incomes of US\$ 2 million and US\$ 1 million, respectively. It is important to ensure that a streamlined collection system is developed and administered in a transparent manner to ensure that the revenues collected for visiting cultural heritage sites will be invested directly in the restoration effort and not diverted to other purposes. Table 5.2 provides an overview of the substantial income potential from World Heritage Sites and Museum Entrance Fees.

## **Implementation Arrangements**

In the past DoA has handled an average budget of less than US\$ 2 million per year. Since its activities are bound to increase drastically, the agency will have to hire additional staff and experts, and procure equipment and logistical support.

Further, new ways of sharing responsibilities and engaging different partners and agencies must be identified to accelerate the documentation, planning and restoration processes. A mechanism for the coordination of all cultural heritage activities will be created under the overall authority of the Ministry of Culture, Tourism and Civil Aviation, with the participation of Ministry of Physical Planning, Ministry of Urban Development, Ministry of Federal Affairs and Local Development, Ministry of Home Affairs, UNESCO Kathmandu, reputed national and international experts and, when appropriate, representatives of development partners.

For the implementation of restoration activities, responsibilities should be fixed at three levels:

- The restoration of village monasteries, temples and non-listed monuments shall be the responsibility of local communities. DoA should act as the overall advisory agency, but day-to-day responsibilities in the management, procurement of materials, reporting and financial accounting will lie with the local communities.
- The restoration of listed monuments, including those that are part of World Heritage Sites, will continue to be under the direct supervision and management of DoA.
- Large scale restoration projects that are financed by private and/or international development partners should be implemented on a turn-key basis under close supervision by professionals from the industry, with DoA providing oversight.







# PRODUCTIVE SECTORS

AGRICULTURE



IRRIGATION



COMMERCE AND INDUSTRY



TOURISM



FINANCIAL SECTOR





# 6. Agriculture

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## Summary

Damages and losses in the agriculture sector due to the earthquakes were prominent, affecting around one million already poor small farming households in 24 districts.<sup>38</sup> Among the affected farmers, women-headed farm households and those managed by the elderly suffered the most.

The earthquakes damaged crop lands, physical infrastructure (mainly small irrigation systems, poly houses, livestock shelters, agricultural tools, equipment and machinery), mills, office buildings, service centres, laboratories and residential premises in government installations. Production losses occurred especially in the agricultural crop and livestock subsectors, specifically for animal fodder, fruit, potatoes, mushroom and vegetables, livestock, poultry, fish and fingerlings, cash crops, stock for seed and animal feed, egg and honey production, and stored food grains. The production losses include the value of production of the lost crops, increased cost of production and estimated production losses in subsequent seasons.

Recovery in the agriculture sector focuses on immediate activities aimed at the restoration of production levels in crop, livestock and fisheries over a period of 12 months. Reconstruction will focus on replacement of destroyed equipment and machinery and reconstruction/rehabilitation of damaged physical infrastructure with improved, disaster-resilient standards over a period of 36 months. The agriculture sector recovery strategy and plan will involve different government agencies and other stakeholders. The executing agency of the agriculture recovery and reconstruction plan will be Ministry of Agricultural Development (MoAD) and the implementation will be by Department of Agriculture (DoA), Department of Livestock Services (DLS) and Nepal Agriculture Research Council (NARC)

with support from development partners, specifically those with proven technical expertise and comparative advantage in the agriculture sector. Given the urgency of the situation, a 'fast track' mechanism with required delegation of authority within the institutional framework of the Government of Nepal will be applied and the activities under both recovery and reconstruction will have to start simultaneously.

## Pre-Disaster Context and Baseline

The agriculture sector in the Post Disaster Needs Assessment (PDNA) includes the subsectors of crop, livestock, fisheries and small irrigation systems that fall under the jurisdiction of the MoAD. Needs assessment of the forestry subsector is included under the environment and forestry chapter.

Agriculture is the biggest employer in Nepal, particularly in rural areas, and is the main contributor to household level food and nutrition security of the rural population. Nearly 80 percent of Nepal's nearly 28 million inhabitants and 60 percent of the labour force is dependent on agriculture.<sup>39</sup> Male out-migration in large numbers has left women to perform farm activities in the villages. Women contribute 60 percent in crop production and 70 percent in livestock and poultry production.<sup>40</sup> The agriculture sector contributes approximately one-third of the national GDP in a country with low per capita annual income (NPR 72,000, or US\$720). Agriculture is largely subsistence with low productivity; farmers are small-holders with average farm size of 0.68 hectares. Landholding is not distributed equally among different ethnic groups. Ethnic communities mostly own land on the hill slopes; the Dalit community in particular has smaller size of landholdings. In value terms, crop production is dominant— rice, maize, wheat, potatoes and

<sup>38</sup> Though the government reports that the earthquakes affected 33 out of 75 districts, this needs assessment of the agriculture sector was conducted in 24 of the most-affected districts, namely, Okhaldhunga, Ramechhap, Dolakha, Sindhupalchowk, Rasuwa, Dhading, Nuwakot, Kathmandu, Lalitpur, Bhaktapur, Kavre, Makawanpur, Gorkha, Sindhuli, Gulmi, Lamjung, Solukhumbu, Tanahun, Bhojpur, Kaski, Palpa, Khotang, Chitwan and Syangja.

<sup>39</sup> Central Bureau of Statistics, 2014, Population Monograph of Nepal, Vol. III

<sup>40</sup> Central Bureau of Statistics, 2014, Population Monograph of Nepal, Vol. III



vegetables are the main products. Monsoon rice is the single most important product with an average production of 4.62 million tonnes over the last five years from a planted area of 1.48 million hectares. Wheat production is about 1.78 million tonnes from about 0.75 million hectares.

Green vegetables are largely grown in districts neighbouring major cities like Kathmandu, Pokhara and Biratnagar, and the total area covered by vegetables is about 0.25 million hectares over the last five years. Average vegetable production is 3.24 million tonnes and includes

cabbage, cauliflower, radish, onion, tomato, leafy vegetables, cucumber, okra, and aubergine. Off-season vegetables and mushroom are grown commercially with many small farmers using poly houses in peri-urban areas. Volume of vegetable and mushroom production has increased in recent years, which is attributed to increased investments in equipment, machinery and inputs. Though around 54 percent of farmland is irrigated in the country, majority of the small farmers with marginal land in hill tracts are deprived of irrigation services. Cultivation of cash crops, such as tea, coffee, cardamom and ginger

**TABLE 6.1: BASELINE PRODUCTION OF MAJOR AGRICULTURAL PRODUCTS IN 24 MOST-AFFECTED DISTRICTS (2013-2014) (TONNES)**

	District	Cereals	Cash crop	Fruits	Vegetables	Fish	Milk	Meat
1	Rasuwa	11,199	11,199	1,247	40,457	1	4,544	949
2	Nuwakot	149,465	149,465	4,134	103,623	27	33,586	5,769
3	Gorkha	108,111	108,111	9,843	49,477	20	17,166	4,174
4	Dhading	114,116	114,116	6,314	100,945	37	36,280	4,804
5	Dolakha	28,302	28,302	2,651	45,906	1	16,886	1,831
6	Sindhupalchowk	111,718	111,718	4,050	96,590	11	24,954	4,196
7	Kathmandu	92,404	92,404	2,190	83,196	23	14,705	10,872
8	Bhaktapur	46,821	46,821	299	75,971	14	11,474	2,478
9	Lalitpur	62,895	62,895	1,248	66,400	21	17,967	5,864
10	Kavre	105,236	105,236	13,772	314,783	19	80,767	6,394
11	Ramechhap	96,522	96,522	12,335	42,681	1	21,461	2,917
12	Sindhuli	130,138	130,138	10,583	48,177	9	19,248	4,196
13	Okhaldhunga	54,044	54,044	1,782	49,737	1	15,544	2,964
14	Makawanpur	121,564	121,564	1,510	115,376	129	36,189	4,654
15	Gulmi	96,290	96,290	3,047	12,846	6	20,155	2,095
16	Lamjung	109,024	109,024	8,306	59,775	24	15,792	2,069
17	Solukhumbu	41,519	41,519	2,133	161,085	0	9,695	2,330
18	Tanahun	139,660	139,660	10,892	39,542	42	39,953	4,435
19	Bhojpur	183,434	183,434	5,532	57,527	1	16,219	2,694
20	Kaski	166,000	166,000	7,571	52,455	78	39,477	6,940
21	Palpa	92,623	92,623	10,397	42,683	18	29,051	3,336
22	Khotang	148,815	148,815	11,575	187,603	5	21,487	3,152
23	Chitwan	161,349	161,349	3,756	121,649	1644	43,629	12,551
24	Syangja	174,009	174,009	13,700	57,430	44	57,473	4,101
	<b>Total</b>	<b>2,545,258</b>	<b>2,545,258</b>	<b>148,866</b>	<b>2,025,914</b>	<b>2,174</b>	<b>643,701</b>	<b>105,765</b>

Source: Data from MoAD 2014

is on the rise, and around 0.06 million hectares of land is occupied by such cash crops. Average area under fruits (including apple and mango) during the last five years is 0.15 million hectares. Over the last decade, due to increased out-migration of youth, the agriculture sector has experienced severe shortage of labour and has become increasingly dependent on women, and other vulnerable and older people. Unattractive income from agriculture has pushed majority of rural male members seeking jobs to urban areas or abroad, which has increased the burden of farming on women. Due to this ever-increasing trend, 26 percent of rural households are headed by women, who also take care of farm management in addition to other household work. Moreover, over 70 percent of agricultural labour is contributed by women.<sup>41</sup> Though remittance flow is rising, it is mainly used for consumption rather than investment in productive sectors.

The MoA is the mainline ministry responsible for agricultural development. The DoA oversees the crop and fisheries subsectors; the DLS is responsible for the livestock subsector. MoAD is also responsible for supporting farmers for small, farmer-managed irrigation schemes.

A diversity of crops is grown in Nepal, rice being the major staple in low altitude areas and maize, millet and barley in high altitude areas. Potato is another important crop widely grown by rural farmers as a staple crop in mountain regions. Maize is planted during April and millet planting starts in June. Farm households generally maintain a small kitchen garden in the backyard. Farmers have cowsheds and pens for goat and poultry at home. A few livestock like buffaloes, cows, bullocks, yak, goats, sheep and pigs are raised by most households depending on altitude and ethnicity. Yak, goat and sheep are mainly reared in high altitude areas. The animals are generally fed with home-made feed and fodder, sometimes also mixed with feed concentrates. Bullocks are the main source of draft power in hill areas. Some poultry birds are reared in homes. Livestock and poultry not only supplements household level food security and nutrition, but also generates some cash for the families through sale of live animals, milk and meat products. Livestock is also used for ploughing and transportation in mountain areas.

Farmers store their farm produce and seed at home, generally on the top floor of their typically two-storey mud-wall houses. Most farmers store their home-saved seeds in jute or polythene bags, or earthen pots. Only a few farmers use metal bins for food and seed storage. Seed replacement rate in Nepal is only 12 percent, meaning that farmers on an average change their seed stock only after 8.5 years. Animal feed is stored at home for protection against sun and rain. Hand tools normally used for farming are also generally stored inside the house whereas bigger farm implements and machinery are kept close to the house.

Despite being an agriculture dominant country, approximately 15 percent of the population still suffers from inadequacy of food, with female-headed households and subsistence farmers as the most food insecure. Nearly half the districts in Nepal (31 out of 75) are considered food deficit. Ironically, nearly half the 24 earthquake-affected districts surveyed fall within the net food deficit area. Most farmers in this area depend more on coarse grains than the preferred staple food, rice. Nearly 20 percent of rice and 60 percent of maize and millets in Nepal are produced in this area, which is inhabited by 31 percent of the population.

### Post-Disaster Context

The devastating earthquake of 25 April followed by frequent aftershocks and a second quake on 12 May was the cause of the deaths of thousands of people. Several more were injured. Key infrastructure, including agriculture infrastructure, was either damaged or destroyed. Nearly 3.5 million people were considered vulnerable with immediate food needs, out of which 1.4 million people were considered highly vulnerable requiring immediate food assistance.<sup>42</sup>

Damages and losses in the agriculture sector are significant. The estimated number of small and vulnerable farming households affected in the 24 districts is around 1 million, with female headed households outnumbering male. Small and vulnerable farming households, in particular the ones with average landholding of less than 0.7 hectares and three to five heads of livestock, and those managed by the elderly and women suffered the most.

<sup>41</sup> Central Bureau of Statistics, 2011-12, National Sample Census of Agriculture



Rice and millet grains harvested in November and stored inside the house as food stock were largely damaged when houses collapsed. Some maize is being recovered; however it is not suitable for human consumption. Some areas with standing wheat and vegetables were affected by landslides. Losses to wheat were caused by hailstorms and the crop over-matured due to lack of attention as households were too busy managing family crises. Productivity of standing maize will also be lower as intercultural operations were delayed. Some vegetables crops, including those grown in poly houses, were lost as the land was cleared to put up temporary shelters. In some districts, such as Gorkha and Rasuwa, the maize crop has fallen prey to the devastating damage caused by army worms. Apart from big quantities of grain stocks, seeds (mainly rice and millet), tools, agricultural machinery and some fertilizer stocks were also damaged. There were reports of damage to farm machinery and equipment (e.g., water pumps, generator, tillers, etc.), milk cans, chilling vats, mills, bee hives and equipment for fish production. Animals, mainly cattle that were tied close to the house, were killed or injured by the earthquake whereas death or injury of the small ruminants that had been left free to graze was less. Commercial farms, mainly for milk cows and poultry, equally suffered losses and damages. During the field visits, farmers reported animals were subjected to abortion and stress syndromes and many were consuming less feed than usual, directly affecting milk production. Some farmers reported that milk produced per animal had reduced by up to 50 percent. Damage to poultry farms have also affected the supply of chicken to local markets. More numbers of animals were reported injured, which if not provided with timely veterinary care, could die in the coming months due to weakness and injuries. Along with human shelter, damage to animal shelters was a major concern among the farmers.

Districts such as Dhading, Rasuwa, Sindhupalchowk, Nuwakot and Dolakha are well known for small-scale rainbow trout farming. Many trout farms suffered direct damage to the raceways as well as loss of fish and fingerlings.

Cheese making, an important activity in a few districts, has also suffered damage to infrastructure and machinery directly affecting production and livelihood opportunities.

Farm power in Nepal mainly comes from human and animal labour. Loss of labour in the agriculture sector was reported due to death and injury of family members, migration, additional burden of survival and safety, and fear of life linked to aftershocks. Increase in male labour out-migration is more likely to recover losses in income and livelihood caused by the earthquakes, which could increase the feminization of agriculture. Some families under crisis, too traumatized to resume their usual activities, face difficulty in keeping their animals due to damage to shelters, lack of feed and no time for caring for the livestock. These factors could not only decrease food production substantially, but also disrupt the production system if appropriate measures are not adopted. Some farmers, especially in landslide-prone areas, are currently living with the fear of further landslides during the monsoon. Few are currently displaced, and they may wait until the frequency of aftershocks has reduced. Farmers in villages are spending as high as 30 percent of their time waiting for relief, a situation which could continue for a while. With frequent aftershocks, people are mentally stressed. Meanwhile, majority of the staff in the public sector have not been able to spend time with their families since the disaster, resulting in additional mental stress on them affecting delivery of services.

#### **DISASTER EFFECTS AND IMPACTS**

Areas in some of the most-affected districts reported cracks in both upland and irrigated fields. Nearly 1,000 hectares of land have been rendered useless due to landslides and land slips; these lands will most likely not be recovered. Internally displaced people from higher land reported huge landslides damaging their maize crop and killing their livestock; crops and livestock were left behind unattended. Damaged irrigation systems pose a threat to standing crops as well as indicate further risk of losing subsequent crops if not immediately repaired. Area planted under rice is likely to go down and area

<sup>42</sup> Food Security Cluster, Flash Appeal, April 2015

under millet may increase. However, the productivity of rain-fed millet is about three times less than that of rice. This will substantially decrease food production in the affected districts. Given the tremendous need for managing shelter, food and other most essential items, farmers are unable to spend time in the field tending to crops or maintaining livestock. Farmers in some of the most-affected districts feared production losses as high as 50 percent. The earthquakes have severely affected the vegetable and mushroom production value chain in Kathmandu, Dhading, Gorkha, Nuwakot and Bhaktapur districts due to damage to poly houses.

Several office buildings and official residences of the District Agriculture Development Office (DADO) and District Livestock Service Office (DLSO) are damaged. Damage to agriculture and livestock service centres that provide direct services to farmers have seriously disrupted extension and livestock support services. In addition, damage to a large number of physical facilities, such as training halls, laboratories, garages, boundary walls, toilets, livestock farms, seed stores, water tanks, pump houses, quarantine offices, cooperatives, milk collection centres and chilling centres, both public and private, have seriously jeopardized crop and livestock production. Damage to access roads in upland areas by landslides have affected the sale of farm produce, particularly perishable vegetables and milk. These losses will discourage farmers, decreasing their efforts in production, which could lead to decreased production. Moreover, already seasonal roads in many villages are likely to be blocked during the rainy season aggravating further the problems in farm production and marketing.

#### **EFFECTS ON PRODUCTION OF GOODS AND SERVICES AND ACCESS TO SERVICES**

The main drivers in decline are crop production and livestock products. Efforts by farmers to support other farmer families, collecting relief materials, construction of temporary shelters and excavation of personal belongings have diverted their time away from farm operations, causing delay in or absence of intercultural operations of maize (particularly weeding, thinning and fertilizer application) and maintaining livestock. Disrupted

market systems and lack of labour, exacerbated by the frequent aftershocks, and other urgent family priorities, have significantly affected production flows. Damaged shelters, lack of food and cash in families and their inability to come out of the state of shock has made the situation desperate. The time to prepare nursery beds for rice and millet is fast approaching; the stored seed is however buried under the rubble. Farmers may either have no money to buy new seed or the seed may not be available locally. Seeds provided by external agencies are either not sufficient to cover overall needs or they might not be supplied in time. These factors may hinder the farmers from accessing required inputs that could pose the risk of almost 30 percent of the land area in the hills remaining uncultivated. This would significantly reduce production, affecting overall household food security and income. Meanwhile, a part of the standing spring rice and maize crops can still be harvested; however, farmers have no storage facilities. Damages caused by army worm could also lower production flows.

Damage to livestock shelters, death and injury of livestock, malnutrition and the risk of animal and zoonotic disease epidemics among the surviving livestock due to insufficient feed, fodder and animal health support could largely affect productivity of the livestock, which in turn would affect production of meat and milk products. Loss of forage seed and damages to pasture land could further aggravate the situation.

Damage to district and rural service centres have affected access to crop and livestock extension services. Extension and animal health workers, whose numbers were low to begin with, have been diverted to relief operations and are busy caring for their own families. Access roads to remote villages are damaged, and logistics and transportation facilities available with the service centres are inadequate. Meanwhile, farmers due to other priorities, are unavailable or unwilling to access the limited services. Such a situation causes decreased access to agricultural extension and veterinary services. This is a particular challenge for women who do most of the agricultural work, but receive only 30 percent of the extension services, and Dalits who often live in remote areas and far from district headquarters.

### EFFECTS ON GOVERNANCE

Agriculture service delivery is affected by death and injury of technicians, damage to office buildings and equipment and service delivery stations, and deployment of technicians to relief operations. Operating out of tents or temporary sheds was seriously hampering the efficiency and effectiveness of civil servants. Lack of basic amenities in their duty stations is further aggravating their physical and mental condition. Meanwhile, the efforts of government agencies are focused on crisis management, hindering regular service delivery and governance. Efforts of veterinary experts have been diverted to treatment of injured livestock and agricultural experts are putting their efforts behind food assistance and seed support in order to meet the fast approaching rice planting season. In addition, the technical staff are busy participating in District Disaster Response Committee (DDRC) meetings as well as updating data on damages and losses and information for immediate needs to resume farm activities and reinstate livelihood to rural farmers. During the meetings, the PDNA team realized that DADO and DLSO are heavily occupied with relief and recovery work. They are over-stretched and a clear need for operational flexibility was realized to cope with the emergency situation.

### RISK AND VULNERABILITIES

The earthquakes increased the fragility of the food production systems making poor and marginal farmers, including the elderly and women, more vulnerable to other possible future disasters. The earthquakes seriously impacted agriculture-based livelihood in the affected districts increasing their vulnerability to hunger and food insecurity. The loss of farm land and other productive assets, and the risk of having land uncultivated on the hill slopes of the most-affected districts, further increases the risks of decreased production and food insecurity in the coming months and in the next couple of years with far-reaching negative impacts. Basic food and nutrition packages currently being provided as humanitarian relief material is neither enough to feed the family in the long run nor sustainable. Furthermore, some vulnerable farmers are indebted and, given the current situation, it will be extremely difficult for them to pay back the capital with interest. Though policy exists, most farmers do not have access to insurance services

to insure their crop, houses or livestock. Unless these farmers are supported to restore their production capacity with appropriate policy and operational interventions, their vulnerabilities are likely to exacerbate further.

With the increasing trend of male out-migration, the vulnerable percentage of women-headed households may face exclusion from recovery and reconstruction support programmes if not targeted specifically. Furthermore, the likelihood of increase in cost of production due to inflation and price hike may further negatively impact women-headed households and other vulnerable groups.

Effects on risks could be multi-fold. Seeds supplied from outside sources need to fit into the agro-climatic conditions of the district to avoid a risk of crop failure and it should be done in close coordination with the DADOs. Recovery assistance should emphasize protecting local biodiversity. Farmers are facing difficulty in managing the carcasses appropriately, and microbes from such dead animals can find their way to water sources, spreading diseases to surviving animals. Adapted breed of livestock and fingerlings need to be ensured. These risks however may not equally affect all the farmers in the 24 districts. Poor and marginal farmers with injured members and the elderly are more vulnerable to risks in production loss, food insecurity and decreased livelihood conditions. Further, women and girls are more vulnerable than men to natural and other hazards and farmers with farm lands in high mountain areas or flood plains are more vulnerable to landslides and floods caused by the earthquakes.

Damaged farm lands due to ground cracks and slipping of mountain sides are additionally exposed to landslide risks during the monsoon due to seepage of water. Damming of the Kaligandaki River and recent landslides are warning signals of a similar situation in some of the most affected areas during the monsoon, which could submerge huge swathes of farm lands, seriously affecting the environment and the lives and livelihood of thousands of people. Meanwhile, high magnitude earthquakes followed by frequent aftershocks have altered the geological systems, changing water springs which can affect water supply in the

farms leading to decrease in crop productivity.

#### DAMAGES AND LOSSES

The estimates of the value of damages and losses are summarized in Table 6.2. The total damages and losses in the agriculture sector amount to about NPR 28,366 million.

The earthquakes have damaged crop lands; stored food grain; seed and feed stocks; physical infrastructure, mainly office buildings, service centres, mills, laboratories, small irrigation systems, poly houses, residential premises in government installations, livestock shelters, and small dairies and cooperatives; and agriculture tools, equipment and machinery. Based on the data compiled from the 24 affected districts the total damages reported to the agriculture sector amounts to approximately **NPR 16,405 million**. Damages to physical infrastructure are estimated by using current refurbishment/reconstruction costs for the respective types of works and replacement/repair costs for infrastructure and machinery.

Production losses especially occurred in the agricultural crop and livestock subsectors. Districts reported loss of production for different crops, animal fodder, potatoes, mushroom and vegetable production, livestock, fish and fingerlings, and cash crops. The total lost value of production estimated in the affected districts for the agriculture sector amounts to nearly NPR 11,962 million, which also includes value of production of the lost crops, higher production cost and estimated production loss in subsequent seasons. The decline in livestock production in subsequent seasons, such as reduced milk and meat supply, egg production and honey, is also included.

According to the MDG 2013 report, Nepal was on track and likely to achieve most of its MDGs, including poverty reduction, despite the prolonged political instability in the country. Agriculture is one of the major sectors of the economy which was facing the challenges of meeting labour demand due to increasing trend of foreign employment. The sector now is severely affected by the earthquakes, and this situation could push the sector further into crisis resulting in low production and abandoned

farms. Achievement of the MDG goals with sustainable economy and employment growth may therefore remain a challenge. An impact analysis of the earthquakes is therefore needed to find out the extent of dislocation of the progress paths of the country to achieve MDGs and other development goals such as poverty reduction, food security, economic growth and graduating from least developed country status to a developing country.

#### Recovery Needs and Strategy

The overall recovery and reconstruction of the agriculture sector is estimated at **NPR 15,560 million** out of which **NPR 3,579 million** (23 percent) is required for immediate recovery in the short-term (next 12 months) and **NPR 11,981 million** (76 percent) is required for reconstruction of the sector in the medium term (over a period of 36 months). The notion of build back better (BBB) has been taken into account while estimating the reconstruction needs with the overall aim of enhancing resilience of small, vulnerable farmers. Given the urgency of the situation, activities under both recovery and reconstruction will have to start simultaneously.

The Food Security Cluster appealed for US\$ 98.6 million in the revised Flash Appeal, with larger share of the appealed amount for emergency food assistance. Since there are several food security cluster partners providing emergency relief food assistance to the affected vulnerable families in the districts, which is expected to continue for some more time, the estimated agriculture sector recovery and reconstruction needs therefore do not cover humanitarian food assistance needs.

Recovery in the agriculture sector focuses on immediate activities aimed at restoration of production levels in crop, livestock and fisheries. Specifically, recovery needs include:

- (i) Provision of inputs for crop planting,
- (ii) Provision of inputs for restoration of fisheries, and
- (iii) Provision of inputs and veterinarian assistance for livestock.

Immediate intervention is needed for supply of millet seeds along with fertilizer; seed for wheat, barley and potatoes for the October-November



planting season; and seasonal vegetable seeds. Grain bags and metal bins also need to be immediately provided to the farmers to store their currently standing maize and recently harvested wheat crop. Provision of seedlings needs to be made for the revitalization of fruit production.

Priority needs for immediately recovering livestock production are proper management of carcasses to prevent possible spread of diseases, treatment of injured animals, and supply of feed concentrate and vaccinations. Provision of rainbow trout and other fish mother stock in fish hatcheries, and resumption of fish breeding and fry production is urgently needed.

Reconstruction needs within the next three years will include:

1. Replacement of tools and machinery for

- crops, livestock and fisheries
2. Restocking of lost animal stock
  3. Reconstruction/rehabilitation of agriculture infrastructure, such as animal shelters, office buildings, agriculture and livestock service centres, laboratories, collection centres and markets, chilling vats/centres, poly houses for vegetables and mushroom, and poultry farms
  4. Reconstruction/rehabilitation of fish ponds and raceways
  5. Immediate repair and rehabilitation of small farmer-managed irrigation systems.

Opportunities need to be explored to replace the machinery, equipment, poly houses and other productive assets at subsidized prices. Furthermore, multi-hazard resilient community grain storage and animal shelters, and community nurseries for paddy, millets, herbs and fruit trees

**TABLE 6.2: SUMMARY ESTIMATES OF DAMAGES AND LOSSES (NPR MILLION)**

Particulars	Damages	Losses	Total
<b>A</b> Crops, fishes and bees			
1 Standing crop loss	-	6,918.82	6,918.82
2 Expected future crop production loss	-	2,263.99	2,263.99
3 Machinery and tools	183.11	-	183.11
4 Infrastructure <sup>43</sup>	1,253.14	-	1,253.14
5 Fisheries	18.73	30.31	49.04
6 Stored seed stock	775.32	-	775.32
7 Stored food grain stock	6,656.82	-	6,656.82
8 Other stored crops and inputs stock	117.85	-	117.85
<b>Total</b>	<b>9,004.98</b>	<b>9,213.12</b>	<b>18,218.10</b>
<b>B</b> Livestock and poultry			
1 Livestock death	2,302.22	-	2,302.22
2 Expected future livestock production loss	-	2,717.51	2,717.51
3 Livestock feed damage	138.24	-	138.24
4 Other livestock inputs	0.63	-	0.63
5 Machinery and tools	8.60	-	8.60
6 Infrastructure	4,949.92	-	4,949.92
<b>Total</b>	<b>7,399.61</b>	<b>2,717.51</b>	<b>10,117.12</b>
<b>C</b> Irrigation			
Production losses due to damage in irrigation systems	-	31.10	31.10
<b>Total</b>	-	<b>31.10</b>	<b>31.10</b>
<b>Grand total</b>	<b>16,404.59</b>	<b>11,961.73</b>	<b>28,366.32</b>

Source: Estimated from data reported by MoAD, DoA, DLS, DADO and DLSO

<sup>43</sup> Including small farmer-managed irrigation system

**TABLE 6.3: DISTRICT-WISE SUMMARY OF DAMAGES AND LOSSES (NPR MILLION)**

District	Crop subsector			Livestock subsector			Agriculture total				
	Damages	Losses	Total Effect	Damages	Losses	Total Effect	Damages	Losses	Total Effect	Private (%)	Public (%)
1 Rasuwa	207.46	21.55	229.01	239.28	21.61	260.90	446.74	43.17	489.91	81.48	18.52
2 Nuwakot	1298.85	1294.68	2593.53	163.77	144.80	308.57	1462.62	1439.48	2902.10	96.33	3.67
3 Gorkha	498.03	752.79	1250.82	353.84	88.71	442.55	851.87	841.51	1693.37	93.24	6.76
4 Dhading	3623.24	2247.71	5870.95	943.46	139.28	1082.73	4566.69	2386.99	6953.68	97.59	2.41
5 Dolakha	334.99	885.40	1220.40	151.42	59.97	211.39	486.41	945.37	1431.78	95.47	4.53
6 Sindhupalchowk	1075.60	1414.82	2490.41	3382.00	106.50	3488.50	4457.60	1521.31	5978.91	99.07	0.93
7 Kathmandu	441.65	176.05	617.70	117.18	163.55	280.73	558.84	339.60	898.44	98.57	1.43
8 Bhaktapur	176.00	185.71	361.70	84.35	55.55	139.90	260.35	241.26	501.61	88.37	11.63
9 Lalitpur	108.63	113.15	221.78	63.71	110.79	174.51	172.35	223.94	396.29	91.44	8.56
10 Kavre	123.89	80.25	204.14	151.29	258.45	409.74	275.17	338.71	613.88	77.05	22.95
11 Ramechhap	215.45	71.07	286.52	55.61	83.29	138.90	271.06	154.36	425.42	78.05	21.95
12 Sindhuli	300.22	451.93	752.15	160.42	93.66	254.08	460.64	545.59	1006.23	80.31	19.69
13 Okhaldhunga	137.00	158.05	295.05	1198.55	70.54	1269.09	1335.55	228.60	1564.15	95.52	4.48
14 Makawanpur	176.85	128.99	305.84	164.77	137.27	302.04	341.62	266.26	607.88	61.32	38.68
<b>Total of 14 districts</b>	<b>8717.84</b>	<b>7982.17</b>	<b>16700.01</b>	<b>7229.67</b>	<b>1533.98</b>	<b>8763.64</b>	<b>15947.51</b>	<b>9516.15</b>	<b>25463.65</b>	<b>94.33</b>	<b>5.67</b>
15 Gulmi	22.10	65.79	87.89	0.15	70.49	70.64	22.25	136.27	158.52	82.02	17.98
16 Lamjung	8.54	97.33	105.87	37.10	60.36	97.46	45.64	157.69	203.33	17.83	82.17
17 Solukhumbu	66.25	23.38	89.63	8.38	49.77	58.15	74.63	73.15	147.78	54.26	45.74
18 Tanahun	11.23	116.87	128.10	3.59	143.11	146.70	14.81	259.99	274.80	29.38	70.62
19 Bhojpur	0.90	99.70	100.60	0.68	68.82	69.50	1.58	168.52	170.10	43.04	56.96
20 Kaski	37.25	188.39	225.64	107.68	172.10	279.79	144.93	360.49	505.43	75.84	24.16
21 Palpa	23.25	81.01	04.25	0.23	105.40	105.63	23.47	186.41	209.88	31.84	68.16
22 Khotang	12.30	131.09	143.39	1.07	86.17	87.24	13.37	217.26	230.62	71.64	28.36
23 Chitwan	72.66	260.26	332.92	9.24	248.78	258.02	81.90	509.04	590.94	83.46	16.54
24 Syangja	33.30	167.14	200.44	1.20	178.53	179.73	34.50	345.67	380.17	53.47	46.53
<b>Total of 24 districts</b>	<b>9005.61</b>	<b>9213.12</b>	<b>18218.73</b>	<b>7398.98</b>	<b>2717.51</b>	<b>10116.49</b>	<b>16404.59</b>	<b>11930.63</b>	<b>28335.22</b>	<b>90.82</b>	<b>9.18</b>
Crop loss due to damage to irrigation systems		31.10						31.10			
<b>Grand total</b>	<b>9005.61</b>	<b>9244.22</b>	<b>18218.73</b>	<b>7398.98</b>	<b>2717.51</b>	<b>10116.49</b>	<b>16404.59</b>	<b>11961.73</b>	<b>28,366.32</b>		

Source: Estimated from data reported by MoAD, DoA, DLS, DADO and DLSO

will be promoted in the districts. Meanwhile, policy will be developed to encourage commercial livestock farming (dairy, piggery, poultry and goat farming) in specific locations away from human settlements adopting Good Agriculture Practices (GAP) and Good Veterinary Practices (GVP) to achieve biosecurity and also with a view to exporting the livestock products from such farms in the longer run.

Overall, their construction needs also include an estimated additional 30 percent BBB cost and associated management support cost. Better technologies will be used to reconstruct animal shelters, irrigation canals, fish ponds and race courses. Reconstruction of office buildings will incorporate concerns of women, elderly and disabled farmers, and employees in addition to structural strengthening. Opportunities will be explored to relocate the office buildings to make them structurally safer and more resilient.

### Implementation Arrangements

As the agricultural sector recovery plan spans different agencies in the government, including research and extension departments and other stakeholders such as farmers, private sector, scientific communities, local cooperatives, forest user groups and CBOs/NGOs, the implementation will be done in coordination with all such relevant stakeholders, as appropriate. The

executing agency will be MoAD and implementation will be done by DoA, DLS and NARC with support from development partners, specifically the ones with proven technical expertise and clear comparative advantages in the agriculture sector. Given the urgency of the situation, a 'fast track' mechanism with required delegation of authority within the existing institutional framework of the Government of Nepal will be applied. Necessary human resources will be deployed to this institutional set up for implementation and monitoring of recovery and reconstruction activities along with provision of equipment and vehicles. Since women-headed households may find it difficult to access the services, they will be specially targeted while providing support for recovery and reconstruction. Training of women technicians will be emphasized to better access female farmers.

A robust monitoring and evaluation system will be developed to ensure efficacy, efficiency and transparency of implementation that gathers gender disaggregated information. The sector implementation strategy will align with the government's overall priorities for the agriculture sector as reflected in the Agriculture Development Strategy (ADS) as well as the Immediate Plan of Action for earthquake recovery, specifically:

- Increased technical and financial support to women farmers, small farmers and agri-

**TABLE 6.4: RECOVERY AND RECONSTRUCTION NEEDS IN THE AGRICULTURE SECTOR (NPR MILLION)<sup>44</sup>**

	Financial Year (NPR million)			Total
	2015-16	2016-17	2017-18	
Recovery activities	3,579	-	-	3,579
Supply of agriculture inputs	2,755	-	-	2,755
Supply of fishery inputs	9	-	-	9
Supply of livestock inputs	815	-	-	815
Reconstruction activities	7,189	3,594	1,198	11,981
Replacement of agriculture inputs/tools/machineries	840	420	140	1,399
Reconstruction of agricultural infrastructures	977	489	163	1,629
Reconstruction of fish ponds and race courses	15	7	2	24
Restocking livestock	1,381	691	230	2,302
Replacement of livestock inputs/tools/machineries	115	58	19	192
Reconstruction of livestock infrastructures	3,861	1,930	643	6,435
<b>Total</b>	<b>10,768</b>	<b>3,594</b>	<b>1,198</b>	<b>15,561</b>

<sup>44</sup> The budget needed for recovery and reconstruction is in addition to the usual agricultural budget allocated to MoAD, and the annual increment over that budget.



business with special emphasis on cereals, vegetable and cash crop farming, livestock and poultry farming, and aquaculture as per the different agro-ecological zones in the earthquake-affected districts;

- Improved management of farmer-managed irrigation systems and water use efficiency;
- Strengthened marketing of agriculture products with value addition; and
- Increased quality and safety of agricultural and agro-processing products.

The agriculture sector implementation strategy will have special focus on gender specific targeting ensuring access of women, ethnic minorities, the under-privileged, elderly and other marginal vulnerable farmers to technology and financial resources, and be based on) recovery interventions, which would immediately address urgent needs to maintain and restore productivity in

the sector and income of the affected population with strong linkages to rehabilitation and development within the next 12 months. The interventions will focus on Hyogo Framework for Action and Sendai Framework for DRR with the notion of BBB, and (ii) rehabilitation/reconstruction of building infrastructure, irrigation, infrastructure, livestock restocking and repair/replacement of agriculture machinery and equipment coupled with institutional strengthening and capacity building to sustainably improve crop, small irrigation, fisheries and livestock within the next 36 months. Cash/voucher transfer will be encouraged for inputs, including fertilizer, at subsidized prices as per the policy of the Government of Nepal in areas where markets have become functional. Rehabilitation/reconstruction works will be carried out through cash-for-work; also to channel the money to the local economy through self-targeting. Special





attention will have to be paid to the structural stability of these structures to better withstand earthquakes in the future.

Since agriculture in Nepal is highly risk-prone due to changes in rainfall patterns, floods and landslides, earthquakes and other natural and man made disasters, and considering the imperative for DRR, the recovery strategy emphasizes investment in technological backups and an agriculture information system to support production and marketing, and improving the resilience of vulnerable farmers against most imminent future natural disasters. To that end, research on disaster risk and introduction of new and improved varieties of crops and breeds of livestock and fish will be pursued. Standard Operating Procedures (SOP) for MoAD will be established to enable it to be better prepared against similar disasters in future, including an early warning system aimed at assisting vulnerable farmers for managing risks in agriculture production, and food and nutrition security in the country.

Farmers Welfare Fund, under the ADS, will provide assistance to farmers under distress through access to financial resources as a safety net to overcome temporary losses of income in similar future disasters. The recovery plan will contribute to the establishment and operationalization of this new concept. The recovery strategy will contribute to bringing the newly initiated crop and livestock insurance plan into effect by working with the private sector. Similarly, the recovery plan will look at opportunities for strengthening the food reserve system to cope with emergencies and to cover suffering vulnerable farming households. Building capacities of extension and animal health workers and farmers through training, Farmer Field Schools (FFS) and technology transfer will be another important element the strategy will look into over the reconstruction period.

The medium-term recovery interventions should aim at strengthening value chains, ensuring the integration of small-holders, mainstreaming crop diversification, good agricultural practices (including FFS and Integrated Pest Management), and climate change adaptation measures that contribute to DRR and management. In addition, it

will be essential to promote and strengthen local cooperatives as they can play a key role in the development of the value chains as well as in water management. Restocking of livestock would strictly target the most vulnerable households for which livestock represents a significant and essential source of income, excluding those already covered by an insurance scheme. Recovery and reconstruction interventions will consider the special case of gender differences in agriculture. To respond to the increasing role of women in farming, drudgery reduction, labour efficient and cost effective technologies such as hand tractors, zero tillers and serrated sickles will be introduced. Similarly, to reduce vulnerability of women and children at home, interventions will be made to attract locally available youth labour force as well as returnee migrant workers by providing them job opportunities in the agriculture sector. The strategy emphasizes government-led implementation with support of development partners in close collaboration with local communities in a participatory manner.

### Assessment Methodology

Data was collected through a variety of methods and cross-checked. In particular,

- a) Available reports were reviewed, including the draft reports circulated by the Food Security Cluster, namely, the Nepal Food Security Monitoring System/World Food Programme (NekSAP/WFP) household survey report for 11 districts and the rapid agricultural livelihoods assessment report prepared by FAO for six most-affected districts.
- b) Damages and losses assessment templates were developed, sent to 24 earthquake-affected districts, and the data received from the districts were compiled and analyzed.
- c) Field visits were made to six most-affected districts<sup>45</sup> in order to meet the authorities and affected population and assess the effects of the earthquakes on agricultural livelihoods. Meetings were held with District Disaster Relief Committees (DDRC) and officials from DADO and DLSO. Focus Group Discussions were carried out with some of the affected farming communities.
- d) Data provided by the districts were cross-checked with official data of the govern-

<sup>45</sup> Dhading, Gorkha, Rasuwa, Nuwakot, Sindhupalchowk and Dolakha

ment.<sup>46</sup> Cropped surfaces communicated by the districts were compared against data of the 2011 Agriculture Census carried out by the Central Bureau of Statistics (CBS) and area and production of crops, livestock and fisheries were obtained from the 2014 report published by MoAD. Losses and damages reported by the district level offices were triangulated with the baseline data.

- e) Prevalent market unit price was considered for estimating losses and damages. Recovery cost was estimated as 30 percent of the total losses, and about 30 percent were added to the damages for estimating reconstruction needs. Total value of damages to livestock was used for estimating the needs for restocking.
- f) The team worked with cross-cutting sector teams, in particular with the environment, irrigation, community infrastructure and gender teams.
- g) A stakeholders' consultation meeting was or-

ganized on 1 June in which the major findings and recovery strategy was presented. Feedback/inputs received from the participants were taken into consideration while finalizing data and the sector report.

District agriculture and livestock offices did their best to collect the data and send it to the PDNA team. However, due to their limited capacity and the short time frame, the data set received seemed incomplete. Collection of data on damages and losses in the districts is ongoing, and the situation is expected to become clearer in a few weeks' time. A revision would therefore be necessary in due course to get a better picture of damages and losses, and recovery and reconstruction needs.

## Reference

MoAD (in press). Statistical information of Nepalese Agriculture. Government of Nepal, Ministry of Agricultural Development, Singhadurbar.

<sup>46</sup> Data available from the Central Bureau of Statistics, 2014







# 7. Irrigation

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## Summary

The Post Disaster Needs Assessment (PDNA) in the irrigation sector covered 31 districts, including the 14 most-affected districts. In these hilly and mountain districts, an estimated 1877 small- and medium-scale farmer-managed irrigation schemes irrigated about 121,900 hectares of land before the earthquakes. The infrastructure and functionality of about 290 of these irrigation schemes was affected to various degrees by the earthquakes. Damages to the sector, including irrigation infrastructure and district offices, are estimated at about NPR 382.8 million. Losses in agriculture production due to non-availability of irrigation water to 10,783 hectares are reported in the chapter on agriculture. Direct losses in irrigation fee collection are estimated at NPR 0.4 million. Recovery and reconstruction of office buildings and irrigation schemes, based on the build back better (BBB) principle, is estimated at about NPR 467.2 million.

## Pre-Disaster Context and Baseline

The agriculture sector accounted for 34.1 percent of GDP in 2013-2014 and 60 percent of the labour force is dependent on agriculture. A total of 2.5 million hectares of the country's land is arable, of which 1.77 million hectares is irrigable and 1.35 million hectares has access to irrigation water. The irrigation systems are categorized according to their size, operation and management responsibility. In the hills, schemes of less than 10 hectares are considered small, schemes between 10 and 500 hectares are considered medium, schemes between 500 and 1,000 hectares are considered large, and schemes above 1,000 hectares are considered major.<sup>47</sup> Micro-irrigation systems using non-conventional technologies are also constructed as independent systems or in conjunction with small and medium irrigation systems to increase water efficiency. Schemes are also classified based on the entity in-charge of the

operation and maintenance into agency-managed irrigation schemes (AMIS), farmer-managed irrigation schemes (FMIS) and jointly-managed irrigation schemes (JMIS).

The total area under AMIS surface irrigation was about 749,063 hectares, of which large and major irrigation schemes accounted for 325,919 hectares and medium irrigation schemes 424,000 hectares. Large and major irrigation schemes are mainly located in the Tarai plains where large areas of productive, irrigable land are available. There were about 15,000 small and medium size FMIS covering 227,077 hectares. These are mainly located in the hills and mountains. About 3,000 of them have received external support from the government and development agencies in the past. The rest were built by farmers and are made of flexible structures and earthen canals with temporary intake that require frequent repair. The ground water schemes cover about 374,691 hectares of irrigated land in the country and the rest of the irrigated land is covered by other minor/micro irrigation schemes.

Right-to-water-use for agricultural purposes is mainly attached to land rights. This means those who own land can enjoy water rights. From the gender perspective, rights to water is discriminatory as in Nepal there is great disparity in land distribution, with women owning only 19.17 percent of the land and housing. Further, there is lack of recognition that women are water stakeholders and actors too. There also exists an undervaluation of the importance of women's skills, knowledge and labour contribution to water management. Yet, women shoulder most of the burden of farm work and make the largest contribution to the agricultural economy.

The government through the Ministry of Irrigation (MoI) and the Department of Irrigation

<sup>47</sup> In the Tarai area, classification of irrigation schemes by size uses different thresholds. Schemes < 200 hectares are considered small, schemes of 200 to 2,000 hectares are considered medium, schemes of 2,000 to 5,000 hectares are large and schemes >5,000 hectares are major.



(DoI) develops and manages medium to major irrigation systems in the country. The Ministry of Federal Affairs and Local Development (MoFALD) through its Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) supports farmers in construction and rehabilitation of small irrigation systems. The Ministry of Agriculture Development (MoAD) through its Department of Agriculture

(DoA) also supports farmers in construction and management of small to minor irrigation systems in different districts.

The irrigation PDNA focuses on 31 earthquake-affected districts totalling an estimated 121,900 hectares that were irrigated prior to the earthquakes. Irrigation in these hilly and mountain districts is provided by small- and medium-scale

**TABLE 7.1 IRRIGATION SYSTEMS IN EARTHQUAKE-AFFECTED DISTRICTS**

S.No.	Districts	Total Number of small and medium irrigation schemes	Total area under irrigation (ha)
1.	Bhaktapur	46	3184
2.	Dhading	123	5523
3.	Dolkha	44	3303
4.	Gorkha	61	3055
5.	Kathmandu	47	2913
6.	Kavrepalanchowk	78	4346
7.	Lalitpur	46	3805
8.	Makawanpur	54	3813
9.	Nuwakot	69	5602
10.	Okhaldhunga	43	2449
11.	Ramechhap	63	3399
12.	Rasuwa	21	1163
13.	Sindhuli	47	4492
14.	Sindhupalchowk	97	5803
15.	Arghakhanchi	51	2143
16.	Baglung	54	1912
17.	Bhojpur	32	2646
18.	Chitwan	152	16499
19.	Dhankuta	60	3313
20.	Gulmi	53	2438
21.	Kaski	47	3329
22.	Khotang	39	3416
23.	Lamjung	95	4527
24.	Myagdi	44	1834
25.	Nawalparasi	65	8849
26.	Palpa	74	3163
27.	Parbat	62	3193
28.	Sankhuwasabha	45	2609
29.	Syangja	79	4492
30.	Solukhumbu	22	1491
31.	Tanahun	64	3205
<b>Total</b>		<b>1,877</b>	<b>121,909</b>

FMIS. Only irrigation schemes and buildings, which are under the responsibility of DoI and DoLIDAR are accounted for in this assessment. Schemes and offices that are under DoA are accounted for in the agriculture chapter. Table 7.1 presents the estimated number of schemes and number of hectares under irrigation in each of the 31 districts.

## Post-Disaster Context

### DAMAGES AND LOSSES

The PDNA of the irrigation sector has considered the damages in irrigation infrastructure and office buildings. Losses in this sector only include reduced Irrigation Service Fee (ISF) collection from damaged irrigation schemes. Losses in agriculture production due to non-availability of irrigation water are accounted for under the agriculture sector.

### Infrastructure Damages

The field visit revealed that physical damage was caused both due to the ground shaking and landslides. Typical damage includes: (i) small and major cracks in RCC canals, and structures falling due to the ground shaking, (ii) displacement of canals due to loss of gradient, (iii) RCC canal section degraded or washed away due to landslides and rock fall, and (iv) damaged retaining walls. In many instances, sections of RCC canals have cracked due to faulty construction. Despite the major scale of the disaster, important structures of the irrigation systems such as intake, super-passages and aqueducts have generally resisted well and remain in operation. Some structures with new spring water are very vulnerable and may deteriorate later. Many landslides have occurred. Even firm rocky areas have started to show wedge failure or serious cracks a couple of inches wide. Many landslide-prone areas have been weakened by the earthquakes. It is expected that monsoon rains will cause many of these weak areas to fail. These hidden damages were accounted for by adding 30 percent to the immediate post-earthquake visual damage estimates. Finally, many DoI and DoLIDAR district offices were damaged. District offices in Dhading, Dolakha and Nuwakot have to be rebuilt.

### Losses in Production, Fiscal Revenue and Services

Losses from damaged irrigation infrastructure include (i) losses in agriculture production due to reduced irrigated area, and (ii) reduction in ISF collection. It is estimated that damaged irrigation schemes, on average, will remain completely or partially non-functional for a period of one year. Some will be fixed earlier and others may be fixed after a maximum period of two years. Losses in production and irrigation fees will be for a period of one year. The fee is collected by the irrigation department as an annual average at the rate of NPR 200/hectare. However, the average collection rate does not exceed 20 percent. This low collection rate was factored in while calculating the losses in ISF collection. Losses in production were calculated for 10,783 hectares, which includes 8295 hectares reported without irrigation plus 30 percent for unreported damaged schemes. For most systems, a year out of production corresponds to losses of three crops, including one rice crop, one wheat crop, and one maize crop. Production losses are estimated at NPR 4,042 million and have been accounted for in the agriculture chapter. Table 7.2 presents estimated damages and losses in 31 earthquake-affected districts.

Damaged office buildings will affect the ability of DoI and DoLIDAR district staff to provide the services that is required to support fast reconstruction and recovery. Fast reconstruction/retrofitting of the offices will be critical, including possible provision of temporary offices.

### Recovery Needs and Strategy

The general approach and strategy for recovery and reconstruction is to restore the performance of the irrigation sector as early as possible with the objective of minimizing economic losses in the agriculture sector. Given the limited international experience in designing and building earthquake-resilient small-scale irrigation schemes and the absence of local experience and capacity, it is not realistic to wait for new design/retrofitting guidelines to be prepared before starting to rebuild/repair the damaged schemes. Developing new design guidelines or retrofitting guidelines will require action research consisting

**TABLE 7.2 IRRIGATION SYSTEMS IN EARTHQUAKE-AFFECTED DISTRICTS WITH DAMAGES AND LOSSES**

S.No.	Districts	Number of affected schemes	Total cost of damage on irrigation scheme in NPR million	Cost of damage to office buildings in NPR million	Total cost of damages (offices +irrigation schemes) in NPR million	Total loss in CA (ha)	Total loss in ISF collection in NPR million @ 20% collection rate
1.	Bhaktapur	0	0.0	0.0	0.0	0	0.0
2.	Dhading	26	50.6	9.5	60.1	944	0.05
3.	Dolkha	38	9.2	15	24.2	874	0.05
4.	Gorkha	111	70.9	0.9	71.8	2,848	0.107
5.	Kathmandu	0	0.0	0.5	0.5	0.0	0.0
6.	Kavrepalanchowk	8	17.8	1.5	19.2	202	0.01
7.	Lalitpur	1	0.5	0.0	0.5	25	0.001
8.	Makawanpur	19	25.8	3.3	29.2	497	0.03
9.	Nuwakot	13	41.6	0.9	42.5	870	0.05
10.	Okhaldhunga	14	12.8	1.5	14.3	271	0.01
11.	Ramechhap	0	0.0	0.0	0.0	0	0.0
12.	Rasuwa	5	16.2	10	26.2	196	0.01
13.	Sindhuli	1	1.0	2.4	3.4	45	0.002
14.	Sindhupalchowk	7	12.6	0.0	12.6	272	0.01
15.	Arghakhanchi	0	0.0	0.0	0.0	0	0.0
16.	Baglung	1	0.3	4.5	4.8	10	0.001
17.	Bhojpur	3	2.2	0.7	2.9	53	0.003
18.	Chitwan	0	0.0	9.2	9.2	0	0.0
19.	Dhankuta	12	11.9	2.0	14	267	0.02
20.	Gulmi	1	0.3	0.5	0.8	20	0.001
21.	Kaski	2	2.5	1.4	3.9	50	0.003
22.	Khotang	1	2.0	5.0	7.0	20	0.001
23.	Lamjung	6	6.4	6.0	12.4	445	0.02
24.	Myagdi	1	0.3	0.0	0.3	10	0.001
25.	Nawalparasi	0	0.0	1.0	1.0	0	0
26.	Palpa	0	0.0	0.5	0.5	0	0
27.	Parbat	5	4.6	0.0	4.6	135	0.007
28.	Sankhuwasabha	0	0.0	0.0	0.0	0	0
29.	Syangja	7	8.0	0.0	8.0	126	0.007
30.	Solukhumbu	6	5.4	2.5	7.9	75	0.004
31.	Tanahun	2	1.1	0.0	1.0	40	0.002
<b>Total</b>		<b>290</b>	<b>304.0</b>	<b>78.8</b>	<b>382.8</b>	<b>8,295</b>	<b>0.4</b>

of pilot testing the feasibility of various options in the Nepalese context. However, improvement can be brought by enhancing the quality of construction. Substantial damage observed during the field visits were a result of faulty construction, particularly the installation of rubber seals. This can be improved by enhancing capacity of DoI/DoLIDAR and Water Users' Associations (WUAs) in construction supervision. Cost for piloting and preparing retrofitting/new design guidelines as well as capacity building in construction supervision is estimated at 10 percent of the cost to repair/rebuild the damaged irrigation schemes.

As irrigation is an integral part of agriculture, it is imperative that women become more involved in irrigation and related activities. The post-disaster recovery frameworks should pursue interventions that engage more women. The long-term reconstruction activities proposed under irrigation should take into account women's needs and priorities by involving them in planning and designing of reconstruction activities. Further, consideration of women's WUAs is necessary. Their inputs will be useful and their capacity will also need to be enhanced for management of irrigation schemes.

There is enough regional and national experience on retrofitting or constructing earthquake-resilient administrative buildings. Based on available guidelines and bibliography, the cost of building new earthquake-resilient offices and

retrofitting damaged ones is estimated at 20 percent of the estimated repair/reconstruction cost. Table 7.3 provides a breakdown of reconstruction and recovery costs.

The strategy for reconstruction and recovery will follow a three-stage approach, including:

(i) Short-term recovery activities (2015-2016):

It is believed that some level of functionality can be restored and maintained during the monsoon in many irrigation schemes through provision of emergency assistance to WUAs. With DoI technical guidance and provision of tools and materials, farmers will be able to clean obstructed canals, repair small and medium cracks, consolidate landslide prone areas or even install temporary pipes in most damaged areas. Material may include PVC pipes, cement bags, high grade plastic sheets, plastic piping, etc. This would help save part of the monsoon paddy crop. Precise inventory of the damage must wait for after the monsoon as further damage is expected to occur during that season. Such inventory should be completed in four months. Preparation of detailed design and costing should start immediately after and be completed in five months. The cost of undertaking the detailed damages inventory and preparing detailed designs was estimated at 1 percent of the cost of reconstruction.

(ii) Medium-term reconstruction activities (FY 2016-2018): Physical reconstruction should not take more than one to 1.3 years as it is

**TABLE 7.3 ESTIMATED RECOVERY AND RECONSTRUCTION NEEDS**

Items	Recovery and Reconstruction cost (NPR million NPR)				Total
	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
Recovery : inventory and detail design of irrigation schemes and building	38.2				38.2
Reconstruction/Repair irrigation schemes	40.0	132.0	132.0		304.0
Reconstruction/Retrofit earthquake resilient office buildings		47.3	47.3		94.6
Piloting/preparing irrigation scheme new design/retrofitting guidelines	10	10.0		10.4	30.4
<b>TOTAL</b>	<b>88.2</b>	<b>189.3</b>	<b>179.3</b>	<b>10.4</b>	<b>467.2</b>



planned to contract these directly to WUAs. Reconstruction and retrofitting of office buildings will take up to 2.5 years, including six months for survey and detailed designs, eight months for tendering and awarding contracts, and 12 months for construction.

- (iii) Long-term reconstruction activities (up to FY 2018-2019): These will consist of identifying possible options for building/retrofitting more earthquake-resilient small- and medium-scale irrigation schemes from the international literature, particularly from the Himalayan region of India as the geologic and economic setting might be similar. Experience of the International Water Management Institute with post-earthquake canal restoration in Pakistan may be a good example to follow. The most promising options will then be tested through pilots in earthquake-prone/affected hill districts. Based on the results of the pilot irrigation schemes, design guidelines will be updated and retrofitting guidelines will be produced. It is estimated that completion of these tasks should take at least four years.

### Implementation Arrangements

In view of the limited budget required for reconstruction and recovery, it is proposed to absorb the cost of reconstruction through donor funded and government projects currently under implementation, including (i) ADB-funded Community Managed Irrigated Agriculture Sector Project (CMIASP) and Water Resource Project Preparation Facility (WRPPF), (ii) World Bank-financed Irrigation and Water Resource Management Project (IWRMP), or (iii) government-financed Medium Irrigation Project (MIP). If required, the geographical scope of these projects may be extended to cover all 31 districts.

During the monsoon season, stocks of materials and tools will be purchased and dispatched to districts, which need them to support WUA-led emergency repairs. Irrigation and DoLIDAR district engineers will assess the needs and provide technical support to the WUAs. The project management units (PMUs) of IWRMP and CMIASP will procure materials and tools using shopping procurement mode to ensure fast delivery.

PMUs of IWRMP, CMIASP and WRPPF may recruit individual consultants to undertake necessary detailed damages inventory in all 31 districts and produce detailed designs of severely damaged schemes and office buildings. Under Nepal government procurement rules, works up to NPR 6 million can be directly contracted to WUAs. Most, if not all, repair/reconstruction works are not expected to exceed this threshold. In most cases, WUAs will be contracted to undertake repair/reconstruction with technical support and guidance from DoI and DoLIDAR engineers. In doing so, a substantial amount of time and effort required for preparing tender documents and procuring works through national competitive bidding (NCB) will be saved. Quality control and overall supervision must be ensured by experts employed under the donor funded projects. Office building repair and reconstruction works will be procured through NCB by CMIASP and IWRMP PMUs.

Similarly, PMU of WRPPF will recruit an individual consultant to (i) explore possible options for retrofitting and enhancing earthquake resilience in DoI design guidelines, (ii) identify and design pilots, and (iii) assess suitability and update design guidelines. Most suitable options will be pilot tested in FMIS to be constructed or reconstructed under CMIASP, IWRMP or MIP.

### Assessment Methodology

The irrigation sector assessment was conducted following the terms of reference for PDNA in May 2015 of the Nepal PDNA Secretariat, led by the National Planning Commission, and the guidelines for PDNA prepared jointly by the European Commission, the United Nations Development Group and the World Bank in 2013. The approach focused on (i) identifying the damages and losses of the 25 April 2015 earthquake and subsequent aftershocks, and (ii) defining and costing a recovery strategy, including the cost for rehabilitation and reconstruction of irrigation infrastructure and office buildings while ensuring resilient recovery based on the BBB principle.

The baseline information was collected from secondary sources, including the Central Bureau of Statistics supported Census Survey 2011, past reports and records of DoI, DoA and DoLIDAR, the report on the develop-

ment of database in irrigation development in Nepal prepared by DoI in 2007, and information from district profiles prepared by District Development Committees (DDCs). Field level post-disaster information was collected from the Irrigation Development Division (IDD) Offices of DoI and District Technical Offices (DTO) of DOLIDAR. A standardized checklist was developed for this purpose. It included questions on (i) the scale of damage in the irrigation systems and buildings, (ii) command area losses due to unavailability of irrigation water as a result of the damage, and (iii) the level of functionality of the scheme. Most post-disaster information was collected on the phone from WUA members. Based on these descriptions, IDD engineers prepared cost estimates using the district schedule of rates. It is estimated that this count covers about 70 percent of the irrigation schemes of the affected districts. About 30 percent of the irrigated area, including the entire irrigated area of Ramechhap district, for which no data could be obtained, is not accounted for. This gap was taken into consideration when accounting for damages and losses in command area and ISF.

In order to check the reliability of the information, field validation of a few irrigation systems in the highly earthquake-affected districts was carried out by ADB, JICA and the World Bank along with the staff of IDD/DoI. The farmers were consulted on the status of the system and their cultivation plan for the next agriculture season. A walkthrough of the system was conducted with detailed observation, measurement of damages and photographic recording. The operational status of the systems was recorded in terms of being fully or partially operational, or

completely non-operational. Also, probable cost of repair and rehabilitation in the post-monsoon condition of the already vulnerable and fragile hills was estimated. Based on such field observation and consultation with farmers, the cost per hectare for immediate measures to make the system operational, short-term repair, and medium- to long-term rehabilitation was estimated.

Results of the field verification surveys were compared with IDD/DTO data. It was concluded that descriptions of damages were usually accurate but costs were over-estimated by an average of 40 percent. IDD cost estimates were reduced by 40 percent. However, these were also increased twice by 30 percent to account for (i) non-reported schemes, and (ii) hidden damages that would lead to further damages during the monsoon.

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# 8. Commerce and Industry

## Summary

The commerce and industry sectors play a key role in the economy, contributing substantially to employment and ensuring access to services and goods. Numerically, the largest share of enterprises in these sectors are micro enterprises, of which majority are informal and create a substantial number of jobs, while medium and large scale enterprises provide access to formal sector employment opportunities.

In the 14 affected districts, prior to the earthquake, there were:

- A total of 174,823 micro enterprises as assessed through the Household Survey, of which 23,180 are classified under industry and 151,643 under commerce;
- 57,308 cottage and small industries (32,949 in commerce and 24,359 in industry), out of 229,309 cottage and small industries registered with Department of Cottage and Small Industries in the entire country;
- 3,919 medium and large industries, or 66 percent of the total of 5,973 medium and large industries registered with Department of Industry in Nepal;
- 2,495 FDI enterprises, or 78 percent of a total of 3,200 FDI enterprises registered in the entire country. 1,775 FDI enterprises, or 55.4 percent of the total, are established in Kathmandu district alone;
- An additional 122,026 commerce firms registered with the Ministry of Commerce and Supplies.

The commerce and industry sectors have been affected by physical damage to premises, equip-

ment, raw materials and stocks of finished goods; lack of labour; reduced demand; as well as disruptions in trade flows due to damage to trade related infrastructure.

Based on the outcomes of the PDNA, damages resulting from the earthquakes amount to NPR 15,613 million in the 14 affected districts (and NPR 17,408 million in the country overall), while losses are estimated to amount to NPR 16,874 million (and NPR 18,815 million in the country overall).

Beyond immediate effects in terms of damages and losses, the earthquakes are likely to generate overall negative impacts in the sectors in terms of business survival and performance, with the exception of the construction subsector, which is likely to be strengthened. Among other impacts, the lower business performance in these sectors is likely to translate into decreased government revenue as well as employment losses and, as a result thereof, increased individual and household poverty.

To mitigate these negative impacts and allow for the commerce and industry sectors to recover and contribute to overall reconstruction efforts, a two-pronged recovery strategy is proposed, comprising, (i) immediate assistance for rubble removal and restoration of working capital to affected enterprises, and (ii) assessing their need for and securing their access to supplementary financial and non-financial services to ensure that the businesses – especially those headed by women and youth – are built back better in terms of management capacity,

**TABLE 8.1: EARTHQUAKE EFFECTS AND RECOVERY AND RECONSTRUCTION NEEDS FOR COMMERCE AND INDUSTRY**

	Earthquake effects		Recovery and reconstruction needs	
	Damages (NPR million)	Losses (NPR million)	Recovery needs (Npr million)	Reconstruction needs (Npr million)
14 Districts	15,613	16,874	6,624	17,955
31 Districts*	17,408	18,815	7,386	20,019

\*11.5% is used as a basis for extrapolation from 14 to 31 districts



sustainability and resilience. The estimated cost of implementing the recovery component of the strategy is NPR 6,624 million for 17 districts and NPR 7,386 million for 31 districts, while reconstruction needs amount to NPR 17,955 million for 17 districts and NPR 20,019 million for 31 districts.

### Pre-Disaster Context and Baseline

Nepal is ranked as one of the least developed countries in the world. Services make up over half of GDP, with wholesale and retail trade contributing 14.95 percent to GDP in 2013-2014. The contribution of industry to GDP is declining and stood at 14.4 percent in 2012-2013 as compared to 17.5 percent in 2001-2002.

For the purposes of this assessment:

- **Industry** refers to manufacturing, construction, minerals and agro- and forest enterprises
- **Commerce** refers to services, businesses and traders.

Prior to the earthquakes, the commerce and industry sectors played a key role in providing

employment opportunities. A large share of the enterprises – especially micro and small-scale enterprises including household-based enterprises – operating in these sectors are informal; it is estimated that only one-fifth of all enterprises are formally registered. Location determines the types of activity that enterprises are involved in, with trade being dominant in urban areas and manufacturing in rural areas. While sex-disaggregated data is scant, indications are that women are most heavily represented among micro entrepreneurs (including as heads of households); their representation among managers and workers in industry is significantly more limited than men. In the industrial estates surveyed, women accounted, on average, between 10 to 15 percent of the workforce.

The pre-earthquake baseline data of the commerce and industry sectors is provided in Table 8.3 by size and type of enterprise. It should be noted that both the baseline as well as the assessment of post-disaster effects could not fully capture the situation of informal enterprises, on which data is scant.

**Micro enterprises** in the commerce and industry sectors represent a significant share of the Nepali economy. In terms of employment creation, they employ, on average, four persons per enterprise. In the 14 affected districts, the number of micro enterprises surveyed through Household Survey 2011 totals 174,823, of which 23,180 are classified under industry (cottage industries) and 151,643 under commerce (including business, service and other subsectors such as beauty parlours, computer cafes, or photo studios). The PDNA housing sector data (based on Ministry of Home Affairs data) indicates that over 90 percent of the households with micro enterprises may have been destroyed in Sindhupalchok, Gorkha, Dolakha, Nuwakot and Rasuwa.

**Cottage and small industries** play a pivotal role in income generation and employment promotion in Nepal. Recognizing their contribution to job creation, the government has established cottage and small industry development offices in each district. Based on information provided by Department of Cottage and Small Industries, 229,309 cottage and small industries are registered in different districts as of FY 2013-2014.

### Box 8.1: Manufacturing: A Key Subsector in Decline

Manufacturing establishments are the backbone of the Nepalese industrial sector. They dominate in numbers and generate more employment opportunities than other categories. The results of the National Census of Manufacturing Establishments survey conducted in 2011-2012 by the Central Bureau of Statistics are summarised in Table 8.2.

**TABLE 8.2: SUMMARY OF PRINCIPAL INDICATORS OF MANUFACTURING INDUSTRIES (ALL NEPAL)**

Principal indicators	2011-12
Total number of establishments	4076
Total number of persons engaged	204,360
Total number of employees	194,989
Average number of employee per establishment	48

*Source: National Census of Manufacturing Industries 2011-12, Central Bureau of Statistics, June 2014. Employment promotion is one of the key objectives of promoting industrial enterprises in Nepal. However, as exhibited in the table, employment creation in manufacturing industries is not encouraging. This could be due to various reasons such as focus on capital intensive technologies or practices of hiring employees on a temporary basis.*

The contribution of the manufacturing industrial sector to GDP has diminished from 9.03 percent in FY 2000-2001 to 6.08 percent in 2013-2014.

Of these, 57,308 small and cottage industries (32,949 in commerce and 24,359 in industry) are registered in districts classified as highly affected, which is almost 25 percent of the total

registered enterprises in 75 districts. The types of businesses registered in the commerce and industry sectors in the 14 affected districts are given in Table 8.4.

**TABLE 8.3: PRE-EARTHQUAKE COMMERCE AND INDUSTRY DATA BY SIZE AND TYPE OF ENTERPRISE**

District	Industry		Commerce			Total commerce
	Cottage industry	Business	Service	Other		
Bhaktapur	3066	6735	5089	1495	13319	
Dhading	2189	4543	4282	439	9264	
Dolakha	717	2327	3616	114	6057	
Gorkha	464	3055	4236	221	7512	
Kathmandu	4062	30428	15230	3684	49342	
Kavrepalanchowk	1922	5875	5642	534	12051	
Lalitpur	3569	8199	5498	1064	14761	
Makawanpur	1332	5485	4213	349	10047	
Nuwakot	969	2576	3238	594	6408	
Okhaldhunga	858	1217	2206	77	3500	
Ramechhap	950	1908	2580	184	4672	
Rasuwa	405	535	400	87	1022	
Sindhuli	453	1840	2783	237	4860	
Sindhupalchowk	2224	4097	4421	310	8828	
<b>Total</b>	<b>23180</b>	<b>78820</b>	<b>63434</b>	<b>9389</b>	<b>151643</b>	

\*Other includes trades such as beauty parlours, rural grocery stores, photo studios and cyber cafes, among others

Source: Household Survey 2011, CBS

**TABLE 8.4: TYPES OF BUSINESSES REGISTERED IN THE COMMERCE AND INDUSTRY SECTOR IN 14 AFFECTED DISTRICTS**

Districts	Manufacturing	Construction	Agri & Forest	Mineral	Service	Only Industry	Commerce	Total
Bhaktapur	1615	78	208	0	1208	1901	1208	3109
Dhading	316	163	353	7	1463	839	1463	2302
Dolakha	169	25	196	3	648	393	648	1041
Gorkha	210	22	137	7	751	376	751	1127
Kathmandu	9634	86	523	0	17405	10243	17405	27648
Kavre	633	0	741	0	1643	1374	1643	3017
Lalitpur	5106	43	292	0	4374	5441	4374	9815
Makawanpur	1080	0	283	0	2028	1363	2028	3391
Nuwakot	460	2	430	7	776	899	776	1675
Okhaldhunga	59	0	64	0	346	123	346	469
Ramechhap	187	1	167	9	508	364	508	872
Rasuwa	63	15	116	1	213	195	213	408
Sindhuli	170	2	127	4	599	303	599	902
Sindhupalchowk	157	154	202	32	987	545	987	1532
<b>Total</b>	<b>19859</b>	<b>591</b>	<b>3839</b>	<b>70</b>	<b>32949</b>	<b>24359</b>	<b>32949</b>	<b>57308</b>

Source: Department of Cottage and Small Industries, 2014

In terms of numbers, medium and large industries are fewer as compared to cottage and small industries. However, these industries generate more employment in the formal sector. The Department of Industry, which administers medium and large industries, has registered 5973 (4836 excluding tourism) industries up to May 2015, with commerce enterprises (as represented by services) accounting for 1,640 enterprises. It is estimated that 496,730 (448,707 excluding tourism) employment opportunities are created from these industries, with commerce (as represented by services) accounting for 102,775 employment opportunities.

Out of 5,973 total industries registered in Nepal, 3,919 (66 percent) are registered in the 14 affected districts. Over 90 percent of the medium to large industries are registered in Kathmandu, Bhaktapur, Lalitpur and Makawanpur.

Foreign Direct Investment (FDI) enterprises can be found in both industry and commerce across all size groups (small, medium and large) with the exception of micro enterprises. In all, 3,200 FDI enterprises are registered with the Department of Industry as of April 2015, generating 202,670 jobs, of which 2,495 FDI enterprises (or 78 percent of the total) are established in the 14 quake-affected districts. Of these, 1,775 industries are registered in Kathmandu district alone.

In addition to the commerce sector establishments registered with the Department of Industries, there are a further 122,026 commerce enterprises registered with the Ministry of Commerce and Supplies in the 14 quake-affected districts, representing an investment of NPR 56,096 million.

## Post-Disaster Context

In the affected districts, the earthquakes disrupted the functioning of enterprises in a variety of ways, including:

- Damage to premises, equipment and stocks of raw materials and finished goods:** In a large number of household-based micro enterprises, premises have suffered significant damage or have collapsed completely. In the case of medium and large industries, damage to property is less extensive, but in many cases even where buildings are intact, cracks following the quakes and aftershocks mean that parts or all of the building must be reconstructed. Damage to property is a cause of disruptions to or stoppage of production. In addition to damage to premises, damage to stocks of raw materials or finished goods has caused further disruption in production and sales losses.
- Lack of labour:** Enterprises are generally facing a lack of labour due to the earthquakes. A large number of migrant workers from India returned home after the quake and, within Nepal, the same phenomenon occurred: workers from other districts left the quake-affected districts in fear, while a reverse trend of workers leaving their workplaces in non-affected areas to help their families in quake-affected areas is also taking place. In addition to this phenomenon of temporary out-migration, workers who are originally from the quake-affected districts and continue to reside in the district have not returned to their workplaces due to fear of working in buildings which they consider unsafe. This has led to further decrease in production capacity. For instance, the Garment Association of Nepal estimates that

**TABLE 8.5: MEDIUM TO LARGE INDUSTRIES IN NEPAL**

Category	No. of industry	Total capital (NPR million)	Fixed capital (NPR million)	Working capital (NPR million)	No. of employees
Agro and forestry	354	16,259	13703.39	2,673	32,115
Construction	46	42,332	41476.76	855	3,062
Energy-based	252	553,073	538336.46	14,737	25,439
Manufacturing	2,483	213,225	157753.79	55,942	278,917
Mineral	61	4,367	3846.99	522	6,399
Services	1,640	111,014	75869.31	35,190	102,775
Tourism	1,137	70,447	62481.36	7,958	48,023
<b>TOTAL</b>	<b>5,973</b>	<b>1,010,717</b>	<b>893468.06</b>	<b>117,877</b>	<b>496,730</b>

Source: Ministry of Industry, June 2015

**TABLE 8.6: DISTRICT-WISE MEDIUM TO LARGE INDUSTRIES IN NEPAL**

District	No. of industry	Total capital (NPR million)	Fixed capital (NPR million)	Working capital (NPR million)	No. of employees
Bhaktapur	144	9,036.89	7,519.46	1,517.42	14,168
Dhading	42	17,915.24	16,854.70	1,060.54	2,992
Dolakha	28	83,751.80	83,238.14	513.66	5,931
Gorkha	22	3,857.05	3,744.09	112.96	1,563
Kathmandu	2,734	158,901.09	122,595.71	36,350.08	210,554
Kavre	129	6,672.58	5,314.71	1,357.86	10,890
Lalitpur	625	31,393.96	21,503.66	9,998.30	37,167
Makawanpur	92	17,119.41	13,969.34	3,150.08	8,892
Nuwakot	34	11,225.20	10,871.07	355.13	1,648
Okhaldhunga	1	1,214.00	1,200.00	14	50
Ramechhap	10	21,002.92	20,156.74	846.19	683
Rasuwa	17	39,709.81	37,289.39	2,420.43	2,258
Sindhuli	2	203.84	194.85	8.99	195
Sindhupalchowk	39	48,462.45	47,148.43	1,314.03	3,354
<b>TOTAL</b>	<b>3,919</b>	<b>450,466</b>	<b>391,600</b>	<b>59,020</b>	<b>300,345</b>

Source: Ministry of Industry, 2014

**TABLE 8.7: FIRMS REGISTERED WITH THE MINISTRY OF COMMERCE AND SUPPLIES (2013-2014)**

District	Registered commercial firms	Investment (NPR million)
Gorkha	1266	365.73
Dhading	2450	380
Nuwakot	2011	355.50
Rasuwa	298	118.20
Kathmandu, Lalitpur, Bhaktapur	102142	51,000
Makawanpur	5063	1,500
Dolakha	1788	1,470
Kavre	3026	
Sindhupalchowk	1841	262.32
Sindhuli	235	173.10
Ramechhap	843	261.50
Okhaldhunga	1063	210
<b>Total</b>	<b>122026</b>	<b>56,096.35</b>

Source: Ministry of Commerce and Supplies, 2014

90 percent of workers have not returned to work after the earthquakes.<sup>48</sup> The lack of demand for labour translates into increase in workers' rates. In the construction sector, for example, the daily rate of workers has gone up by 100 percent, from NPR 500 before the quake to NPR 1000.<sup>49</sup>

- **Reduced demand:** Demand in general has fallen for a number of reasons, including lower domestic consumption as a result of lower purchasing power of consumers (due to property damage and other losses), a phenomenon of guilt leading to reduced desire to purchase non-essential goods and services,

<sup>48</sup> It should be noted, however, that there is also an inverse trend occurring at the same time, albeit on a more restricted scale: in some cases where production has been interrupted because of infrastructure damage or reduced demand, workers who would be willing to work have in been either given leave (with 50-100% of pay, in the case of hired staff), or asked not to come to work (in the case of day labourers). See: The Himalayan, 'Labour shortage hits businesses', 5 June 2015.

<sup>49</sup> The Himalayan, 'Labour shortage hits businesses', 5 June 2015



and a drastic reduction in tourist arrivals (affecting enterprises beyond the tourism sector). It should be noted, however, that it is expected that demand for certain products, such as those related to construction, will increase due to the earthquakes.

- **Damage to trade-related infrastructure:** Roads, bridges and customs points have been severely affected, with significant implications for trade in both merchandise and services.

As a result of the damages and losses suffered, it is estimated (based on assessments by private sector stakeholders) that all enterprises in the industry and commerce sectors in all districts will, on average, lose 100 percent of their normal rev-

enue for two months, 75 percent for the third month, 50 percent for the fourth month and 25 percent for the fifth month, with revenue being restored to normal levels after six months, if support is provided.

While financial losses are larger for larger industries, the almost complete destruction of the premises of smaller businesses (especially household-based micro enterprises) combined with their lower capacity to deal with such shocks (lower reserve capital availability, lack of insurance, etc.) means that medium, small and micro enterprises (MSMEs) are disproportionately affected and require special attention in recovery efforts.

## Box 8.2: Effects in Makawanpur, Chitwan and Dhading districts\*

### In Makawanpur District:

- Enterprises and industries were generally closed for 20 days after the quakes. Some small enterprises have started producing their goods in tents.
- In the industrial estate of Makawanpur, a company involved in manhole cover production, for instance, was closed for two weeks and is currently operating at 30 percent capacity. A tent has been set up, as the main production building is cracked and needs to be demolished and reconstructed.

### In Chitwan District:

- Tourist arrivals have dropped to less than 50 per day as compared to 1,000-1,500 per day before the earthquakes. While there are no damages in tourist related businesses, this reduced demand has a large negative impact nevertheless, affecting some 150 hotels, 50 restaurants and 3,500 workers (many of whom are receiving 50 percent of their salaries and are on leave).
- Poultry firms did not experience physical damage but losses due to low demand and decreased prices of chicks, eggs and meat (e.g., price of eggs have fallen by NPR 4).

- In brick industries, there is physical damage to chimneys and raw materials. More than 10,000 workers in the district were working on daily wage basis; now production has been reduced by 50 percent and a large number of workers have returned home.

### In Dhading District:

- The district is heavily affected and in particular many micro and small enterprises have suffered significant damage and losses.
- As an example, a furniture maker interviewed had lost glass worth NPR 400,000 and formica worth NPR 200,000. The 20 workers employed by the business left and have not returned to work since the quake.
- Public and private business support organizations and agencies such as the District Cottage and Small Industries Office have also been damaged and are operating out of tents, with limited capacity to serve enterprises in the district.

\*The above highlights of findings are based on statements by key informants garnered during the field visits. As such, they cannot be considered to be accurate or comprehensive reflections of the effects and trends in the earthquake-affected districts; they are meant to serve as example testimonies only.

It should be noted that while the damages and losses are most significant in the affected districts, and while non-affected districts do not face the challenge of physical damages, limitations in the availability of labour and reduced demand has negative effects even in the non-earthquake affected districts.

#### **DAMAGES AND LOSSES**

Based on the PDNA carried out, the damages for the commerce and industry sectors in 14 affected districts amounts to NPR 15,611 million (US\$156.11 million), while losses amount to NPR 16,873 million (Table 8.8).

Extrapolating with a multiplier of 11.5 percent, the total damages for both sectors combined for the country overall amounts to NPR 17,408 million, while losses amount to NPR 18,815 million.

#### **DISASTER EFFECTS AND IMPACTS**

While an accurate estimate of impacts is difficult to obtain given limitations in the baseline and post-earthquake data that could be obtained and in the absence of a detailed survey, impacts that have a relatively high likelihood of occurring are outlined, calling for a recovery strategy that mitigates negative impacts and supports recovery of the sectors.

It is expected that the damages and losses experienced by enterprises in the commerce and industry sectors will lead to a number of changes within the sectors themselves, including:

- The possible collapse of some of the most hard-hit micro enterprises;
- Reduced levels of business activity, performance and profit in a number of subsectors, including agribusiness, and commerce and trade. Given the strong backward and forward linkages in agro-processing, the impact on the supply of intermediate as well as final goods and opportunities for small and medium industries will be negative;
- The strengthening of a limited number of subsectors linked to reconstruction, such as construction materials.

As most goods are produced (and consumed) in the Tarai and Kathmandu Valley, the reduced demand for goods and services in Kathmandu

Valley and affected districts has led to a slow-down in production as well as shortage of labour in the Tarai. Unless recovery activities in Kathmandu Valley and major district towns are undertaken quickly, overall industrial demand will continue to be subdued till the medium term.

While the disaster has created a short-term lack of labour (resulting in high demand for labour) and will boost the construction sector, leading to new employment opportunities, the net impact on overall employment in the medium and long term is likely to be negative due to the challenges that enterprises face. Small-scale enterprises and those run by women and youth who have more limited assets and lower disaster resilience will be more severely affected. The possible employment losses, in turn, could translate into reduction in individual and household income levels and increase in poverty and vulnerability levels.

The negative impact that the disaster will have on the survival and performance of enterprises in the commerce and industry sectors is also likely to lead to a reduction in government revenue due to a shrinkage in corporate tax contributions. This, in turn, will negatively affect the government's capacity to provide much-needed social services.

In terms of access to goods, the earthquake and its negative impact on enterprises will most likely also lead to a reduction in supplies, thus increase in imports as well as increased prices for consumers. Depending on the extent to which imports exceed exports, balance of payments challenges could also emerge.

A short- and medium-term liquidity crunch is likely to occur in the financial sector, as requests for loans from affected enterprises will increase. Investment overall is likely to decrease, and the stock exchange may be negatively affected as a result.

To mitigate the risks in terms of these impacts, it is critical that needs-based support is channeled to the commerce and industry sectors and enterprises within them, in both the immediate future as well as in the medium and long term.

**TABLE 8.8: ESTIMATED DAMAGES AND LOSSES TO COMMERCE AND INDUSTRY**

	Damages (million NPR)	Losses (million NPR)	Total effects (million NPR)
Industries	7,527	9,754	19,271
Commerce	8,084	7,119	16,953
<b>Total</b>	<b>15,611</b>	<b>16,873</b>	<b>32,484</b>

INDUSTRY	Micro		Cottage/Small		Medium & Large		District wise consolidated	
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss
Bhaktapur	144,525,000	308,437,500	41,694,387	16,772,062	71,160,500	425,950,000	257,379,887	751,159,562
Dhading	211,428,000	209,750,000	301,203,527	2,575,563	70,191,500	285,989,583	582,823,027	498,315,147
Dolakha	82,400,000	72,100,000	84,417,237	456,430	4,285,000	34,416,667	171,102,237	106,973,097
Gorkha	46,371,000	43,306,250	113,704,489	791,166	3,300,000	17,191,146	163,375,489	61,288,562
Kathmandu	93,420,000	1,080,168,750	2,323,566,083	72,484,770	1,292,632,000	2,262,461,354	3,709,618,083	3,415,114,874
Kavrepalanchowk	201,110,000	460,416,667	224,161,983	1,346,057	63,912,250	479,276,042	489,184,233	941,038,766
Lalitpur	82,080,000	506,160,000	234,195,521	10,130,542	156,831,500	1,260,065,833	473,107,021	1,776,356,376
Makawanpur	56,647,000	89,946,250	14,784,137	5,642,626	285,267,000	1,309,356,354	356,698,137	1,404,945,230
Nuwakot	111,400,000	90,512,500	336,327,015	750,112	6,638,250	27,489,583	454,365,265	118,752,196
Okhaldhunga	39,440,000	80,112,500	31,903,333	2,328,188	-	-	71,343,333	82,440,688
Ramechhap	99,372,000	88,725,000	127,453,583	460,473	432,500	186,502,604	227,258,083	275,688,077
Rasuwa	44,640,000	37,781,250	50,467,733	450,372	30,790,000	89,645,833	125,897,733	127,877,456
Sindhuli	30,576,000	50,700,000	45,175,991	722,963	192,500	880,208	75,944,491	52,303,172
Sindhupalchowk	230,130,000	127,850,213	130,854,813	1,015,746	8,727,500	13,843,750	369,712,313	142,709,709
<b>Total Nepalese Rupees</b>	<b>1,473,539,000</b>	<b>3,245,966,880</b>	<b>4,059,909,833</b>	<b>115,927,073</b>	<b>1,994,360,500</b>	<b>6,393,068,958</b>	<b>7,527,809,333</b>	<b>9,754,962,911</b>

COMMERCE	Micro		Cottage/Small		Medium & Large		District wise consolidated	
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss
Bhaktapur	414,450,960	321,636,000	8,743,360	2,122,571	6,700,947	36,128,050	429,895,267	359,886,621
Dhading	590,602,320	266,325,000	173,327,933	899,697	3,520,902	29,576,042	767,451,155	296,800,738
Dolakha	459,690,000	146,265,000	45,932,934	149,703	70,950	218,750	505,693,884	146,633,453
Gorkha	495,993,960	168,441,000	74,945,516	319,117	351,087	3,385,417	571,290,563	172,145,534
Kathmandu	748,730,400	2,098,714,000	1,302,913,742	24,637,266	122,619,222	1,920,690,042	2,174,263,364	4,044,041,307
Kavrepalanchowk	832,311,480	277,160,000	88,459,558	321,846	3,352,635	14,887,500	924,123,673	292,369,346
Lalitpur	224,070,000	439,652,500	62,128,438	1,625,778	42,800,670	476,770,592	328,999,108	918,048,870
Makawanpur	282,148,680	271,519,000	7,259,204	1,677,948	1,559,316	18,102,050	290,967,200	291,298,998
Nuwakot	486,354,000	143,695,500	95,803,973	129,648	633,600	2,620,583	582,791,573	146,445,731
Okhaldhunga	106,260,000	78,487,500	29,615,692	1,310,269	-	-	135,875,692	79,797,769
Ramechhap	322,642,320	104,754,000	58,699,510	128,319	-	-	381,341,830	104,882,319
RASUWA	74,448,000	22,912,500	18,191,785	98,863	-	-	92,639,785	23,011,363
Sindhuli	180,748,260	108,985,500	29,471,929	283,540	-	-	210,220,189	109,269,040
Sindhupalchowk	603,028,800	121,824,169	78,203,362	365,738	8,019,000	12,500,000	689,251,162	134,689,907
<b>Total Nepalese Rupees</b>	<b>5,821,479,180</b>	<b>4,570,371,669</b>	<b>2,073,696,935</b>	<b>34,070,305</b>	<b>189,628,329</b>	<b>2,514,879,025</b>	<b>8,084,804,444</b>	<b>7,119,320,999</b>

**TABLE 8.9: DISASTER EFFECTS AND IMPACTS**

	Short term (FY 2015-16)	Medium term (FY 2016-17 and 2017-18)	Long term (FY 2018- 19 and 2019-20)
Sector restructuring with a collapse of a share of micro enterprises and emergence of new ones in growing subsectors (e.g., construction)		X	X
Growth of investment in infrastructure and reconstruction, leading to increased demand for construction materials and increased demand for labour in these sectors	X	X	X
Negative impact on agribusiness due to reduced agricultural production	X	X	
Short- to medium-term shrinkage of commerce and trade in the severely-affected districts	X	X	
Employment opportunity losses, corresponding household income reduction and increase in household poverty levels	X	X	X
Increased vulnerability of already vulnerable groups (women, youth, minorities)	X	X	X
Decrease in government revenue from tax-contributing enterprises in commerce and industry sectors	X	X	
Reduction in supplies	X	X	
Price rise for consumers	X	X	
Increased imports	X	X	
Balance of payments challenges		X	
Liquidity crunch in banks due to requests for loans from enterprises	X	X	
Decrease in overall investment	X	X	X
Negative impact on stock exchange	X	X	X

## Recovery Needs and Strategy

### POLICY MEASURES

Part of the response to the impacts of the earthquakes and needs of the enterprises that comprise the commerce and industry sectors relates to national policy level issues.

During the PDNA consultation process, stakeholders from the commerce, industry and supplies sectors recommended the following policy measures, some of which could be integrated into the sector strategy following discussion and validation by the government and other stakeholders:

- Increased government budget to the sectors for recovery and revival in order to cover direct losses and to channel additional practical assistance to MSMEs, in particular for those in high-priority sectors, such as construction, and for target groups with specific needs, such as returning migrant workers, youth and women.
- Development of an overall industrial vision addressing import-substitution and export growth.
- Downward adjustment of interest rates to avoid depression and of cash reserve ratio rates to ensure sufficient liquidity.
- Temporary relaxation of rules regarding provisioning by the central bank to allow for re-scheduling of loans.
- Reductions in corporate tax and VAT.
- Subsidies and reduction in customs duties on materials that are key for reconstruction.
- Implementation of the National Employment Policy to address the lack of availability of skilled labour and weak links between the supply and demand of labour; possible temporary measures (e.g., wage subsidies) for securing labour; and enactment of the revised draft Labour Act for securing harmonious and enabling industrial relations and to stimulate the attraction of workers to the domestic industrial sector.



- Infrastructure-related measures (e.g., road construction for linkages to neighbouring countries) and trade financing mechanisms to boost trade.

#### **PRACTICAL ASSISTANCE TO AFFECTED MSMEs**

Larger industries will most likely be able to cope with the effects of the disaster if helped by the policy measures outlined above, in particular loan rescheduling provisions and subsidies for imports to replace damaged equipment and raw materials.

In addition to the policy level measures outlined above, MSMEs – more affected by the earthquakes and with a lower capacity to respond as compared to larger establishments – will require targeted practical assistance, both in the immediate and longer term, to enable them to cope with losses and rebound; contribute to overall recovery and reconstruction efforts; and improve their performance and long-term resilience.

MSMEs are facing a range of challenges following the earthquakes, including:

- Damage to premises, stock and equipment, resulting in interruptions to or reduction in production;
- A short-term lack of labour due to worker absenteeism due to fear after the quakes, given the property damage, and long-term limitations on the availability of skilled workers;
- Reduced demand due to lower domestic spending and reduction in flow of tourists, resulting in reduced sales and income.

These challenges are compounded by pre-existing limitations such as the quality of human capital, both in terms of managers and workers.

The practical assistance component of the proposed strategy comprises (i) immediate support for demolition/rubble removal and restoration of working capital to the affected MSMEs, and (ii) the provision of additional needs-based support for accessing finance and markets, upgrading the technical and business management skills of entrepreneurs and their employees, and other measures as required.

While the nature and extent of damages and losses can be roughly estimated for the sector

overall as well as for specific geographical areas and sub-groups of enterprises within it, there is need for more detailed information on the structure of specific subsectors and value chains, business development service markets, and the supply and demand of labour.

The proposed strategy is thus based on preliminary analyses of these factors, which in turn will inform intervention design.

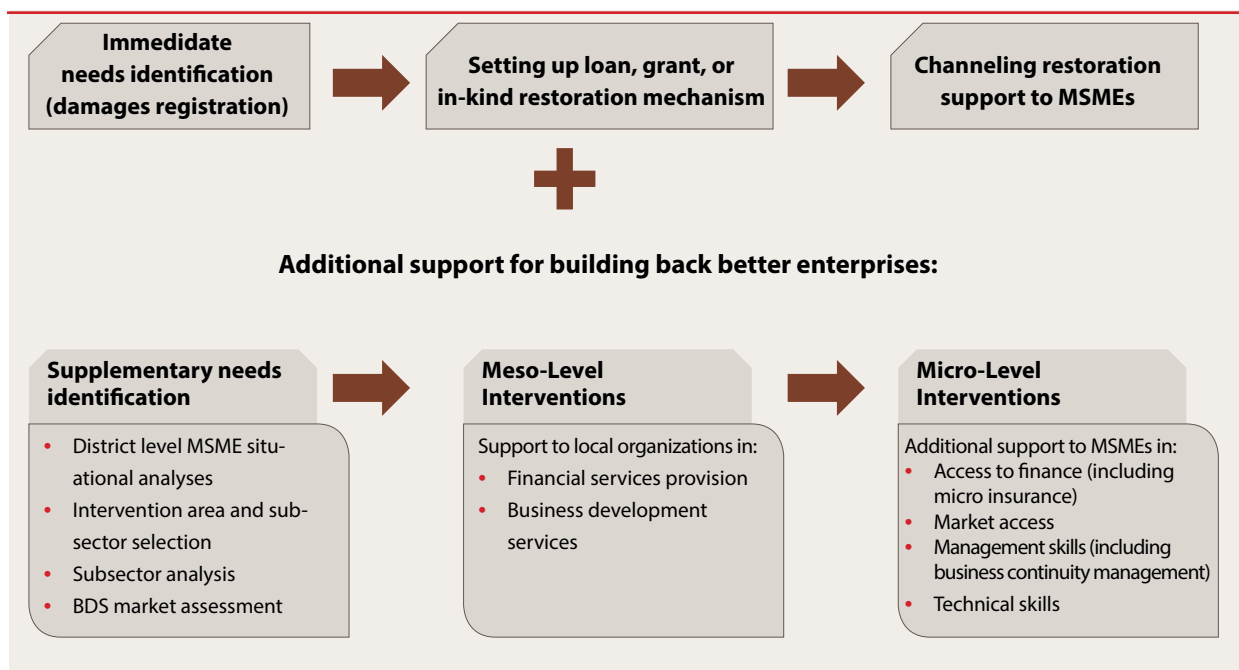
The strategy is built on the following pillars:

- Immediate support for responding to challenges arising from the earthquake for earthquake-affected MSMEs, including demolition and rubble removal from premises and restoration of working capital;
- Identification of additional needs (e.g., through area-based district level MSME studies, subsector or value chain analyses) for building back better enterprises in terms of sustainability and resilience, management capacity, working conditions, practices and productivity, and contributions to green and socially inclusive growth.
- Capacity building of service providers, such as microfinance organizations or business development service providers, to provide the required services.
- Additional service delivery by service providers to earthquake-affected MSMEs in areas such as skills upgrading (e.g., technical or managerial training, including in-business continuity management), market access (e.g., business linkages services), and financial services (e.g., micro insurance).

While districts themselves should identify their own priorities, it is recommended that they select a limited number of subsectors (building construction, for instance) or value chains to work with, based on potential impact, and focus on these. The potential of MSMEs in building construction has been harnessed in other contexts, such as in Haiti where MSMEs were supported to play a key role in post-disaster reconstruction efforts while providing much needed employment opportunities.

Special attention should be given to women, youth and returning migrant workers in the MSME sector both for the assessment of needs

**FIGURE 8.1: IMMEDIATE SUPPORT FOR DEMOLITION/RUBBLE REMOVAL AND RESTORATION OF WORKING CAPITAL**



**TABLE 8.10: SUMMARY OF RECOVERY AND RECONSTRUCTION NEEDS**

	Recovery needs (NPR million)	Reconstruction needs (NPR million)
14 Districts	6,624	17,955
31 Districts*	7,386	20,019

\*11.5% is used as a basis for extrapolation from 14 to 31 districts

and channeling financial and technical assistance. For the latter, it is proposed that at least 65 percent of the proposed budget in the strategy be allocated to activities targeting these groups.

**RECOVERY AND RECONSTRUCTION INITIATIVES AND COSTS**

Overall, recovery needs of 31 districts for commerce and industry are estimated to amount to NPR 7,386 million, while the same estimate for reconstruction needs is NPR 20,019 million.

The individual recovery and reconstruction activities proposed in the strategy, their costs, and proposed implementation timing are detailed for the 14 districts in Tables 8.11 and 8.12 for the commerce and industry sectors separately.

**Implementation Arrangements**

It is proposed that recovery and reconstruction be implemented through the following strategy:

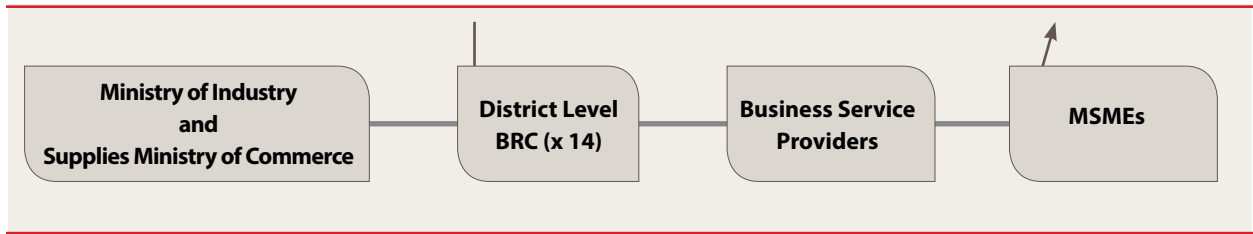
- The Ministry of Commerce and Supplies and Ministry of Industry will be responsible for overall coordination and monitoring.
- At district level, Business Recovery Centres (BRC) composed of public and private stakeholders will be set up. The BRCs will identify district-level needs and priorities; channel direct recovery assistance to earthquake-affected MSMEs through a loan, grant, or in-kind restoration mechanism; coordinate capacity building of local business development service providers; and connect MSMEs to service providers.
- Local business service providers (organizations such as district chambers of commerce, financial institutions, NGOs, or others) will be capacitated to provide additional services to earthquake-affected MSMEs based on their needs in areas such as access to finance, market access, or technical or managerial skills development.

**TABLE 8.11: RECOVERY AND RECONSTRUCTION ACTIVITIES, COSTS AND PROPOSED IMPLEMENTATION IN INDUSTRY**

	Financial Year (NPR million)					Total
	2015-16	2016-17	2017-18	2018-19	2019-20	
Recovery Needs	2,035	1,124	112	49	33	3,353
Demolition and rubble removal costs	202	50	-	-	-	252
Working capital	1,764	950	-	-	-	2,714
Additional services needs assessment (value chain analysis)	2	6	1	-	-	9
Capacity building for providers of non-financial and financial services	11	20	13	-	-	45
Delivery of additional non-financial and financial services to final beneficiaries	48	96	96	47,945	32,335	320
Establishment of institutional mechanisms for channeling support	8	2	1	1,115	1,115	13
Reconstruction	2,403	1,601	-	-	-	4,004
Reconstruction of premises and replacement of assets	2,403	1,601	-	-	-	4,004
<b>Total</b>	<b>4,438</b>	<b>2,725</b>	<b>112</b>	<b>49</b>	<b>33</b>	<b>7,357</b>

**TABLE 8.12: RECOVERY AND RECONSTRUCTION ACTIVITIES, COSTS AND PROPOSED IMPLEMENTATION IN COMMERCE**

	Financial Year (NPR million)					Total
	2015-16	2016-17	2017-18	2018-19	2019-20	
Recovery Needs	1,938	1,326	446	196	130	4,036
Demolition and rubble removal costs	216	55	-	-	-	271
Working capital	1,445	778	-	-	-	2,223
Additional services needs assessment (value chain analysis)	8	20	3	-	-	31
Capacity building for providers of non-financial and financial services	43	79	52	-	-	175
Delivery of additional non-financial and financial services to final beneficiaries	193	386	386	193	128	1,286
Establishment of institutional mechanisms for channeling support	32	8	4	3	2	50
Reconstruction	9,609	6,406	-	-	-	16,015
Reconstruction of premises and replacement of assets	9,609	6,406	-	-	-	16,015
<b>Total</b>	<b>11,547</b>	<b>7,731</b>	<b>446</b>	<b>196</b>	<b>130</b>	<b>20,051</b>

**FIGURE 8.2: RECOVERY ASSISTANCE (WORKING CAPITAL RESTORATION)**

The practical assistance component of the strategy will target the 14 affected districts as a priority, but may gradually be expanded to cover all districts.

### Assessment Methodology

The methodology used for assessing the impact of the earthquakes on the commerce and industry sectors and developing recommendations included:

- The establishment of a baseline based on documentation and secondary data obtained from the Ministry of Industry (MoI), Ministry of Commerce and Supplies (MoCS) and private sector stakeholders (Chamber of Nepalese Industries, Federation of Nepalese Chambers of Commerce and Industry, Federation of Nepal Cottage and Small Industries, local chambers of commerce and industry, and local officials).
- The calculation of post-earthquake damages and losses data based on the baselines provided from different sources, including MoI, MoCS, various departments, Central Bureau of Statistics, National Planning Commission, and others.
- A survey of four industrial estates located at Balaju, Patan, Bhaktapur and Hetauda was carried out to assess damage to structures and plants.
- Field visits to selected districts to validate quantitative data provided by sector stakeholders and to gather additional qualitative data. Field visits were conducted in Makawanpur, Chitwan and Dhading districts and consisted of interactions with district level chambers of commerce and industry, District Cottage and Small Industries Office, Industrial Area Development Management Office, District Administration Office, producers' associations and other stakeholders.
- Stakeholder meetings in Kathmandu with the relevant ministries and departments and industry associations (Chamber of Nepalese Industries, Federation of Nepalese Chambers of Commerce and Industry, Federation of Nepal Cottage and Small Industries,) to obtain qualitative overall assessments of damages and losses and their recommendations for recovery.





# 9. Tourism

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## Summary

The tourism sector has sustained significant physical damages in the affected districts but more importantly is expected to suffer major economic losses over the next two to three years as a result of the earthquakes. It is important to note that the overall impact of the earthquakes on the tourism sector goes beyond the 14 affected districts and well-known tourism destinations like Chitwan and Pokhara in terms of sharp fall in tourists. The negative repercussions of the disaster are likely to result in a reduced number of tourist arrivals over the next couple of years and reduction in tourist spend per day from \$43 to \$35 as per industry sources, which will significantly affect tourism revenue. Other nations which have experienced a similar disaster, have generally taken several years to recover fully with regard to tourist arrivals.

It is estimated that the overall impact on the Nepali tourism industry will be a reduction in tourists' arrival annually of about 40 percent, on average, over the next 12 months, and a 20 percent reduction in the following 12 to 24 months.

Despite the overall estimated damages and losses, the tourism sector remains resilient and optimistic in turning around in the medium to long term. With concerted efforts from all relevant stakeholders and support from the government, the sector is poised to build back better (BBB). However, these efforts need to target the global tourism market and convince (potential) visitors to come to Nepal, as well as provide assistance to affected rural and urban tourism entrepreneurs. The recovery strategy should be carried out in a phased manner with actionable items as suggested in this chapter.

## Pre-Disaster Context and Baseline

### IMPACT OF TOURISM ON GROSS DOMESTIC PRODUCT

The tourism sector constitutes an important

component of the Nepali economy with steadily increasing numbers of visitors till the earthquakes struck. In 2013, Nepal received nearly 800,000 tourists. While the exact contribution of tourism to the GDP is not available due to absence of tourism satellite account, the World Tourism and Travel Council (WTTC) report 2015 mentions direct contribution of 4.3 percent to GDP in 2014. Hotels and restaurants may contribute about 75 to 80 percent of the tourism sector's revenue to GDP (including domestic tourism).<sup>50</sup> With hotels and restaurants contributing about 1.9 percent to GDP in 2012, international tourism contributed about two percent to GDP. This is more or less similar to estimates of other developing countries.

However, domestic tourism is not accounted for and no national survey to understand its contribution had been carried out so far. Aggregating the contribution of domestic tourism and that of other subsectors, which are not accounted for, to the tourism sector, total contribution of hotels and restaurants to GDP according to the World Tourism and Travel Council (WTTC) 2015 report was 8.9 percent in 2014.

### EMPLOYMENT GENERATION

The Tourism Employment Survey, 2014 of the Ministry of Culture, Tourism & Civil Aviation (MoCTCA) indicates that approximately 138,148 persons were engaged in the tourism sector.<sup>51</sup> Based on the National Living Standards Survey (NLSS) 2011, more women than men are engaged in the tourism sector. Analysis of the hotel and restaurant survey indicates that 52 percent of the people employed in this sector are women. The WTTC 2015 report, based on pre-earthquake data, indicates that in 2014 travel and tourism in Nepal directly supported 487,500 jobs (3.5 percent of total employment). The number of jobs was expected to rise by 4 percent in 2015 and by 3 percent per annum to 681,000 jobs in 2025. Following the earthquakes, these numbers will need to be revisited.

<sup>50</sup> Central Bureau of Statistics (CBS) estimates

<sup>51</sup> There is a caveat that the survey findings were based on only 10 districts and some 193 enterprises and therefore the estimate is associated with some uncertainty.



**TABLE 9.1: FOREIGN EXCHANGE EARNINGS FROM TOURISM (2001-2001 TO 2013-2013)**

Year	Total foreign exchange earnings from tourism (million npr)	As % of total value of merchandise exports	As % of total value of exports of goods and non-factor services	As % of total foreign exchange earnings	As % of GDP
2000-01	11,717	16.8	11.8	5.7	2.7
2001-02	8,654	14.9	10.6	4.8	1.9
2002-03	11,748	23.1	15.2	6.1	2.4
2003-04	18,147	32.9	20.3	8.0	3.4
2004-05	10,464	17.5	12.2	4.7	1.8
2005-06	9,556	15.5	10.9	3.6	1.5
2006-07	10,125	16.5	10.8	3.7	1.4
2007-08	18,653	30.1	17.9	5.5	2.3
2008-09	27,960	40.0	22.8	6.5	2.8
2009-10	28,139	44.5	24.6	8.1	2.4
2010-11	24,611	35.8	20.2	5.0	1.8
2011-12	30,704	37.7	20.0	4.8	2.0
2012-13	34,211	39.8	18.9	4.7	2.0

Source: Nepal Rastra Bank, 2013

**TABLE 9.2: SOME INDICATORS ON THE TOURISM SECTOR'S CONTRIBUTION TO THE GOVERNMENT'S FISCAL REVENUE**

Year	2010	2011	2012
Indirect tax (million NPR)	2,221.4	2,551.9	
Internal commodity tax revenue collection (million NPR)			
VAT (tourism services)			1,057.4
Administrative fees (immigration and tourism)			5,481.9
Non-tax revenue	1,928.5	2,059.2	
Visa fees	1,221.9	1,268.8	1,781.9
Mountain trekking fees	343.5	366.9	508.8
Pollution control fees	363.1	423.5	
Other tourism fees			2.1
Corporate and other taxes	NA	NA	NA
<b>Total (Excluding corporate and other taxes)</b>	<b>4,149.9</b>	<b>4,651.1</b>	<b>8,832.1</b>

Source: Data extracted from Financial Comptroller's Annual Report of the respective years

Note: In Nepal, tax contribution to fiscal revenue of the government from tourism consists of the following:

- Airport taxes, fees and levies
- Hotel, restaurant, tour and travel agency, car rental and nightclub registration/licensing fees
- Corporate and personal income taxes
- Import duties on imported items used in tourism
- Taxes on local inputs to the tourism sector
- Entertainment tax (tourist expenditure taxes in hotels, restaurants, etc.)
- Entry fees to tourist attractions –parks and reserves, cultural and heritage sites
- Trekking, expedition and climbing peaks levies
- Municipal, local level taxes including property taxes and copyright fees

**FOREIGN EXCHANGE EARNINGS FROM TOURISM**

At the macroeconomic level, tourism is the third largest economic sector for foreign exchange earnings after remittances and export of goods and services. Currently, revenue from tourism accounts for about 40 percent of the contribution of merchandise export, 19 percent of the total value of goods and non-factor services, 4.7 percent of total foreign exchange earnings and about 2.0 percent of GDP.

**FISCAL ASPECTS OF TOURISM**

In 2012, the directly visible government revenue from the sector was NPR 8,832 million (Table 9.2), and represented about 3.6 percent of total government revenue. This, however, excludes direct corporate and various other taxes, which the tourism sector pays through industries.

**TOURISM ESTABLISHMENTS IN NEPAL**

The majority of registered hotels are located in the two main tourist hubs of the country – Kathmandu and Pokhara. Hotels range from tourist standard to five star accommodation in these locations (Table 9.3). There are 160 registered homestays around Nepal but a significant number of homestays are not yet registered with the government. The total number of non-MoCTCA registered properties was 2,604, which provided 35,789 tourist rooms and 69,040 tourist beds in the 15 major and five minor tourism sites.<sup>52</sup> Most of these additional lodgings are homestays, teahouse lodges and monastery accommodations.

The tourism statistics for 2013 show 2,336 registered travel agencies and tour operators, 1,665 trekking agencies and 56 rafting agencies (Table 9.4).

**TOURISM TRENDS**

Annual tourist arrivals to Nepal have a typical seasonality with arrivals peaking during the summer (March to May) and winter (September to November). Arrivals range from around 80,000 to 90,000 visitors in March, October and November to around 50,000 in May, June and July. The growth of tourists from China has contracted the tourism off-season in Nepal, with arrivals from China during the lean season filling the gaps from the long-haul markets of North America and Western Europe and other short-haul markets like India.

The two main volume markets, India and China, have shown encouraging trends in arrivals to Nepal. In the past five years, the average annual growth rate of Chinese and Indian visitors has been 26 percent and 14 percent respectively. The growth from the rest of the world has been about 8 percent a year. As share of visitors from India and China accounts for about 36 percent, the overall growth in tourist arrivals has been pulled up to 10 percent a year over the past five years.

**Global Comparison**

With total tourism receipts of NPR 42,900 million in 2013, Nepal ranks 23<sup>rd</sup> among Asia and Pacific tourism economies.<sup>53</sup> Nepal's tourism yield appears low in comparison with most global and Asian destinations. In comparison with other regions and countries in Asia:

- Nepal attracts 0.1 percent of global international visitors and 5.7 percent of arrivals to South Asia.
- International visitors' receipts per arrival in 2013 was NPR 53,800, which is less than half the global average, a third of Bhutan

**TABLE 9.3: REGISTERED HOTEL ACCOMMODATION IN NEPAL BY CATEGORY AND CAPACITY, 2013**

Hotel standard	Number	No. of rooms	No. of beds
Five star	10	1,818	3,461
Four star	2	190	362
Three star	27	796	1,707
Two star	35	1,513	3,096
One star	31	964	2,374
Tourist standard	625	9,985	23,382
<b>Total</b>	<b>730</b>	<b>15,266</b>	<b>34,382</b>

Source: Ministry of Culture, Tourism & Civil Aviation, Tourism Industry Division, 2070 B.S.

<sup>52</sup> Nepal Tourism Board (NTB), 2011, Tourist Accommodation Facilities in the Major Tourist Areas of Nepal

<sup>53</sup> UNWTO, 2013, World Tourism Barometer, Volume 12, April 2013, Annexure



and Thailand, and around a quarter of the receipts per arrival in India. As per MoCTCA figures for 2013, a total of 10.42 million tourist days were spent resulting in an average length of stay of 12.51 nights per tourist. This leads to a daily spend per visitor of only NPR 4,280.

## Post-Disaster Context

### DISASTER EFFECTS

The immediate damages and losses on the tourism sector as a result of the earthquakes are:

- Tourist numbers are down by about 90 percent between May and July 2015.
- About NPR 16 billion worth of hotel properties are fully or partially damaged in the affected areas.
- Domestic airline operators reported total monthly income losses of about NPR 400 million for the month following the earthquake.
- Tourist accommodations of different types were either fully or partially damaged in the Langtang, Gorkha-Manaslu, Khumbu, Charikot, Kalinchok, Jiri and Rolwaling areas and in Dhanding district. A few hotels in the Kathmandu Valley (including Nagarkot) were completely damaged with a majority having minor cracks.
- A portion of key tourism monuments

and heritage attractions have been reduced to rubble.

- Portions of tourism infrastructure have been destroyed, e.g., 150 kilometers of trekking trails have significant damage and 200 kilometers require maintenance and repair, which also impedes access to rural areas.
- A further implication is on jobs that the sector has provided to the country over the years and revenue losses.
- Recovering and rebuilding destinations and visitors' confidence stands at billions of Nepali rupees.

### EFFECTS ON INFRASTRUCTURE AND ASSETS

The tourism sector has sustained damages of approximately NPR 18,862.8 million, majority of which (86 percent) comes from hotel accommodations and homestays (9 percent). Trails in the current form have sustained damages of about NPR 426.1 million.

### EFFECTS ON PRODUCTION OF GOODS AND SERVICES AND ACCESS TO SERVICES

The decreased tourism arrivals will affect tourist spending and subsequently lead to a revenue loss of NPR 21,300 million between May and December 2015. This is estimated to decrease by about half (to NPR 12,800 million) in the next six-month period. Similarly, there are losses to revenue streams like

**TABLE 9.4: OTHER TOURISM RELATED FIRMS AND SERVICE PROVIDERS**

Subsector	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tourist guides	1,900	2,001	2,071	2,149	2,202	2,271	2,343	2,458	2,548	2,661	2,835	2,935	3102
Trekking guides	2,745	3,094	3,457	3,930	4,395	4,663	5,098	5,356	5,987	6,747	7,303	8,163	9076
River guides										24	44	58	115
Tourist police								52	52	50	53	60	227
Paragliding company											16	21	21
Ultra-light Company											1	3	3
Skydiving											2	2	2
Domestic Airlines											17	15	15
International airlines											29	28	29
Domestic airport											54	54	54

Source: Ministry of Culture, Tourism & Civil Aviation; Civil Aviation Authority of Nepal, 2013

permit fees (national parks), tourist service fees (Nepal Tourism Board), taxation revenue (to the government), etc. (Table 9.6).

#### EFFECTS ON GOVERNANCE FUNCTIONS AND SYSTEMS

The decline in public sector revenue flows from tourism will affect the promotion, maintenance and upkeep of the tourism sector. There will be increased costs to respond to market slackness both to Nepal Tourism Board (NTB) and for the industry as a whole. The NPR 400 million annual marketing spend of NTB under normal situations and the approximate NPR 1,800 million aggregated total marketing and promotion spend of the private sector may have to be increased multiple-fold to recover and revive the market.

The information provision function at the regional and district levels will require strengthening through well-managed information centres to provide up-to-date information to tourists related to weather or information on trekking trails. Some of these functions can be carried out jointly with the private sector.

#### INCREASED RISKS AND VULNERABILITIES

After the earthquakes, Nepal must now be prepared for secondary disasters like rockfall, slope failures, glacial lake outburst floods and avalanches, particularly during the coming monsoon season. Safety has now surfaced as a critical issue; hazards may arise from visitors to monuments/buildings at heritage sites.

There is an increased need to invest in an early warning system to ensure safe tourist experiences for all market segments. This will mean additional costs over and above the calculated reconstruction costs.

#### GENERAL OBSERVATIONS ON RISKS TO TOURISM IN NEPAL

- Mountain tourism is in general more vulnerable to calamities due to geophysical challenges, weather conditions, climate change and inappropriate human behavior. Mitigating measures to date have been based on enterprise and industry practices and guided by the experience and skills of the trekking and tourism industry.
- No inventory/assessment/classification of

trekking routes exists to date. Trail sections are declared insecure based on assessments by trekking companies and individual companies make their own assessment of use.

- The protected area system in Nepal (national parks and conservation areas) do not have an inventory system in place that assesses the safety of their areas with respect to natural disasters.
- Mountain communities and residents relying on tourism are particularly at risk. As residents they are exposed to the general increased risk of landslides, rockfall, floods, etc. associated with mountain settings. As employees and entrepreneurs they are exposed to the dangers of trekking and mountaineering and as families they are highly vulnerable to changes in visitor numbers and travel patterns that directly affect their incomes. If no alternative income sources are available to the households, their condition is likely to become severe in the near future.
- A clear and present risk is the sustained loss of income due to the absence of visitors in the aftermath of the earthquakes. This risk is not limited to actual earthquake-affected areas but to the whole of Nepal.
- The capital value of tourism in Nepal is found in the accommodation and transport sectors. Physical damage to hotels, lodges and resorts

**TABLE 9.5: DAMAGES AND LOSSES TO THE TOURISM SECTOR**

Particulars	Million NPR
Hotels, other accommodations (Source: DoT/HAN/TAAN)	16,294.5
Homestays (Report under housing sector)	1,720.0
Eco-Lodges in conservation Areas (Source: NTNC)	415.3
Trekking trails (Source: TAAN)	426.1
Tour operators (Source: NATO)	6.9
<b>Total</b>	<b>24,573.70</b>

Particulars	Million NPR
Hotels, other accommodations (Source: DoT/HAN/TAAN)	16,294.5
Homestays (Report under housing sector)	1,720.0
Eco-lodges in conservation areas (Source: NTNC)	415.3
Trekking trails (Source: TAAN)	426.1
Tour operators (Source: NATO)	6.9
<b>Total</b>	<b>18,862.81</b>

incurs high financial costs compounded by the loss of income due to the absence of guests. Existing loans are in danger of defaulting in the absence of sufficient income, making (re) financing of repairs and retrofitting difficult. Staff lay-offs are expected, combined with increased labour migration to other Asian countries and the Gulf States. More women than men, however, are likely to be laid off first but have limited options (such as migration) for alternative livelihoods.

#### DEMAND SIDE

The arrivals numbers to Nepal have drastically declined by 90 percent compared to May 2014. It is expected that this downturn will remain for the next couple of months. The industry expects visitor numbers to be 40 percent lower in the fiscal year 2015-2016 following the earthquake compared to 2014-2015. Whilst new travel insurance products are widely available, the majority exclude claims made where a government has advised against travel to Nepal and/or claims directly or indirectly relating to the reason the government advised against travel to that country, i.e., claims related to the earthquakes.

The Foreign and Commonwealth Office (FCO), Government of UK communication advising visitors to remain in Nepal only if absolutely essential is seen as a major constraint for adventure travel insurance providers. There are other travel advisories from other countries as well. It is unlikely that this will change during the monsoon season which influences the 'booking' for upcoming peak season September to November severely.

The tourism sector has sustained damages to assets worth NPR 18,862.8 million (full destruction damages of NPR 5,053.5 million and NPR 13,809.3 million of partial damages), which includes hotel and restaurant facilities and furniture, homestays, eco-lodges, trails, etc. Home-

stay physical damage is reported in the housing chapter. However, it is worth noting that 57 percent of all homestays are owned by women and as such damages in this subsector are likely to affect women more adversely.

Physical damages for the hotel subsector could not be calculated as the data on damages to rooms and beds was not available from the districts.

A total of NPR 62.4 billion of revenue losses is estimated due to a combination of destruction and non-availability of tourism facilities and the drastic decline in foreign tourist arrivals post the disaster. The revenue losses result from losses in tourism revenues, air transport revenues, tour operator revenues, trekking revenues and restaurant revenues. The losses in revenue will cascade for several years starting from May 2015 till June 2017. Losses will stop when all destroyed assets have been rebuilt and when the number of foreign tourists recovers to normal levels.

#### IMPACTS OF THE DISASTER

It is important to note that the overall impact of the earthquakes on the tourism sector goes beyond the 14 most-affected districts. The negative repercussions of the disaster are likely to mean a reduced number of tourist arrivals over the next two to three years and reduction in spend per day to about NPR 3,500 from NPR 4,300.<sup>54</sup> Other nations that have experienced a similar disaster have generally taken several years to recover fully with regard to tourist arrivals.

It is estimated that the overall impact on the Nepali tourism industry will be a reduction of tourists' arrival annually of about 40 percent, on average, over the next 12 months and a 20 percent reduction in the following 12 to 24 months.

However, the impact on tourist arrivals is not expected to be uniform across the three market

**TABLE 9.6: IMPACT ON TOURISM SUBSECTOR REVENUES**

Subsector	May-Dec 2015 (NPR million)	Jan-Jun 2016 (NPR million)	Jul 2016-Jun 2017 (NPR million)
Domestic airlines loss of revenue (Source: AOAN)	2,000.0	1,280.0	1,440.0
Revenue losses – Tour operators	1,851.7	1,228.9	1,843.4
Income losses – Trekking	5,711.3	0.0	0.0
Income losses – Restaurants in Kathmandu alone	11.1	0.0	0.0

<sup>54</sup> Source: NATO

**TABLE 9.7: SUMMARY TABLE OF ESTIMATES OF DAMAGES AND LOSSES**

	Value of damages (NPR million)	Value of total flow changes (NPR million)	Time distribution of revenue losses	
			2015-16 (NPR million)	2016-17 (NPR million)
<b>Damages</b>	<b>18,862.77</b>			
Hotels and others	16,294.5			
Homestays	1,720.0			
Eco-lodges	415.3			
Trekking trails	426.1			
Tour operators	6.9			
<b>Changes in flows</b>		<b>62,379.32</b>	<b>40,477.69</b>	<b>16,179.36</b>
Tourism revenues		47,013.0	34,117.1	12,896.0
Air transport revenues		4,720.0	3,280.0	1,440.0
Homestay		495.3		
Tour operator revenues		4,924.0	3,080.6	1,843.4
Trekking revenues		5,711.3	Not estimated	Not estimated
Restaurant revenues		11.1	Not estimated	Not estimated
Promotion campaign costs		5,250	2,730.0	2,520
Cost of demolition and rubble removal		3,772.56	3,018.1	754.5

segments. High-end cultural/leisure tourism is likely to suffer relatively more than the other segments. At least 55 to 60 percent reduction in number of groups over the next 12 months is expected. As only minor damage has been reported from Chitwan and the tourism infrastructure in Lumbini has not been affected at all, it is expected that religious tourism to Lumbini will recover in 12 months. For trekking, visitors in the higher end segment are more likely to cancel their visits and the impact is expected to be a 70 percent reduction over a 12 month period. The number of lower-end trekking groups is expected to recover quickly, with an estimated reduction of 20 percent over a 12 month period.

Trekking Association of Nepal reports that 40,000 employees (guides, porters, cooks, etc.) engaged in the trekking subsector (combining all the major trekking destinations) have no jobs between May and July 2015 and were sent home. Similarly Nepal's Tour Guides Association has reported that 228 tour guides are no longer employed as a result of the earthquakes as there are hardly any tourists to take around in Durbar Square in Kathmandu, Bhaktapur and Patan. Restaurants in Kathmandu reported a total of 335 contractual workers who lost their jobs. Taking into account that the tourism sec-

tor employs more women than men, it can also be assumed that more women have lost jobs than men, particularly when one considers that women occupy less skilled jobs such as house-keeping which can be easily taken over by men.

A sustained absence of visitors from highly-affected areas (due to destroyed infrastructure, enterprises and geophysical dangers) is likely to lead to a (permanent) relocation of residents to other areas, resulting in their livelihoods getting disconnected from their place of origin.

### Recovery Needs and Strategy

The Disaster Risk Reduction (DRR) and recovery process of the tourism sector is modelled on the following needs which have been identified:

- Cost of demolition and rubble removal
- Cost of promotion campaign abroad to attract tourists
- Rescheduling of previous loans to hotel and restaurant owners
- Temporary tax holidays, perhaps over one year

As for reconstruction needs, the total amount required for reconstruction is NPR 22.6 billion

Total promotion costs includes two elements: (i) the estimated regular annual budget for pro-



motion allocated by the Government of Nepal through Nepal Tourism Board, which is assumed to remain the same as 2014, and (ii) the total cost of promotion by the tourism industry as a whole through sales calls, web marketing, print marketing, e-newsletters, sales missions, roadshows/trade shows, and other media which is roughly at least five times higher than the government's annual budget (using historical data).

### Implementation Arrangements

The earthquakes are likely to have a sustained negative impact on the tourism sector in Nepal and the wider economy, and mountain livelihoods unless a number of mitigating initiatives are pursued. These efforts need to target the global tourism market and convince (potential) visitors to come to Nepal as well as provide assistance to the affected rural and urban tourism entrepreneurs. The recovery strategy has four distinct phases: [1] identify and assess unaffected and safe destinations and enterprises where tourism can start quickly; [2] create a **Safe Trekking System** for mountain tourism in Nepal, [3] rebuild and redevelop damaged areas and enterprises following improved guidelines and regulations as per the new Safe Trekking System and [4] identify and develop new tourist products and services. Some of these phases can be sequential or run in parallel depending on needs.

#### PHASE 1: SHORT-TERM ARRANGEMENTS

Conduct a rapid post-earthquake assessment of Annapurna and Khumbu (Everest) regions through a specialized ATC-20 audit (earthquake damage assessment) to prove the safety of these areas and enable visitors to return (to selected areas). Accommodation establishments in rural and urban areas should obtain a similar assessment certificate enabling them to be used by visitors. Package tours to unaffected areas can be offered.

An appropriate marketing and promotion plan for the upcoming peak season (September-November 2015) should be created with all stakeholders. A special effort should be made to attract visitors from India, which is close and forms a resilient market driven by pilgrimage and religious objectives. Cultural heritage sites assessed as safe should be opened for visitors in Kathmandu Valley.

Immediate relief through soft loans and loan restructuring is a need for the tourism industry (in particular hotels and restaurants) to recover. More details are reported in the financial sector chapter.

#### PHASE 2: CREATE A SAFE TREKKING SYSTEM

Standards are to be formulated for all elements of a Safe Trekking System, including communication coverage throughout the areas/trails, a monitoring system that captures movement of visitors and staff along a trail, rescue procedures and management, shelter provision at each daily section of a trail, enterprises built and operating according to safety standards and infrastructure, and resources built and operated according to safety standards. These improved products should be supported by an appropriate management system that provides a grading system for trails and climbs, promotes trails and climbs, incorporates a revenue collection system able to cover the costs of safety monitoring and management, maintenance of trails as per management plan, investment in infrastructure upkeep and expansion, and staff skills and training.

#### PHASE 3: REBUILD AND REDEVELOP DAMAGED AREAS AND ENTERPRISES

Assess and design financial and technical relief packages (e.g., credit lines and 'soft loans' through local commercial banks) for hotels, restaurants and other tourism enterprises for reconstruction and rebuilding with earthquake-resistant technologies and according to the Safe Trekking System guidelines (where applicable) to enable accommodation facilities to sustain at a basic operational level. The financial relief package requires more detailed discussion with Nepal Rastra Bank and Nepal Bankers Association when being formulated. In order to assist tourism enterprises to revive their business, the government could come up with training schemes/interventions for newly recruited workforce, as many of the old workers have left for their home districts. Attention should also be paid to women who own hospitality establishments, especially homestays, who may find it difficult to recover quickly due to limited access to financial resources.

Selected trekking areas are to be rehabilitated and the option to open areas for trekking which have earlier been restricted, such as Upper Mustang, should be assessed as this would both generate attention and also entice trekkers to return. To-

PDNA Sector	Questions	Indicators	Indicative recommendations to address DRR for recovery of the sector
	What safety is requested & required by visitors?	<ul style="list-style-type: none"> <li>• Travel insurance cover for Nepal</li> <li>• Liability insurance cover for tour companies in/to Nepal</li> <li>• Foreign travel advice to Nepal by source market</li> <li>• # visitors asking for safety schemes</li> </ul>	<p>Travel insurance and liability insurance underwriter's guidelines for Nepal</p> <p>Travel advice criteria for Nepal in source countries</p>
	How can safety for tourists against natural disasters be provided?	<ul style="list-style-type: none"> <li>• Certified enterprises (accommodation, museum, shops, information centres)</li> <li>• Certified infrastructure (pathways, bridges, signage, drinking water stations, shelters, viewpoints, high-pass crossings)</li> <li>• Communications system covering the complete destination area/trekking route</li> <li>• Visitor monitoring system in place for the destination areas</li> <li>• Rescue services operational in the destination area</li> <li>• # of appropriate shelters and location of shelters</li> <li>• Classification of the geophysical attributes of a destination area/trail in terms of its safety (high, medium, low risk) with seasonal adaptation</li> </ul>	<p>Creation of the Nepal <b>Safe Trekking System</b> comprising standards and regulations at two levels:</p> <ul style="list-style-type: none"> <li>• [1] Product Level</li> <li>• Communication</li> <li>• Monitoring</li> <li>• Rescue</li> <li>• Shelter</li> <li>• Enterprise</li> <li>• Infrastructure &amp; resources</li> <li>• [2] Management Level</li> <li>• Grading</li> <li>• Promotion</li> <li>• Revenue collection</li> <li>• Maintenance of trails</li> <li>• Investment in infrastructure</li> <li>• Staff skills and roles</li> </ul> <p>Formulation of appropriate criteria and regulation for each of the Safe Trekking System categories</p>
	Do tourist facilities consider appropriate building codes and by-laws and policies and are there plans in place by the government for safe construction?	<ul style="list-style-type: none"> <li>• # Enterprises that are built and operate according to appropriate codes</li> <li>• # appropriate building guidelines that are used and which are location specific</li> <li>• % tourist facilities for which measures have been taken to enable them to withstand expected hazards</li> <li>• % enforcing existing policies, standards and guidelines regarding safe construction, including risk assessment during site selection and hazard-resistant building designs</li> </ul>	<p>Formulation of tourism safety standards per type of enterprise and location, incorporating climate adaptation/resilience guidelines for mountain areas</p> <p>Management capacity and mandate at district or protected area levels to inspect and assess building regulation</p> <p>Grading system to be created for enterprises to incorporate safety aspects</p> <p>Implementation of the <b>Safe Trekking System</b></p>
	Do tourists and tourism staff have access to forecasts and warnings to common hazards (floods, landslides, avalanches etc.)?	<ul style="list-style-type: none"> <li>• % of tourism areas where forecasts/warning information is made available to tourists</li> <li>• % of communication coverage across destination areas</li> </ul>	<p>Creation of an early warning system and communication system</p> <p>Implementation of the <b>Safe Trekking System</b></p>
	Are there disaster preparedness systems and other protective and safety measures for tourism? Are there appropriate policies and plans in place by the government for responding to emergencies, preparedness and long-term resilience of the sector?	<ul style="list-style-type: none"> <li>• % sites and areas with facilities for emergency communication of warnings/forecasts and arrival tracking/monitoring</li> <li>• #appropriate operational plans for national parks &amp; conservation areas</li> <li>• # appropriate operational visitor management plans for heritage sites</li> <li>• #staff trained and certified in appropriate behaviour in mountain environments</li> <li>• % of hotels/tourist facilities with disaster preparedness plans in place based on risk assessments, including business continuity plans</li> </ul>	<p>Formulation of business plans and visitor management plans</p> <p>Creation of certified training course on appropriate mountain tourism behaviour and conducting of training</p> <p>Creation of a template for a disaster preparedness plan and business continuity plan</p> <p>Assessment of insurance appropriateness and possible enhancement measures</p> <p>Implementation of the <b>Safe Trekking System</b></p>
	What is tourism doing in terms of worker safety and insurance?	<ul style="list-style-type: none"> <li>• % of workers insured</li> <li>• Employment standard available</li> <li>• # enterprises following employment standards</li> </ul>	<p>Assessment and adaptation of insurance scheme</p> <p>Formulation of employment standards</p>

gether with communities and local operators, a selection of small-scale repair/recovery projects that can be developed quickly should be drawn up. Donations can be channeled into this area. All reconstruction will follow a labour intensive approach and work guarantee scheme. In close cooperation and collaboration with relevant organizations like UNESCO, repair and rebuilding of priority heritage sites of cultural importance is to be undertaken to allow income-generating tourism usage.

As part of the national rebuilding effort, the recently completed National Tourism Strategy Plan (NTSP) with a 10 year horizon and a detailed five year action plan is to be re-examined in the light of the earthquakes and their aftermath to identify new challenges and re-prioritize important tasks so that the tourism industry recovers quickly.

Finally, there is a need to rebuild and re-brand the image of tourism in Nepal, including announcement of 2017 or 2018 as ‘Visit Nepal Year’, as-

suming that reconstruction and rebuilding will be completed by then. Hence, significant effort and resources and coordination among key stakeholders are required to ensure that foreign tourists perceive Nepal as a safe destination.

### Assessment Methodology

To assess the damage to infrastructure and physical assets, the team consulted government counterparts led by MoCTCA and sought active support from the Department of Tourism and the NTB. Other agencies who supported with information include Department of National Parks and Wildlife Conservation (DNPWC) and Nepal Trust for Nature and Conservation (NTNC).

The key source of information on damages and losses were the private sector business associations such as the Hotel Association of Nepal (HAN), Trekking Agencies’ Association of Nepal (TAAN), Nepal Mountaineering Association (NMA), Nepal Association of Tour Operators (NATO), Nepal Association of Tour and Travel

**TABLE 9.8: SUMMARY OF RECOVERY NEEDS**

	Financial year (NPR million)		Total
	2015-16	2016-17	
Recovery needs	10,866	5,209	16,075
Demolition and rubble removal	3,018	755	3,773
Promotion campaign costs	2,730	2,520	5,250
Loan rescheduling	5,118	1,934	7,052
Reconstruction	18,571	4,064	22,635
Hotels	15,643	3,911	19,553
Homestays	2,064	-	2,064
Eco-Lodges in conservation areas	498	-	498
Trekking trails	358	153	511
Tour operators Office	8	-	8
<b>Total</b>	<b>29,437</b>	<b>9,273</b>	<b>38,710</b>

**TABLE 9.9: PROPOSED SHORT-TERM ACTIVITIES FOR TOURISM SECTOR RECOVERY**

Activity	Cost	Coverage	Duration
<b>Safety assessment</b>			
ATC-20 audit for Annapurna and Khumbu	TBD	Samarth-NMDP & WBG	July 2015
Safety audit for enterprises	TBD	TBD/Industry associations	
<b>Communication</b>			
Travel advisory adjustment	TBD	Samarth-NMDP	September 2015
Tour operator buy-in from source markets	TBD	NATO	July & August 2015
Special Indian market promotion	TBD	NTB	July & August 2015

**TABLE 9.10: PROPOSED ACTIVITIES FOR SAFE TREKKING AND TRAILS RECONSTRUCTION**

Activity	Cost	Coverage	Duration
Creation of a Nepal Safe Trekking System			
Design of standards and criteria for product	TBD	Samarth-NMDP	October 2015
Reconstruction, repair of trekking trails	TBD	ILO, WBG, WFP, TAAN, NMA	

Agents (NATTA), Tour Guide Association of Nepal (TURGAN) and others. The assessment was based on the number of physical assets damaged and the estimates provided by these organisations.

In order to estimate the impact on overall revenues, the team calculated the normal or pre-disaster revenue forecast and the post-disaster revenue forecast; the difference of the two gave the estimated post-disaster losses. The following calculations were used to arrive at the figures:

*Revenue forecast = Arrival of tourists \* Average tourist expenditure/visit*

The normal average tourist expenditure/visit was calculated as follows, where the estimates were based on the National Tourism Strategy Plan, 2015-2024:

*Average length stay (days) \* Average spend per day*

For homestay, it is assumed that total revenue losses will be around NPR 495 million, assuming a loss of NPR 1,000 per night for a total of six months.

The normal arrival of tourists for May-December 2015, January to June 2016 and July 2016 to June 2017 was calculated assuming a 1 percent increase on the 2014 arrival data, which was made available by the Department of Tourism.

The post-disaster arrival of tourists for May-July 2015 has been estimated at 10 per cent of normal arrivals; for August to December 2015 at 40 percent of normal arrivals; for January to June 2016 at 60 percent, and for July 2016 to June 2017 at 80 percent. From July 2017 onwards it is assumed that the numbers will reach pre-earthquake arrivals.

Average length of stay is estimated at 67 percent, 75 percent and 92 percent of normal average for May to December 2015, January to June 2016 and July 2016 to June 2017 respectively.

Post-disaster average spend per day is estimated at 82 percent, 89 percent and 93 percent of normal average spend for May to December 2015, Jan to June 2016 and July 2016 to June 2017 respectively.

The Recovery Needs Estimation includes the total annual expenditure of promotion campaigns (comprising both government and private sector contributions) and the working capital (line of credit) requirements. Rescheduling of previous loans to hotel and restaurant owners are roughly estimated at 25 percent of revenue losses. Cost of demolition and rubble removal has been calculated at 20 percent of the cost of destroyed buildings.

The Reconstruction Needs Estimation includes the need for tourist accommodations including hotels, homestays, lodges in conservation areas, trekking trails, physical assets of tour operators, reconstruction, rebuilding and retrofitting. These have been estimated at 1.2 times of the damage estimation under the build back better concept.

#### RECOVERY NEEDS ASSUMPTIONS:

- Cost of demolition and rubble removal (20 percent of the cost of destroyed buildings based on similar cases elsewhere in the world)
- Rescheduling of previous loans to hotel and restaurant owners, which are roughly estimated at 25 percent of revenue losses (on the basis of informal consultations with selected tourism sector representatives)
- Temporary tax holidays, perhaps over one year, was a requirement expressed by hotel and restaurant owners interviewed

#### RECONSTRUCTION ASSUMPTION:

Cost of reconstruction using disaster-resilient standards (i.e., 20 percent above value of damage).





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# 10. Financial Sector

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## Summary

The earthquakes exacerbate Nepal's already complex financial sector challenges. In the years prior to the earthquakes, successes have been achieved in expanding the reach of the financial system, in restructuring state-controlled financial institutions and improving legal frameworks. Nonetheless, a significant proportion of the population lacks access to financial services, and the banking sector remains exposed to several vulnerabilities, including concerns over asset quality. The framework for financial crisis management is still in the development stage and depositor safety net is in the early stages of implementation. Work to reform the insurance sector is now underway but will not be completed for some time, and the frameworks for supervision of the largely unregulated microfinance sector are very weak.

Thanks to a decisive policy response, operational disturbances in financial infrastructure caused by the earthquakes were short-lived outside the affected areas and the overall financial sector remains sound in the aftermath of the earthquakes. This is a remarkable achievement, given the serious physical damage to Nepal Rastra Bank (NRB) premises, and the absence of a Disaster Recovery Site (DRS) and Business Continuity Plans (BCPs). Although retail electronic banking holds considerable promise for expanding access and enhancing efficiency and speed in the delivery of financial services, it has not yet reached a stage where it can substitute for damaged bank branches.

The non-banking financial sector, particularly microfinance and cooperatives, is more heavily impacted than the banking sector. Preliminary impact assessments point to a very large number of affected members. Most of the borrowers will see their income flow severely affected and lack alternative income generating activities. This could translate into liquidity and solvency pressures on the microfinance sector, impacting its capacity to assist communities in times of need.

From the preliminary estimates, it is suggested that the total damages and potential losses suffered by the banking and insurance sectors are expected to be NPR 5 billion and NPR 26.9 billion respectively.<sup>55</sup> However, it must be strongly emphasized that these estimates are based on currently available information, which is largely anecdotal and unsupported by the data needed for precision. It will take many months for the true extent of damages to the sector to become fully apparent. There are specific concerns that if the damages to financial institutions is greater than initial estimates, there is potential for de-leveraging across the sector (a 'credit crunch'), with the impact concentrated in the lower tiers of the system, affecting access to finance by poor and rural communities. The quantification of losses also does not recognize the inherent risks posed to the gains made over recent years in reforming the banking sector by post-earthquake relaxation of prudential rules, or the potential delays to the implementation of further reforms as a result of the need to address post-earthquake problems first.

## Pre-Disaster Context

### OVERVIEW OF THE FINANCIAL SYSTEM

Nepal's financial system is bank-dominated, with decreasing but significant state ownership (Table 10.1). There are four classes of NRB-regulated banks and financial institutions (BFIs) differentiated by their capital requirements and range of permissible activities. Non-bank financial institutions and capital markets are in their initial stages of development, but with very rapid growth in both numbers and share of system assets and deposits held in Savings and Credit Cooperatives (SACCOs). Together with micro-finance institutions (MFIs) and financial intermediary NGOs (FINGOs), these are the primary source of financial services for poor and rural communities.

Despite tangible advances in expanding outreach of the banking sector, important gaps in

<sup>55</sup> Potential losses could increase by 30 percent as per information being received.

the provision of financial services remain. The financial sector has been growing rapidly (driven in part by the increasing volume of remittances), with deposits, credit and number of branches and ATMs (heavily concentrated in the Kathmandu Valley and urban areas) increasing over the past few years. Deposit mobilization and credit to the private sector exceeds the South Asian average. Accessibility in general has improved: the number of BFI branches has doubled in eight years. Nonetheless, an urban-rural and gender gap persists, only partially remedied by the growth of MFIs, FINGOs and SACCOs.

#### KEY PRE-EARTHQUAKE CHALLENGES AND STRENGTHS

##### Access to Finance

Several SACCOs have become problematic in the absence of adequate supervisory and regulatory frameworks. This adversely affects the reputation of the sector and its capacity to function as a reliable first point of entry into the financial system for poorer people. Work to address the risks in the non-bank financial sector has begun, but wholesale reform of the regulatory and supervisory frameworks for SACCOs, and build-

ing the capacity of SACCOs and the regulator remains to be done.

Similarly, access to finance is a major constraint for firms, especially for small- and medium-sized enterprises (SMSEs). Administrative measures have been taken to channel funds to deprived sectors via MFIs (now representing about 4.5 percent of total BFI loans), promote the flow of credit to productive sectors, lower the intermediation cost and to address what is perceived as excessive profitability in the banking sector. Comparatively little progress has however been made in strengthening the enabling environment, with important gaps in credit reporting systems, secured transactions, creditor rights and insolvency frameworks, retail payment system development, and consumer protection and financial literacy.

At the micro level, access to formal finance by rural communities, especially women, is also a major challenge. Their lack of collateral forces them to rely on informal microcredit structures that charge exorbitant interest rates, thereby constraining their ability to grow their micro enterprises.

**TABLE 10.I: STRUCTURE OF NEPAL'S FINANCIAL SECTOR**

Financial Institution	Number	Total deposits (NPR million)	% of Total	Total loans (NPR million)	% of Total	Total assets (NPR million)	% of Total
Commercial A <sup>1</sup>	30	1,291,660	72.79	1,013,724	68.91	1,599,295	72
Development B <sup>1</sup>	81	202,679	11.42	168,676	11.47	261,271	11.76
Finance C <sup>1</sup>	51	74,893	4.22	65,694	4.47	112,488	5.06
Microfinance D <sup>1</sup>	35	13,093	0.74	44,077	3	58,433	2.63
Cooperatives–NRB <sup>2</sup>	15	15,046	0.85	14,027	0.95	21,083	0.95
Micro credit NGO <sup>2</sup>	27	4,744	0.27	10,356	0.7	14,000	0.63
Subtotal regulated by NRB	239	1,602,115	90.28	1,316,554	89.5	2,066,570	93.04
Cooperatives savings & credit <sup>3</sup>	13,368	129,000	7.27	117,147	7.96	117,200	5.28
Cooperatives multipurpose <sup>3</sup>	4,114	31,400	1.77	27,041	1.84	27,100	1.22
Subtotal	17,482	160,400	9.04	144,188	9.8	144,300	6.5
Other cooperatives <sup>3</sup>	13,695	12,100	0.68	10,305	0.7	10,331	0.47
Total cooperatives	31,177	172,500	9.72	154,493	10.5	154,631	6.96
Grand total	31,416	1,774,615	100	1,471,047	100	2,221,201	100

<sup>1</sup> As of Mid-January 2015

<sup>2</sup> As of Mid-May 2015

<sup>3</sup> As of Mid-July 2014

Progress in modernization of the payments system has been slow and consequently the use of electronic payments remains limited, reducing the efficiency, safety and reach of the payment infrastructure. A comprehensive National Payments Systems Development strategy has been developed and action plans are now being prepared, but out of 541 Village Development Committees (VDCs) in 10 most impacted districts (excluding Kathmandu, Lalitpur, Bhaktapur and Kavre), there are only 86 VDCs with some form of financial services touch points.<sup>56</sup>

#### **Excessive Number of BFIs with Low Capital Base and sub-optimal Financial Intermediation**

At face value, the Nepali banking sector appears highly profitable, reasonably well capitalized and asset quality appears good, but reported financial ratios do not necessarily reflect the true financial condition of BFIs. There are too many small BFIs with limited capital base, weak risk management systems and governance. Given these weaknesses, the financial system is vulnerable to shocks and does not adequately fulfill its purpose of intermediating resources to finance Nepal's infrastructure investment and development needs. In response, NRB has imposed a moratorium on new licenses for BFIs, promoted mergers, and in 2014 started in-depth special inspections of 54 banks. As a result, NRB has successfully identified and taken action against weaker institutions and seen improvements in the overall quality of financial reporting, while the number of BFIs has also fallen rapidly. Intermediation cost (net spread) has decreased to more acceptable levels. In parallel, NRB is working to build up and modernize its supervisory capacity, while the government is working to reform the legal framework for bank supervision and regulation and strengthen the deposit guarantee system to bolster depositor confidence and reduce liquidity risks.

#### **Banking Sector Profits are Sound**

Profits of the banking sector are considered sound with commercial banks registering profits in the second quarter of FY 2014-2015 at a record high – a total of NPR 14.4 billion in six

months compared to NPR 9.4 billion in the corresponding period of the previous year. Average ROE is estimated to be above 15 percent.

#### **Low Rate of Reported non-performing Loans**

The level of non-performing loans (NPLs) reported for the banking sector stood at around 2.7 percent of the total loan portfolio as of Q2FY15 compared to 3.1 percent reported a year ago. NPL levels have been hovering between 2.5 percent and 3.5 percent since FY10. Average NPLs for all class of banks (A, B and C) is reported to be 3.9 percent in Q1FY15 compared to 4.1 percent in Q1FY14. While NPLs are adequately covered by loan loss provisions, the special inspection report indicates under-reporting of impaired assets.

#### **Ample Liquidity in the Banking System**

The banking sector continues to have surplus liquidity despite significant growth in loan disbursement in the first two quarters of FY15. Excess liquidity is being mopped up by NRB through deposit auction and reverse repos on a periodic basis. The weighted average 91-days Treasury-bill (T-bill) as of Q2FY15 was 0.1151 percent compared to 0.47 percent a year ago. Similarly, interbank rate was 0.15 percent compared to 0.21 percent a year ago. However, interbank rates amongst other financial institutions (other than commercial banks) declined only slightly to 2.51 percent from 2.62 percent a year ago.

## **Post-Disaster Context**

### **DISASTER EFFECTS**

#### **Financial Infrastructure**

Operational disturbances in financial infrastructure caused by the earthquakes were short-lived outside the affected areas, minimizing disruptions in the availability of payment services. However, damage to the physical infrastructure of banks in the affected areas has been high, with 408 branches and 652 ATMs owned by Class A, B and C BFIs damaged. Cost of damages is estimated at about NPR 864 million. Despite this, most depositors have regained access to their accounts, which has been key in maintaining pub-

<sup>56</sup> This data is sourced from the research department of NRB. It was collected in an interaction post the earthquakes between United Nations Capital Development Fund (UNCDF) and NRB.



lic confidence in the banking system. Outside the most heavily affected areas, payment systems were quickly resumed, remittances could again be received (and are reported to have increased significantly), and domestic and international trade flows are restored. NRB has also moved quickly to relax restrictions on the ability of BFIs to open new service points and to reduce documentation requirements for earthquake victims.

The restoration of services has been a remarkable achievement, given the serious physical damage to NRB’s headquarters (including its main cash distribution facilities) and the lack of an NRB DRS, which means that its core banking systems – which lie at the centre of the domestic payments and settlement system and management of monetary and liquidity facilities – remain vulnerable to destruction by a new disaster. The cost of replacing the two damaged NRB buildings with a well-equipped modern central bank is estimated at NPR 3.1 billion.

**Banks and Financial Institutions**

Deterioration in the quality of loan portfolios of BFIs resulting from the disaster could occur as a result of earthquake damage and disruption in three main ways: (i) as a result of damage or disruption to otherwise viable businesses (e.g., hydro power and tourism), which may need to restructure their debts and will need additional finance to repair damage; (ii) damage to uninsured real estate collateral; and (iii) losses on deprived sector lending in the affected areas where borrowers are unlikely to be able to repay their loans. If the impact of these factors is significant, it would lead to de-leveraging and constricting the flow of credit needed to support reconstruction and development of the economy.

**Microfinance Sector and Access to Finance**

The livelihoods of very large numbers of low income people – who rely on microfinance services as their only source of finance for income generating activities – has been severely damaged by the earthquakes with the 14 most impacted districts accounting for 13.6 percent of the total number of people living below the poverty line. The preliminary impact assessment of damages to Class D MFIs and FINGOs estimates that 132,000 members (approximately 10 percent) of licensed MFIs have been affected (72,064 households directly affected and

53,457 livestock lost). Similarly, it is estimated that about 31 percent of FINGO members (about 155,000 people) have been impacted. Out of the total 1,049 MFI branches across the country, 156 branches (14.9 percent) have been damaged (partly and fully). Most of the affected MFIs have also lost all or some of their records. The cost of reconstruction and data recovery is expected to hamper the sustainability of MFIs and, in addition, they will be unable to operate for months.

As most of the affected borrowers do not have alternative income generating activities and sources of repayment, MFIs will face both liquidity and solvency issues, impacting their capacity to assist their communities in a time of need. The sector is especially vulnerable due to the lack of diversification of its funding, weak or non-existent IT systems, and low connectivity. Some MFIs may be susceptible to rapid loss of liquidity as members withdraw their funds to pay for immediate expenses and there are no central liquidity facilities available to supply additional funds. Little is known about the condition and portfolio composition of the 17,000 or so SACCOs, which are particularly susceptible to rapid loss of liquidity as members withdraw their funds to pay for immediate expenses. SACCOs too have no central liquidity facilities available to supply additional funds. Table 10.2 illustrates the impact on SACCOs.

**TABLE 10.2: SACCOS AFFECTED BY THE EARTHQUAKES**

Particulars	Damages
Number of affected SACCOs	502
Amount of affected loans	NPR 4.9 billion
Physical damage to the assets	NPR 622 million
Number of affected members	221,370
Number of affected households	45,178
Number of human casualties associated with SACCOs	280

The major probable financial problems which will be faced by the sector are:

- **Deterioration of asset quality:** MFIs’ portfolio will most probably be the most damaged among the financial institutions as low income people in the affected districts in rural areas lost their lives and livelihoods. The

level of NPLs will increase steeply and the Portfolio at Risk (PAR) could reach unacceptable magnitude for future sustainability of already fragile balance sheets/operations.

- **Falling liquidity leading to a contraction or cessation of lending and inability to repay deposits:** MFIs and FINGOs receive credit mostly through mandatory deprived sector lending from Class A, B and C BFIs and this borrowing is the most critical component of funding, representing about 70 percent of total resource mobilization. As MFIs and FINGOs in the affected areas are likely to default on existing loans, this source of funding is also likely to dry up. This loss of liquidity is likely to be reinforced by falling deposits as people withdraw savings to fund emergency costs. SACCOs are thought to be particularly vulnerable to liquidity risks because they lack any central funding back-up or access to borrowed funds.

#### DAMAGES AND LOSSES

Table 10.3 provides an estimate of the total damages and potential losses suffered by the banking and insurance sectors.

#### SOURCES OF DAMAGES

##### (INFRASTRUCTURE DAMAGE)

BFIs and the microfinance sector have suffered significant losses due to damage to their physical infrastructure and ATM networks in the affected areas. In addition, NRB has suffered about NPR 1.8 billion of damage to its two buildings.

Replacing these two buildings with RTGS is expected to cost an additional NPR 1.4 billion.

#### SOURCES OF POTENTIAL LOSSES

##### Losses from Deterioration in Asset Quality

Deterioration in the quality of loan portfolios of BFIs could occur as a result of earthquake damage and economic disruption in three main ways:

- As a result of damage or disruption to otherwise viable businesses (e.g., hydro power and tourism) which may need to restructure their debts and will need additional finance to repair damage. Some of these losses may be mitigated by regulatory forbearance, but this also carries considerable risk of simply storing up problems – by restructuring unviable debts – for later.
- Damage to uninsured real estate collateral. All real estate used for collateral by BFIs is required to be insured against earthquake damage – which would pass on any BFI losses due to damaged collateral to the insurance sector – but under-insurance is considered widespread, and weaknesses in credit administration at some BFIs may mean that insurance policies may not have been perfected (e.g., due to failure to secure building completion certificates) or renewed, allowing claims to be denied. A lax approach by some BFIs to requiring borrowers to renew their insurance on time has been specifically identified by insurers as a potential source of disputed claims, meaning that some coverage could be invalidated for BFIs with poor loan administration.

**TABLE 10.3: SUMMARY OF DAMAGES AND LOSSES**

Loss	NPR millions		
	Total	Public	Private
Cost of potential loan loss/ restructuring	16,542	2,812	13,730
Technical assistance required for MFIs	340	40	300
Concessions for housing reconstruction	6,808	4,539	2,269
Cost of potential liability of insurance companies	3,200	128	3,072
Total losses	26,890	7,519	19,372
Damage	Total	Public	Private
Damage to Central Bank infrastructure	3,130	3,130	0
Damage to BFI and SAACOs infrastructure	1,885	320	1,565
Total damages	5,015	3,450	1,565
Total losses and damages	31,905	10,969	20,937

- (iii) Losses on deprived sector lending in the affected areas where borrowers are unlikely to be able to repay their loans. Diagnostics are urgently needed to determine the extent of damage to BFIs' asset quality and identify where these losses will be incurred.

In the microfinance sector (particularly for FIN-GOs and SACCOs), there is less reliance on real estate – and according to the Insurance Association no insurance of real estate collateral is required – with the main threat to loan performance coming from the loss of borrowers' income as a result of the earthquakes. In specific sectors (such as manufacturing and tourism), post-earthquake labour shortages are forcing factories to stay closed and the severe decline of the tourist market is also reducing the ability of borrowers to repay and the value of the collateral underlying the loans, at least in the short term.

#### **Losses Due to the Cost of Recapitalization of Institutions**

Losses incurred by BFIs as a result of the earthquakes will result in a significant loss of system-wide capital specifically and are also likely to be unevenly distributed, with losses concentrated in smaller institutions which are either more exposed to the affected areas or which have the weakest loan administration practices and thus will see higher levels of uninsured losses. The deposit guarantee fund only contains sufficient resources to cover the liquidation of two small BFIs, and thus the government will have to step in to either cover the guaranteed deposits or, in the case of any larger BFIs, recapitalize the institution.

#### **Cost of Interest Rate Subsidy Programmes**

The NRB has announced subsidized interest rate refinancing programs (zero interest refinancing by NRB of loans to be lent on by banks at 2 percent interest per annum) for rebuilding houses. Providing this refinancing at zero interest rate entails a subsidy. However, given the unattractiveness of the terms offered, uptake of this programme is envisaged only if BFIs are adequately incentivized with an interest subsidy over the tenure of the loan.

#### **INSURANCE SECTOR LOSSES**

For the insurance sector the impact of losses is largely mitigated by the fact that around 80 percent of the liability is covered under reinsurance treaties. While the sector as a whole is thinly capitalized, the number of claims is low given the scale of the disaster (estimated by the Insurance Association at 15,000 potential claims, of which 13,000 have already been claimed), representing a maximum of NPR 16 billion of covered losses. The Insurance Association estimates that its total losses (i.e., net of reinsurance provided by foreign reinsurers) will not be more than NPR 3.2 billion, but the distribution of losses between the 16 insurance companies may be uneven, particularly if reinsurers find a basis to deny claims. Diagnostics are needed to determine if this is in fact the total amount of un-reinsured losses and the distribution of losses between insurance companies (which would determine if any company faces solvency problems).

An important question is whether insurance companies have the financial capacity to honour their commitments to reimburse claimants (net of reinsured commitments). In an adverse scenario where the amount of claims will exceed the financial capacities of insurance companies, the banking sector would be exposed in order to absorb this loss of collateral. These losses could significantly affect banks' capital, and would put additional pressure on their balance sheets.

#### **MICROFINANCE AND COOPERATIVES**

##### **Portfolio NPL/PAR**

Portfolios of MFIs will most probably be the most damaged among the financial institutions as low income families in rural areas in the affected districts lost their lives and livelihoods. The level of NPLs will increase steeply and the PAR will reach unacceptable levels for future sustainability of already fragile balance sheets/operations.

##### **Lack of Diversified Source of Funds**

Microfinance Development Banks (MFDBs) and FINGOs receive credit mostly through mandatory deprived sector lending requirements established for banks by the central bank, and as such lack diversified sources of funds. As

of mid-March 2015, the banks had an exposure to the microfinance sector of NPR 34.5 billion under deprived sector lending. MFIs receive 60 percent of their funds through such lending. If funds are reduced or no longer available due to the liquidity crisis in the financial sector, MFIs will suffer. For MFDBs, borrowing is the most critical component of financing. It covers about 70 percent of total resource mobilization. Members' savings comes next, followed by equity. If the recovery process for MFIs is slow and not supported, the crisis might further impact the banking sector given their exposure (of around 4.5 percent) to the microfinance sector.

#### **Clients Withdrawing their Savings**

Though in the balance sheets of MFIs savings are not the most important source of funding, some of them rely heavily on it. People are withdrawing their savings to cope with the disaster and they will continue withdrawing. This increases the risk of the liquidity crisis. In particular, the cooperative system could be adversely affected.

Many borrowers have seen their income streams disrupted due to the earthquakes, and many will require a loan to rebuild their livelihoods. However, the lack of a stable source of income may be grounds for credit providers not to extend loans. As a consequence, such borrowers face a Catch-22 situation. With their income stream disrupted due to the earthquakes, they need loans to recover livelihoods, but are denied the loan precisely because they have no income stream. Borrowers that do not have spare, unencumbered real estate that can be pledged to take out a new loan and whose source of income has dried up as a consequence of the earthquakes are particularly vulnerable. This is, for instance, the case for MSMEs that have pledged their only property (which often serves as their place of business) as collateral for a loan.

#### **CONTAGION OF BFIS BY LOSSES IN THE MICRO-FINANCE SECTOR**

Deprived sector lending by BFIs to MFIs (4.5 percent of total loans) will result in substantial losses for Class A, B and C banks, which have lent to MFIs within the affected areas. The contagion could spread from an expected high rate of default to MFIs by borrowers who have lost

their livelihoods; the MFIs will then be unable to repay the loans they have received from BFIs.

#### **CAPITAL MARKETS**

Other than the loss of fees to Securities Board of Nepal (SEBON), Nepal Stock Exchange (NEPSE) and brokerage houses from no trading for nearly a month, NEPSE has experienced limited impact since it began operations after the earthquake. Two weeks after trading resumed on NEPSE, market capitalization was reaching pre-earthquake levels. Immediately before the first earthquake, market capitalization stood at NPR 963.53 million. As of 3 June 2015, market capitalization was NPR 951.18 million. The market remains bullish and Nepal Stock Broker's Association is confident the market will reach pre-earthquake levels in the coming weeks.

#### **REMITTANCE NETWORKS**

There remain challenges in the availability of connectivity (telecommunications), transportation and cash (as unsafe buildings enhance the risk of holding significant amounts of cash). While some remittance agents have begun operations, several are still non-operational and may relocate or cease operations altogether.

Infrastructure damage has also disrupted remittance networks. Roads and telecommunications connectivity are basic infrastructure required by an agent to operate. With many roads damaged, optic fibre connectivity down in parts of affected districts and telecom data services intermittent, reestablishing remittance agents and networks will be challenging.

### **Recovery and Reconstruction Strategy**

Based on the build back better (BBB) principle, the recovery and reconstruction strategy will be a three-pronged approach: (i) financial sector stability, (ii) access to finance, and (iii) economic recovery.

#### **FINANCIAL SECTOR STABILITY**

##### **Diagnostic of the Impact of Damage to Real Estate in Affected Areas on BFIs and Insurance Companies**

Diagnostics are needed to allow accurate assessment of the impact of the earthquakes on the



solvency of BFIs and insurance companies and will facilitate the design of recapitalization and restructuring programmes for the sector.

#### **Diagnostic of the Financial Condition of MFIs, FINGOs and SACCOs in Affected Areas**

Diagnostics are needed to: (i) get an accurate assessment of the recapitalization and liquidity needs of the non-bank financial sector in the affected areas to allow the resumption of credit flows to poor and rural communities; and (ii) to assess the impact of losses from deprived sector lending on BFIs.

#### **Loan Restructuring**

As a consequence of the earthquakes, there may be broader impacts economy-wide. If economic activities slow down, it will affect many borrowers' ability to service their debt. Previously creditworthy borrowers may need to have their existing loans restructured to allow them to revive their livelihoods.

#### **Recapitalization Fund**

This fund would provide financial resources to help recapitalize BFIs and non-bank financial institutions in affected areas, based on the results of the diagnostics. The need for the fund reflects: (i) the need to prevent de-leveraging by the financial system as a result of reduced solvency and the inability of BFIs to provide deprived sector loans to insolvent MFIs and FINGOs, and (ii) the low balance of the deposit guarantee fund and the fact that deposits in non-bank financial institutions are not guaranteed, exposing small depositors to heavy losses if the institutions are not restored to solvency.

#### **Capital increase for the Deposit and Credit Guarantee Fund**

The Deposit and Credit Guarantee Fund (DCGF) presently has less than NPR 2 billion with which to insure about NPR 300 billion of deposits, well below the recommended level of NPR 15 billion (5 percent of insured). While the government has been contributing NPR 500 million of additional capital each year, the capital of the fund needs to be increased rapidly to increase depositor confidence and allow insolvent banks to be liquidated rather than recapitalized by the government.

## **ACCESS TO FINANCE**

#### **Special Cash Transfer Account Scheme**

The financial system can play a key role in channelling support to earthquake victims through a special cash transfer account scheme, using banks that meet certain eligibility criteria. Contrary to traditional bank accounts, such cash transfer accounts do not serve transactional or savings purposes. It is merely a scheme for the government to transfer funds to victims. It therefore represents minimal risk of abuse. The scheme would, amongst others, require establishing sound eligibility criteria for participating banks and a robust enrollment process. It would also require a simplification of Know Your Customer (KYC) and Customer Due Diligence (CDD) norms. As a matter of urgency, this requires technical assistance aimed at establishing the KYC/CDD tier thresholds; issuing an amendment to the current regulations and issuance of a guidance circular to the financial sector; and developing the full technical and operational framework for account opening and payment processes.

#### **MFI Liquidity Facility**

This facility would provide concessional loans to MFIs in affected areas to quickly restore their liquidity and respond to the increased demand for credit from FINGOs and SACCOs to finance reconstruction and recovery.

#### **Technical Assistance to MFIs**

Given the extent of damages caused by the earthquakes in the MFI sector, the sector would require a range of technical assistance for two reasons: (i) to ensure that the MFI sector, which has greater outreach in rural parts of Nepal but is also vulnerable to shocks, is back on track providing basic financial services to people in the lowest income groups, and (ii) to make sure that rural livelihoods that have been impacted by the earthquakes are restored quickly thereby ensuring that households do not slip back into poverty.

The recovery technical assistance is warranted for:

#### **Rebuilding Livelihoods in Affected Communities**

Compared to other larger financial institutions, MFIs have better outreach, community-based

linkages, long and trusted presence in the affected rural areas and can be an effective delivery mechanism and channel. There is need for specific support schemes for rebuilding livelihoods in affected communities, to be channelled through eligible MFIs and cooperatives, targeted specifically at micro entrepreneurs. In addition, MFIs could play a supplementary role as delivery channels with outreach in the affected rural communities to support house reconstruction and repair.

#### **Rebuilding Infrastructural Assets, Recovering Data and Enhancing MIS/IT Structure**

MFIs need technical assistance to rebuild physical infrastructure and recover data (in the short term) and to enhance/introduce MIS systems (in the long term). Assistance will be required so that appropriate parameters/conditions are set (e.g., assessment of physical damage, management structure, basic business plan). In the long term, financial support and technical assistance are needed to enhance/introduce IT infrastructure and MIS systems to instill best practices and to equip MFIs for post-emergency action and sustainability.

#### **Capacity-building at Sectoral and Institutional Level**

Strengthening the sector and providing support in the areas identified as major constraints before the earthquakes is imperative to enhance resilience and equip the sector in the long term. Tremendous capacity building of the sector will be required to cope with the changed circumstances after the earthquakes. Similarly, regulatory support will also be required to make short-term regulatory adjustments to provide flexibility to enable MFIs to be back in business, and medium- to long-term regulatory changes to enhance resilience of the sector. In order to support recovery of the microfinance sector, a programme to identify key areas such as risk management, loan recovery, and loan origination and approval processes will be required. Technical assistance will accordingly need to be provided for targeted MFIs and FINGOs to guide them to instill best practices based on the country context, and to equip them for post-emergency action. In addition, a programme will also be required to develop, test and pro-

mote micro-risk management products post calamity, such as insurance and pension. Technical assistance to develop and launch household level micro-risk management products would also be helpful. These activities will have to be complemented by financial awareness raising and customer protection programmes to ensure that these complex products are offered responsibly and in a transparent manner.

#### **Insurance Product Development and Education Technical Assistance**

The earthquakes have highlighted the lack of insurance to provide protection from the devastating impacts of natural disasters for the vast majority of people – only about 15,000 of the 500,000 homes damaged by the earthquake are insured, and most of those insured are under-insured (meaning insurance will cover only debt, not the cost of rebuilding). Technical assistance is needed to support the development of insurance products which provide protection from natural disasters and to provide financial education to promote their use.

#### **Recapitalization Fund for MFIs, FINGOs and SACCOs**

This fund would provide financial resources with which to recapitalize non-bank financial institutions in affected areas, based on the results of the diagnostics. The need for the fund reflects the inability of BFIs to provide deprived sector loans to MFIs and FINGOs while they are insolvent (cutting them off from 70 percent of their funding) and the fact that deposits in non-bank financial institutions are not guaranteed, exposing poor and rural depositors to heavy losses if the institutions are not restored to solvency.

#### **Effective Regulation and Supervision of SACCOs**

There are thousands of SACCOs operating in the country; most of them are registered with the government through the Department of Cooperatives. Unlike banks and other financial institutions, including licensed MFDBs and FINGOs, SACCOs not licensed by NRB are not regulated or supervised by NRB. However, the outreach of these SACCOs is widespread and they have been providing financial services to a large number of

members across Nepal. Given the volume of financial services business being managed by SACCOs, there is need for a strong regulator and a major upgrade of the regulatory and supervisory regime, with a view to raising safety and soundness in the sector to the direct benefit of its users. Regulating SACCOs on the one hand will ensure the financial services they are carrying out are fully accounted for in the overall financial sector portfolio and national payment transmission mechanism. On the other hand, it will ensure a level playing field for similar smaller financial institutions, including the licensed MFDBs and FINGOs that are currently subject to NRB regulation and supervision.

#### **ECONOMIC RECOVERY AND FINANCE**

##### **Refinancing Facility Funding to Support Recovery of Households**

This facility would provide concessional refinancing for on-lending by BFIs to allow for the

funding of repair/reconstruction of damaged homes. Funds would be provided through an NRB refinancing window at a concessional rate. The financing would be provided at a concessional rate for 10 years for housing reconstruction to rebuild destroyed uninsured homes.

#### **INSURANCE**

##### **Capacity-building to Expand Coverage**

Building capacity to streamline and accelerate the claims settlement process can send positive signals to expand insurance coverage.

##### **Enhancing Legal and Regulatory Framework**

There is also need to strengthen insurance regulation and supervision to ensure effective enforcement.

##### **Implementation Strategy for Recovery**

The government will continue to carry out reform measures designed to assess and then



mitigate risks to the financial sector, which have been amplified by the impact of the earthquakes. These include strengthening the financial crisis management architecture, establishment of disaster recovery centres by NRB and BFIs, and expanded diagnostic work to assess the impact of the earthquakes on banks and insurance company solvency.

The recovery strategy will encompass:

- Physically reconstructing NRB with built-to-purpose facilities, establishing a disaster recovery centre, re-equipping staff, and providing adequate information systems to support supervision.
- Financial support provided by development partners for reforms. This will provide support for putting in place a legal framework for financial crisis management, strengthening risk-based supervision of BFIs, reforms to the legal and regulatory frameworks for insurance companies and SACCOs, further steps to strengthen the payments system, and in-depth diagnostics of insurance companies and SACCOs. These actions will also be supported by capacity building grants from DFID and FIRST Initiative of the World Bank.
- The use of carefully designed regulatory forbearance to allow BFIs to restructure the debts of viable borrowers. This could include, among others, deferring of loan loss provisioning requirement by one notch on the incremental NPA. However, the BFIs should disclose such ‘gains’ and dividend payout should be restricted to the extent of forbearance exercised.
- Providing concessionary financing and expanded use of credit lines to facilitate the restructuring of viable corporates and SMES, and to support housing reconstruction. The emergency facilities established by NRB will be complemented by on-budget facilities and the distribution channels will be designed to ensure transparency and accountability.
- It may be important to impose a moratorium on the increase in lending rates by BFIs at pre-earthquake levels for at least a quarter.
- Allow full deduction of financial contributions made by all incorporated BFIs to the Prime Minister’s Relief Fund.
- Investments in financial education/awareness and new product design to encourage and enable the more widespread use of insurance as a disaster mitigation mechanism, especially by poor and rural communities.
- Establish a Bailout Fund for concessions and recapitalization with appropriate mechanism in consultation with relevant stakeholders and development partners.

### Assessment Methodology

This financial sector needs assessment is based on a wide range of inputs and data from diverse sources. The assessment was led by NRB in collaboration with the World Bank, ADB, UNCDF, ILO, USAID, IOM and DFID. However, it will take time for the full impact of the earthquakes to become apparent. The team also carried out a field visit to Nuwakot and met affected BFIs and MFIs; consulted various associations of BFIs, MFIs and insurance sector; the Department of Cooperatives; and the Insurance Board; and used expert opinions and secondary data where possible.









# INFRASTRUCTURE SECTORS



ELECTRICITY



COMMUNICATIONS



COMMUNITY INFRASTRUCTURE



TRANSPORT



WATER, SANITATION, AND HYGIENE







# 11. Electricity

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## Summary

The PDNA pertaining to the electricity sector covers generation, transmission and distribution facilities in on-grid and off-grid system. It covers the generation, transmission and distribution systems owned by the public utility company Nepal Electricity Authority (NEA) and the hydropower generation facilities owned by Independent Power Producers (IPPs). The distribution system above also includes community-managed and operated rural electrification entities. It also covers community-based micro hydropower projects (MHP), solar home systems (SHS), small solar home systems (SSHS) and institutional solar PV systems (ISPS) owned by local communities and individual households and promoted by Alternative Energy Promotion Centre (AEPIC). The assessment covers the entire country, with a focus on the 14 districts that have been severely affected by the earthquake.

The PDNA was carried out based on the data collected and verified by NEA as well as representatives of the Power Grid Corporation of India Ltd (PGCIL), Independent Power Producers Association, Nepal ([PPAN] for on-grid facilities) and AEPIC (for off-grid facilities) under the leadership of the Ministry of Energy (MoE) and Ministry of Science, Technology and Environment (MoEST). The World Bank, as the leading agency for PDNA for the electricity sector, has provided support to MoE and MoEST in data processing, damage assessment and preparation of the recovery and reconstruction strategy and plan with the active participation of and contributions from Japan International Cooperation Agency (JICA), Asian Development Bank (ADB), United Nations Development Programme (UNDP), and the Norwegian Embassy.

Electricity generation facilities, both on-grid and off-grid, and distribution networks were damaged in a big way. For generation under operation, about 115 MW hydropower facilities out of the 787 MW total installed capacity in the country (grid and off-grid) were severely

damaged, and 60 MW were partially damaged. For generation under construction, about 1,000 MW of hydropower projects owned both by IPPs and NEA have been partially damaged. Regarding the transmission system under operation, seven substations were damaged. The boundary wall of eight substations, cracks in control room buildings of nine substations, and damage to staff quarters and office buildings at 14 locations were observed. Damages were also noticed in five transmission lines. Despite this, all the affected transmission substations were restored within a short period of time with the assistance of PGCIL officials. At the time of assessment all 42 substations and 57 transmission lines were in operation. However confirmation about the risks of tower foundation damage, vulnerability of towers due to landslide/soil erosion and structural damage would be confirmed only after a walk-through check for all towers in the transmission line in the earthquake-affected areas.

Regarding distribution, about 800 km of distribution lines at different voltage levels (33 kV, 11 kV and 400 V) and 365 transformers at different capacity (from 15 to 300 kVA) were damaged and non-operational. As for off-grid electricity services, about 262 MHP facilities and 115,438 SHS or small SHS, and 156 ISPS were damaged and non-operational.

The total costs of physical damage are about NPR 17,807 million, including NPR 5,575 million in the public sector and NPR 12,231 million in the private sector. For out-of-service operational facilities, during the estimated duration of recovery and reconstruction period, the loss of revenues amounts to NPR 3,338 million for IPPs in power sales revenues and about NPR 97 million for the government in royalty payments by NEA and IPPs, and no loss of revenue for NEA since cost of purchase of electricity is higher than retail tariff. The cost of recovery and building back better is estimated to be NPR 18,586, with NPR 5,693 million and NPR 12,893 for public and private assets.



About 603,000 households have lost access to electricity, including 91,200 households for grid electricity and the rest for off-grid electricity, either due to house collapse or damage to electricity supply facilities. Assuming that new houses will be built on time, it will take 12 to 24 months for electricity services to be restored to the affected households.

## Pre-Disaster Context and Baseline

### ACCESS TO ELECTRICITY SERVICES

According to the national census published in 2013, about 75 percent of the total population in Nepal (27.5 million) is estimated to have connections to grid (about 50 percent) and off-grid (about 25 percent) electricity. Although off-grid connections provide relatively reliable electricity supply in the rural areas, access to the grid in rural and urban areas does not necessarily mean access to electricity due to continuing load shedding, up to 14 hours per day, in grid-covered areas in the dry season. Lack of access to reliable grid-supplied electricity is one of the key obstacles to lifting sections below the poverty line out of poverty. While Nepal has achieved remarkable progress in off-grid electrification, coordination with grid extension needs to be enhanced through planning future rural electrification to avoid stranded off-grid assets when the grid is extended to the off-grid areas.

Electricity service in Nepal is provided mostly through the grid system and in some part through isolated instances of the off-grid system. The grid system consists of vertically integrated generation, transmission and distribution systems. NEA, a fully government owned power utility, is responsible for the operation and management of the grid. The

generation assets are owned by NEA as well as private power companies, whereas transmission and distribution assets are fully owned and managed by NEA. A brief description of generation, transmission and distribution system is described below.

### ON-GRID GENERATION

The total existing installed generation capacity in the pre-disaster period was reported to be 787 MW of which 782.5 MW is on grid. Of the total grid capacity 729.1 MW is provided from hydropower plants, whereas 53.4 MW consists of thermal generation. IPPs own 255.6 MW of generation capacity and the rest (473.4 MW) is owned by NEA. Table 11.1 gives a summary of generation capacity.

### Transmission Network

The existing transmission system consists of 66 kV and 132 kV transmission lines and associated grid substation, as well as a Load Dispatch Centre. NEA has a transmission system with 42 substations (28 at 132 kV level and 14 at 66 kV level) with a total transformation capacity of 2,159.6 MVA (1722 MVA at 132 kV and 438 MVA at 66 kV). There are a total of 57 lines in the transmission segment of which 36 lines are at 132 kV level and 21 lines at 66 kV level. It is reported that there are 2,129.7 circuit km of 132 kV transmission lines and 511.16 circuit km of 66 kV transmission line. The route length of the transmission line is 1,948 km with 6,093 towers.

### Distribution

Electricity services to the end-consumer are provided through a distribution system of 33 kV, 11 kV and 400 V distribution lines and associated distribution substations. NEA provides electricity services to more than 2.7 million consumers through its 90 distribution centres spread across the country. The total number of consumers in the 14 earthquake-affected districts accounts for 23 percent of total NEA customers, whereas these affected districts contribute 72 percent of the total sales and 73 percent of sales revenues of NEA. The baseline information of physical Infrastructure is provided in Table 11.2.

### Off-grid Electricity Services

As of July 2013, there were 1152 community-owned MHPs with a total installed capacity of 22,830 kW. Similarly, about 600,000 (July 2014) SHS/SSHS with a total capacity of about

**TABLE 11.1: ON-GRID GENERATION CAPACITY OF NEPAL**

Source of generation	Installed capacity (MW)
Total hydro (NEA)	477.9
Total small hydro isolated (NEA)	4.5
Total hydro, in grid system (NEA)	473.4
Total hydro (IPP)	255.7
Total hydro (Nepal)	729.0
Total thermal (NEA)	53.4
Total installed capacity in Nepal	782.4

10 MW have been installed by individual households for lighting purposes.

## Post-Disaster Context

### DAMAGES TO INFRASTRUCTURE AND ASSETS

The April 2015 earthquake significantly damaged hydropower plants, the transmission system (substation and lines) and distribution lines. The damage to complete transmission lines and grid substations are being assessed by means of a walk-through survey.

### EXISTING HYDROPOWER PLANTS

Three NEA-owned power plants (48 MW) and 15 IPP-owned power plants (123 MW) were damaged, resulting in an outage of 171 MW (see Table 11.3 for a list of power plants affected by the earthquake). Other hydropower plants are still in operation, their damage status being unavailable. The magnitude of damage to the power plants of NEA and IPP would be known only after a detailed assessment of damaged power plants, this being a preliminary assessment of physical damage at the time of the assessment.

It is reported that in the Kulekhani storage hydropower plant (92 MW), a deep crack has developed in the dam, going 0.8 m deep to the clay-core. Cracks are observed in the shaft bearing block as well. Cracks have also been observed in the power house of Upper Marsyangdi hydropower plant (75 MW). In Kaligandaki A hydropower plant (144 MW), cracks have developed in the left bank of the reservoir which was damaged by heavy rain two years back. Similarly, the waterway of cascade plants Trishuli (24 MW) and Devighat (14.1) have reported damage.

However, all the power plants of NEA are currently in operation except for Sunkoshi (10 MW); its infrastructure is said to be seriously damaged. Although there seems no visible damage to other hydropower plants, a thorough assessment is needed for confirmation.

Out of 15 IPP power plants, Chilime hydropower plant, under a NEA subsidiary company, is already in operation. Other power plants require major reconstruction work for a period ranging from four months to 12 months. Their head works, waterways, substations, transmission lines,

**TABLE 11.2: DISTRIBUTION SYSTEM BASELINE INFORMATION**

S.N.	Description	33 kV
1	33 kV distribution line (km)	3,823
2	11 kV distribution line (km)	32,393
3	400 V distribution line (km)	87,318
4	33/11 kV distribution transformer-set	800
5	11/0.4 kV distribution transformer-set	21,877
6	33/11 kV substation(Nos.)	100
7	Installed capacity of 33/11 kV S/S (MVA)	843
8	Installed capacity of distribution transformers (MVA)	2030
9	Meters-set	3,172,424
10	Distribution poles-(Nos.)	2,347,146

power houses, office buildings and staff quarters, have suffered extensive damage. Table 11.3 lists the hydropower plants affected by the disaster.

### HYDROPOWER PLANTS UNDER CONSTRUCTION

There are reports of damage to hydropower projects under construction that are owned by NEA and IPP. The construction work in major hydropower projects such as Upper Trishuli 3A (60MW, and the only one being developed by NEA), Upper Tamakoshi (456 MW), Rasuwagadhi (111 MW), Madhya Bhotekoshi (102 MW), Sanjen (45 MW) and Upper Sanjen (14 MW) and UT1 (216 MW) was stopped in the wake of the earthquake and subsequent landslides. The details of damage are yet to be assessed. Similarly, other small IPP projects under construction (Upper Chaku, 22 MW; Lower Modi, 20MW; and Lower Khare, 11MW), totalling 43 MW capacity, are also reported to be severely damaged.

The NEA, Government of Nepal, has requested the Government of Japan to assess the damage to the Kulekhani storage hydropower plant since it was designed and its construction was supervised by a Japanese consulting firm. GoN has also requested the German government through KfW to assess the damage to the Middle Marsyangdi hydropower plant (70 MW), Lower Marsyangdi hydro power plant (69 MW), Kaligandaki A hydropower plant (144 MW) and the Load Dispatch Centre. Since the assessment reported no major problem, it was not deemed necessary to these plants from operating. GoN has not yet decided on the policy of providing relief to the affected private hydropower plants under construction.

**TABLE 11.3: AFFECTED HYDROPOWER PLANTS (IN OPERATION)**

Hydropower plant	Installed capacity (MW)	District
NEA-Owned		
Trishuli	24.0	Nuwakot
Devighat	14.1	Nuwakot
Sunkoshi	10.0	Sindhupalchowk
Sub-Total:	48.1	
Private power producer		
Chilime	22.0	Rasuwa
Bhotekoshi	45.0	Sindhupalchowk
Baramchi	4.2	Sindhupalchowk
SipringKhola	10.0	Dolakha
BhairavKunda	3.0	Sindhupalchowk
Chaku	3.0	Sindhupalchowk
MadheChaku	1.8	Sindhupalchowk
Lower Chaku	1.8	Sindhupalchowk
Sunkoshi	2.6	Sindhupalchowk
AnkhuKhola	8.4	Dhading
MailungKhola	5.0	Rasuwa
RadhiKhola	4.4	Lamjung
Jiri	2.2	Dolakha
TadiKhola	5.0	Nuwakot
SiuriKhola	5.0	Lamjung
Sub-total:	123.4	
<b>Total affected:</b>	<b>171.5</b>	

### Transmission System

The list of substations where equipment damage was reported is presented in Table 11.4. The damage noticed in transmission lines passing through the most-affected areas is summarized in Table 11.5. Further, Table 11.6 lists substations where the boundary wall was damaged and cracks appeared in the buildings. A partial damage in the Load Dispatch Centre was reported and load management in the system was being carried out through a back-up system.

The substations were out of service for some time either due to loss of power or some problem in the substations due to equipment damage. As reported, all substations were restored in a few days with the help of officials from PGCIL, and material as well as machineries received from India.

In most of the substations, transformers with rollers were placed on rail. Due to the high intensity of shaking during the earthquake, the transformers moved along the rail from their position as there was no locking arrangement to keep them at a fixed position or they got off of the rails. As a result, the accessories of transformers were affected. The main tanks of transformers were not damaged. Some of the transformers started leaking heavily through various joints during the earthquake and the oil drained out from them. Around 20,500 litres of oil have been refilled in these transformers after rectification of the cause of leakage by NEA helped by a PGCIL team, following which most of the transformers were put into service except one transformer at Teku substation and another one at Lainchaur substation. One transformer, received from India, is under installation at the

Teku substation. Action has already been taken for procurement of the damaged equipment required for restoration of the transformer at the Lainchaur substation.

Similarly, one transformer at the Lamosangu substation which is in service, jumped off the rails and had to be put back at the earliest possible opportunity to prevent damage to the foundation with every aftershock. Substation bay equipment that also got damaged was replaced either from inventory, materials received from India or after cannibalizing from bays already installed in new transmission system or bay charged bypassing the equipment due to non-availability of the same in inventory. Cracks developed in the control room building wall, column as well as in the beams in some substations. Some of the damaged walls of control room building are load bearing walls. Cracks also developed in the control room floor and foundation settlement also observed but none of the control room buildings collapsed. The boundary walls of eight substations were damaged or collapsed.

It may be noted that a majority of transmission lines pass through difficult hilly terrain and deep forest. During an earthquake there is every possibility of tower foundations getting damaged at some location, or of stress developing on them due to disproportionate shifting of their base as a result of movement of earth. This might weaken the tower structure. The route length of transmission lines for 6,093 towers is 1,948 km. The actual quantity of damage to the transmission lines can be assessed only after thorough checking of all these 6,093 towers along the total route length but this would take considerable time. A walk-through survey of transmission lines is in progress and as per preliminary report received from NEA transmission team on May 31 2015, tower damage reported in 3 no. 132 kV lines and 2 no. 66 kV lines. The Foundation was damaged in around 20 locations. Protection walls need to be erected due to soil erosion. However all transmission lines are in service as it was prior to earthquake.

### Distribution

It is reported that four major substations in Kathmandu Valley and one substation outside the val-

**TABLE 11.4: SUBSTATIONS WITH EQUIPMENT DAMAGE**

Name of Substations	Voltage level
1 Balaju	66 kV
2 Lainchour	66 kV
3 Teku	66 kV
4 Panchkhal	66 kV
5 Suichatar	66 kV
6 New Chabahil	66 kV
7 Lamosangu	132 kV

**TABLE 11.5: DAMAGE TO TRANSMISSION LINES (PRELIMINARY SURVEY)**

Name of transmission lines	
1 Khimti-Lamusangu transmission line	132 kV
2 Lamusangu-Bhaktapur line	132 kV
3 Suichatar-Marsyangdi line	132 kV
4 Chilime-Trihuli transmission line	66 kV
5 Devighat-New chabel	66 kV

ley were damaged. However, supply to the consumer is being restored. Distribution networks were significantly damaged in the 14 districts including three districts of Kathmandu. As per preliminary estimates of the director, NEA Distribution and Consumer Services, the total damage to distribution networks is shown in Table 11.7.

With the help of PGCIL, NEA managed to fix the four affected substations in Kathmandu and electricity supply was restored within four days. At this stage the Government of India is supporting NEA/MoE by providing poles and distribution transformers. Untill now about 37-100 percent electricity supply has been resumed in all the 14 badly-affected districts.

### OFF-GRID MICRO-HYDRO PLANTS

It was reported that 262 MHPs with 3.7 MW installed capacity and 115,438 SHS and 156 ISPS are damaged. This has affected more than 81,000 households. A summary of MHP damage in 14 districts is presented in Table 11.8. AEPC is trying to assess the exact nature of damage and to come up with the cost estimate to repair the damage, including strategy and action plan.

### ESTIMATES OF FINANCIAL LOSSES DUE TO PHYSICAL DAMAGE

A technical (engineering) assessment of damage is a prerequisite for calculating the value of loss from physical damage in power plants under



operation as well as those that are under construction. Since such an engineering assessment is yet to be done, the estimate of financial losses of physical damage in on-grid generation, transmission and distribution systems and associated civil structures, and off-grid electricity services are indicative and preliminary in nature. Based on the preliminary information of physical damage provided by NEA, IPPAN and AEPC, the estimated financial loss resulting from damage to physical infrastructure in generation is given in Table 11.9. In the absence of a detailed assessment of damage to hydropower plants and transmission line, a provisional figure of NPR 2,000 million as a contingency sum is used. One of the objectives of the PDNA is to ascertain the reconstruction requirement and its associated cost to identify the resource implication. This contingency amount is also reflected in the reconstruction cost for building back better in this sector, which gives rise to a figure of NPR 17,807 million for physical damage to assets, inclusive of NPR 2,000 million as a contingency sum. A summary of details of resource implications for reconstruction is given in Table 7.

The estimation of change in economic flows (CEF) or losses is carried out to assess the impact of the disaster in the sector. It is ascertained by estimating the loss to three sub sectors: namely public sector entities such as NEA, private companies such as IPP, and the government. The change in loss of net revenues is taken as the basis for calculating the CEF.

**NEA Revenue Losses:** The NEA system is vertically integrated and sales revenues are realized in the distribution subsector. Therefore, financial losses of this system are accounted for in the distribution system. However, NEA is better off in terms of net revenues as a result of reduction in sales due to IPPs' power plant outages. The reason behind this is that the cost of service from IPP purchase is higher in comparison to sales revenues from the same (mismatch of cost of service versus retail tariff). As a result, energy unavailable for sale from IPP resulted in a reduction in power purchase expenses, leading to a positive impact in the net revenues of NEA. Hence, net change in revenue of NEA is not considered for total change in change in economic flows or losses.

**IPP Revenue Losses:** Loss of generation is calculated on the basis of the outage period, from the date of interruption of supply due to earthquake to the date of resumption of supply by the plant. In general, a six month outage is assumed for all affected power plants. However, in case of plants such as Bhotekoshi, an assumption of 12 months of outage is made. The total loss of sales is calculated on the basis of estimated time for restoration of generation from existing power plants and their average monthly energy sales to NEA. The losses are calculated assuming the associated loss of energy sales during the outage time of generation multiplied by the PPA rate. The change in IPP net revenues is estimated as NPR 3,338.0 million. The calculation of

**TABLE 11.6: DAMAGE TO DISTRIBUTION NETWORKS**

S.No.	Description	Unit	Base line data	Works to be carried out	
				Immediate restoration*	Reconstruction**
1	33 kV transmission line	km	3,823	63	191
2	11 kV distribution line	km	32,393	210	291
3	400 V distribution line	km	87,318	463	904
4	33/0.4 kV distribution transformer	Nos.	800	10	0
5	11/0.4 kV distribution transformer	Nos	21,877	565	148
6	33/11 kV substation	Nos	100	0	0
7	Energy meter (single & three Phase)	Nos.	3,172,424	79,519	64,000
8	Distribution poles	Nos	2,347,146	37,170	12,500
9	Substation equipment (power transformer, ct, pt, control & relay panel, battery & charger etc.)	Set		335	0
10	Physical infrastructure (control building, staff quarter, office building, boundary wall, guard room)	sqm		44,789	9524
		Nos.		45	0

\*The scope of works includes the construction of healthy line, physical infrastructure and rehabilitation of substations in affected areas where the power supply has been restored temporarily.

\*\*The scope of works includes the construction of line and physical infrastructure for new resettlement. However, the cost is not include in the reconstruction cost as there are uncertainties about the finalization of the new resettlement

**TABLE 11.7: LIST OF DAMAGED MICRO-HYDRO PROJECTS**

		Number of MH plant	Installed capacity (kW)	Total HH
<b>Severely-affected districts</b>				
1	Rasuwa	7	45.0	478
2	Gorkha	35	604.5	6,198
3	Nuwakot	7	23.0	240
4	Dhading	40	582.0	5,267
5	Sindhupalchowk	14	123.0	948
6	Dolakha	27	431.0	4,553
7	Ramechhap	16	170.0	1,888
	<b>Subtotal:</b>	<b>146</b>	<b>1978.5</b>	<b>19,572</b>
<b>Disaster hit districts</b>				
8	Kavrepalanchowk	42	615.5	5,847
9	Sindhuli	22	166.5	1,887
10	Okhaldhunga	47	912.5	9,347
11	Makawanpur	5	42.2	447
12	Lalitpur	-	-	-
13	Bhaktapur	-	-	-
14	Kathmandu	-	-	-
	<b>Subtotal:</b>	<b>116</b>	<b>1736.7</b>	<b>17,528</b>
	<b>Total</b>	<b>262</b>	<b>3715.2</b>	<b>37,100</b>

financial loss of CEF in IPP generation is presented in Table 11.10.

**GoN Royalty Revenue Loss:** Royalty is applicable in capacity and energy generation from power plants and is the source of government revenue from the electricity sector. Change in royalty from the affected projects is estimated to be at around NPR 97 million. A summary of this calculation is presented in Table 11.11.

**Estimates of Damages and Losses:** The total loss of revenues is the sum of revenue losses of IPPs and loss of GoN revenues through royalty. This calculation is presented in Table 11.12.

#### **DISASTER EFFECTS AND IMPACTS**

**Major impacts:** About 600,000 households were directly affected by the earthquake in the form of loss of electricity services. This impact was either through damage to electricity facilities, on-grid and off-grid, or due to house collapse. Loss of access to electricity has a direct bearing on people's ability to derive their livelihoods and generate income, particularly so for rural communities engaged in small- and medium-scale enterprises.

Loss of power has also had a negative impact on women who use electricity for household work and productive activities. Women interviewed in Kavre indicated that their burden of work has increased now that they are compelled to allocate as much as three hours to fetch firewood in the absence of electricity. Furthermore, lighting works as a deterrent to violence, and in the absence of a steady power supply, women may face an added risk of violence.

The disruption in the power supply will further pose challenges to the government's avowed goal of universal access to modern energy services by 2030 in Nepal. It should be noted that the decrease in electricity supply is due to the loss of generation from hydropower plants. As import from India is limited to available transmission capacity and limited thermal plants, NEA has resorted to increasing load-shedding hours for consumers. Consequently, there has been an increase in electricity generation from captive diesel generator (DG) sets. The total loss of generation from damaged hydropower plants and corresponding increase in generation from DG sets would be about 428 GWh. The typical cost of generation from DG sets is about 30 UScent/kWh including capital and fuel costs.

**TABLE 11.8: DAMAGES IN THE ELECTRICITY SECTOR (NPR MILLION)**

Sector	SubSector	Cost of damage	Remarks
<b>Public-NEA</b>	<b>Generation</b>		
	Hydropower: Severely damaged	200.0	not in operation
	Partially damaged	800.0	in operation
	Under construction	400.0	
	<b>Total generation</b>	1,400.0	
	<b>Transmission</b>	347.0	
	<b>Distribution</b>	1,829.0	
	<b>Total public</b>	3,062	
<b>Private</b>	Generation		
	Hydropower: Severely damage	2,294.0	Not in operation
	Partially damage	85.0	In operation
	Under construction	3,950.0	
	Distribution (meters)	1,497.0	
	<b>Total private</b>	<b>7,826.0</b>	
<b>Total grid</b>		11,402.0	
<b>AEPC</b>	<b>MHP</b>	747.0	
	<b>Solar home system and ISPS</b>	3,658.0	
	<b>Total off-grid</b>	4,405.0	
<b>Contingency</b>		2,000.0	
<b>Grand total electricity</b>		17,807.0	
<b>Public-NEA</b>	<b>Generation</b>		
	Hydropower: Severely damaged	200.0	Not in operation
	Partially damaged	800.0	In operation
	Under construction	400.0	
	Total generation	1,400.0	
	Transmission	347.0	
	Distribution	1,829.0	
	Total public	3,576.0	
<b>Private</b>	<b>Generation</b>		
	Hydropower: Severely damaged	2,294.0	Not in operation
	Partially damaged	85.0	In operation
	Under construction	3,950.0	
	Distribution (meters)	1,497.0	
	<b>Total private</b>	<b>7,826.0</b>	
<b>Total grid</b>		11,402.0	
<b>AEPC</b>	<b>MHP</b>	747.0	
	<b>Solar home system and ISPS</b>	3,658.0	
	<b>Total off-grid</b>	4,405.0	
Contingency		2,000.0	
<b>Grand total electricity</b>		17,807.0	

Note: Basic cost estimates are prepared in US\$ and exchange rate 100 NPR to US\$ 1 has been used.

**TABLE 11.9: IPP REVENUE LOSS (NPR MILLION)**

Description	Pre-earthquake	Post-earthquake	Net revenue loss
Sales revenue	3,407.0	0.0	
Less royalty to GON	77.0	9.0	
Net revenue	3,329.0	(9.0)	3,338.0

**TABLE 11.10: GON ROYALTY REVENUE LOSS (NPR MILLION)**

Description	Pre earthquake	Post-earthquake	Net revenue loss
Royalty from NEA	216.0	187.0	
Royalty from IPP	77.0	9.0	
Total	293.0	196.0	97.0

**TABLE 11.11: SUMMARY OF ESTIMATES OF DAMAGES AND LOSS OF REVENUE**

	Value of damages (NPR million)			Value of revenue losses (NPR million)			
	Total	Public	Private	Total	Public	Private	Impact fiscal
<b>Generation</b>							
NEA	1,400.0	1,400.0		-	-		
IPPs	6,329.0		6,329.0	3,338.0		3,338.0	
Local communities	4,405.0		4,405.0	-			
Government royalty				97.0	97.0		
<b>Transmission</b>							
NEA	347.0	347.0					
<b>Distribution</b>							
NEA	1,315.0	1,315.0					
Consumers	1,497.0		1,497.0				
<b>Civil structures</b>							
NEA	514.0	514.0					
Contingencies	2,000.0	2,000.0					
<b>Total damages</b>	<b>17,807.0</b>	<b>5,575.0</b>	<b>12,232.0</b>	<b>3,435.0</b>	<b>97.0</b>	<b>3,338.0</b>	

## Recovery Needs and Strategy

The recovery of electricity in grid and off-grid could be achieved through alternate sources of electricity supply, most commonly with the import of electricity from India, DG sets, roof-top solar panels. The following initiatives are suggested for recovery in the short, medium and long term:

- Short-term measures include a reduction in load shedding and distribution of solar lanterns to affected households, repair and maintenance of partially damaged power plants, transmission lines and distribution lines.
- Medium-term measures include the timely completion of hydropower projects that are in an advanced stage, and completing the ongoing cross-border transmission line that will facilitate additional imports of electricity from India.

- Long-term measures include the construction of new hydropower plants and reconstruction of those that have been damaged.

### Reconstruction Initiatives for off-grid Facilities

The reconstruction of off-grid electricity services will be carried out two phases.

- The first phase would involve an immediate relief package offering domestic clean cooking and lighting solution. The focus will be on domestic Remote Electrical Tilt (RET) solutions that can be supplied to the needy within the current fiscal year and will be initiated immediately. This package primarily includes SHS with mobile charging for the household; improved cooking stove (ICS); and community mobile charging station; water purification; immediate solar lighting solutions for health posts and



schools; biogas; rapid assessment of Photo Voltaic Pump Set (PVPS) and micro-hydro projects; income generation activities; and activities for micro, small and medium-sized enterprises (MSME) activities. This relief package will be implemented up to December 2015.

- The second phase involves reconstruction, rehabilitation and medium-term relief solutions. The focus will be on delivering solutions which will include repair, maintenance and installation of new solar systems for schools; installation of solar mini/micro grids; repair, maintenance and installation of new solar systems for health posts; repair, maintenance and installation of new biogas systems; repair, maintenance, re-construction and commercial operation of micro-hydro plants; repair, maintenance and re-construction of damaged micro, small and medium enterprises, and revival of income generating activities. This phase is expected to be completed before December 2016. However, re-construction of micro-hydro plants may extend up to June 2017.

#### POLICY GAPS IN ELECTRICITY SECTOR RELATED TO EARTHQUAKE RISK AND VULNERABILITY IN NEPAL

It is a well-established fact that Nepal lies in one of the most earthquake-vulnerable zones, which puts its infrastructure at considerable risk. However, to date there is no policy in place to address the crucial issue of resilience to natural disasters. In this context, it is imperative to initiate and adopt the following policies in the electricity sector:

- Formulation and implementation of a policy addressing the issue of dam safety and security in public and private sector hydropower projects with regard to existing as well as future projects.
- Standardization of parameters for seismic-safety features in the design of electricity infrastructure such as dams, waterways,

power stations, substations and transmission lines, among others.

- Design of early warning systems in hydropower projects.
- Policy for selection of hydropower projects in various river basins to reduce the impact of natural disaster.
- Adoption of appropriate insurance policy by public utilities.
- Preparation of guidelines for safety and evacuation of electrical equipment and personnel in the event of a disaster.
- Policy guidelines and procedures for disaster management in restoration of power at the earliest.
- Policy guideline for asset as well as inventory management

### Implementation Arrangements

#### OVERALL PLANNING

A Master Plan for Rural Electrification, a Transmission System Master Plan, and an Integrated River Basin Development Planning that includes a Hydropower Generation Master Plan, will be initiated soon to ensure a coordinated approach for generation, transmission and distribution system development and rural electrification programmes.

#### ON-GRID FACILITIES

NEA and IPPs will be responsible for assessment, planning and implementation of recovery for their respectively hydropower facilities that were damaged due to the earthquake. For the recovery of grid electricity facilities including generation, transmission and distribution, international standards will be applied and systems planning will be followed to ensure better quality of facilities, safety and earthquake-resilience of dams, and improved optimization of distribution system. The recovery process will include the following steps:

**TABLE 11.12: VALUE OF PHYSICAL DAMAGE AND COST OF RECONSTRUCTION**

S.No	Asset category	Damages (million NPR)			Reconstruction (million NPR)		
		Total	Public	Private	Total	Public	Private
1	Generation	12,134.0	1,400.0	10,737.0	12,573.0	1,440.0	11,097.0
2	Transmission	347.0	347.0	-	417.0	417.0	-
3	Distribution	2,812.0	1,315.0	1,497.0	3,118.0	1,322.0	1,796.0
4	Civil structures	514.0	514.0	-	514.0	514.0	-
5	Contingencies	2,000.0	2,000.0	-	2,000.0	2,000.0	-
	<b>Total</b>	<b>17,807.0</b>	<b>5,575.0</b>	<b>11,663.0</b>	<b>18,586.0</b>	<b>5,693.0</b>	<b>12,893.0</b>

- **Generation:** Carry out a rapid dam safety assessment of all major hydropower dams in the earthquake-affected area to ensure full recovery or increased dam safety and resilience to future earthquake disasters and to inform the recovery investment plan accordingly.
- **Transmission:** To avoid potential risks of interruption due to earthquake effects, NEA will conduct a walk-through inspection along the transmission line in earthquake-affected areas to check foundation stability, structure defects and landslide risks, and prepare and implement the investment programme as needed. In the process of restoration of substation equipment, available spare parts already consumed, attention should be paid to procuring and maintaining adequate spares to take care of future contingencies. Emergency restoration systems (ERS) for transmission lines may be thought of as a part of disaster management of transmission lines in the event of future disasters so that transmission lines are restored quickly with ERS minimizing the loss of revenues.
- **Distribution:** In accordance with the Distribution Master Plan and international standards for the distribution system, plan new feeders in close coordination with housing sector activities to ensure recovery of electricity services in new settlement areas as soon as new houses are rebuilt.

#### OFF-GRID FACILITIES

AEPC will be responsible for implementation of the recovery and reconstruction with respect to off-grid electricity services. Community and individual households should be encouraged to play an active role in restoring or rebuilding the affected schemes. The off-grid initiatives for recovery and reconstruction will adopt international technical standards for design and installation of specific MHPs and Solar Systems and follow the Master Plan to ensure optimization of site and size selection of MHPs and better coordination with the grid extension plan.

### Assessment Methodology

This assessment has been conducted in accordance with the guidance provided by the PDNA Secretariat of the Government of Nepal. It is primarily dependent on the initial assessment data provided by the government, which has been refined and re-categorized in accordance with PDNA Guidelines through selected field

verifications and intensive discussions with the NEA, MoE, DoED, IPPAN and the PDNA electricity sector team.

As electricity is supplied through on-grid and off-grid systems, the damages, losses and needs have been calculated separately for them. The assessment of damage of physical assets for generation, transmission and distribution in the grid system was accomplished with the help of information provided by NEA and IPPAN, whereas information about damaged assets in the off-grid system was provided by AEPC.

The effects of damages to electrical installations and supplies resulted in financial loss (change in economic flows [CEF]). The value of financial losses due to physical damage of electricity infrastructure is estimated in accordance with the existing cost structure. Financial losses are attributed to decline in demand due to interruption in supply or loss of sales to electricity customers, loss of revenue of IPP, and loss of government revenue in the form of royalties from the electricity sector.

Considering the load-shedding situation prevailing in Nepal, reduction in sales due to loss of connection is not considered. The reason is that as a result of loss in demand in earthquake-affected area, the available energy is being supplied to other areas, hence preventing any reduction in sales. However, outages in power plants cause a decrease the power supply, which leads to a reduction in sales. Accordingly, the loss of revenue is estimated on the basis of an estimated decrease in sales due to the generation lost, multiplied by the current average revenue rate of NEA. For this purpose, the loss of sales is calculated from the lost generation after making an adjustment for a system lost factor of 25.5 percent. In the case of IPP, the change in economic flows or losses is estimated on the basis of loss of generation multiplied by sales price of power. The change in economic flows to government is established as per the change in government royalty from this sector.

MHPs are run on the lines of community ownership and management, with no saving from sales of electricity service. Accordingly, it is assumed that there will be no financial loss in the off-grid system. Hence, the total financial loss in the electricity sector is calculated by considering only the financial effects on the grid system.





## 12. Communications

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### Summary

The PDNA for the communications sector covers the strategic public and private telecommunications networks (both fixed and mobile), internet service providers, postal services, print and broadcast media (newsprint, radio, television) and cable television operators. It also includes the Ministry of Information and Communications (MoIC) responsible for the sectors of information and communications, and its associated agencies including the Department of Information, Department of Printing, Press Council, National News Agency, Film Development Board, Radio Service Broadcast Development Committee (Radio Nepal), and Nepal Television. The MoIC and Nepal Telecommunications Authority (NTA) have policy and regulatory oversight of the sector.

The total damages and losses in economic flows are estimated at NPR 3,610.2 million (US\$36.10 million) and NPR 5084.6 million (US\$50.85 million), respectively. The estimated cost of recovery and reconstruction is estimated at NPR 4,938.8 million (US\$49.39 million).

The long-term recovery goal for the communications sector is to rebuild and put in place a future-proof communications infrastructure and services sector that will serve the needs of a digital Nepal. In line with this vision, the reconstruction effort should be anchored in a future-proofed approach, that ensures increased investments in the telecommunications sector, the establishment of a resilient public service broadcast sector, and the convergence of the Information and Communications Technology (ICT) sector that will allow Nepal to take advantage of the opportunities provided by technological developments.

In the short term, communications infrastructure in the worst-affected districts will be rehabilitated as quickly as possible using available

financial resources, including the existing Rural Telecommunications Development Fund (RTDF). Broadband wireless internet services will also be provided in the worst-hit districts so that affected communities have access. These initiatives will be led by NTA in close coordination with MoIC and service providers.

### Pre-Disaster Context and Baseline

Prior to the earthquake, Nepal's communications sector was characterized by competition and growth in market size and coverage. In particular, there was impressive growth in the cellular market, a well-developed community and FM radio ecosystem, a large number of print and broadcast media players, and a competitive cable television market. The postal network extended to every Village Development Committee (VDC) across the country. Table 12.1 below provides a summary of the communications sector and market structure prior to the earthquake.

Nepal's telecommunications market comprises two major operators with almost equal market share, Nepal Telecom and Ncell, and four other small operators. With mobile services providing greater mobility, and with close to full population coverage achieved nationwide, mobile services will continue to dominate the market. While Nepal's mobile communications sector is well developed and all districts and VDCs have access to mobile services, Nepal's internet penetration is still less than 40 percent. The chart below<sup>57</sup> indicates growth in access (percentage of population with access to various services).

Telecommunications is a major source of tax and royalty revenues for the Government of Nepal (GoN). As such, overall sector revenues for 2014 were estimated at NPR 85,900 million (US\$859 million) and GoN received approximately NPR 3,450 million (US\$34.5 million) in royalties. The two major telecommunications

<sup>57</sup> Source: Nepal Telecommunications Authority (July 2014)



operators are some of the largest taxpayers in Nepal. One of the largest foreign direct investors in Nepal has been the telecommunications operator Ncell. Before the earthquake, the telecommunications sector faced a number of policy and regulatory challenges including:

- a need for revisions in the policy and regulatory framework, given the significant technological developments in the sector;
- lack of an emergency and disaster communications strategy, plan and network infrastructure;
- large unutilized amounts accumulated (approximately NPR 10,000 million) in the RTDF funds; and
- limited mobile Value Added Services and Applications designed to serve economic and social sectors, particularly with respect to mobile financial services which lacks a clear regulatory framework for mobile network operators (MNOs).

Despite potential challenges, ICTs have been adopted across the public and private sectors in Nepal. ICTs have been extensively used in

the provision of many public and private sector services, among them banking and financial services, public sector financial management, agriculture, health, education, social protection, transport, energy, and rural development. The government has invested in cross-sectoral ICT infrastructure (government integrated data centre) and service frameworks (Nepal eGovernment Interoperability Framework (NeGIF)). The National Identification Management Centre (NIDMC) of MoHA was also in the process of implementing a pilot project to establish a digital national identification infrastructure based on biometric data.

## Post-Disaster Context

### DAMAGES AND LOSSES

The Communications sector was significantly damaged by the earthquake. The **telecommunication networks** were affected, as mobile base transceiver stations (BTS) were damaged, and power disruptions and lack of fuel supply impacted service provision. All operators reported damage to some of their sites, including build-

**TABLE 12.1: COMMUNICATIONS SECTOR AND MARKET STRUCTURE IN NEPAL**

Policy maker	Ministry of Information and Communications (MoIC)
Telecommunications regulator	Nepal Telecommunications Authority (NTA)
Spectrum management	Frequency Management Division (FMD) at the MoIC. Telecommunications spectrum is allocated on a 'block' basis to NTA to manage. Broadcast and other spectrum is managed by FMD. Overall spectrum management policy, including pricing, is decided by the Radio Frequency Policy Determination Committee (RFPDC) – a cross-sectoral committee headed by the Minister, MoIC, and comprising the Ministry of Home Affairs (MoHA), Ministry of Defence (MoD) and Ministry of Civil Aviation and Culture (MoCAC).
Department of Information & Press Council Nepal	Accredits journalists Concurs registration of print media operations Houses print media information
Telecommunications operators and market share	Nepal Telecom (vertically integrated state-owned operator) - 46% NCell (mobile operator majority owned by Teliasonera) - 46% Smart Telecom Private Limited (Basic telecom operator) - 5% United Telecom (WLL operator – majority Indian owned) - 2% Others (Nepal Satellite, STM, etc.) - 1%
Telecom sector statistics (end-January 2015)	Fixed penetration: 3.12% Mobile penetration: 87.55% Others (Limited mobility, satellite): 7.63% Internet users: 38.78%
Number of television broadcasters	1 state-owned Television broadcaster -- Nepal Television 25 private television broadcasters in operation
Print media	2 government-owned newspapers 7016 privately-owned newspapers; magazines and other weekly publishing houses.
Postal services	Government owned Nepal Post with presence in every VDC and municipality across Nepal. Multiple private courier service providers
Cable television providers	850 registered private operators, 6 digital cable providers.
Internet service providers	46 licensed private operators; all telecommunication operators also provide internet services.

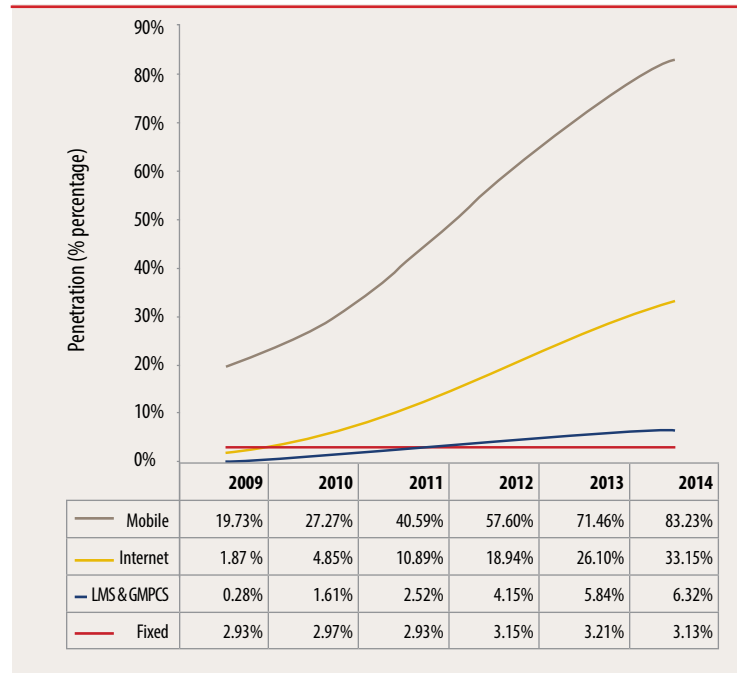
ings. This resulted in significant network congestion and downtime in the immediate time frame of a week. It has been reported that some house owners, on whose rooftop BTSs were installed, are hesitant to continue renting space, given the additional loading factors on their rooftop premises. While the international gateways, which enable international communications, were not affected, network back haul infrastructure (both aerially installed fiber optic cables and microwave links) were damaged in a number of areas. The fixed line network in Kathmandu sustained damage as well.

To cope with the effects on network coverage and congestion in the Kathmandu Valley, NTA made additional frequency available for GSM operators on request for a one month period. Ncell utilized its additional spectrum, while Nepal Telecom did not. Operators provided free voice, data and SMS services. The services have been largely restored. In the worst-affected districts, mobile communication services are available, but the quality is being impacted by the low reliability of power supply and dead spots in the network. Internet services, too, were disrupted but have been restored. However, erratic power supply remains a challenge. At the post offices, damage was limited to physical buildings at 32 locations. Postal services continue to be provided, albeit with delays due to road blockages, among others.

As for the **broadcast media**, both television and radio broadcasters were affected. The Association of Community Radio Broadcasters (ACoRAB) reported damage to community radio equipment and buildings at 60 locations across 19 affected districts. Approximately 50 FM radio stations were impacted by the earthquakes. Twenty of the 50 FM stations were off-air for approximately three days after 25 April. The state-owned Radio Nepal, which continued its broadcast for 24 hours for a few days after the disaster, halted all advertising and focused on public service announcements. Corporate clients of FM broadcasters cancelled advertising, which impacted their financial position.

The buildings and equipment of television broadcasters were physically damaged. Nepal Television, the state-owned broadcaster, con-

**FIGURE 12.1: COMMUNICATIONS MARKET ACCESS**



(Source Nepal Telecommunications Authority July 2014)

tinued broadcasting round the clock, despite challenges. It also lost revenues from advertising and time slot sales. Although the buildings and some equipment of print media agencies were affected, their operations continued. The building of the Department of Information was seriously damaged; so too the office premises of the Press Council of Nepal, National News Agency and Radio Service Broadcast Development Committee (Radio Nepal). The Film Development Board reported that 57 private cinema halls were also physically impacted by the earthquake. Their own office premises were also affected. NTA was forced to move to another location as their rented office space of NTA were damaged, forcing a move to another location.

**EFFECTS ON SECTOR INVESTMENTS**

While MoIC and NTA provided all regulatory support to service providers, the earthquake will likely impact future investments in the telecommunications sectors. As such, the cost of insurance for private operators is likely to increase.

**EFFECTS ON GOVERNMENT FUNCTIONS AND SYSTEMS**

The communications sector is crucial to ensuring that the government is able to communicate

and manage its disaster response, relief and rehabilitation efforts. While initial network congestion and lack of coverage was experienced, there has been no visible adverse effect on governance and key decision-making processes. However, in the event that the networks had failed and could not be restored in time, the government would have been impacted by the development. Following the earthquake, as the government seeks to make cash transfers to severely affected constituencies and individuals, the adoption of mobile financial services would have been very effective and would have greatly facilitated the process of service delivery at such a critical time.

#### EFFECTS ON RISKS AND VULNERABILITIES

As Nepal does not yet have a National Emergency Telecommunications Plan, the sector faces an increasing vulnerability to network downtime. A lack of power supply and damage to road networks in rural Nepal implies that operators need to rely on back-up power solutions such as diesel engine generators and solar power for their rural networks. This increases the risk of network downtime, as it is a challenge to get fuel to remote sites. Further, communication towers located in earthquake-affected and landslide-prone areas are at risk of collapse.

Damage costs are estimated on initial assessments by MoIC, based on information<sup>58</sup> provided by public and private operators, print and media broadcasters, the post office and other agencies. These estimates have not been verified through detailed engineering assessments. The loss figures mainly consist of damage to physical premises, network equipment and additional maintenance costs (largely for fuel supply for sites where commercial power is unavailable and/or erratic) and immediate rehabilitation/reconstruction works.

As telecommunication networks were impacted immediately after the earthquake, significant revenue losses were borne by operators due to network outages (mainly the two large mobile network operators) and the fact that they provided free airtime and SMS services. The operators also reduced call charges to key interna-

tional locations where a large number of Nepali residents are based. Finally, media broadcasters accumulated revenue losses due to the non-carriage of commercial advertising and time slots.

The overall cost of damages and losses in the communications sector is estimated at NPR 3610.2 million (US\$36.10million) and NPR 5084.6 million (US\$ 50.85 million), respectively, as summarized in Table 12.2 below.

#### Disaster Effects and Impacts

The total population of the most-affected 14 districts is about 5.37 million. Most of them live in remote rural communities and face challenges in accessing social and economic services. An underdeveloped mobile money ecosystem in Nepal has impacted their access to finance, and an underdeveloped broadband ecosystem has impacted their access to public services. Moreover, the lack of a digital National Identification System is likely to hamper public service delivery.

The ability of government agencies and people to communicate and receive information following the disaster, demonstrated the need for a robust and resilient communications infrastructure in Nepal. While operators provided coverage to all districts and VDCs and were in the process of increasing coverage of mobile broadband networks, in the short term, their focus will be on restoring coverage to pre-disaster status. As a result, the expansion of mobile broadband networks will likely be delayed.

ICT and telecommunications in particular constitutes a crucial economic infrastructure and its early recovery and restoration is important to support economic and public service delivery activities in Nepal. Post-disaster relief efforts relied heavily on telecommunications, internet and broadcast media.

The GoN has invested in a number of cross-sectoral ICT infrastructure (governmentintegrated data centre) and service frameworks (NeGIF and NEA). The adoption and mainstreaming of these across all government agencies will enable faster and cheaper deployment of ICT solutions

<sup>58</sup> Qualification: Information provided is preliminary and subject to more details on ground assessment (including engineering and technical) by providers of the information.

**TABLE 12.2: SUMMARY OF ESTIMATED DAMAGES AND LOSSES IN THE COMMUNICATIONS SECTOR**

	<b>Sub-sector</b>	<b>Estimated damages (NPR million)</b>	<b>Estimated damages (US\$ million)</b>	<b>Estimated losses (NPR million)</b>	<b>Estimated losses (US\$ million)</b>
1	Ministry of Information and Communications and related agencies	817.6	8.2	-	-
2	Telecommunication operators	1,735.5	17.4	4,550.1	45.50
3	Internet service providers	20.8	0.2	467.0	4.67
4	Postal sector	509.8	5.1	-	-
5	Television broadcasters	248.3	2.5	50.0	0.50
6	News papers	143.0	1.4	-	-
7	Radio broadcasters	56.2	0.6	17.5	0.18
8	Cable television	79.0	0.8	-	-
	<b>TOTAL</b>	<b>3,610.2</b>	<b>36.1</b>	<b>5,084.6</b>	<b>50.85</b>

and applications across government; reduce the cost of providing public services using ICT; and support government in the business process re-engineering process and allow for data sharing among agencies.

The government's disaster risk reduction (DRR) strategy includes the use of monitoring and early warning systems some of which rely on telecommunication networks. Further, geo-mapping activities (e.g., OpenStreetMap) rely on availability of internet access.

Lack of reliable power and insufficient supply of fuel for diesel engine generators caused significant network downtime. A large number of subscribers were inaccessible as they were unable to charge their mobile phones or use their computers due to a lack of power. On the other hand, fibre optic cables for network backhaul that were ducted and buried underground were not adversely affected, as opposed to aerial cables. There is thus a need to coordinate with the Department of Roads and urban authorities in order to facilitate the development of underground ducts to enable underground fibre networks. As telecom and internet providers start using optical-fibre ground wire (OPGW) on power transmission networks, the linkage between the ICT and the power sector will only become stronger.

The earthquake response has demonstrated the challenges faced in correctly identifying

and verifying affected persons based on biometric information.

### Recovery Needs and Strategy

Reconstruction needs resulting directly from the earthquake in the Communications sector is estimated at NPR 4938.8 million (US\$49.4 million) over a 24-month period.

The key priorities are to ensure that:

- the most-affected districts receive both telecommunications and internet services as quickly as possible;
- displaced communities are provided access to internet services;
- towers are constructed at critical sites both within Kathmandu Valley, in the 14 districts and in other places to ensure that service interruptions are minimized in the event of another disaster;
- NRB finalizes its mobile financial services regulations on a fast track basis;
- an emergency public service broadcasting studio infrastructure is built and Radio Nepal and Nepal Television are merged into a single public service broadcasting agency;
- the construction of the disaster recovery integrated data centre commences immediately; and
- fuel and power supply to the telecommunications sector is prioritized.

The objective is to pursue the development of a future-ready communications infrastructure and service industry that meets the country's



long-term development objectives in terms of inclusive, equitable and sustainable growth as well as a well-functioning digital economy. The strategy is to ensure that networks are built back better and are resilient to disasters.

In the interest of a more resilient telecommunication network, the following measures should be examined:

- Promoting underground cabling in ducts for fibre optic cables to strengthen telecommunication infrastructure.
- Improving the resilience of BTS: making provisions for vehicles with microwave transceivers combined with the function of a base station as well as a satellite ground station, to be shared between operators; adjusting the output power and reconfiguring base station antennas to cover more ground to serve low population density and low network traffic areas better; Increasing power back-up at base stations and all other communication facilities to counter electricity outages.
- Increasing power back-up at the base stations and all other communication facilities to counter electricity outages by deploying more optical fibre on power transmission networks and the use of techniques such as large-zone base stations (to widen existing coverage). Such base stations will have to be deployed in highly populated areas covering a radius of seven km on buildings that have high standards of earthquake resistance.
- Ensuring multiple route redundancies for the backhaul network, both domestic and regional, to ensure that Nepal's telecommunications and internet connectivity is not compromised in the future.
- Ensuring creation of hazard maps by local authorities and their usage, taking necessary safety precautions while building communications infrastructure.
- Taking measures to mitigate traffic congestion on the network, such as call restriction, call prioritization and appropriate disclosure of network capacity by operators through a pre-determined process.
- Building Critical Tower Infrastructure in key strategic locations nationwide and enabling infrastructure sharing for all operators and potential broadcast media providers.

While it is expected that telecommunications coverage will eventually be restored to pre-earthquake status, the ability of operators to provide broadband internet access across the country will be limited by factors such as:

- lack of access to affordable backhaul networks (including fibre optic networks);
- inadequate access to radio spectrum resources; and
- high taxes and sector specific duties and royalties.

It is important to note that these factors have an impact on the consumers with regard to the total cost of ownership and usage. Populations in severely-affected districts will likely have less disposable income to spend on communication services (both voice and internet). Thus, Nepal is likely to fall behind in digitally connecting its people, particularly through the internet in rural areas, if policy decisions and regulatory actions are not taken up with urgency.

In the aftermath of the earthquake, public service broadcasters including Radio Nepal and Nepal Television were instrumental in ensuring that the Nepali people were kept fully informed of developments. Given their extremely critical public service role, it is important to ensure their resilience for the future. This could include the development of back-up production studios in locations outside of Kathmandu.

As ICT is a cross-cutting sector and key infrastructure such as government data centres and the National Identification (NID) infrastructure are key enablers, the building back better strategy would also address these infrastructures. The NID infrastructure should be addressed under the governance agenda.

Overall, given Nepal's reliance on ICT in general, it is important to complete the government's integrated data centre for disaster recovery on a priority basis. Potentially, a second disaster recovery centre, based on containerized data centres, could be established in the Far West Region of Nepal. The government could also plan on a cloud strategy for hosting government data, applications, and services.

GoN should accelerate the implementation of its digital National Identification (NID) programme to provide better public services and target beneficiaries of social protection and other support, both in the post-disaster period and in the long term.

The communications sector in a digitally converged<sup>59</sup> environment cannot be treated separately from the ICT sector. Nepal is the only country in South Asia today where communications and IT are handled by two separate ministries. This has impacted the development of the ICT sector in the country. To address ICT in a more holistic manner, the IT policy making and implementation function can be transferred from the Ministry of Environment, Science and Technology to MoIC, thus paving the way for a converged ICT sector that could then consider an integrated ICT policy. This will enable improved disaster risk and business continuity ICT planning across the government and enable Nepal to make the best of digital economy opportunities.

While recovery costs for telecommunications in particular have been borne by the service providers as they have had to restore services, there are short-term reconstruction needs. The table below shows the reconstruction needs of the communications sector based on information provided by operators and service providers. These estimates are for a 12-month period in

FY 2015-2016. In addition, there is an urgent need for building back better access (cellular and internet services) and eGovernment infrastructure platforms. This cost is estimated at NPR 1,500 million over the next two years.

### Implementation Arrangements

The proposed strategy revolves around a two-phase intervention: the short to medium term, and the medium to the long term.

Table 12.4 below summarizes the immediate priorities, both related to restoring basic communications services and to use of ICT in broader cross-sectoral relief operations. The overall estimated cost to implement these high priority actions to ensure resilience and build back better is approximately NPR 3,500 million (US\$35 million).

The medium to long-term ICT requirements related to building the country's resilience and promoting overall competitiveness of the economy are identified in Table 12.5 below.

### Assessment Methodology

This assessment has been carried out under the guidance of the National Planning Commission (NPC) and the Post Disaster Needs Assessment (PDNA) secretariat. It is based on the initial assessment provided by MoIC and NTA, which have been reviewed by the PDNA team.

**TABLE 12.3: ESTIMATED RECOVERY AND RECONSTRUCTION COSTS**

	Subsector	Estimated Reconstruction (NPR million)	Estimated Reconstruction (US\$ million)
1	Ministry of Information and Communications and related agencies	798.7	7.99
2	Telecommunication operators	517.8	5.18
3	Internet Service Providers	5.9	0.06
4	Postal Sector	742.0	7.42
5	Television Broadcasters	855.5	8.56
6	Newspapers	193.3	1.93
7	Radio Broadcasters	246.6	2.47
8	Cable Television	79.0	0.79
9	Build Back Better of Access and eGovernment infrastructure	1500.0	15.00
	<b>TOTAL</b>	<b>4,938.8</b>	<b>49.39</b>

<sup>59</sup> Digital convergence of telecommunications, IT, consumer electronics and media.

**TABLE 12.4: SHORT-TERM ACTIONS**

Area	Immediate needs	Specific actions
<b>Restoring Nepal Telecom's local network for priority customers</b>	<ol style="list-style-type: none"> <li>1. Repairing local access networks in Kathmandu and affected districts for priority customers (government, hospitals, schools)</li> <li>2. Emergency power generators</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm locations and cost of repairing access network for priority customers</li> <li>2. Pool requests for power generators across sectors</li> </ol>
<b>Cellular and Internet services</b>	<ol style="list-style-type: none"> <li>1. Restore cellular service by repairing fallen/ damaged sites</li> <li>2. Provide high speed broadband connectivity in the worst-affected districts.</li> <li>3. Lease government land, where available, within Kathmandu Valley to operators to build towers</li> </ol>	<ol style="list-style-type: none"> <li>1. Use RTDF to build new towers in severely affected districts and ensure infrastructure sharing between operators</li> <li>2. Use RTDF to support development of wireless broadband networks in worst affected districts</li> <li>3. Use government resource and RTDF to finance the early build out of community information centers in every VDC in rural Nepal.</li> <li>4. NTA and MOIC to identify in collaboration with operators, sites for leasing from government.</li> </ol>
<b>Postal service</b>	<ul style="list-style-type: none"> <li>• Immediate restoration of postal service for official (government and diplomatic) correspondence</li> </ul>	<ul style="list-style-type: none"> <li>• Repair and rebuild 32 damaged post office buildings.</li> </ul>
<b>Public Service Broadcasters</b>	<ul style="list-style-type: none"> <li>• Strengthen Public Service broadcasting agencies</li> </ul>	<ol style="list-style-type: none"> <li>1. Build emergency public service studio infrastructure</li> <li>2. On a fast track, merge Radio Nepal and Nepal Television into a single Public Service Broadcasting agency.</li> </ol>
<b>Financial system</b>	<ul style="list-style-type: none"> <li>• Redundancy of fibre network in Kathmandu connecting banks in the capital</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct a quick assessment and deploy redundant network solutions in consultation with the Banking association.</li> </ul>
<b>Public finance and mobile payments and solutions</b>	<ul style="list-style-type: none"> <li>• Use mobile money for transfer of benefit payments</li> <li>• Use mobile applications for service delivery</li> </ul>	<ol style="list-style-type: none"> <li>1. Nepal Rastra Bank to approve mobile money regulations and allow mobile operators to participate in service provision.</li> <li>2. NTA to lead the mobile service delivery agenda in partnership with stakeholders.</li> <li>3. Use ICT solutions to identify and verify beneficiaries of cash transfer and other relief benefits.</li> </ol>
<b>Displaced Persons (DPs)</b>	<ol style="list-style-type: none"> <li>1. Provide internet access and community telecentres at DP camps</li> <li>2. Continuation of education of displaced population through e-learning</li> </ol>	<ol style="list-style-type: none"> <li>1. Use RTDF to finance this initiative as a priority.</li> <li>2. Provision of digitalized textbooks (including teacher's guides) and educational material electronically to displaced population.</li> </ol>
<b>eGovernment Platforms</b>	<ol style="list-style-type: none"> <li>1. Ensure continuity of Government Integrated Data Center</li> <li>2. National Identification System to be deployed</li> </ol>	<ol style="list-style-type: none"> <li>1. Current Government Integrated Data Center to be expanded and Disaster Recovery Center to be built</li> <li>2. Complete ADB pilot for national identification program as a priority and scale up initiative across the country.</li> </ol>
<b>Creation of a favourable environment for good sectoral governance</b>	<ol style="list-style-type: none"> <li>1. Implement the National Broadband policy</li> <li>2. Review and revise licensing regime; and telecom sector taxation regime</li> <li>3. Develop a spectrum roadmap</li> <li>4. Convergence approach to ICT sector</li> </ol>	<ol style="list-style-type: none"> <li>1. Approve and adopt the National Broadband Action Plan currently under preparation.</li> <li>2. Merge ICT function under one Ministry –with IT function moved to MoIC from Ministry of Environment, Science and Technology.</li> <li>3. Approve and implement the integrated National ICT policy currently under preparation</li> <li>4. Committee to review/revise licensing and telecom taxation regime formed and revisions drafted.</li> <li>5. RFPDC and FMD to develop a draft spectrum roadmap</li> </ol>

The damage, loss and recovery assessments are highly dependent on data provided by operators, service providers and government agencies to the MoIC. This data was reviewed in accordance

with PDNA guidelines through discussions with the government and the PDNA Communications sector team, led by the MoIC and World Bank, and supported by Asia Foundation.

**TABLE 12.5: MEDIUM-TERM NEEDS AND ACTIONS**

Area	Medium-term needs	Specific actions
Building resilience in international and national communication	<ol style="list-style-type: none"> <li>1. Establish redundancy for international gateways at both the India and China borders.</li> <li>2. Deploy short terrestrial fiber networks to India and China at border points.</li> <li>3. Deploy national backbone network with open access (e.g., by including it in the electricity network rebuilt)</li> <li>4. Install additional towers in rural areas to provide increased coverage and ensure tower sharing</li> <li>5. Install and operationalize the emergency communications network</li> <li>6. Implement a disaster recovery telecommunications Standard Operating Procedures (SOPs)</li> <li>7. Develop and raise citizen awareness of telecommunications and ICT services and applications for use during disasters</li> </ol>	<ol style="list-style-type: none"> <li>1. RTDF fund utilized for redundant network build-outs, with infrastructure sharing mandated.</li> <li>2. Review of telecommunications sector policy and regulatory framework to ensure that infrastructure investments are future proofed.</li> <li>3. Adopt a policy, legal and regulatory framework for infrastructure sharing across utilities and sectors (roads, urban, power) and easier rights of way access.</li> <li>4. Identify critical network points and implement early warning systems (EWS) in coordination with other agencies that have existing EWS.</li> <li>5. Develop SOPs for disaster recovery in the telecommunications sector.</li> <li>6. Develop mobile applications for both smart and feature phones that can send messages from a customer to pre-selected numbers.</li> <li>7. Raise awareness among consumers on using telecommunications and ICT services during disasters in order to prevent network congestion.</li> </ol>
Postal service	<ul style="list-style-type: none"> <li>• Postal network resilience improved</li> </ul>	<ul style="list-style-type: none"> <li>• Complete restoration of postal service network</li> </ul>
Media Broadcast sector	<ol style="list-style-type: none"> <li>1. Digital switchover completed</li> <li>2. Digitalization of public broadcasters and national news agency's information.</li> </ol>	<ol style="list-style-type: none"> <li>1. Work with MOIC and NTA for digital switchover by 2017</li> <li>2. Nepal Television to procure portable broadcasting equipment.</li> <li>3. Archive all production materials in a digital format.</li> </ol>
Building resilience to loss of critical data across sectors	<ul style="list-style-type: none"> <li>• Create system of redundant repositories of data for critical government information systems</li> </ul>	<ol style="list-style-type: none"> <li>1. Establish government disaster recovery data centers.</li> <li>2. Pilot and adopt the concept of "cloud computing"</li> </ol>
Urban planning and transport	<ul style="list-style-type: none"> <li>• Integrate ICT into urban planning in Kathmandu and road construction</li> </ul>	<ol style="list-style-type: none"> <li>1. Integrate deployment of fiber optic networks into the reconstruction of Kathmandu's urban infrastructure</li> <li>2. Include ducts for telecom infrastructure in roads, as well as in buildings (both new and rebuilt)</li> </ol>





PAPAकार्यक्रम द्वारा निर्माणाधीन  
जिला शुभिय, मुठ  
निर्माणमिती: २००९



# 13. Community Infrastructure

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## Summary

Community infrastructure are small-scale facilities owned, planned, built, operated and/or maintained with the active involvement of the community. On a day-to-day basis, local service structures or life-line structures are crucial to the community; however, due to low levels of socio-economic development and complex topography, community infrastructure in Nepal is still in its developing phase.

Government policies defines community infrastructure as covering seven sectors: rural transport; water supply and sanitation; irrigation; electricity; community buildings; social infrastructure; and solid waste infrastructure. However, in order to avoid duplication, the damages and losses relating to rural roads, irrigation, electricity and drinking water are covered in separate sector reports. The damage and losses to the remaining components – trails bridges, footpaths, community buildings and micro communal works, amount to NPR 3.3 billion (US\$ 33.5million).

Community infrastructure was substantially damaged in the affected districts. Roads, bridges and trails were damaged or swept away by the earthquake and landslides; irrigation, micro-hydro and drinking water schemes were impacted, becoming completely non-operational due to changes in the hydrological regime in some cases; electricity networks that connected houses as well as solar installations were damaged; community buildings used for meetings, social events and child care collapsed; and many of the micro infrastructure facilities such as ponds, dug-wells or threshing/drying areas were broken.

The long-term recovery goal for community infrastructure is to rebuild to better and more resilient standards and expand in a way as to improve the access of poor and marginalized groups to its various facilities. Several lessons can be learnt from the damage caused by the earthquake; moreover, issues of design and maintenance of rural community structures have widened the

scope of sustainable community development. The assessment report shows that any disruption in these grassroots structures limits the community's access to the entire network of institutional structures that drive the community development efforts of the government, NGOs and development partners. Further, any such disruption also makes it difficult for people to access the technological and market opportunities that the private sector can provide.

In line with this vision, the reconstruction effort should be anchored in a highly participative approach characterized by explicit mechanisms to involve the poor and marginalized sections of the population, and women. There should be a streamlined approval, implementation, monitoring and reporting process for rapid funds disbursements in the interests of accountability and transparency. There should also be improved institutional mechanisms for operations and maintenance, including sustainable cost recovery. Priority is to be accorded to areas that are at risk from landslides and floods, and economic opportunities should be created for populations to relocate to safer places. Efforts should be made to promote suitable technologies, lightweight construction material, local materials and earthquake-resistant designs, and to incorporate the role of the private sector. Reconstruction and recovery costs based on these enhanced criteria have been estimated at NPR 4,450 million (US\$44.5 million). This is in addition to the costs estimated for community-level projects in the sectoral reports on transport, irrigation, drinking water and electricity.

The Government of Nepal (GoN) has a longstanding experience of developing community infrastructure. At present there are a number of ongoing major projects and programmes that aim to address the challenges of building back better, with NGOs and development partners working with the government in a spirit of collaboration aimed at resilient reconstruction and rehabilitation.

The existing system of governance and implementation needs to be strengthened. Planning and prioritizing for rehabilitation needs to be accomplished in a participative manner, formalizing community platforms alongside assessment by local bodies (Village Development Committee/District Development Committees/Municipalities (VDC/DDC/MNC). Local bodies should lead community infrastructure reconstruction, supported by the Ministry of Federal Affairs and Local Development (MoFALD). Technical support should be provided by the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) and the District Technical Offices (DTOs), which need to be strengthened.

### Pre-Disaster Context and Baseline

Most communities in the earthquake-affected districts live in scattered settlements usually consisting of households belonging to the same caste or ethnic group, clan or even one large extended family. This sector report covers the 14 affected districts that have been severely affected, which together account for 741 VDCs and municipalities. Most of the villages are located in hilly or mountainous areas; a few are situated in valleys and in the inner Tarai area. In most of the affected areas existing infrastructure in most of these areas is limited to largely labour-based traditional design and technology, dependent on the use of local materials. Both the quantity and quality of local infrastructure varies with the topography and is vulnerable to disasters and extreme weather events, particularly due to weak maintenance.

Much of the smaller community infrastructure, including footpaths, trails, drinking water supplies and small hydro or solar electricity producing schemes, are built with the involvement of local communities. Public infrastructure, such as an irrigation scheme, a bridge or a road linking to a highway or district road, may be built by one or several villages but this tends to be rare for it requires substantial community mobilization.

In all the affected districts have about 13,000 km of village roads, 1,000 trail bridges and 11,000 km of foot trails; small scale irrigation facilities covering 130,000 ha of land; 800 drinking water schemes; 260 small hydroelectricity schemes

and 70,000 solar installations; and over 2,000 community buildings. In addition, most settlements and villages have a range of micro facilities which serve small groups of 15-20 households. These structures usually consist of small ponds or tanks to capture rainwater; small solar pumps for drawing water for humans, livestock or kitchen gardens; sheds for storage and to provide shelter for livestock; and areas for drying and threshing crops such as rice. These small micro-infrastructure facilities are valued at almost NPRs 4,000 million (US\$40 million).

Infrastructure services such as irrigation, electricity and drinking water substantially improve productivity and quality of life in the community. The transport network, though limited, provides a critical linkage to markets and social services such as schools, health centres and hospitals. Local bodies are responsible for implementation, oversight and maintenance support.

Over several years efforts have been launched to empower community-level organizations to operate local services/infrastructure, creating an interface with beneficiaries. Likewise, local NGOs have partnered with ongoing programmes such as the Rural Community Infrastructure Works (RCIW) programme and the Poverty Alleviation Fund (PAF) programme to mobilize people to form Users Group (UG) or Community Organizations (COs). Often cash-for-work or food-for-work modalities are employed to build community infrastructure, particularly when the works are technically simple.

Generally, COs tend to be small and only cover one or few settlements. As a result projects and programmes prepared and implemented through them tend to be small and focus on very local needs. Regular operations and maintenance could be challenging, particularly if substantial cash outlays are needed for repairs.

Infrastructure is subject to the risks of inclement weather, climatic and geological changes and little effort has been made to ensure that they are resilient. The fragility of community-level infrastructure is exacerbated by the consequences of a harsh environment; low level technology; and limited funds for good quality construction and maintenance. Hence, most community infra-

structure is vulnerable to rapid deterioration in the face of heavy monsoon rains or landslides, among others.

## Post-Disaster Context

### DISASTER EFFECTS AND IMPACTS

The damage to community infrastructure was greatest around the epicentre of the earthquake area and in the 14 severely-affected districts. Damage to community infrastructure has a negative social impact on villagers, particularly women who are responsible for household chores and looking after livestock as well. Further, with the monsoon, heavy rains, landslides and high water levels in streams and rivers, there is likely to be further damage to community infrastructure.

The damage to local infrastructure has had a negative economic, social and quality-of-life impact – reducing productivity and access to key services such as electricity and drinking water. In addition, the damage to community infrastructure has increased the isolation of many communities living in mountain areas, to a great extent cutting them off from trade, commerce, education and medical facilities that can have severe cultural and social impacts. In many cases, the loss of community facilities has reduced the interaction of people for cooperative economic and social activities which, if not addressed quickly, could significantly erode social capital.

### RURAL TRANSPORT

Rapid and safe transportation remains a major challenge in Nepal with many rural communities located hours away from the nearest arterial road or district headquarters where essential social and economics services are available. Community roads continue to be the weakest link in the transport network, particularly trail bridges and walking tracks that link households and settlements, and village roads – typically 10-15 km long - that link the village to the district road network. District-level reports have detailed the damage to various trail bridges comprising mainly of cracks, breakages and movements in the foundations and associated structures. Village walking trails were mainly damaged due to landslides caused by the earthquake. Some walking trails only needed clearing while others ne-

cessitated new paths. The damages are estimated to be NPR 469 million (US\$ 4.7 million) for this component of community infrastructure. Village, district and municipal roads were also affected which, along with losses, are detailed in the sectoral report on transport.

### COMMUNITY IRRIGATION

In the mountainous and hilly areas, marked by steep slopes and fast flowing streams, intake structures of irrigation canals as well as canals themselves, which often run along the contours for 0.5 km to 2 km, were affected. In the less hilly areas and valleys, the damage was less, with the problems mainly relating to water storage, diversion structures and channels. Of the 130,000 ha of community irrigated lands in the 14 most-affected districts, 44,000 ha are farmer-managed irrigation schemes under the purview of the Irrigation Department, and 87,000 ha are community irrigated areas that farmers do not pay charges for. The damage will have an impact on the summer crops, and local water shortage may lead to a substitution of rice with maize. The impact of the damage will be higher in the case of winter crops which require irrigation owing to low rainfall. The damages for small-scale community irrigation schemes, as well as the quantification of losses, are provided in the PDNA sector report on irrigation.

### MICRO ELECTRICITY

At the community level, a number of hydropower and solar powered electricity generation facilities have been damaged or destroyed. Similarly, some of the local distribution systems that draw from the national grids and provide electricity to households and settlements have also been damaged. The estimates of damages in small-scale electricity generation and distribution, as well as the quantification of losses, are provided in the PDNA's sectoral report on electricity.

### COMMUNITY DRINKING WATER

Many of the settlements and villages in the mountains and higher hills rely on streams and springs for their domestic water supply. However, those at lower altitudes pump water from streams or wells into local storage tanks. Although a high proportion (60 percent to 80 percent), theoretically, has access to drinking water, many schemes were in poor condition



even prior to the earthquake. The earthquake further damaged tanks, pipes, and pumps and associated supply structures. In some cases, geological changes have resulted in streams and springs running dry. In addition to physical damage, the effect on drinking water infrastructure has had a negative impact on women and young girls who are responsible for fetching drinking water for the entire household. The estimate of damages in drinking water and sanitation infrastructure, as well as quantification of losses, is provided in PDNA's sectoral report on water, sanitation and hygiene.

#### COMMUNITY BUILDINGS

A number of village buildings are used by the community and community organizations such as 'Ama Samuha' ('Mother's group'), 'Chetna Samuha' ('Awareness Group'), public libraries, community halls, cooperative buildings and Ward Citizen Forums, among others, for social (religious and cultural) gatherings and training purposes. Community buildings provide spaces to discuss and decide on actions that impact the community as a whole. An added advantage is that these places denote safe meeting grounds and a refuge, especially in the wake of a disaster. Community buildings are critical physical component of rural landscape. The damages in this component of community infrastructure amount to NPR 2,500 million (US\$ 25 million).

#### MICRO FACILITIES

Most settlements and villages have a range of micro facilities catering to small groups of 15-20 households. These comprise small ponds or tanks to capture rainwater for drinking, washing animals or even to irrigate the kitchen garden; sheds for storage and to provide shelter for livestock; and areas for drying and threshing crops such as rice. The damages are estimated at NPR 379 million (US\$ 3.8 million).

#### DAMAGES AND LOSSES

The total damages for the above mentioned works are estimated at NPR 3,349 million (US\$33.5 million). The largest proportion of these costs are related to community buildings (NPR 2,500 million [US\$25 million]), followed by micro facilities.

#### Recovery Needs and Strategy

As mentioned earlier, the way this PDNA is structured, the damage and needs data on four of the seven components of community infrastructure (irrigation, electricity, water, sanitation and hygiene, and transport) have been dealt with in the respective sector reports. The sectoral report on community infrastructure deals with damages and needs of three components, namely trail roads and bridges, community buildings and other micro facilities.

However, during the recovery and reconstruction phase it is essential that a unified and comprehensive approach be followed for all community-level infrastructure work, all the more so since the effect of the earthquake could well exacerbate the sense of isolation and of being abandoned among the weaker sections, and women.

Due to the levels of socio-economic development and complex topography, community infrastructure in Nepal is still in the process of evolving. Most of it is out of reach for, say, persons living with disabilities (PLWD). Disruptions in grassroots infrastructure that affect the mobility and ability of the community to access public services and larger economic opportunities in the public and private sector (the latter especially in the light of new technology) have a very negative impact. Traditional systems related to gender, ethnicity and caste persist in the absence of impact from national efforts to address these issues. Secondly,

**TABLE 13.1: DAMAGES TO TRAIL BRIDGES, COMMUNITY BUILDINGS AND MICRO FACILITIES**

Description	Unit	Damage Cost	
Trail bridge	85 Nos.	NPR 118.8 m	US\$ 1.2 m
Foot trail	500 km	NPR 350 m	US\$ 3.5 m
Community buildings	1667 Nos.	NPR 2501.9 m	US\$ 25 m
Others (Micro community structure)	Lumpsum	NPR 378.6 m	US\$ 3.8 m
<b>Total</b>		<b>NPR. 3349.3 m</b>	<b>US\$ 33.5 m</b>

production systems, too, remain at the level of subsistence.

There is consensus on the view that as countries affected by disasters rebuild damaged or destroyed infrastructures, they need to build back better. This usually means that services, infrastructure and governance mechanisms need to be rebuilt to a higher level than in the past, which includes being more resilient to future shocks as well. However, in Nepal, community infrastructure was extremely limited even prior to the earthquake. In such a context, a broader concept of building back better is required – a concept that not only involves rebuilding damaged or destroyed community infrastructure but also its expansion to improve the access of marginalized sections of society, disadvantaged and vulnerable social and ethnic groups, PLWD, children, and women.

Hence, the targeted recovery outcome is to put in place a network of community infrastructure that links all households and segments of population to national and district level services, infrastructure, markets and social development efforts, and to create equitable opportunities for social and economic development at the grass-roots level.

Based on the above vision, the community infrastructure recovery effort would require:

- a highly participative approach for planning, resourcing, implementation and governance of community infrastructure, with strong and explicit mechanisms to involve the poor and marginalized sections, including women;
- according priority to areas at risk from landslides and floods, and creating new economic opportunities in areas for populations to relocate;
- promoting appropriate technologies, light-weight construction material, use of local material and earthquake-resistant designs, finding ways to enhance the role of the private sector;
- skill development for communities in line with the new technologies to create new livelihood opportunities;
- improved institutional mechanisms for operations and maintenance, including sustainable cost recovery;
- a streamlined approval, implementation, monitoring and reporting process for rapid funds disbursement, and to enhance accountability and transparency;
- an emphasis on the basic principles of recovery such as safety first, building back better, appropriate technology, social acceptance and consensus; and
- reiteration of the first principle of ensuring access for disadvantaged sections, groups with specific needs such as children and PLWD, and women.

Actions are also required to strengthen DDCs. They need to play a coordinating role to ensure that all communities and population groups have access to minimum infrastructure services and see that there is no duplication of efforts at the same time. Towards this, DDC should improve current systems of monitoring community infrastructures to ensure that they are adequately maintained and operated. Following recovery and reconstruction, initiatives are required to rehabilitate community livelihoods.

#### **BUILDING BACK BETTER**

As suggested above, BBB in Nepal would imply:

- social aspects, among them greater involvement of the communities, particularly women and other sections of the population;
- geographical aspects, concerning relocation away from sites prone to risks; and
- technological aspects, particularly the use of appropriate, local materials and designs, better management and operation, and maintenance.

These improvements are bound to have cost and resource implications. In addition, it is proposed that funds be provided on a priority to communities that lack even the minimal set of facilities needed for their social and economic well-being, particularly those impacting women. These minimum facilities would translate to drinking water supplies, and water for livestock; sanitation and solid waste disposal; electricity supply either through a hydro/solar installation or by linking to the national grid; community buildings that can be used for social activities and as daycare centres where women can leave their children while working, and as a place of refuge following a disaster.

### **COSTS OF RECOVERY**

The earthquake recovery and reconstruction effort will require about NPR 4,451 million (US\$ 44.5 million). Of this NPR 3,850 million (US\$ 38.5 million) is for repair and reconstruction of community infrastructure considered in this report -- NPR 3,349 million (US\$ 33.5 million) for direct repair and reconstruction of damaged facilities, and NPR 502 million (US\$ 5 million) for building back better with a greater focus on vulnerable sections of the population, and women; more resilient designs and relocation to areas less prone to natural hazards. In addition, NPR 600 million (US\$ 6 million) will be required to fill the infrastructure gap in remote villages that are poorly served.

### **Implementation Arrangements**

Following the earthquake, a number of ongoing major projects and programmes aim to ad-

dress the challenges of developing community infrastructure in a better way. For a long time, MoFALD and its agencies have been implementing community-based programmes such as the Rural Community Infrastructure (RCIW), Community Irrigation Project (CIP), among others. Some of the key features of these new generation of community infrastructure projects include a strong effort at social and community mobilization, working closely with local governmental and non-governmental agencies and partner organizations; community involvement in construction and maintenance through cash-for-work and food-for-work; well-functioning financial and monitoring systems; and technical wings that can promote low cost, technologically advanced, environmentally-friendly designs.

The current institutional, organizational and programme set-up would be able to handle the



recovery and reconstruction effort in the affected areas. Local bodies (VDC/DDC/MNC) are mandated to develop sustainable community infrastructure, and they are supported by the technical wing of DoLIDAR and DTOs, with MoFALD being responsible for policy coordination at the central level. This network of agencies, which reaches down to the village level, needs to be institutionally strengthened for an effective reconstruction strategy based on the principle of building back better. Simultaneously, a number of improvements in operational practices would be needed including in social mobilization, financial management, use of new technology, and improved reporting and monitoring.

Furthermore, private sector support, as per the recovery strategy, is important to rehabilitate community livelihoods. To sum up, community infrastructure recovery responsibility should be led by local bodies, and the funds would be decided in accordance with the programme document.

### Assessment Methodology

This assessment focused on the 14 most-affected districts. Of these seven districts are 'severely affected' (Rasuwa, Gorkha, Nuwakot, Dhading, Sindhupalchowk, Dolakha, and Ramechhap), and seven are 'crisis hit' (Kavrepalanchowk, Sindhuli, Okkhaldhunga, Makawanpur, Lalitpur, Bhaktapur and Kathmandu).

The assessment is based on data obtained from various sources such as district offices, DDCs, MNCs, VDCs (through MoFALD); damage assessments done by institutions with ongoing activities related to community infrastructure such as the Alternative Energy Promotion Centre (AEPIC), the Poverty Alleviation Fund (PAF); as well as data from published sources such as district profiles and from various technical departments such as DoLIDAR and Department of Irrigation. Moreover, selective field visits were made to verify and validate data, and to discuss reconstruction modalities with local officials and communities.





# 14. Transport

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## Summary

The PDNA for the transport sector covers the strategic road network, the local road network (which includes the district road core network as well as the village road core network), and air transport subsectors. The Department of Roads (DoR), Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) and Civil Aviation Authority of Nepal (CAAN) are the government agencies responsible for these subsectors.

This assessment was carried out according to the guidelines discussed during a two-day workshop organized by the PDNA secretariat. It is based on the initial assessment provided by CAAN, DoLIDAR and DOR, which have been reviewed by the PDNA team.

The total damages and losses in economic flows are estimated at NPR 17188 million (US\$171.88 million) and NPR 4930 million (US\$49.30 million), respectively. The total recovery need is estimated at NPR 28200 million (US\$282 million). About 68 percent of the estimated total needs are in the local roads network (LRN), which is a lifeline infrastructure for rural communities. The share of strategic roads network (SRN) is about 32 percent of the total needs.

Airports experienced minor damages to some structures but these did not affect air transport operations in any way. Damage to the civil aviation sector was NPR 110 million (US\$1.1 million) and the losses amounted to NPR 130 million (US\$ 1.3 million).

Recovery needs in the transport sector are estimated at NPR 28,185 million (US\$282 million) for 60 months from 25 April 2015. This estimate is based on the damages and costs data provided by DoR, DoLIDAR and CAAN. A majority of the recovery needs pertain to LRN because considerations of resilience have not been integral to the design of this network which experiences relatively low traffic volumes.

However, LRN is crucial for access to remote areas and hence the urgency to make it functional again at the soonest.

Recovery needs cover the short term (up to six months), medium term (up to 24 months), and the long term (up to 60 months). Short-term activities include the immediate opening up of blocked roads, repair of minor damages to prevent the monsoon from inflicting further damage, and repair of non-structural and minor structural cracks in the office and workshop buildings of DoR, DoLIDAR and CAAN. Medium-term activities include rehabilitation or reconstruction of relatively small infrastructure on the principle of build back better (BBB), based on risk assessment to the extent possible. Relatively large projects for rehabilitation, reconstruction or improvement aimed at building back better, which would be built over 24 months, are categorized as long-term work.

Ultimately, the underlying aim is to use the opportunity to build disaster-resilient infrastructure.

## Pre-Disaster Context and Baseline

Roads are the predominant mode of transport in the country, and the development and adequate maintenance of road networks is critical for achieving regionally-balanced economic growth as well as promoting inclusive growth by enabling people to access public services and opportunities for advancement. Moreover, roads are vital for rapidly responding with support services in the event of a disaster. At another level, domestic air transport has also been on the rise, with the Tribhuvan International Airport (TIA) in Kathmandu, Nepal's sole international airport, as the hub.

Nepal has the lowest road density in the region. Even today, 22 percent of the population lacks road accessibility. Nepal has about 14,902 km long SRN, which constitutes the core network of national highways and feeder roads connect-



ing district headquarters. About 51 percent of SRN is paved, 13 percent is gravelled and 36 percent is earthen. Ten percent of SRN is in a good condition, 74 percent is in fair condition, while 16 percent requires urgent repair.

Nepal also has about 50,944 km of LRN. About 3 percent of the network is black-topped, 29 percent is gravelled, and about 68 percent is earthen.<sup>60</sup> LRN comprises two types of road networks: the district road core network (DRCN) and the village road core network (VRCN).

In the 31 affected districts, SRN extends across 5,140 km while LRN, which is crucial for rural communities, covers about 29,443 km. Vehicles in Nepal numbered 1.63 million at the end of first quarter of 2014, which is a two-fold increase over the last five years. Seventy-seven percent of the total registered vehicles are motorcycles.

Two central government departments are involved in road network development and operations. DoR (Ministry of Physical Infrastructure and Transport [MPIT]) is in charge of developing and maintaining SRN, and DoLIDAR (Ministry of Federal Affairs and Local Development [MoFALD]) directly develops and maintains SRN. However, DoLIDAR manages LRN in a decentralized manner, providing technical support through the District Technical Offices (DTOs) within the District Development Committees (DDCs), a local government body. With regard to air transport, CAAN plays the role of regulator and operator of all airports in Nepal. Its revenue comes mainly from TIA (90 percent).

DoR is a technical organization comprising 428 engineers under MPIT. It has 34 divisional offices, five regional offices, seven heavy equipment divisions, and 10 mechanical divisions for the construction and maintenance of strategic roads all over the country. Major projects financed by development partners are implemented under separate project management offices. Consultants are engaged for the design and supervision of such projects. Procurement of work, goods and services are done under the prevailing Public Procurement Act except for projects financed by development partners, which are guided by

the provisions of the financial agreements. The procurement process under the Public Procurement Act (PPA), 2063, tends to be slow and cumbersome.

DoLIDAR has a strength of 79 staff including 44 engineers and, in addition, 578 engineering staff assigned to DTOs. Its technical services to LRN are provided through DTOs located in all 75 districts, to assist the DDCs to implement the construction and maintenance of local infrastructure. The key characteristic of LRN is that it is participatory and low cost in nature, with a high level of community participation in decision making but a low level of engineering inputs in their development. This often results in significant portions of the network being un-engineered, low quality, earthen roads. For example, the absence of essential retaining and drainage structures and poorly maintained cut-and-fill slopes are very common in LRN, exposing them to damage even during normal rainfall and traffic conditions. Motorable bridges in LRN are few even though they are needed. Consequently, a significant portion of VRCN and some part of DRCN roads require heavy investment to make them accessible or usable for safe public transport. All these factors contributed to the limited accessibility of LRN even before the earthquake. The disaster exacerbated the situation to a greater extent.

Procurement for local infrastructure projects is carried out under the provisions of local body financial rules guided by the prevailing Local Self Governance Act 2055, and PPA. The projects are either undertaken by Users Committees (UCs) or by local contractors through competitive bidding process, depending on the nature and volume of the work.

## Post-Disaster Context

### DAMAGES AND LOSSES

A very small percentage of SRN was completely damaged/washed out or sank due to the earthquake. In hill/mountain roads, landslides caused a partial blockage of road traffic for a few days in limited sections of SRN. A major disruption of traffic has been experienced in the entire 26 km Arniko Rajmarg section adjacent to the Chinese

<sup>60</sup> DoLIDAR. 2012. Summary of Rural Roads Record, 2069, Department of Local Infrastructure Development Agricultural Roads, Lalitpur

border, causing interruption of trade flows between the two countries.

The estimated damage costs (damages plus losses) are based on the initial assessment of DOR. Damages refer to the cost of specific repair and reconstruction cost. The losses mainly include the cost of equipment operation to get the road opened after the quake (NPR 15 million or US\$ 0.15 million); an additional cost (30 percent of the damage cost) for monsoon risks and inflation, and losses of vehicle operating cost (NPR 12.6 million or US\$ 0.12 million). There has been no loss in tolls since there are no toll roads in the affected areas. The total estimated damages and losses on SRN are NPR 4,589 million (US\$45.9 million) and NPR 526 million (US\$5.26 million), respectively.

Similarly, the estimated damages and losses on LRN are NPR 12,485 million (US\$ 124.85 million) and NPR 4,274 million (US\$42.74 million), respectively. The recovery cost of LRN is the damage cost plus an additional 50 percent of the damage cost (for monsoon risks and inflation). On LRN extensive road blockages were reported in DRCN for a number of days, while VRCN, most of which was non-motorable even before the earthquake, suffered further blockages, becoming inaccessible. The obstructions were mainly due to landslides. Some road sections were completely destabilized and damaged. DTOs have received reports of persisting instability in fragile areas with visible cracks and fissures noted above the road sections. However, the impacts and the severity vary widely across districts. For example, the damages to LRN in Dolakha and Sindhupalchowk districts have been observed throughout the districts, while serious damage is mostly concentrated in the northern sections of Gorkha and Dhading districts. In the case of LRN, losses in transportation cost due to road closure have been estimated on the assumption that demand does not change and transportation refers mainly to non-motorized transport. This gives a loss to the economy of about NPR 3,986 million (US\$39.86 million) over the recovery period. This amount is an indicative loss which is not included in the transport sector loss because this may overlap with other sectoral assessment during the calculation of loss of agricultural prod-

ucts and health services, among others, due to the blockage of roads.

In the airports, TIA and 13 domestic airports experienced only minor damage to both the air-side and landside facilities, which did not affect air transport operations. Although airport operations were not suspended after the earthquake, TIA incurred revenue losses during rescue and relief operations due to waivers of landing and cargo charges, airport terminal fees, reduced passenger traffic on regular flights, and additional operational expenses for 24-hour operations immediately following the earthquake. The estimated damages and losses on airports are NPR 114 million (US\$1.1 million) and NPR 130 million (US\$1.3 million) respectively.

The overall damages and losses of the transport sector amount to NPR 17,188 million (US\$171.9 million) and NPR 4,930 million (US\$49.30 million), respectively, as summarized in Table 14.1.

#### **EFFECTS ON DECISION MAKING**

In Kathmandu, which is home to 25 million people, no significant reduction in transportation services has been observed. No major destruction of public transportation vehicles has been reported either. Thus, no adverse effect of transport sector damage has been observed on governance or decision-making processes.

#### **RISKS AND VULNERABILITIES**

Due to the mountainous terrain and climate of Nepal, road networks are prone to damages and blockages due to landslides, and road formation washouts during monsoon seasons. The earthquake increased the risk of landslides by further loosening mountain slopes and damaging mountain slope protections wherever they are provided. Damage to drainage structures further increase the risk of floods. The already-poor pavement of TIA may have been weakened by the earthquake, which will further deteriorate during the coming monsoon season. It is necessary to carefully evaluate the pavement strength and initiate the required rehabilitation work at the earliest.

#### **DISASTER EFFECTS AND IMPACTS**

For the 5.37 million population of largely rural communities living in the most-affected dis-



**TABLE 14.1: SUMMARY OF DAMAGES AND LOSSES IN TRANSPORT SECTOR (NPR MILLION)**

Subsectors	Component	Estimated damage	Estimated loss
Strategic road network (SRN)	Highways and feeder roads	1,660	526
	Bridges	2,676	0
	Government buildings	253	0
<b>Subtotal</b>		<b>4,589</b>	<b>526</b>
Local Road Network (LRN)	District road core network (DRCN)	8,858	2,674
	Village road core network (LRCN)	3,627	1,600
<b>Subtotal</b>		<b>12,485</b>	<b>4,274</b>
Civil aviation	Airports	95	130
	CAAN HQ, Academy, Safety, Fire Building	19	0
<b>Subtotal</b>		<b>114</b>	<b>130</b>
<b>Total for transport sector</b>		<b>17,188</b>	<b>4,930</b>

Note: Strategic urban roads are included in SRN and the remaining municipal roads are in LRN.

districts, the existing lack of access to social and economic services has been compounded further by the earthquake. The losses in economic flow due to being cut off are to be accounted for in the respective sectors, such as agriculture, health and education, among others.

The damages to LRN and the consequent interruption of traffic from earthquake-affected areas have severely impacted the more vulnerable members among the communities. The proportion of women and children were higher among those who lost their lives or were severely injured. The damage to LRN at various places meant that many women, children and those from disadvantaged groups, including Dalits, were not able to access necessary treatment or relief support. When support services are limited due to road blockages, they are often cornered by the more influential and stronger members of the community. While this situation has improved with the temporary opening of blocked LRN sections, it is important that LRN rehabilitation as well as the reconstruction process is designed with sensitivity keeping the needs of vulnerable groups in mind. Priority should be accorded to women and vulnerable communities for employment in the repair and rehabilitation work concerning LRN.

LRN contributes to the economic activities of rural communities and helps promote agricultural production and technology transfers from urban areas. It also contributes to the develop-

ment of the social sector such as health and education, by providing rural communities easier access to social amenities (hospitals and schools). Losses due to blockages in LRN arises more in agriculture, education and health sectors than in the transport sector. On the other hand, SRN represents crucial economic infrastructure and its early recovery will spell early recovery for economic activities in the country. Closure of SRN and airports is expected to cause losses to the tourism sector development, but there was no serious damage to SRN and airports this time.

### Recovery Needs and Strategy

The long-term aim of recovery is to restore pre-disaster services provided by the various networks in disaster-affected areas. In doing so, fully-damaged and partially-damaged structures are rehabilitated/reconstructed on the principle of building back better. There are four stages of recovery needs, namely preparing to minimize damage to infrastructure by the monsoon, including identifying emergency transport or evacuation routes; repairing minor damages of affected structures to hark back to original standards, including retrofitting of undamaged structures, where necessary, depending upon the importance of the structure; rehabilitating the fully-damaged elements of the main structures with improved standards to make them resilient to the monsoon and future disasters; and reconstructing the fully damaged sections of the linear infrastructure such as roads and airports to design standards that can withstand the impacts

of rainfall, flood and future earthquakes of a serious magnitude.

The recovery strategies involve short term, medium-term, and long-term work. Short-term work would be completed within six months, which includes immediate measures for opening the traffic in landslide-blocked and washed out sections of the road; repair of damages such as clearing landslide debris, clearing drains, filling potholes, sealing the cracks, protecting the outfalls, and repairing partial damages; and work relating to monsoon preparedness. Medium-term work should be completed in 24 months, which includes rehabilitation or reconstruction of relatively small infrastructure. BBB principles would be applied for these rehabilitation and reconstruction activities. Relatively large work for rehabilitation, reconstructions or improvement with BBB features, which need over 24 months, is categorized as long-term work.

The design philosophy, procurement modalities and implementation strategies would be different for short-, medium- and long-term work and would also depend on the type of transport infrastructure. Short-term work should be completed with existing government resources, including the utilization of existing contractors of government projects. Variation orders or direct contracting should be considered for these projects. Labour-based approaches using local workers would be considered for repair work and earthworks in rehabilitation.

Medium-term activities require the recruitment of fresh consultants for designs and contractors for civil work, but fast track procurement should be considered in the interests of speedy conclusion. Long-term work needs more cautious designing and procurement of large contracts and would follow the standard procedure. Design philosophy for medium-term and long-term work would be based on assessments of risks. However, due to the nature of disaster recovery work, executing agencies should establish the most efficient implementation arrangement. Special provisions shall be considered by the government for the purpose. GoN Cabinet decisions for procurement under special circumstances under the provisions of Article 41 (1) (gha 3) of amended PPA 2063 and Article 66 of

the PPA, 2063, and under the provisions in the bilateral or multilateral agreement as per Article 67 (1)(kha) for foreign financed projects, may be used as references.

Urban roads in Kathmandu are to be a part of urban recovery planning of Kathmandu metropolitan area. Long-term comprehensive urban recovery planning on Kathmandu metropolitan area, based on the future population forecast, future urban structure, land use plan, transportation plan, BBB based on risk assessment, including several kinds of recovery projects, such as evacuation routes, evacuation place like parks, land readjustment project, among others, are to be addressed in the Housing and Settlements Sector of the PDNA.

Design for LRN will be consistent with equipment supported labour-based environmental friendly approach of the Government of Nepal. The designs of roads in the mountainous regions should generally follow Mountain Risk Engineering (MRE) approaches developed by the International Centre for Integrated Mountain Development (ICIMOD) with special attention to earthquake risks. LRN could be constructed using community-based approaches but the shortage of labour due to the chaotic situation in rural communities requires the utilization of more equipment, which will be more costly than under normal circumstances.

Approaches for VCRN shall be different because these roads are mostly non-engineered, non-climate resilient roads requiring significant improvements to meet the traffic demand. These roads are typically for low volume of traffic, but those which serve as lifeline transport infrastructure to communities, may be built back better to have climate resilience designs. This may include construction of water management facilities such as side drains, pipe culverts or gravelling and black topping of the weak subgrade sections and wet areas, additional retaining structures, slope stabilization measures, and landslide stabilization.

In sum, the guiding principles are:

- fast track repairs of minor damages and opening blocked roads in the short term (within 6 months);
- speedy and efficient construction or reha-

bilitation of various components of the road using the BBB principle, employing relaxed procurement regulations in the medium term (within 24 months);

- speedy and effective procurements for long-term work to build back better; and improvement of the reliability of highways, feeder roads, district roads and village roads that may not have been affected by earthquakes but would constitute a basic access to the more damaged and populated areas.

Table 14.2 shows that of the total recovery of NPR 28,185 million (US\$282 million), 68 percent is found in LRN subsector. The SRN and Air Transport comprise 32 percent and 1 percent of the total recovery costs, respectively.

#### **SHORT-TERM ACTIONS (UP TO 6 MONTHS)**

This work should be conducted through variation orders to existing contractors of government projects or through the mobilization of local communities to avoid the lead time required for procurement. The following constitute the required immediate actions:

- Removal of landslide debris and opening the roads to traffic.
- Minimum restoration of roads and bridges including repair of highly vulnerable sections, construction of temporary bailey bridges securing the lifeline access to communities, and temporary repair work to avoid secondary disasters.
- Stabilization of road embankment and vulnerable bridges to withstand the monsoon.
- Comprehensive condition surveys and risk assessments of all damaged roads to plan and prioritize rehabilitation, reconstruction and recovery work.
- Repairs of minor damages in all affected airports.
- Minimum repairs of the TIA runway pavement.
- A total of NPR 1,935 million (US\$19.35 million) will be needed for this phase.

#### **MEDIUM-TERM RECOVERY (UP TO 24 MONTHS)**

- Rehabilitation of SRN and LRN in accordance with BBB concept.
- Planning and engineering design of large rehabilitation projects (construction period up to 24 months) as well as reconstruction proj-

ects (to be completed within 60 months). This would also include the urban development plan in the Kathmandu metropolitan area on the principle of building back better.

- Comprehensive surveys of all existing roads and bridges to assess their vulnerability to future earthquakes of similar degree and to plan and prioritize the necessary retrofitting work to be accomplished.
- Risk mitigation planning with regard to potential landslides on lifeline roads through risk assessment, hazard mapping and evacuation planning, to be reflected in long-term recovery work. Procurement and mobilization of contractors for large rehabilitation/reconstruction projects concerning LRN and SRN.
- Full-fledged rehabilitation of TIA runway pavement.
- A total of NPR 11,521 million (US\$115.21 million) will be needed for this phase. The cost of rehabilitating the runway of TIA is not included in this cost.

#### **LONG-TERM RECOVERY (UP TO 60 MONTHS)**

Long-term work includes planning, design and reconstruction of the fully damaged/ rerouting sections of SRN and LRN on the principle of building back better. The estimated cost of this phase is NPR 14,729 million (US\$147.29 million).

### **Implementation Arrangements**

Given the high level of investment and the enormous amount of work to be delivered in a limited period, especially in the first 24 months, it becomes necessary to be vigilant about the increased risk of fraudulent practices, corruption and serious compromises in the quality of work, as has been observed in other countries in similar circumstances. Since government resources are also finite, careful planning of implementation arrangements is required to enable efficient implementation. Creating additional layers of decision making for close monitoring purposes usually does more harm than good, delaying the achievement of intended outputs through the recovery operations. Direct monitoring by the office of decision makers at the top is a good practice for quick and appropriate decision making and implementation.

The implementing capacity of DOR (for SRN) is sound, based on extensive experience in implementing projects financed by development partners. However, the capacities of DDCs, which would be responsible for implementing local and rural road projects, vary across districts. DoLIDAR's staff base is already overstretched with a large number of scattered projects in a number of districts. The additional volume of design and supervision needed for recovery work is a heavy burden on it. Hence, it is recommended that additional resources, including consultants, be allocated to DoLIDAR for project management. Also, women, Dalits and other disadvantaged sections most affected by the earthquake, should participate in suitable activities related to the reconstruction of rural roads. In such cases, coordination will be needed with concerned agencies in accessing crèche facilities for children to enable women with children to participate in recovery activities.

In the area of civil aviation, since the recovery needs are minor, CAAN can issue variation orders to existing contractors. Additional burden for these activities is not expected.

Annual budget needs for the five years (FY2014-015 to FY 2018-2019) has been assessed in Tables 14.3A, 14.3B, and 14.3C. The budget

requirements for SRN and LRN will be NPR 183 million, NPR 7,744 million, NPR 8,010 million, NPR 6,641 million, and NPR 5,493 million, respectively.

### Assessment Methodology

The damages and effects assessment method has been conducted in accordance with the guidelines provided by PDNA Secretariat under the overall leadership of the Nepal Planning Commission. It is primarily dependent on the government's initial assessment data, which has been refined and re-categorized in accordance with PDNA Guidelines through selected field verifications and intensive discussions with the government and PDNA transport sector team. However, we need to note here that the estimate of assessed needs, especially in the medium and long term, is still rough due to the nature of rapid assessment, which would be further refined through detailed surveys at the early stage of recovery work. The assessment team included the cost for detailed survey needs in the short- and medium-terms efforts.

The PDNA transport sector team, led by ADB, comprised representatives from DOR, DoLIDAR and CAAN, team members from DfID, World Bank, JICA, ILO, and UNOPS, as well as from Switzerland and India.

**TABLE 14.2: SUMMARY OF SHORT, MEDIUM AND LONG TERM NEEDS (NPR MILLION)**

Subsector		Short term	Medium term	Long term	Total needs amount
Strategic road network (SRN)	Highways and feeder roads	691	1,859	3,442	5,992
	Bridges	803	1,873	0	2,676
	Government buildings	0	349	0	349
<b>Subtotal</b>		<b>1,494</b>	<b>4,081</b>	<b>3,442</b>	<b>9,017</b>
Local road network (LRN)	District road core network (DRCN)	252	5,951	7,336	13,539
	Village road core network (VRCN)	75	1,489	3,951	5,515
<b>Subtotal</b>		<b>327</b>	<b>7,440</b>	<b>11,287</b>	<b>19,054</b>
Civil aviation	Airports	95	0	0	95
	CAAN HQ, Academy, Safety, Fire Building	19	0	0	19
<b>Subtotal</b>		<b>114</b>	<b>0</b>	<b>0</b>	<b>114</b>
<b>Total for transport sector</b>		<b>1,935</b>	<b>11,521</b>	<b>14,729</b>	<b>28,185</b>



**TABLE 14.3A: BUDGET PLAN FOR SRN (NPR MILLION)**

S.N.	Term	Recovery needs	FY	FY	FY	FY	FY	FY
			2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1	Short term	<ul style="list-style-type: none"> <li>- Removal of debris,</li> <li>- Minor repairs to drains, culverts, walls, bridges</li> <li>- Minor back cutting &amp; filling</li> <li>- Temporary bridges/crossing</li> <li>- Reopening of traffic</li> <li>- Condition survey and risk assessments</li> <li>- Procurement method: force Account, variation, quotation</li> </ul>	150	1,344	-	-	-	-
2	Medium term	<ul style="list-style-type: none"> <li>- Designs based on BBB and type of road</li> <li>- Procurement planning and award of projects</li> <li>- Construction</li> <li>- Procurement method: Direct Contract, request for quotation, variation, LT/LIB</li> </ul>	-	1,632	2,040	409	-	-
3	Long term	<ul style="list-style-type: none"> <li>- Designs based on BBB and type of road</li> <li>- Procurement planning and award of works</li> <li>- Construction</li> <li>- Procurement method: Contract, NCB, ICB, LT/LIB</li> </ul>		344	688	1,205	1,205	

**TABLE 14.3B: BUDGET PLAN FOR LRN AND DRCN (NPR MILLION)**

S.N.	Term	Recovery needs	FY	FY	FY	FY	FY	FY
			2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1	Short term	<ul style="list-style-type: none"> <li>- Removal of debris,</li> <li>- Minor repairs to drains, culverts, walls, bridges</li> <li>- Minor back cutting &amp; filling</li> <li>- Temporary bridges/crossing</li> <li>- Reopening of traffic</li> <li>- Condition survey and risk assessments</li> <li>- Procurement method: force account, variation, quotation</li> </ul>	25	227	-	-	-	-
2	Medium Term	<ul style="list-style-type: none"> <li>- Designs based on BBB and type of road</li> <li>- Procurement planning and award of projects</li> <li>- Construction</li> <li>- Procurement Method: Direct contract, request for quotation, variation, LT/LIB</li> </ul>	-	2,400	2,951	600		-
3	Long term	<ul style="list-style-type: none"> <li>- Designs based on BBB and type of road</li> <li>- Procurement planning and award of projects</li> <li>- Construction</li> <li>- Procurement method: Contract, NCB, ICB, LT/LIB</li> </ul>		730	730	2,938	2,938	

**TABLE 14.3C: BUDGET PLAN FOR LRN AND VRCN (NPR MILLION)**

S.N.	Term	Recovery needs	FY	FY	FY	FY	FY	FY
			2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1	Short term	- Removal of debris, - Minor repairs to drains, culverts, walls, bridges - Minor back cutting & filling - Temporary bridges/crossing - Reopening of traffic - Condition survey and risk assessments - Procurement method: force account, variation, quotation	8	67	-	-	-	-
2	Medium term	- Designs based on BBB and type of road - Procurement planning and award of projects - Construction - Procurement method: Direct contract, request for quotation, variation, LT/LIB	-	600	750	139		-
3	Long term	- Designs based on BBB and type of road - Procurement planning and award of projects - Construction - Procurement method: Contract, NCB, ICB, LT/LIB	-	400	851	1,350	1,350	





**NEPOLII**  
NEPTIC WASHABLE  
DIRECTION FOR USE

For best results, the surface to be treated should be prepared by removing loose material and debris. Apply a thin layer of NEPOLII to the surface. Allow to dry for 24 hours. For a thicker application, apply a second layer. For a thicker application, apply a third layer. For a thicker application, apply a fourth layer. For a thicker application, apply a fifth layer. For a thicker application, apply a sixth layer. For a thicker application, apply a seventh layer. For a thicker application, apply an eighth layer. For a thicker application, apply a ninth layer. For a thicker application, apply a tenth layer. For a thicker application, apply an eleventh layer. For a thicker application, apply a twelfth layer. For a thicker application, apply a thirteenth layer. For a thicker application, apply a fourteenth layer. For a thicker application, apply a fifteenth layer. For a thicker application, apply a sixteenth layer. For a thicker application, apply a seventeenth layer. For a thicker application, apply an eighteenth layer. For a thicker application, apply a nineteenth layer. For a thicker application, apply a twentieth layer. For a thicker application, apply a twenty-first layer. For a thicker application, apply a twenty-second layer. For a thicker application, apply a twenty-third layer. For a thicker application, apply a twenty-fourth layer. For a thicker application, apply a twenty-fifth layer. For a thicker application, apply a twenty-sixth layer. For a thicker application, apply a twenty-seventh layer. For a thicker application, apply a twenty-eighth layer. For a thicker application, apply a twenty-ninth layer. For a thicker application, apply a thirtieth layer. For a thicker application, apply a thirty-first layer. For a thicker application, apply a thirty-second layer. For a thicker application, apply a thirty-third layer. For a thicker application, apply a thirty-fourth layer. For a thicker application, apply a thirty-fifth layer. For a thicker application, apply a thirty-sixth layer. For a thicker application, apply a thirty-seventh layer. For a thicker application, apply a thirty-eighth layer. For a thicker application, apply a thirty-ninth layer. For a thicker application, apply a fortieth layer. For a thicker application, apply a forty-first layer. For a thicker application, apply a forty-second layer. For a thicker application, apply a forty-third layer. For a thicker application, apply a forty-fourth layer. For a thicker application, apply a forty-fifth layer. For a thicker application, apply a forty-sixth layer. For a thicker application, apply a forty-seventh layer. For a thicker application, apply a forty-eighth layer. For a thicker application, apply a forty-ninth layer. For a thicker application, apply a fiftieth layer. For a thicker application, apply a fifty-first layer. For a thicker application, apply a fifty-second layer. For a thicker application, apply a fifty-third layer. For a thicker application, apply a fifty-fourth layer. For a thicker application, apply a fifty-fifth layer. For a thicker application, apply a fifty-sixth layer. For a thicker application, apply a fifty-seventh layer. For a thicker application, apply a fifty-eighth layer. For a thicker application, apply a fifty-ninth layer. For a thicker application, apply a sixtieth layer. For a thicker application, apply a sixty-first layer. For a thicker application, apply a sixty-second layer. For a thicker application, apply a sixty-third layer. For a thicker application, apply a sixty-fourth layer. For a thicker application, apply a sixty-fifth layer. For a thicker application, apply a sixty-sixth layer. For a thicker application, apply a sixty-seventh layer. For a thicker application, apply a sixty-eighth layer. For a thicker application, apply a sixty-ninth layer. For a thicker application, apply a seventieth layer. For a thicker application, apply a seventy-first layer. For a thicker application, apply a seventy-second layer. For a thicker application, apply a seventy-third layer. For a thicker application, apply a seventy-fourth layer. For a thicker application, apply a seventy-fifth layer. For a thicker application, apply a seventy-sixth layer. For a thicker application, apply a seventy-seventh layer. For a thicker application, apply a seventy-eighth layer. For a thicker application, apply a seventy-ninth layer. For a thicker application, apply an eightieth layer. For a thicker application, apply an eighty-first layer. For a thicker application, apply an eighty-second layer. For a thicker application, apply an eighty-third layer. For a thicker application, apply an eighty-fourth layer. For a thicker application, apply an eighty-fifth layer. For a thicker application, apply an eighty-sixth layer. For a thicker application, apply an eighty-seventh layer. For a thicker application, apply an eighty-eighth layer. For a thicker application, apply an eighty-ninth layer. For a thicker application, apply a ninetieth layer. For a thicker application, apply a ninety-first layer. For a thicker application, apply a ninety-second layer. For a thicker application, apply a ninety-third layer. For a thicker application, apply a ninety-fourth layer. For a thicker application, apply a ninety-fifth layer. For a thicker application, apply a ninety-sixth layer. For a thicker application, apply a ninety-seventh layer. For a thicker application, apply a ninety-eighth layer. For a thicker application, apply a ninety-ninth layer. For a thicker application, apply a hundredth layer.



# 15. Water, Sanitation and Hygiene

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## Summary

The PDNA for the water, sanitation and hygiene (WASH) sector was part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission (NPC). It was a joint exercise of the government and development partners, and has been guided by the Ministry of Urban Development (MoUD) with technical support from the Department of Water Supply and Sewerage (DWSS).

The overall objective of this assessment was to take stock of the damages and change in economic flows faced by the sector as a result of the magnitude 7.8 earthquake of 25 April, and provide estimates of the recovery and reconstruction needs using the principle of building back better.

The damages and change in economic flows for the sector were calculated by DWSS based upon rapid assessment surveys undertaken by Districts Divisional- and sub-Divisional Water Supply and Sanitation Offices in the 14 severely-affected districts. A data quality assurance exercise was carried out between 23 May and 28 May 2015 by three Sector Assessment Teams led by the Embassy of Finland, Japan International Cooperation Agency (JICA) and the Rural Water Supply and Sanitation Fund Development Board. The teams visited nine of the affected districts. These field visits not only verified data from the rapid assessments, they also helped gain additional insights into the extent of damage to physical infrastructure and assets, prompting a better understanding of the broader effects of the disaster on water supply and sanitation services delivery and governance mechanisms, as well as emerging risks and vulnerabilities. This assessment also includes estimates for damage and change in economic flows for an additional 17 districts that were classified by the government as moderately impacted by the earthquake. In addition, consultations were held with representatives of relevant line agencies and development partners

to better understand the effects of the disaster on the functioning of the water and sanitation sector and to solicit their suggestions for formulating recovery strategies and needs.

The net total value of damages and change in economic flows to the water and sanitation sector is estimated at NPR 11.4 billion at pre-disaster prices. Of this, the damage to infrastructure and physical assets is estimated at NPR 10.5 billion. The total needs for recovery and reconstruction, using the principle of building back better, is estimated at NPR 18.1 billion, of which 25 percent is needed for FY 2015-2016, 40 percent for FY 2016-2017 and 35 percent for FY 2017-2018. The specific needs are described in more detail in the body of this report.

From PDNA assessments it is clear that safe water supply and sanitation needs are accorded the highest priority by affected populations, in addition to food and shelter. This priority is further amplified by the risks of diarrheal disease outbreaks among these populations from the imminent monsoon. The following aspects will be looked at: alignment to approved institutional systems, and standards and procedures of the sector; cost-effectiveness that is accountable to both central and local oversight; gender sensitivity and social equitability of service delivery that takes a human rights-based approach to reach those who are left unserved; and, adapting technology and service levels to local contexts. Likewise, it is central to fully engage the inter-cluster cooperation in this effort.

The WASH sector damage and change in economic flows assessment covers communities that have been impacted by the earthquake. However, there remains a population of approximately 788,000 (13 percent) in the 14 most-affected districts that, even prior to the earthquake, had not been served in any manner. The cost of providing WASH services to this un-served population is approximately NPR 7.9 billion.



## Pre-Disaster Context and Baseline

MoUD is the lead ministry for the WASH sector. Its main operational agency, DWSS, was established in 1972. The agency operates through a network of five regional offices, 48 divisional offices and 22 sub-divisional offices, and has a total staff of 1,660 including 170 professionals. It supports the implementation of rural and small town water supply schemes. In recent years, DWSS has taken on sector support and regulatory roles at the national level.

At the district level, the District WASH Coordinating Committee (DWASHCC) is the main instrument for the planning, coordination and monitoring of WASH infrastructure development, including leading the ‘open defecation-free’ (ODF) campaigns together with other local government agencies. The District Technical Office (DTO), as part of the local authority structure of the Ministry of Federal Affairs and Local Development (MoFALD), undertakes smaller WASH projects and supports minor repairs in accordance with decentralization policies, including water supply. The DTO is guided by the Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) that comes under MoFALD. The Rural Water Supply and Sanitation Fund Development Board (RWSSFDB), which comes under MoUD, promotes demand-led rural water supply and sanitation services, using non-governmental and private organizations as implementing partners. As of 2015, the Fund Board operates under the guidance of the respective District Development Council (DDC) /DWASHCC.

The Kathmandu Valley Water Supply Management Board (KVWSMB) is an autonomous government body that reports to MoUD. It is responsible for developing and overseeing service policies, and providing licences to service providers for the operation and management of the water supply and sanitation service system in Kathmandu Valley (comprising the districts of Kathmandu, Lalitpur, and Bhaktapur). Its main contracted service provider is Kathmandu Upatyaka Khanepani Limited (KUKL). The Nepal Water Supply Corporation (NWSC) pro-

vides water services to some 21 towns in Nepal, some of which are located in the affected areas (such as Banepa and Kavre, among others). Water supply services in the Kathmandu Valley are being upgraded through the Melamchi Project.

There are several important prevailing sector policies and strategies including the Rural Water Supply and Sanitation National Policy, Strategy and Sectoral Strategic Action Plan, 2004, that sets a national goal of universal water supply and sanitation coverage by 2017 and makes provision to allocate 20 percent of the WASH sector budget for sanitation and hygiene promotion. There is also the Urban Water Supply and Sanitation Policy, 2009, and the Sanitation and Hygiene Master Plan, 2011, that emphasizes the elimination of open defecation and total behaviour change with regard to sanitation and hygiene. Community-Led Total Sanitation (CLTS) is now the main approach to sanitation, with a focus on behaviour change and a no-subsidy principle.

The WASH Umbrella Act and Comprehensive WASH policy is being formulated to streamline the sector, address institutional fragmentation, overlapping responsibilities and project driven modalities. Improvements in coordination among government WASH actors, development partners, UN and (I)NGOs is raising sector quality and facilitating a gradual movement towards a sector-wide approach. Following the Second Joint Sector Review (April 2014), which drew together sector-specific thematic priorities, the outline of a Sector Development Plan (SDP) was shared with stakeholders in 2014 for review. The key objective of SDP is to enhance coherence and harmonization in the sector aligned to government policies and strategies. At the same time, the Terms of Reference for the Sector Financing Strategy was approved by the government. However, preparation of the strategy is expected to be delayed because of the earthquake until the third quarter of 2015.

The 2015 update of the Joint Monitoring Programme (JMP), reports that 92 percent of Nepal’s population has access to improved drinking water, and 46 percent has access to improved sanitation<sup>61</sup>. The sustainability of drinking wa-

<sup>61</sup> NMIP/DWSS estimate for water supply coverage is 85 percent and for sanitation is 70 percent

ter systems, however, remains a priority concern for the sector. According to DWSS/NMIP data for 2012, only 25 percent of water schemes were functioning well; 36 percent need minor repair, 9 percent need major repair, 20 percent need rehabilitation, 9 percent need reconstruction, and 1 percent of the schemes are non-functional. The underlying causes of the low rates of functionality can be attributed in part to inadequate management of operation and maintenance. Just 31.5 percent of schemes have a Water Supply and Sanitation Technician (WSST), only 38 percent of the schemes have registered Water and Sanitation Users Committees (WSUC), and less than 5 percent have an operation and maintenance (O&M) fund. Considering the overall functionality of schemes, effective coverage of water supply is only 40 percent without even accounting for water quality. Nepal needs to significantly increase its performance to realize the national target of universal access to basic water supply by 2017.

The recent Multiple Indicator Cluster Survey (2014 MICS) and the DWSS database suggest that there has been a significant acceleration in sanitation progress both in terms of access to improved sanitation and, very importantly, a substantial decrease in open defecation. So far 21 districts have been declared ODF, and a further 21 districts have reached more than 50 percent ODF status. The main challenge lies in accelerating the sanitation movement nationwide, ensuring equitable targeting, and achieving total sanitation and sustaining sanitation outcomes and behaviour.

With ongoing rural to urban migration coupled with newly demarcated municipalities, the urban population in Nepal today stands at 38 percent, up from 17 percent in 2014. This requires a more in-depth planning in new urban areas so as to provide appropriate levels of water supply and sanitation and also to assure compliance with the Urban Water Supply and Sanitation Policy, 2009.

The safety of the drinking water is another issue that must be addressed. The 2014 MICS included water quality testing and found that 71 percent of drinking water sources and 82 percent of household stored water were contaminated with E.coli ( $\geq 1$  cfu/100ml). This requires interventions at the technical and social levels.

Equity of access to water and sanitation services is an important concern, as access varies significantly according to location, wealth quintile, ethnicity, and level of education. For example, the 2014 MICS finds that access to piped water in the household or yard touches 55 percent in the wealthiest population quintile compared with 16 percent in the poorest quintile; open defecation is practiced by 39 percent households with no education versus 8 percent of households with the highest level of education, and open defecation is much more widespread in rural areas (31 percent) than urban areas (6 percent). Access to improved drinking water in the Mid-Western Mountain and Mid-Western Hill regions lags behind other regions by around 15 percent; with regard to improved sanitation, least progress has been made in the Eastern Tarai and Central Tarai regions.

**TABLE 15.1: ACCESS TO IMPROVED DRINKING WATER AND SANITATION IN NEPAL**

TOTAL WATER						TOTAL SANITATION				
Estimate coverage 2015 update						Estimate coverage 2015 update				
Year	Total improved	Piped onto premises	Other improved	Other unimproved	Surface water	Year	Improved	Shared	Other unimproved	Open defecation
1990	66%	6%	60%	27%	7%	1990	4%	2%	6%	88%
1995	72%	9%	63%	22%	6%	1995	13%	6%	5%	76%
2000	77%	13%	64%	18%	5%	2000	22%	9%	5%	64%
2005	82%	17%	65%	14%	4%	2005	30%	12%	5%	53%
2010	87%	21%	66%	10%	3%	2010	38%	15%	5%	42%
2015	92%	24%	68%	6%	2%	2015	48%	18%	4%	32%

Source: (JMP Update 2015 – in press)

## Post-Disaster Context

### INFRASTRUCTURE AND ASSETS

In the 14 severely-affected districts, the vast majority of the 11,288 water systems are gravity-fed, with springs or streams as their source. It is estimated that around 1,570 systems have been totally damaged, and a further 3,663 systems have suffered partial damage that requires repair. More than 90 percent of the damaged schemes are rural, though this is mainly because urban schemes are fewer in number and serve larger populations.

The earthquake caused multiple impacts to the water supply schemes. There are many reports of water sources either drying up completely or re-emerging at lower elevations. In a few cases it has been reported that the source flow has increased. Problems with water quality have mostly been due to increased turbidity as a result of damage to intake works or transmission pipelines. Landslides have caused much of the damage leading to blockage of intake works, and carrying away sections of pipeline – even buried pipeline in some cases. Structural damage to reservoirs and break-pressure tanks has resulted in leakage; overhead reservoirs and tap stands have also been damaged and are no longer structurally sound. The nature of damage to both rural and urban systems is similar.

Access to sanitation has been severely affected by the earthquake. In urban areas most households have toilets located within the house, and thus the collapse of housing has led to a total loss of sanitation facilities. In rural areas the situation is slightly different. Although some households have adjoining toilets or have incorporated them into the house structure, it is more common for toilets to be located in the household yard. Nevertheless, there has been substantial loss of toilets in rural areas. One difference, though, is that toilets built in the yard are more likely to have their sub-structure intact, and could potentially be rebuilt. It is estimated that in the 14 severely-affected districts, approximately 220,000 toilets have been partially or totally destroyed.

Office buildings of DWSS and other water and sanitation service providers have also been damaged in many districts. The assessment reports that six DWSS buildings have completely col-

lapsed, and a further 47 have suffered partial damage. It has not been possible to assess the extent of damages and change in economic flows to equipment such as office furnishings and computers.

### EFFECTS ON PRODUCTION OF GOODS AND SERVICES AND ACCESS TO SERVICES

As a consequence of partial or total damage to water supply systems and sanitation, many socio-economic effects have been observed and assessed. Economic loss is likely to occur through the non-collection of revenues (water user fee) by service providers such as KUKL in Kathmandu Valley and by WSUC in rural communities. Reduced revenue collection is partly due to the disruption of water supplies but also because of financial hardship among the affected population, a proportion of whom will be unable to pay the water user fee.

In both urban and rural areas, households are generally required to pay for water supply connections and, in urban areas, for water meters as well. Given the level of destruction to households it is very likely that a new connection fee will be charged to cover labour and materials costs. This constitutes a loss of investment by the householder. Similarly, a large proportion of households have lost the investment made in the construction of toilets, especially so in the predominantly rural population. Many households take out small loans to build their toilets and are unlikely to see these debts waived even though they have lost their investment.

In rural areas, communities are expected to contribute to the capital costs of the water system by providing labour, materials and in some cases a cash contribution. Regardless of whether the water system needs repair, reconstruction or relocation, communities will be expected to contribute to the overall investment costs. Where this involves contributing labour or providing local materials, it represents an opportunity cost to the household.

Livelihoods have been impacted through the disruption to the water supply, including loss of wages among village water system caretakers, restaurant businesses, rearing of livestock and poultry, and cultivation of cash crops.

In places where serious damage to the water system has occurred, women have reported that they are trudging anywhere between one and three hours to collect water from alternate sources. Water collection is often for both household members and livestock, and it has a time, energy and child care cost attached to it. In addition, women in focus group discussions observed that disruption to water supply and loss of sanitation facilities has compromised personal hygiene, including menstrual hygiene management. The impact to women's dignity through loss of access to sanitation is not yet measurable. Neither is it feasible to quantify the quality of life impacts on children, the elderly, infirm and disabled population through the disruption to water supply and sanitation services.

#### EFFECTS ON SECTOR GOVERNANCE FUNCTIONS AND SYSTEMS

As mentioned above, there was significant damage to DWSS and WSUC offices, furnishings and equipment. In some cases the staff has had to move into temporary office space or operate from tents. System records, work plans, and other essential documents have also been lost in some districts. In order to support the assessment and recovery process, DWSS has temporarily moved its staff from non-affected districts, resulting in reduced service capacity in those districts. Given the scale of the disaster, individuals involved in water supply and sanitation administration, operation and maintenance, and governance, such as members of WSUC are

less available for the recovery process due to the demands of managing their personal and family needs. In order to deliver on the build back better principle in the recovery strategy, capacity building of staff will be required especially in the area of risk reduction and disaster preparedness.

#### INCREASED RISKS AND VULNERABILITIES

The disruption to water supply and sanitation services is not only inconvenient; it presents several increased risks and vulnerabilities. Foremost among these is the public health risk and the prospect of diarrheal disease outbreaks. The difficulties in maintaining good personal hygiene practices, the reduced access to sanitation and thereby increase in open defecation, and the deterioration in water quality all combine to substantially increase the risk of faecal-oral disease. The water-related impacts on livelihoods leaves people more vulnerable to disease through a reluctance to spend scarce financial resources on medical treatment, and may subsequently lead to reduced household productivity. Infants and young children under the age of five years are particularly vulnerable to diseases associated with poor hygiene practices, unsanitary conditions and unsafe drinking water as these further undermine their health and nutrition status. Girls and women may face additional risks of violence and sexual abuse due to the lack of access to gender separated and safe toilets in schools, or by having to walk long distances to alternate water sources, or when seeking privacy to defecate in the open.

**TABLE 15.2: ESTIMATES OF DAMAGES AND CHANGE IN ECONOMIC FLOWS**

Sector	Damages (NPR)	Losses (NPR)	Total effects, (NPR)	Total effects, (US\$)
<b>14 severely affected districts</b>				
Water systems	5,571,802,656.0	579,875,557.1	6,151,678,213.1	60,310,570.7
Sanitation	1,195,746,350.0		1,195,746,350.0	11,723,003.4
<b>Sub-total</b>	<b>6,767,549,006.0</b>	<b>579,875,557.1</b>	<b>7,347,424,563.1</b>	<b>72,033,574.1</b>
<b>Other 17 affected districts</b>				
Water systems	2,822,337,000.0	293,523,048.0	3,115,860,048.0	30,547,647.5
Sanitation	915,835,772.1	-	915,835,772.1	8,978,782.1
<b>Sub-Total</b>	<b>3,738,172,772.1</b>	<b>293,523,048.0</b>	<b>4,031,695,820.1</b>	<b>39,526,429.6</b>
<b>Total</b>	<b>10,505,721,778.1</b>	<b>873,398,605.1</b>	<b>11,379,120,383.3</b>	<b>111,560,003.8</b>



**TABLE 15.3: DAMAGES AND LOSSES IN THE 14 SEVERELY-AFFECTED DISTRICTS**

Name of district	Water damages (NPR)	Sanitation damages (NPR)	Losses (NPR)
Okhaldhunga	29,430,000.0	54,500,000.0	12,405,310.4
Ramechhap	931,489,475.0	136,250,000.0	16,987,556.3
Sindhuli	17,467,250.0	32,700,000.0	24,829,398.4
Kavre	344,870,039.1	141,700,000.0	32,017,292.6
Dolakha	1,095,678,900.0	114,450,000.0	15,638,835.9
Sindhupalchowk	838,114,080.0	125,350,000.0	24,125,740.1
Kathmandu	67,852,500.0	68,277,600.0	236,193,564.0
Lalitpur	131,422,857.1	61,590,450.0	63,391,371.3
Bhaktapur	191,295,000.0	93,522,000.0	41,253,844.3
Rasuwa	65,400,000.0	38,150,000.0	3,629,783.9
Nuwakot	426,920,300.0	119,900,000.0	23,260,040.8
Dhading	588,835,817.3	26,781,300.0	28,172,068.9
Makawanpur	426,918,937.5	62,675,000.0	35,248,051.8
Gorkha	416,107,500.0	119,900,000.0	22,722,698.6
<b>Total of 14 districts</b>	<b>5,571,802,656.0</b>	<b>1,195,746,350.0</b>	<b>579,875,557.1</b>

**TABLE 15.4: DAMAGES AND LOSSES IN OTHER 17 MODERATELY-AFFECTED DISTRICTS**

Name of district	Water damages (NPR)	Sanitation damages (NPR)	Losses (NPR)@ 10.4 % of damages in the 14 districts
Dhankuta	155,652,000.0	41,001,440.0	16,187,808.0
Khotang	212,877,000.0	29,448,393.2	22,139,208.0
Solukhumbu	85,837,500.0	11,083,582.2	8,927,100.0
Tanahu	262,090,500.0	85,331,740.0	27,257,412.0
Baglung	199,143,000.0	67,015,380.0	20,710,872.0
Gulmi	230,044,500.0	63,767,309.9	23,924,628.0
Parwat	149,929,500.0	38,910,820.0	15,592,668.0
Palpa	254,079,000.0	46,701,028.2	26,424,216.0
Nawalparasi	62,947,500.0	63,437,476.8	6,546,540.0
Myagdi	76,681,500.0	30,222,430.0	7,974,876.0
Chitwan	43,491,000.0	72,128,025.0	4,523,064.0
Lamjung	135,051,000.0	45,832,320.0	14,045,304.0
Kaski	171,675,000.0	136,750,310.0	17,854,200.0
Syangja	252,934,500.0	73,927,244.4	26,305,188.0
Bhojpur	180,831,000.0	28,940,461.4	18,806,424.0
Sankhuwa Sabha	137,340,000.0	30,297,471.1	14,283,360.0
Arghakhanchi	211,732,500.0	51,040,340.0	22,020,180.0
<b>Total of other 17 districts</b>	<b>2,822,337,000.0</b>	<b>915,835,772.1</b>	<b>293,523,048.0</b>

## DAMAGES AND LOSSES

### DISASTER EFFECTS AND IMPACTS

The effects of the earthquake represent a major setback for the water and sanitation sector. In particular, achieving the national target of ‘Water and Sanitation for All by 2017’ is now clearly in doubt. Of particular concern is the impact to the momentum and success of the Social Movement for Sanitation. As mentioned earlier, sector monitoring and the 2014 MICS indicate that the efforts to eliminate open defecation are paying dividends with an accelerated trend in the number of VDCs being declared ODF. While concern about lost sanitation facilities has been widely voiced, households that have lost everything will inevitably place sanitation as a lower priority over rebuilding their homes and livelihoods. The situation with regard to recovery in sanitation is complicated partly because of the no-subsidy principle, which may significantly delay the resumption of current progress towards sanitation targets. Equally the national target to achieve universal access to water supply by 2017 will be extremely difficult to achieve given the magnitude of damage to water supply schemes. This may require a reconsideration of the existing zero subsidy policy for sanitation in favour of some form of household incentives, given their severe change in economic flows in this regard.

Sector development with regard to policy development, strategy review and institutional reform will also be set back. Government and development partner stakeholders that have been putting in place the building blocks for the SDP, have recognised that this process will be delayed but is still expected to be completed during 2015.

The linkages between livelihoods and water supply have been addressed earlier but prolonged disruption to water and sanitation services can be expected to have a disproportionate impact on women and girls through the social costs incurred through the time and energy spent collecting water, threat of violence and sexual harassment, diminished child care, reduced school attendance, dignity and self-esteem.

### Recovery Needs and Strategy

The recovery and reconstruction strategy is based on the principles of disaster risk reduction (DRR) and build back better. It aims to return the sector to a better and more resilient state than the pre-

earthquake status as quickly as possible, and enable it to resume progress towards achieving the national goal of universal access to water supply and sanitation. The strategy is not only intended to restore infrastructure and governance but also to ensure that the sector as a whole is more resilient, that access to water and sanitation services are more equitable, that services are developed to a higher standard, and that governance is strengthened through enhancing sector coordination, professionalism and accountability.

Short-term activities will build on the ongoing emergency response and run through to the end of 2015. In this regard, the WASH cluster has begun planning on how to transition its work into the normative WASH development structures at national and district levels. Priority activities through end-2015 will include:

- temporary or provisional repairs to water systems;
- rebuilding of toilets and hand-washing facilities through a resumption of the CLTS total behaviour change approach;
- household water treatment; and
- the restoration and fortification of institutional capacity to coordinate and implement short-term recovery needs and undertake disaster preparedness measures.

The last point is in reference to the monsoon season, which is widely expected to induce landslides causing further disruption to water supply. Given the heightened risk of diarrheal disease outbreaks due to the reduced access to water supply and sanitation, it is imperative that short-term activities give priority to the most vulnerable communities. The short-term activities in sanitation and hygiene will be further informed by the ongoing Sanitation and Hygiene Assessment at district level, initiated by the National WASH Sector, which will further compliment and add depth to the PDNA WASH assessment of toilet damages. The following table summarizes the main short-term activities (June to December 2015), details of which will be worked out prior to intervention.

Medium to long-term recovery activities will be implemented from early 2016 through to December 2018. These activities will place more emphasis on the principles of DRR and build back better. Activities will include:

**TABLE 15.5: SHORT-TERM ACTIVITIES IN SANITATION AND HYGIENE (JUNE 2015- DECEMBER 2015)**

Priority recovery needs	Interventions	Expected outputs	Intended outcomes
Reconstruction of toilets and hand-washing facilities	<ul style="list-style-type: none"> <li>Incentivize households to rebuild toilets and hand-washing facilities through cash or materials support</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in thousands) toilets and hand-washing facilities re-built</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in thousands) people have access to sanitation and hand-washing facilities</li> </ul>
Provision of temporary toilets and hand-washing facilities	<ul style="list-style-type: none"> <li>Build toilets and hand-washing facilities in temporary shelters for earthquake- and/or monsoon-affected population</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in hundreds) toilets and hand-washing facilities built</li> </ul>	<ul style="list-style-type: none"> <li>Reduced risk of diarrhoeal disease outbreak</li> <li>Dignity and safety of girls, women, elderly and infirm enhanced</li> </ul>
Resume CLTS programme	<ul style="list-style-type: none"> <li>Follow-up activities to sustain ODF behaviour</li> <li>Refresher triggering</li> <li>Celebration of national sanitation week</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in hundreds) VDCs declared ODF</li> </ul>	<ul style="list-style-type: none"> <li>As above, and</li> <li>Restored sense of normality and business as usual</li> </ul>
Restore partially-damaged water systems	<ul style="list-style-type: none"> <li>Incentivize communities to clean and repair minor damage to water systems through cash or materials support</li> <li>Provide technical supervision</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in hundreds) water systems restored to at least minimal service levels</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in thousands) people have access to safe drinking water</li> <li>Reduced water collection time</li> </ul>
Disaster preparedness	<ul style="list-style-type: none"> <li>Develop user-friendly operational manual to address preparedness and response.</li> <li>Identify frequent landslide locations</li> <li>Pre-position emergency supplies</li> <li>Establish and train rapid response teams</li> </ul>	<ul style="list-style-type: none"> <li>No. of districts prepared to respond to emergency water supply, sanitation and hygiene needs</li> </ul>	<ul style="list-style-type: none"> <li>No. of (in thousands) people can potentially receive emergency water supply and sanitation</li> </ul>
Restore governance capacity	<ul style="list-style-type: none"> <li>Provide logistics support to DWSS, WSUC, among others</li> <li>Capacity--building on objectives and approaches to short-term recovery</li> </ul>	<ul style="list-style-type: none"> <li>No. of rented offices, vehicles, furnishings, tools, equipment, and budget</li> <li>No. of water/sanitation staff trained</li> </ul>	<ul style="list-style-type: none"> <li>No. of water and sanitation institutions have capacity to deliver short-term recovery outputs</li> </ul>
Develop build back better guidelines	<ul style="list-style-type: none"> <li>Conduct a consultative review of options for build back better water and sanitation services.</li> <li>Advocacy and awareness on risk management and BBB</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines developed for medium to long term recovery</li> </ul>	<ul style="list-style-type: none"> <li>Key sector actors 'own' build back better guidelines</li> </ul>
Establish coordination and monitoring mechanisms	<ul style="list-style-type: none"> <li>Undertake consultation with key sector and community actors</li> <li>Undertake consultation with other sectors such as housing, and health</li> </ul>	<ul style="list-style-type: none"> <li>Roles and responsibilities agreed</li> <li>Short-term recovery targets established</li> <li>Monitoring mechanism developed</li> </ul>	<ul style="list-style-type: none"> <li>Key sector actors adopt results-based management approach</li> </ul>
Develop detailed medium to long-term recovery plan	<ul style="list-style-type: none"> <li>Undertake consultation with key sector actors</li> <li>Task team develops medium to long-term recovery plan</li> </ul>	<ul style="list-style-type: none"> <li>Detailed medium to long-term recovery plan</li> </ul>	<ul style="list-style-type: none"> <li>Key sector actors 'own' medium to long term recovery plan</li> </ul>

- rehabilitation and construction of new water systems (for resettled communities) as well as ensuring the compliance of municipalities with the Urban Water Supply and Sanitation Policy, 2009;
  - building-in resilience qualities, developing and implementing water safety plans;
  - resuming at-scale the Social Movement for Sanitation;
  - implementing urban sludge management projects;
  - building community and institutional capacity in DRM;
  - strengthening governance, especially among service providers;
  - establishing guiding principles of equity in the development of services;
  - strengthening sector monitoring; and
  - completing the planned sector reform processes that are embodied in the SDP.
- The following table summarizes the priority medium to long-term recovery activities.

**TABLE 15.6: PRIORITY MEDIUM TO LONG-TERM RECOVERY ACTIVITIES**

Priority recovery needs	Interventions	Expected outputs	Intended outcomes
Social movement for sanitation	<ul style="list-style-type: none"> <li>• Resume at-scale CLTS programme</li> </ul>	<ul style="list-style-type: none"> <li>• No. of districts declared ODF</li> </ul>	<ul style="list-style-type: none"> <li>• No. of (in thousands) people have access to basic sanitation and hand-washing facilities</li> </ul>
Private sector sanitation services	<ul style="list-style-type: none"> <li>• Stimulate expansion of private sector sanitation service providers</li> </ul>	<ul style="list-style-type: none"> <li>• No. of private sector manufacturer/importer of sanitation products</li> <li>• No. of licensed/registered service providers</li> </ul>	<ul style="list-style-type: none"> <li>• No. of (in thousands) households have higher sanitation service level</li> <li>• Affordable and quality products and services available</li> </ul>
Urban sludge management	<ul style="list-style-type: none"> <li>• Implement faecal sludge management projects</li> </ul>	<ul style="list-style-type: none"> <li>• No. of medium-large towns have faecal sludge management services</li> <li>• Waste water treatment facilities of KUKL rehabilitated and capacity increased</li> </ul>	<ul style="list-style-type: none"> <li>• Public health risks and environmental degradation mitigated</li> </ul>
Water supply	<ul style="list-style-type: none"> <li>• Rehabilitate damaged water supply systems</li> <li>• Construct new water systems with water conservation features</li> </ul>	<ul style="list-style-type: none"> <li>• No. of water systems that incorporate resilience qualities</li> <li>• No. of water systems with improved water treatment capacity</li> </ul>	<ul style="list-style-type: none"> <li>• No. of resilient water systems delivering improved water quality</li> </ul>
Water supply management	<ul style="list-style-type: none"> <li>• Develop water safety plans</li> <li>• Train WSUC and other service providers</li> <li>• Register service providers</li> </ul>	<ul style="list-style-type: none"> <li>• No. of water safety plans</li> <li>• No. of service providers trained in O&amp;M, DRR, administration</li> <li>• No. of service providers registered and certified</li> </ul>	<ul style="list-style-type: none"> <li>• No. of service providers with effective management capacity</li> <li>• No. of service providers brought into regulatory system</li> </ul>
Advocacy/Capacity building in DRM	<ul style="list-style-type: none"> <li>• Train WSUC and other service providers in DRM</li> </ul>	<ul style="list-style-type: none"> <li>• No. of service providers trained in DRM</li> </ul>	<ul style="list-style-type: none"> <li>• No. of service providers put in place DRM measures</li> </ul>
Equity guidelines	<ul style="list-style-type: none"> <li>• Undertake consultation on enhancing equity in development and delivery of services</li> <li>• Task teams develop equity guidelines</li> <li>• Revise sector monitoring protocol revised to incorporate equity indicators</li> </ul>	<ul style="list-style-type: none"> <li>• Equity guidelines developed</li> <li>• Monitoring protocol revised to include equity indicators</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced equity in access to water and sanitation services</li> </ul>
Sector Development Plan	<ul style="list-style-type: none"> <li>• Prepare financing strategy</li> <li>• Consult with key sector actors</li> <li>• Improve Sector Governance – regulation, compliance with service standards over extraction and waste water management</li> </ul>	<ul style="list-style-type: none"> <li>• Finalized Sector Development Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthened sector efficiency and effectiveness</li> </ul>



**TABLE 15.7: RECOVERY AND RECONSTRUCTION INITIATIVES AND COSTS (Based on needs, DRM/BBB and recovery and reconstruction strategy)**

District/ Buildings	Sanitation (NPR)	Water Systems (NPR)	Build Back Better (NPR)			Total Cost, US\$	Budget allocation, US\$		
			WSP/ Upgrad- ing water quality	Infrastructure	Institutional capacity devel- opment		2015/16 (25%)	2016/17 (40%)	2017/18 (35%)
<b>A. Severely affected districts (14 districts)</b>									
Okhaldhunga	54,500,000.0	29,430,000.0	2,943,000.0	4,414,500.0	1,258,950.0	92,546,450.0	231,366.1	370,185.8	323,912.6
Ramechhap	136,250,000.0	931,489,475.0	93,148,947.5	139,723,421.3	16,016,092.1	1,316,627,935.9	3,291,569.8	5,266,511.7	4,608,197.8
Sindhuli	32,700,000.0	17,467,250.0	1,746,725.0	2,620,087.5	752,508.8	55,286,571.3	138,216.4	221,146.3	193,503.0
Kavre	141,700,000.0	344,870,039.0	34,487,003.9	51,730,505.9	7,298,550.6	580,086,099.3	1,450,215.2	2,320,344.4	2,030,301.3
Dolakha	114,450,000.0	1,095,678,900.0	109,567,890.0	164,351,835.0	18,151,933.5	1,502,200,558.5	3,755,501.4	6,008,802.2	5,257,702.0
Sindhupalchowk	125,350,000.0	838,114,080.0	83,811,408.0	125,717,112.0	14,451,961.2	1,187,444,561.2	2,968,611.4	4,749,778.2	4,156,056.0
Kathmandu	68,277,600.0	67,852,500.0	6,785,250.0	10,177,875.0	2,041,951.5	155,135,176.5	387,837.9	620,540.7	542,973.1
Lalitpur	61,590,450.0	131,422,857.0	13,142,285.7	19,713,428.6	2,895,199.6	228,764,220.9	571,910.6	915,056.9	800,674.8
Bhaktapur	93,522,000.0	191,295,000.0	19,129,500.0	28,694,250.0	4,272,255.0	336,913,005.0	842,282.5	1,347,652.0	1,179,195.5
Rasuwa	38,150,000.0	65,400,000.0	6,540,000.0	9,810,000.0	1,553,250.0	121,453,250.0	303,633.1	485,813.0	425,086.4
Nuwakot	119,900,000.0	426,920,300.0	42,692,030.0	64,038,045.0	8,202,304.5	661,752,679.5	1,654,381.7	2,647,010.7	2,316,134.4
Dhading	26,781,300.0	588,835,817.0	58,883,581.7	88,325,372.6	9,234,256.8	772,060,328.0	1,930,150.8	3,088,241.3	2,702,211.1
Makawanpur	62,675,000.0	426,918,938.0	42,691,893.8	64,037,840.7	7,343,909.1	603,667,581.6	1,509,169.0	2,414,670.3	2,112,836.5
Gorkha	119,900,000.0	416,107,500.0	41,610,750.0	62,416,125.0	8,040,112.5	648,074,487.5	1,620,186.2	2,592,298.0	2,268,260.7
<b>Sub-total of 14 districts</b>	<b>1,195,746,350.0</b>	<b>5,571,802,656.0</b>	<b>557,180,265.6</b>	<b>835,770,398.4</b>	<b>101,513,235.1</b>	<b>8,262,012,905.1</b>	<b>20,655,032.3</b>	<b>33,048,051.6</b>	<b>28,917,045.2</b>
<b>B. Other moderately affected districts (17 districts)</b>									
Dhankuta	41,001,440.0	155,652,000.0	15,565,200.0	23,347,800.0	2,949,801.6	238,516,241.6	596,290.6	954,065.0	834,806.8
Khotang	29,448,393.2	212,877,000.0	21,287,700.0	31,931,550.0	3,634,880.9	299,179,524.1	747,948.8	1,196,718.1	1,047,128.3
Solukhumbu	11,083,582.2	85,837,500.0	8,583,750.0	12,875,625.0	1,453,816.2	119,834,273.4	299,585.7	479,337.1	419,420.0
Tanahu	85,331,740.0	262,090,500.0	26,209,050.0	39,313,575.0	5,211,333.6	418,156,198.6	1,045,390.5	1,672,624.8	1,463,546.7
Baglung	67,015,380.0	199,143,000.0	19,914,300.0	29,871,450.0	3,992,375.7	319,936,505.7	799,841.3	1,279,746.0	1,119,777.8
Gulmi	63,767,309.9	230,044,500.0	23,004,450.0	34,506,675.0	4,407,177.1	355,730,112.1	889,325.3	1,422,920.4	1,245,055.4
Parwat	38,910,820.0	149,929,500.0	14,992,950.0	22,489,425.0	2,832,604.8	229,155,299.8	572,888.2	916,621.2	802,043.5

District/ Buildings	Sanitation (NPR)	Water Systems (NPR)	Build Back Better (NPR)			Total Cost, US\$	Budget allocation, US\$		
			WSP/ Upgrad- ing water quality	Infrastructure	Institutional capacity devel- opment		2015/16 (25%)	2016/17 (40%)	2017/18 (35%)
Paipa	46,701,028.2	254,079,000.0	25,407,900.0	38,111,850.0	4,511,700.4	368,811,478.6	922,028.7	1,475,245.9	1,290,840.2
Nawalparasi	63,437,476.8	62,947,500.0	6,294,750.0	9,442,125.0	1,895,774.7	144,017,626.5	360,044.1	576,070.5	504,061.7
Myagdi	30,222,430.0	76,681,500.0	7,668,150.0	11,502,225.0	1,603,559.0	127,677,864.0	319,194.7	510,711.5	446,872.5
Chitwan	72,128,025.0	43,491,000.0	4,349,100.0	6,523,650.0	1,734,285.4	128,226,060.4	320,565.2	512,904.2	448,791.2
Lamjung	45,832,320.0	135,051,000.0	13,505,100.0	20,257,650.0	2,713,249.8	217,359,319.8	543,398.3	869,437.3	760,757.6
Kaski	136,750,310.0	171,675,000.0	17,167,500.0	25,751,250.0	4,626,379.7	355,970,439.7	889,926.1	1,423,881.8	1,245,896.5
Syangja	73,927,244.4	252,934,500.0	25,293,450.0	37,940,175.0	4,902,926.2	394,998,295.6	987,495.7	1,579,993.2	1,382,494.0
Bhojpur	28,940,461.4	180,831,000.0	18,083,100.0	27,124,650.0	3,146,571.9	258,125,783.3	645,314.5	1,032,503.1	903,440.2
Sankhuwa Sabha	30,297,471.1	137,340,000.0	13,734,000.0	20,601,000.0	2,514,562.1	204,487,033.1	511,217.6	817,948.1	715,704.6
Arghakhanchi	51,040,340.0	211,732,500.0	21,173,250.0	31,759,875.0	3,941,592.6	319,647,557.6	799,118.9	1,278,590.2	1,118,766.5
<b>Sub-Total for other 17 moderately af- fected districts</b>	<b>915,835,772.1</b>	<b>2,822,337,000.0</b>	<b>282,233,700.0</b>	<b>423,350,550.0</b>	<b>56,072,591.6</b>	<b>4,499,829,613.7</b>	<b>11,249,574.0</b>	<b>17,999,318.5</b>	<b>15,749,403.6</b>
<b>Total (A+B)</b>	<b>2,111,582,122.1</b>	<b>8,394,139,656.0</b>	<b>839,413,965.6</b>	<b>1,259,120,948.4</b>	<b>157,585,826.7</b>	<b>12,761,842,518.8</b>	<b>31,904,606.3</b>	<b>51,047,370.1</b>	<b>44,666,448.8</b>
<b>C. Recovery in Melamchi, NWSC, PID, STUEIP and STWSSP supported schemes(@4% total (A+B))</b>		<b>335,765,586.2</b>				<b>335,765,586.2</b>	<b>839,414.0</b>	<b>1,343,062.3</b>	<b>1,175,179.6</b>
<b>D. Meeting mu- nicipal standards- for new urban population</b>		<b>5,008,586,000.0</b>				<b>5,008,586,000.0</b>		<b>20,034,344.0</b>	<b>30,051,516.0</b>
<b>Grand Total (A+B+C+D)</b>	<b>2,111,582,122.1</b>	<b>13,738,491,242.2</b>	<b>839,413,965.6</b>	<b>1,259,120,948.4</b>	<b>157,585,826.7</b>	<b>18,106,194,105.0</b>	<b>32,744,020.3</b>	<b>72,424,776.4</b>	<b>75,893,144.4</b>



### Implementation Arrangements

The implementation of the recovery strategy should be through existing sectoral policies and institutional arrangements, with coordination and strategic leadership provided by the MoUD. Although the recovery strategy is clearly focused on addressing the needs of affected districts, this should not be at the cost of slowing the development of water and sanitation services in other parts of the country. Indeed the principles of risk reduction and build back better should be incorporated into sector development nationwide. There should be continued progress towards SDP as this will facilitate a more effective and efficient delivery of the recovery strategy.

For an effective recovery, it is essential that roles and responsibilities, jurisdictions and resource envelopes are clearly established through consultation with key sector actors. This should set out the underlying principles of the recovery strategy, including the results-based management approach, monitoring and accountability. High-level technical and strategic guidance for implementation should be developed at an early stage. Dedicated task teams should undertake this work under the coordination of the Sector Efficiency Improvement Unit (SEIU), with MoUD providing overall guidance and supervision. The implementation mechanism should seek to further strengthen the decentralization process and capacity building of local government institutions to ensure that interventions are sustainable. Similarly, the principle of decision-making at the lowest possible organization level is critical to sustainability, meaning that consultation with communities and their involvement in monitoring must be viewed as an integral part of the implementation strategy, for example, reshaping/ revising of ongoing or upcoming WASH projects in affected districts to incorporate rehabilitation, DRR and BBB components.

### Assessment Methodology

The sector assessment was led by DWSS with significant contributions from development partners. At a very early stage a comprehensive assessment format to record the extent of damage to the component parts of water systems and sanitation was developed and disseminated across district offices of DWSS. Through a combination of site visits, and information received

from WSUCs and VDCs, assessment of individual water systems was undertaken. Standard costs were estimated for repair and reconstruction of both rural and urban systems, and sanitation facilities. Information was collated for each district and transferred to the central level to produce an overall summary of damage to assets and the costs of repair or reconstruction.

To supplement the DWSS assessment, a validation exercise was organized for the purposes of collecting qualitative information about the impacts on the affected population as a conse-

quence of disruption to water supply and sanitation services, and also for quality assurance. Field missions were undertaken in nine districts. Site visits were made to visually inspect water systems and sanitation facilities, consultations with community members took place and focus group discussions with women were held to better understand the gender dimensions of the disaster. Stakeholder meetings took place at district headquarters and with DWSS and other water and sanitation actors to discuss views on DRR and approaches and needs to actualize the principle of build back better.









# CROSS-CUTTING SECTORS

ENVIRONMENT AND FORESTRY



EMPLOYMENT AND LIVELIHOODS



GENDER EQUALITY AND SOCIAL INCLUSION



SOCIAL PROTECTION



GOVERNANCE



DISASTER RISK REDUCTION





# 16. Environment and Forestry

## Summary

The damages and losses to the environment and forests of Nepal comprise mainly of three types: (i) destruction of forests, including Protected Areas (PAs); (ii) destruction of previously installed environmentally-friendly technologies; and (iii) destruction of office buildings, furniture, equipment and other assets of government institutions and community-based natural resource management institutions. The largest loss in terms of value in the sector is from loss of ecosystem services. Other losses comprise increased costs of managing solid and hazardous waste and reducing pollution from brick manufacturing to meet the post-earthquake demand for reconstruction.

Major impacts include reduced capacity for forest and environment governance by the government and local communities in the affected districts. Beyond that, the earthquakes have enhanced the magnitude of several existing environmental hazards such as avalanches, floods, especially Glacial Lake Outburst Floods (GLOF), and landslides.

The total damages in the forestry sector are estimated to be NPR 32,960.3 million. Losses are estimated at NPR 1,061 million (excluding loss of ecosystem valued at NPR 34,021.3 million). The total cost of recovery and reconstruction is estimated at NPR 25,197 million. Of this, estimated reconstruction cost is NPR 6,773 million and recovery cost is NPR 18,424 million.

The overall aim of the reconstruction and recovery programme for the sector is to increase the resilience of ecosystems, the environment and vulnerable communities to future anthropogenic and natural shocks from earthquakes and climate change by enhancing their management, and working with other sectors to promote sound development and reduce unsustainable impacts in order to build back better, safer and greener.

Reconstruction activities include reconstruction of government and community offices and buildings, reforestation, afforestation to restore damaged forest areas, and re-installation of renewable energy technologies such as improved cooking stoves (ICS) and biogas. Recovery activities include implementing measures and building capacities to address pressures and threats to forests and ecosystems, including PAs.

Support will be provided to Community Forestry User Groups (CFUGs) to rehabilitate and restore their forests, including short-term targeted livelihood support to help rebuild environmental incomes from forest and natural resources. Recovery activities will also provide for sound management of solid and hazardous waste, including safe collection and disposal. Management of large amounts of debris and rubble and measures to reduce pollution from the anticipated rise in brick production to meet post-earthquake demand are other important recovery activities. Policy adjustments and incentives to promote climate smart, environment friendly (green) technology in construction and other sectors involved in the recovery will be prioritized as well.

As a cross-cutting issue, recommendations pertaining to environment and forestry have been included in other sector reports. These recommendations, which encompass nine principles, are mentioned in Box 16.1 below.

## Pre-Disaster Context and Baseline

### FORESTS

Forests cover about 5.83 million hectares (39.6 percent) of the country's total land area, including 2.15 million hectares of shrub lands. The main drivers of deforestation are illegal logging, fuelwood consumption, encroachments and road construction.<sup>62</sup> In addition to government managed forests, community forestry (CF) programmes are a major success in sustaining for-

<sup>62</sup> (Nepal's Readiness Preparation Proposal REDD 2010 – 2013, Ministry of Forest and Soil Conservation, 2010; Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+; Ministry of Forest and Soil Conservation, 2014)



### Box 16.1: Principles for Green, Resilient Recovery and Reconstruction

1. Ensure that building design and construction is environmentally sustainable, appropriate to the region, and will withstand future disasters.
2. Enforce environmental impact assessment/initial environmental examination regulations during reconstruction in order to avoid future disasters; and ensure enforcement.
3. Ensure that fuelwood collection complies with existing forest management plans and promote alternative energy and energy efficient technologies to reduce pressure on forest energy.
4. Recycle and reuse debris as much as possible, and ensure that solid waste disposal during the reconstruction phase is managed using environmentally sound practices, including the introduction of new systems.
5. Design water and sanitation interventions to reflect post-earthquake changes in water resources, future climate change scenarios, and awareness of integrated water resource management (IWRM).
6. Conduct land use planning, including zoning, before finalizing the location of resettlement areas to minimize risks from landslides and floods; and ensure adequate land and natural resources to meet community needs while minimizing environmental impacts.
7. Ensure that reconstruction of roads and hydro power take the opportunity to build back safer and greener and take account of climate variability.
8. Prioritize support for rapidly restoring livelihoods in order to take pressure off forests and biodiversity; in the longer term ensure livelihood restoration projects reflect the principles of resilient development.
9. Build capacity for green recovery and reconstruction, and ensure consultation/coordination with relevant stakeholders in recovery and reconstruction.

ests. The 31 earthquake-affected districts contain around 41 percent (2,393,535 hectares) of all forest area. Around 48 percent of this area is community forests managed by 11,554 CFUGs and involve more than 55 percent of the households in these districts. Another 48 percent is government managed forests, including Protected Areas (PAs). The rest includes leasehold forests (LHF) (0.73 percent), private forests and other categories (Table 16.1).

#### BIODIVERSITY AND PROTECTED AREAS

Nepal occupies only 0.1 percent of global land area but harbours 3.2 percent and 1.1 percent of the world’s known flora and fauna, with many endemic and threatened species. With its great altitudinal range, it contains a wide variety of ecosystems and habitat types. Protected areas are cornerstones of biodiversity conservation, covering 23.23 percent of the country and protecting flagship species such as tiger, rhino, red panda and snow leopard. Four national parks (Sagarmatha National Park is a world heritage site) and three conservation areas covering around 1,598,800 hectares have been affected by the earthquakes. There are a total of 1,156 lakes in the 31 districts including two Ramsar sites located in Langtang and Sagarmatha national parks. Some major river systems and hydrologi-

cal dams are also situated in the region. In addition, three buffer zones adjacent to PAs have been affected, covering 152,500 hectares.

#### LANDSLIDES AND GLACIAL LAKES

Intense monsoon rainfall triggers floods, landslides, debris flow and other hazards. Landslides cause considerable soil erosion and sedimentation, polluting waters and blocking waterways as well as destroying agricultural fields and threatening settlements. The recent extensive road opening with poorly designed and constructed roads has resulted in landslides in many parts of the mid-hills and mountains. More intense rainfall due to increased climate variability may also be a contributing factor.

An inventory of glaciers and glacial lakes by ICIMOD (in 1999; repeated in 2009) identified as many as 3,252 glaciers in Nepal. As glaciers melt and retreat due to climate change, glacial lakes form and rapidly fill up behind natural moraine or ice dams. These dams can breach suddenly, leading to downstream floods.<sup>63</sup> The National Adaptation Programmes of Action (NAPA) defined six of these lakes as the most critical.<sup>64</sup> Three are located in the earthquake-affected areas: Tsho Rolpa, Imja and Thulagi lakes.

<sup>63</sup> Glacial Lakes and Glacial Lake Outburst Floods in Nepal, ICIMOD, 2011

<sup>64</sup> National Adaptation Programme of Action (NAPA) to Climate Change, Ministry of Environment, 2010

### HAZARDOUS SUBSTANCES AND WASTE MANAGEMENT

Management of solid waste is a growing concern in Nepal, particularly in urban centres. Application of modern waste management techniques, such as source separated door-to-door collection systems, material recovery and recycling facilities, sanitary landfilling, and private sector participation are limited in most municipalities. Poor management of healthcare waste (HCW) exposes healthcare workers, waste handlers, the community, livestock and wildlife to infections, toxic effects and injuries. Most healthcare facilities do not implement safe practices such as onsite safe and separate collection, transport, storage, treatment and final disposal in secure landfill sites; most healthcare waste is dumped together with other wastes.

### AIR POLLUTION

The predominant source of air pollution in the Kathmandu Valley is from the operation of a large number of polluting and inefficient brick kilns. There are 429 officially registered brick kilns in Nepal while the Federation of Nepalese Brick Industries (FNBI) estimates more than 700 in total, with 103 being operated within the Kathmandu Valley. Coal is the major fuel for brick firing; annual coal consumption by the sector is estimated at 449,358 tonnes. With anticipated increase in demand for bricks for reconstruction of damaged buildings and houses, rise in air pollution is a concern.

### EXISTING ARRANGEMENTS AND PERFORMANCE OF ENVIRONMENTAL AND FORESTRY GOVERNANCE

Nepal has good environmental and forestry policies and legislation. The implementation of these policies, however, requires improvement. In many cases there is inadequate capacity for

implementation and monitoring, and penalties for transgressions are too low. There is lack of citizen awareness about development and environment and application of environmental impact assessment tools is currently limited. Community-based forest governance and institutions is very strong while institutional capacity within concerned government institutions requires further strengthening. The Ministry of Science, Technology and Environment (MoSTE) is mandated to ensure environmental safeguards, maintain environmental quality and promote renewable energy. It has developed several guidelines and environmental standards for various sectors. These need to be enforced properly. The mandate for the management and governance of forests and PAs is with the Ministry of Forest and Soil Conservation (MoFSC). Community forests are managed locally by CFUGs; buffer zone management councils manage forests in the buffer zones; and leasehold forestry groups manage degraded and marginalized forestlands to restore them.

## Disaster Effects

### EFFECTS ON INFRASTRUCTURE AND ASSETS

#### Damage to Forest Area

Several landslides, crevices, soil liquefactions and local floods following the earthquakes resulted in large-scale destruction of forest areas. To ascertain forest loss, The Food and Agriculture Organization (FAO) carried out a systematic analysis of pre- and post-earthquake satellite imagery. Based on this, a forest loss rate of 2.2 percent was estimated for six earthquake-affected districts. The impacts on forests are largely expected to be similar in 14 other severely-affected districts (with the exception of Kathmandu, Bhaktapur and Lalitpur which have very limited forest cover). Applied to the baseline forest area,

**TABLE 16.1: BASELINE FOREST DATA IN THE 31 EARTHQUAKE-AFFECTED DISTRICTS**

Districts	Total area (ha)	Households in district	Forest area (ha)	Govt. M forest (ha)	CFUGs			LHFs		
					No	Area (ha)	HHs	No	Area (ha)	HHs
Most affected	2,274,882	1,237,264	1,101,523	683,113	5,340	400,208	549,339	3,421	17,817	30,348
Hit with heavy loss	1,042,260	319,299	393,623	233,758	1,440	146,987	178,611	1,259	4,410	10,147
Moderate losses	783,734	416,007	334,072	202,988	2,740	110,540	293,107	58	610	660
Slightly affected districts	1,157,381	314,620	564,317	280,173	2,034	172,850	215,429	324	1,998	2,976
<b>Total</b>	<b>5,258,257</b>	<b>2,287,190</b>	<b>2,393,535</b>	<b>1,400,032</b>	<b>11,554</b>	<b>830,585</b>	<b>1,236,486</b>	<b>5,062</b>	<b>24,835</b>	<b>44,131</b>

the total damage and forest loss is estimated at 23,375 hectares.

The value of damages and losses as a result of destruction of these forests has been computed using an economic valuation study of the goods and services of forests carried out by MoFSC in 2005.<sup>65</sup> The direct use values have been taken as damages, and total damages of NPR 29,258.7 million is estimated.

#### **Effects on Biodiversity and Protected Areas**

Seven PAs were affected by the earthquakes. Among these were Sagarmatha National Park, a sacred landscape and world heritage site, as well as two Ramsar sites (Gosaikunda and Gokyo). These PAs provide refuge to several endangered fauna of global significance such as red panda, snow leopard and musk deer. Damages to the habitats of these key species are expected. In addition, earthquake impacts in adjacent areas and on local communities will have a significant bearing on management of PAs. Pressures on PA resources are likely to increase. Localized illicit activities, including poaching of wildlife and illegal wildlife trade, may also likely increase as several security posts are damaged and vigilance and monitoring activities hampered.

In addition, there were reports of extensive damage to eco-tourism infrastructure, including walking trails, bridges and hotels. Access to several nature-based tourism sites has been disrupted. This will significantly impact income from tourism – endangering the financial sustainability of the PAs and severely affecting the income of local communities and private business operators in the area. Several PAs (e.g., Sagarmatha National Park and Annapurna Conservation Area (ACA)) are world-renowned nature tourist destinations. Nature tourism contributes substantial revenue to the national economy. For example, during FY 2013-2014, of the 797,616 tourists visiting Nepal, nearly 551,680 tourists visited different PAs. Thus, tourists visiting PAs accounted for close to 70 percent of all tourists visiting the country. It is thereby pertinent that recovery efforts under the tourism sector integrate measures to revitalize **nature tourism in PAs as a driver of economic growth in Nepal** so as to continue to make positive contributions towards PA sustainability in the long run.

There was no damage reported to the wetlands. However, sedimentation, landslides and other changes are likely to have an impact on the wetlands. These may include eutrophication of lakes and damage to the habitat of aquatic flora and fauna, which will ultimately impact livelihoods of the poor, marginalized and other rural communities. Further, if landslides block the Trishuli/Narayani or Koshi rivers during the monsoon season and result in large floods, this will impact endangered wildlife species and their habitats downstream in Chitwan National Park and Koshi Tappu Wildlife Reserve.

#### **Damage to Office Buildings, Equipment and Furniture**

Analysis of damage to government and community-based institutions reveals that of the 894 government office buildings (district and sector/field level offices) of MoFSC in the 31 earthquake-affected districts, 569 have reported damages with severe damage to office equipment and furniture. A total of 740 CFUGs reported destruction of their office buildings while a further 407 CFUGs reported partial damage; 222 CFUGs reported cracks and damage. Almost all the affected CFUGs reported loss of important official documents such as Forest Operational Plans and files. Total damages of around **NPR 1,263.3 million** are estimated for government buildings and equipment, and **NPR 780 million** for CFUG buildings and equipment.

#### **Damage to Environment friendly Technologies**

Renewable Energy Technology solutions such as improved cooking stoves (ICS) and biogas installations promoted in the country through the Alternative Energy Promotion Center (AEPC) has led to improvements in household health and livelihood conditions, while also delivering significant positive environmental outcomes. For example, ICS installations can lead to energy savings of up to 80 percent and significant reduction in greenhouse gas (GHG) emissions, indoor pollution and deforestation. A rapid assessment by AEPC and its partner network reveals that 146,767 ICS units, 16,721 domestic biogas installations and 70,000 solar installations have been destroyed. These need to be replaced to prevent environmental impacts, including CO<sub>2</sub> emissions. The value of damages estimated at **NPR 1,573.3 million** has been in-

<sup>65</sup> Economic Valuation of Ecological Goods and Services (ESE), Ministry of Forest and Soil Conservation 2005

corporated under the housing sector. The loss to environment and forests as a result is estimated at NPR 181.4 million.

### **EFFECTS ON PRODUCTION OF GOODS AND SERVICES AND ACCESS TO SERVICES**

#### **Loss of Ecosystem Goods and Services**

Natural forest ecosystems, including wetlands, provide several important ecosystem services that people benefit from. In addition to timber and firewood, non-timber forest products (NTFPs) such as fruits, flowers, bark, dyes, fibers, gums and resins, and medicinal and aromatic plants (MAPs) are important products. Most NTFPs, including MAPs, have a higher commercial value than those of wood products. Income from environmental resources is particularly important for the rural poor. It can decrease rural income inequalities and serve to reduce the prevalence, depth and severity of poverty. In addition, forests provide many other ecosystem services, including absorbing carbon dioxide and buffering from floods and landslides. They maintain hydrological processes and conserve soil and water, enable nutrient cycling and host pollinators. Ecosystem services from forests are particularly important for rural communities, especially indigenous people, poor men and women, and other forest dependent communities. Using the 2005 MoFSC study, the total loss of ecosystem services is estimated at NPR 34,715.3 million.

#### **Increased Generation and Management Demands for Solid and Hazardous Waste**

The earthquakes have significantly worsened waste management, particularly in camp sites where affected communities have been residing. Whereas household waste generation was somehow managed and most rural waste is recycled or composted, the current concentration of people in camps has led to considerable generation of waste without a proper waste management system in place. Waste generation per camp is estimated to be around 37.66 kilograms, on average, per day. Waste collection is done using small bins with very little segregation at source and in some cases no effort is made to collect waste. Only around 40 percent of the camps have proper sanitation facilities; the majority are at best being served through pit latrines. Drinking water is available in half the camps while the supply of bottled water has

increased manifold, resulting in considerable plastic waste. MoSTE has banned the production, use, sale and transportation of plastic bags within Kathmandu and initiated promotion of environment friendly alternative bags made of cloth, fibre and paper. However, following the earthquakes, the increased use of plastics, including plastic bags, is of concern.

### **DISASTER IMPACTS**

#### **Need for Debris and Rubble Management**

With almost 750,000 buildings either completely or partially damaged, the earthquakes have generated a large amount of rubble. The total estimated volume of rubble is 18.854 million cubic metres. Of this, estimates for rubble that can be recycled or reused range between 60 percent and 80 percent. The remaining debris and rubble will need to be transported and disposed safely. Such a large amount of debris and rubble poses a threat to community health in several ways. Building waste from 31 affected districts is expected to contain up to 2.7 million litres of paint. Lead in paint may escape into the environment through paint dust and contaminate soil, which can lead to lead poisoning. Similarly, mercury from damaged buildings (e.g., in light bulbs and hospital equipment) may be contaminating the environment. Other hazardous materials include asbestos in roofing and hazardous chemicals in electronic waste. All potentially hazardous waste, e.g. healthcare waste, asbestos waste and building rubble contaminated with toxic lead paint and mercury, as well as electrical and electronic items, should be treated separately. Specifically, no burning technology should be used for this waste management. Environmentally-sound health-care waste management practices need to be promoted and scaled up, as part of building back better.

#### **Increased Pollution from Brick Manufacture**

According to the calculations by the housing sector, more than a billion bricks will be required for reconstruction. Manufacture of these many bricks will require coal imports of 1.58 million tonnes, which will lead to around 39,000 tonnes of CO<sub>2</sub> emissions. In addition, brick firing to generate the required bricks will emit around 2,800 tonnes of suspended particulate matter. The total cost of air pollution for



the 1.12 billion bricks that will be required for reconstruction is calculated to be around NPR 737 million. In addition, brick making will also deplete and pollute top soil in areas around the brick kilns, affecting agricultural productivity and health of local communities. Chimneys of many brick kilns were damaged. Production of a large number of bricks in brick kilns without adequate pollution control mechanisms such as chimneys may significantly increase air pollution and lead to health impacts. Mercury emission from burning coal in brick kilns will also impact human health and the environment.

#### **INCREASED RISKS AND VULNERABILITIES**

##### **Increased Risks from GLOF and Landslides**

The most significant environmental hazards is the threat of GLOF. While no major damage has been reported to moraine dams of the three largest and dangerous lakes, small cracks have been observed on the moraine dam of the Tsho Rolpa Lake. Previously constructed man-made channels to siphon out water may be blocked or damaged. A recent outburst following the earthquakes was reported in one of the supra glacial lakes located above Imja Lake, causing a temporary increase in water flow in the river. These indicate serious risks of GLOF in future. This risk may further be exacerbated by the impacts of climate change. Close monitoring of these lakes, including further study on the effects of the earthquakes on the stability of the moraine dam, is required. In addition, equipment and infrastructure such as gauge readers (at Tsho Rolpa), the meteorological stations at Langtang and Beding, and the base house at Kyangjing were destroyed.

More than 25 hydro-meteorological stations under the Department of Hydrology and Meteorology have also been damaged. Likewise, field reports and analysis of post-earthquake GIS/remote sensing imagery reveal that there were numerous landslides. Numerous cracks have formed in the hillsides. In the sloping hillsides, disturbances to soil structure and stability post-earthquake will increase the risks of fresh landslide significantly, in particular during the upcoming monsoon season. Landslides can cause huge losses to lives and property. Monitoring and geotechnical assessment together with measures such as watershed management, including afforestation, land and soil conservation, and

bio-engineering techniques are required to reduce this risk. With millions of people affected and their houses damaged, there is tremendous pressure on forests for land and timber to build temporary shelters. Data from five District Forest Offices (DFOs) reveal that 88 hectares of forests have been encroached upon while nearly 206 hectares have already been illegally felled. This trend is expected to increase in future and will, if not monitored, lead to significant land use changes and forest area conversions.

#### **IMPACTS ON GENDER AND SOCIAL INCLUSION**

Many women and socially excluded groups dependent on natural resources have been particularly affected by the earthquakes. There is need to build women's capacity for active participation in community forests, especially in light of out-migration of men. Forests and conservation areas are key sources of livelihood building for local communities, especially of rural women, indigenous peoples, Dalits, poor men and women, and other people living around forests. Loss of forests due to landslides triggered by the earthquakes means loss of livelihood assets for people living in earthquake-affected districts. In addition, with the loss of nearby forests, women, responsible for taking care of livestock, will have to spend more time in collecting animal feed from forests that are further away. Nevertheless, forests also provide food and income for households in times of stress and they will become an important resource for coping with food shortages. In addition, community forest users in 14 affected districts have reported earthquake damage to water resources. Likewise, many energy efficient and alternative energy installations have been damaged. This has direct implications for women and girls, exacerbating their workloads since they now have to collect more water and firewood from forests. The increased workload for women will have a negative impact on their capacity to engage in community leadership, natural resource management and earthquake recovery in their households, communities and forests.

#### **IMPACTS ON SECTOR GOVERNANCE FUNCTIONS AND SYSTEMS**

##### **Forest and Environmental Governance Performance and Issues**

The earthquakes greatly reduced the capacity of government and local communities in the af-

affected districts, affecting monitoring and stewardship of PAs, wildlife, forests and natural resources. A large number of CFUG members and executive members were directly affected by the disaster. Tragically, at least 1536 CFUG members (731 male, 805 female) and around 150 CFUG executive members (69 male, 81 female) died in the earthquakes.

Some villages have been completely destroyed. In addition, office buildings, equipment and furniture of both government and community based natural resource management institutions were damaged in many villages. The loss of life and damage to property and official documents directly hampers the performance of both government and community institutions in delivering services and enforcing laws. Consequently, management of government and community managed forests, and PAs will be greatly affected at a time when demand for fuel, food and shelter from forests is likely to increase. This will increase the risk of unsustainable and illegal harvesting of forest produce, poaching of wildlife and exploitation of remaining community owned resources critical to their livelihood in the guise of recovery and reconstruction. The possible translocation of few villages will further worsen community-based forest governance and resource stewardship.

### Recovery Needs and Strategy

The total estimated reconstruction and recovery needs for the environment and forestry sector is NPR 25,197 million. This estimate is based on wide consultations among sector experts, representatives of the two ministries, NGOs and development partners. Of this, the total estimated cost of reconstruction is NPR 6,773 million. The reconstruction activities will build back the environment and forestry infrastructure and assets that were damaged. The total recovery costs estimated is NPR 18,424 million.

The overall aim of the reconstruction and recovery programme for the environment and forestry sector is to increase the resilience of ecosystems, the environment and vulnerable communities to future anthropogenic and natural shocks from earthquakes and climate change by enhancing their management, and working with other sectors to promote sound development and reduce unsustainable impacts in order to build back bet-

### Box 16.2: The case of Langtang Village

Langtang village in the Langtang National Park was hit hard by the earthquake of 25 April 2015. An avalanche of ice and rocks completely buried the village killing about 200 of its inhabitants and leaving about 500 homeless. In the incident, four executive committee members of Langtang National Park Buffer Zone User Committee - including its chairman Mr. Chhowang Thiley Tamang - lost their lives. In the same incident, former chairperson of Buffer Zone Management Committee, Tenzing Pasang Tamang, also died. The loss of Mr. Thiley Tamang, an emerging conservation leader from Langtang Valley, has created a big gap.

ter, safer and greener. Planned investments under the sector will be targetted to recover the losses by creating 'green jobs' under the broader recovery strategy and promoting sustainable solutions to address the key emerging issues of waste and air pollution based on the principles of reuse and recycle. The recovery activities will augment actions to carefully manage municipal and hazardous substances and waste, making sensible use of debris and other proven green substitutes during reconstruction. These will contribute to building capacities, tools and skills of key government, community and private sectors institutions to identify, monitor and manage risks to natural ecosystems and vulnerable populations.

Natural hazards such as floods, including GLOF, avalanches, drought and storms, are exacerbated by climate change, which is expected to increase the severity and frequency of these hazards. They pose a serious threat to poor farmers and rural communities who live in remote, marginal, mountain and hill areas with limited resources, communications and transportation networks. In addition, the natural resources that these people depend on to cope with the impacts of such hazards are also highly climate sensitive – agriculture, forest products, water resources, etc. Given this, future recovery investments will need to explore ways to integrate climate risks and strengthen the resiliency of ecosystems and communities, including using the potential of Ecosystem-Based Adaptation (EBA) options and nature-based mitigation measures.

The reconstruction and recovery activities have been designed to address the short-, medium- and long-term needs of the sector. In the short

**TABLE 16.2: SUMMARY ESTIMATES OF DAMAGES AND LOSSES**

SN	Themes	Baseline	Unit	Damages NPR	Losses NPR	Total effect (damages + losses)
<b>Public sector</b>						
<b>1</b>	<b>Forestry related infrastructure</b>			<b>2,043,318,400</b>		<b>2,043,318,400</b>
	GON offices	894	No.	1,257,650,400	0	1,257,650,400
	GON equipment and furniture	n/a		5,718,000	0	5,718,000
	CFUG offices	11,520	No.	694,630,000	0	694,630,000
	CFUG equipment and furniture	n/a		85,320,000	0	85,320,000
<b>2</b>	<b>Impact on forestry, watershed, biodiversity, NTFP</b>			<b>29,343,674,341</b>	<b>142,601,520</b>	<b>29,486,275,861</b>
	Forest area loss	1,101,523	Hectare	29,258,769,601	0*1	29,258,769,601
	Encroachment and illicit felling			0	104,339,520	104,339,520
	NFTP collection loss	4,618,031	kg	84,904,740	38,262,000	123,166,740
<b>3</b>	<b>Environment</b>			<b>1,573,332,200</b>	<b>918,404,300</b>	<b>2,491,736,500</b>
	Air pollution due to brick industry			0	737,000,000	737,000,000
<b>Private sector<sup>3</sup></b>						
	Improved cooking stove	1,237,353	No.	1,138,512,200	157,187,100	1,295,699,300
	Biogas	79,623	No.	434,820,000	24,217,200	459,037,200
	<b>Total NPR</b>			<b>32,960,324,941</b>	<b>1,061,005,820</b>	<b>34,021,330,761</b>
	<b>Total US\$</b>			<b>329,603,249</b>	<b>10,610,058</b>	<b>340,213,308</b>

**Notes:**

- Loss in ecosystem services such as forest contribution in controlling soil erosion and loss of soil nutrient, carbon sequestration and environmental amelioration is estimated to be NPR 34,715 million which is intangible and not included in the estimates.
- The recovery cost for forest damage and ecosystem restoration is estimated to be lower than the total damages and losses incurred. It is assumed, within a planned 10 year period, that about 50 percent of the losses will either be restored naturally or will not be restored in some cases.
- Although the ICS and biogas plant damages have been categorized in the private sector, the recovery cost is only from government subsidy, and potential 50 percent additional cost will be incurred by the private owner.

term, priority is given to respond to immediate and urgent reconstruction needs. In the medium term, measures to restore ecosystem functionality, ensure safe management and use of environmental hazards, including solid waste management, and promotion of sustainable practices will be prioritized. Long-term activities are geared towards improving the resilience and sustainability of ecosystems and the sound management of environment hazards and risks. It is strongly recommended that during reconstruction and recovery, the important principles given in Box 16.1 are applied by all sectors.

**GOVERNMENT-MANAGED FORESTS AND WATERSHED MANAGEMENT**

**Reconstruction**

In the short term, reconstruction activities that include nursery and plantations, and repair and maintenance of damaged renewable energy schemes will be implemented. Short-term interventions will also include geo-stability assessments of cracked and disturbed land masses in selected areas to identify

the threats of landslides and help implement measures that reduces these risks. Damage analysis indicates that large forest areas were destroyed by the earthquakes. Removal and salvage operations in the damaged forests and supply of timber and firewood resulting from the salvage operations to the market will be undertaken as short-term priorities. Measures to enhance surveillance and monitoring of incidences of forest land encroachments will also be implemented in the short term.

**Recovery**

Building institutional capacities to address pressures and threats to forests more systematically will be done in the medium term. Measures to promote and implement bio-engineering and soil conservation/agro-forestry will be implemented in the short term to reduce threats of landslides. Integrated watershed management approaches will be promoted in the medium to long term. Watersheds will be restored with the aim of promoting water infiltration, regulating stream flows, protecting against mass movement and buffering against climate related hazards.

In this regard, sustainable land management practices in all forms of land uses will be encouraged through effective implementation of land use policies for sustainable landscape management that balances competing land uses while reducing negative impacts on forests and ecosystems. Roles for various stakeholders will also be explored, including creating opportunities for private sector investments in sustainable forestry and forest product management, and ensuring technologies for improved, seasoned or treated wood products for reconstruction of building and infrastructure are adopted. Activities that will ensure the restoration of ecological functions and ecosystem services will be implemented in the medium term and long term. In the long term, this recovery programme, by employing proven approaches of EBA and mitigation, should also lead to improvements in sustainable forest management that increase the resilience of forest landscapes and ecosystems to climate change and other threats.

## COMMUNITY FORESTS

### Reconstruction

Immediate support to restore the services provided by CFUGs and their federated bodies at district and national levels will be needed to deal with physical and material losses. In the short term, direct institutional support and cash transfers to support livelihoods and replace capacities to manage forests will be critical. CFUGs will also require support to carry out detailed assessments to identify and account for losses. Technical support will be required to plan and implement measures to restore community forests. These may include reforestation or creating conditions for expedited regeneration. Livelihood support is critical both in the short term and medium term. These can include sustainable alternative livelihood development to reduce pressure on forests.

### Recovery

In the long term, community capacity to manage forests to increase resilience of community forests will be supported. Such an aspiration may be incorporated into the revised management plans of community forests under the medium term. Support should also be provided to restore damaged ICS and biogas installations to reduce pressure on forests. Many women

(52.17 percent) and men (43.83 percent) in the 14 most-affected districts actively participate in community forestry programmes both as users and managers of forest products. Their participation in forestry management will be critical for sustainable management of these resources and will be proactively ensured. In addition, most of the high hill districts affected are rich in forest/herbal products. Skills development and training for women in sustainable harvesting of NTFPs and marketing forest products to expand their livelihood base will also be considered as part of the recovery strategy. Similarly, participation of ethnic minorities who depend the most on these resources will be critical for their livelihoods as well as sustainable management of forest resources.

## TIMBER AVAILABILITY AND PRODUCTION

### Reconstruction

Given the huge number of private and public houses that were damaged, MoFSC is concerned about how to source timber and other construction material required for reconstruction. Initial assessment of inventory data and analysis of growing stock confirms the availability of timber volume totalling 18,552,263 cubic feet – this includes 2,477,163 cubic feet from the Tarai region and 16,075,100 cft cubic feet from the 24 earthquake-hit districts. These will be made available for reconstruction of both public and private buildings. Where possible, use of locally available timber and poles from community forests and/or government managed forests will be encouraged. To ease the timber harvest and distribution process, existing policy and regulatory provisions will require revision, such as relaxing legal restrictions on harvest and transport of timber including the overall ban on timber harvest during the period 15 June to 15 October (by the Forest Regulations of 1995).

## BIODIVERSITY AND PROTECTED AREAS

### Recovery

Short-term activities may include identification of impacts of the earthquakes on critical habitats and key species and future risks (e.g., flooding in downstream PAs). To deter violations of rules and to control illegal wildlife poaching and trade, regular patrolling, and anti-poaching and monitoring activities will be given priority in the



short term. In the medium term, implementation of species and habitat recovery that are integrated into revised PA management plans will be implemented, while in the long term the aim will be to improve the resilience of PAs, biodiversity and ecosystems to anthropogenic and climate risks by incorporating climate change and DRR into management strategies of PAs.

#### WASTE MANAGEMENT AND POLLUTION

##### Recovery

Considering the scale of the waste problem, short-term needs will include safe collection and disposal of waste, and disposal and management of debris and rubble. In the short to medium terms, efforts to identify low emission and environmentally-friendly ways of producing and resourcing construction materials will be important. Support to developing a framework/mechanism to reduce pollution, including hazardous waste, will be a medium-term priority. In the long term, sustainable management of waste and pollution, including legislation, improving capacity to monitor and enforce environmental regulations, etc. will be planned.

#### ENVIRONMENTALLY FRIENDLY TECHNOLOGIES

##### Recovery

Promotion of ICS and biogas as a clean alternative to traditional cooking practices by AEPC has substantially decreased the use of fuelwood as energy fuel and contributed to lower carbon emissions. The damaged ICS and biogas plants will be repaired and reconstructed in two phases:

*Phase I – Immediate relief package offering domestic clean cooking:* The focus will be on providing immediate cooking solutions by December 2015 with the installation target of 100,000 ICS and 8360 biogas plants.

*Phase II – Reconstruction, rehabilitation and mid-term relief solutions:* Under this package, the focus will be to deliver long-term solutions for reconstruction and rehabilitation of damaged ICS and biogas. During this phase, a total of 46,767 ICS and 8360 biogas plants within December 2016 will be installed.

#### ENVIRONMENTAL GOVERNANCE

##### Reconstruction

In the short term, reconstruction of damaged infrastructure and equipping them to restore operational capacity is important. In the medium term, strengthening the human capacity of both government and community institutions will be required. Also, in the medium-term to long-term efforts to strengthen the policy/institutional environment and support good environmental governance will be made. There is need to expand the network of environmental institutions at regional and district levels with fully equipped environmental laboratories and professional human resources.

##### Recovery

In the medium term, strengthening the human capacity of both government and community institutions to assess and mitigate impacts of hazards (including climate risks) will be implemented. Also in the medium to long terms, efforts to strengthen the policy and institutional environment to foster good environmental governance will be intensified. Improved mechanisms for environmental decision-making, including environment management information systems (EMIS) and improved environmental assessment processes, is an important medium- to long-term need. Equal importance needs to be given to increasing the capacity of government and non-government actors. At the same time, certain new strategies will be required to ensure resilient recovery and reconstruction, which include Strategic Environmental Assessment Strategy for developments; Low Carbon Development Strategy; and a comprehensive Sustainable Development Strategy. The Department of Environment (DoE) will lead the development of an appropriate environmental mitigation plan to reduce negative impacts of the reconstruction and rehabilitation related activities and will prepare temporary shelter environmental management guidelines.

#### POLLUTION CONTROL

##### Recovery

In the short term, measures to reduce pollution from brick production will be implemented. In the medium term, identification, recognition and integration of technologies and practices for reuse/recycle in the construction industry

will be supported; promotion of technological improvements in the brick industry through fiscal measures such as subsidies are also important medium-term needs. Fiscal incentives should also be given to support import of climate smart, environmentally friendly (green) technology in the construction industry. Another short- to medium-term need is to establish and operate mobile and stationary stations to monitor air pollution, noise pollution, water pollution and soil pollution. The technical and institutional capacity of DoE to conduct assessments, document, analyse and disseminate information regarding environmental hazards should be improved in the medium term while long-term needs include policy oriented research to lead to adoption of climate smart green technologies and promotion of sustainable consumption patterns.

### Implementation Arrangements

The reconstruction and recovery programme for the environment and forestry sector will be implemented in a phased approach. The recovery and reconstruction programme for the forestry sector will be coordinated by MoFSC and for the environment sector by MoSTE.

The ministry and its respective departments, such as Department of Forests, National Park and Wildlife Conservation, Soil Conservation and Watershed Management, will be responsible for coordinating recovery of the forestry, biodiversity and watershed management subsectors in close collaboration with local community groups. Likewise, MoSTE's Department of Environment will be responsible to coordinate waste management and pollution issues while the Department of Hydrology and Meteorology will coordinate all activities related to environmental hazards such as GLOF. AEPC will coordinate the recovery activities related to environmentally-friendly technologies (ICS and biogas installations).

Each ministry will coordinate closely with other lead ministries and sectors for developing detailed plans of implementation for other sectors. Both ministries will also participate actively in any future national recovery coordination body that may be set up, and work with other sectors to ensure green principles and resilient practices are adopted, and to promote sustainable development. The recovery strategy will: (i) be clearly aligned with the Government of Nepal's existing plans and environmental conditions specified in international

treaties and accords; (ii) ensure promotion of landscape and basin level approach, strategy and activity planning to recognize the integrated nature of environmental/natural resources issues; and (iii) will continue to build and expand the strategy of forestry for prosperity, low carbon growth, avoiding deforestation and reforestation. In addition, MoSTE will also lead a Rapid Environmental Assessment (REA) of recent earthquakes to identify, map and prioritize environmental impacts, hazards and risks resulting from the earthquakes itself and from subsequent recovery/reconstruction. It will also ensure that negative environmental impacts be reduced while measures to build back better in a more resilient and environmentally sensitive way is integrated across sectors. This REA report will build on and validate the PDNA findings.

A Post Disaster Recovery and Reconstruction Management Coordination Committee (DRRMCC) will be formed under the Secretary of the respective ministries to coordinate implementation management. Respective departmental projects will be aligned, coordinated and implemented through the Implementation Working Group chaired by the Director General of each department. This committee will manage the overall planning and decision making process, including putting in place an effective monitoring and evaluation system. All recovery and reconstruction work at district level will be coordinated through the District Disaster Relief Committees (DDRCs). Field level implementation will be executed through district offices and through mobilizing local forestry groups and multi-stakeholder institutions such as District Forestry Sector Coordination Committee (DFSCC) and Agriculture Environment and Forest Committee.

### Assessment Methodology

The environment and forestry sector PDNA was completed by 25 members drawn from government, donors, international NGOs, federations and academia. In its first meeting, the group identified major issues facing the sector, direct impacts from the earthquakes, and existing indirect and future potential impacts from responses to the earthquakes by other sectors. The group further organized into subgroups as per the priority sub-themes for data collection and analysis, which were later validated and compiled.

- **Forest loss:** GIS analysis was undertaken by FAO to estimate areas of forest loss due to landslides, using a sampling methodology

TABLE 16.3: SUMMARY RECONSTRUCTION AND RECOVERY NEEDS (NPR MILLION)

SN	Major Recovery Activities	Short			Medium			Long			Reconstruction	Recovery	Total
		2015-16	2016-17	2017-18	2018-19	2019-20	2020-25	2015-16	2016-17	2017-18			
<b>1</b>	<b>Forestry related infrastructure</b>	<b>900</b>	<b>700</b>	<b>600</b>	<b>300</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2400</b>	<b>100</b>	<b>2500</b>	
1.1	Temporary shelter to district offices and service centre	100	0	0	0	0	0	0	0	100	0	100	
1.2	Furniture and forestry equipment	100	0	0	0	0	0	0	0	100	0	100	
1.3	Repair/retrofit and reconstruction of offices (GoN + LFUG)	700	700	600	200	0	0	0	0	2200	0	2200	
1.4	Risk assessment and management of GoN and LFUGs	0	0	0	100	0	0	0	0	0	100	100	
<b>2</b>	<b>Restoration forestry, watershed, biodiversity, NTFP</b>	<b>3040</b>	<b>2280</b>	<b>2280</b>	<b>2280</b>	<b>2280</b>	<b>2280</b>	<b>3040</b>	<b>2800</b>	<b>12400</b>	<b>15200</b>		
2.1	Forest management [(i) detailed impact assessment; ii) preparation of management plans; iii) plan implementation; iv) surveillance; v) monitoring; vi) technology development etc.]	440	330	330	330	330	330	440	880	1320	2200		
2.2	Forest restoration [(i) rubble removal; ii) afforestation/ reforestation (18,000 ha); iii) grazing control and plantation protection; iv) salvage felling and clearing etc.]	480	360	360	360	360	360	480	1920	480	2400		
2.3	Watershed Management and Landslide Risk Mitigation [(i) hazard mapping; ii) prepare WS plans; iii) landslide treatment (bio-engineering, gabions, masonry); iv) sustainable soil management]	1120	840	840	840	840	840	1120	0	5600	5600		
2.4	Biodiversity Conservation and PA management [(i) habitat restoration plan; ii) habitat management (7000 ha); iii) anti-poaching and illicit activities; iv) conservation outreach; v) human-wildlife conflicts etc.]	460	345	345	345	345	345	460	0	2300	2300		
2.5	Resumption of community-based forest management livelihood support capacity development [(i) 2300 OP revision; ii) direct support to 1650 LFUGs; iii) livelihood improvement plan support to 20000 HHs; iv) NTFP promotion; v) capacity development of LFUGs and staffs	440	330	330	330	330	330	440	0	2200	2200		
2.6	Gender and Social Inclusion [(i) empowerment; ii) training; iii) education; iv) livelihood support]	100	75	75	75	75	75	100	0	500	500		
<b>3</b>	<b>Environment restoration</b>	<b>1876.9</b>	<b>2721.2</b>	<b>1648.9</b>	<b>750</b>	<b>500</b>	<b>0</b>	<b>0</b>	<b>1573</b>	<b>5924</b>	<b>7497</b>		
3.1	Repair and install ICS and biogas units/replacement	471.9	629.2	471.9	0	0	0	0	1573	1573	1573		
3.2	Promotion of environment friendly technology	20	30	0	0	0	0	0	0	50	50		
3.3	Comprehensive environment assessment and monitoring	5	5	0	0	0	0	0	0	10	10		
3.4	Air, water and noise quality monitoring stations	15	75	75	100	100	0	0	0	365	365		
3.5	Subsidies and incentives for promotion of green recovery	300	300	200	100	100	0	0	0	1000	1000		
3.6	Debris and rubble management, improvement of landfill	500	500	0	0	0	0	0	0	1000	1000		
3.7	Technical capacity enhancement of DOE	50	75	50	50	50	0	0	0	275	275		
3.8	Solid waste management technology	500	750	500	500	250	0	0	0	2500	2500		
3.9	Prepare environmental safety guidelines (waste management hazardous/toxic waste management etc.)	15	10	5	0	0	0	0	0	30	30		
3.10	Promote research on new emerging technologies for environment protection and safe disposal of waste	0	347	347	0	0	0	0	0	694	694		
<b>Total</b>		<b>5,816.9</b>	<b>5,701.2</b>	<b>4,528.9</b>	<b>3,330</b>	<b>2,780</b>	<b>3,040</b>	<b>6,773</b>	<b>18,424</b>	<b>25,197</b>			

- **Loss and damage to forest, biodiversity and watershed management capacity:** Department of Forest (DoF), Department of National Parks and Wildlife Conservation (DNPWC), Nepal Trust for Nature and Conservation (NTNC) and Department of Soil Conservation and Watershed Management (DoSCWM) undertook rapid assessments to collect information on loss of infrastructure in PAs, DFOs and range posts, and district soil conservation and watershed management offices. Federation of Community Forestry Users Nepal (FECOFUN) provided data on loss of life and injury to CFUG members as well as CFUG infrastructure.
- **Valuation of payments for ecosystem services:** The 2005 MoFSC study provides both direct (such as timber, firewood, fodder, grass/leaf-litter, edible fruits, tubers) and indirect use (such as biodiversity conservation, ecological function, carbon sequestration, soil and water conservation, ecotourism, etc.) values of forests per hectare for different forest types. Forest areas damaged by the earthquakes were mainly of two types: pine forests (30 percent) and sub-temperate forests (70 percent). These values were adjusted to present values with an interest rate of 6 percent. No differentiation was made between government managed and community forests.
- **Alternative energy installations:** AEPC and its partners undertook rapid assessments to collect information. Estimates were made of additional carbon emissions as a result of burning firewood on open fires instead of using the damaged installations, and these were valued using current alternative energy market values for avoided carbon emissions.
- **Building materials:** Calculations were made for the requirement of new bricks for reconstruction, including the amount of soil and energy required for their production, and the environmental cost in terms of carbon emissions and health hazards from air pollution. Estimates were also made for sand, gravel and aggregate extraction, and their environmental cost (15 percent of their market value).
- **Building debris:** Estimates were made of the amount of building debris that will require disposal (i.e., which is not reused or recycled).
- **Hazardous waste:** Estimates were made of hazardous materials, including hospital waste, lead based paint, asbestos and mercury, by the Center for Public Health and Environmental Development.

## Assessment Limitations

Given the time limitations, the assessment of the sector effects were based largely on secondary data and information collected from various government and non-government organizations. Efforts were made to validate data received. The baseline and other post-disaster information provided represent a high level of precision. The following assumptions were made and limitations exist in the analysis of the post-disaster assessment.

- In the assessment of the forest damage area, the sample size is small. The average damage (or forest loss) calculated by FAO (2.2 percent for six districts) was extrapolated to five other severely-affected districts with the assumption that effects of the earthquakes is similar in these districts. This will need further confirmation during the reconstruction and recovery period through detailed field assessments. Similarly, no significant forest cover was assumed for the three districts of Kathmandu, Lalitpur and Bhaktapur. Another assumption was that damage to forests was limited in the other 17 districts.
- The economic valuation of the goods and services was based on the 2005 study of the MoFSC. The study considered six different forest types and average economic value computed for similar forest types was used to estimate the value of ecosystem services lost. An interest rate of 6 percent was used to convert the 2005 values to the present value. However, the average inflation rate during this time is reported to be around nine percent.
- Valuation of damages and reconstruction costs to infrastructure and assets is based on best estimates from field offices and informed by expert advice. Many CFUGs operate either from rented private office buildings or private residences of executive committee members. Only some have dedicated office buildings. A uniform standard cost estimate method was applied to all damaged CFUG offices. This should be verified during the implementation of the reconstruction and recovery activities. The recovery costs of various activities have not taken into account changes in interest and other price fluctuations. Sourcing of timber and other construction materials is assumed to be from local areas and locally-available materials.





# 17. Employment and Livelihoods

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## Summary

The 25 April and 12 May earthquakes affected the livelihoods of about 2.29 million households and 5.6 million workers across 31 districts, resulting in the loss of 94 million work days and NPR 17 billion of personal income in FY 2015-2016. The agriculture sector appears to be the most severely affected; it is estimated that 49.9 percent of all work days lost occurred in agriculture, followed by tourism with 31.1 percent and commerce and industry with 20 percent. Although the personal income loss is equivalent to only two percent of the total disaster effect, it is important to highlight that annual labour earnings in Nepal are extremely low. Therefore, even a minor income loss has serious implications for poverty in the country.

Despite the heavy losses suffered, the reconstruction and recovery phase is an opportunity for job creation and employment growth. It is estimated that large-scale housing reconstruction may generate up to 352 million workdays over the next five years.

Enabling households and workers to recover their productive and income-generating activities and increasing the resilience of livelihoods to future shocks must be a key component of the reconstruction and recovery process. A comprehensive strategy – *Working Out of Disaster, Building Resilient Livelihoods* – is proposed, consisting of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation to medium- and long-term employment recovery. The estimated budget for the employment and livelihoods recovery needs amounts to NPR 12.5 billion.

## Pre-disaster Context and Baseline

### LABOUR MARKET OVERVIEW

Prior to the earthquakes, Nepal was confronted with a number of long-term, structural econom-

ic and labour market challenges. Since emerging in 2006 from a ten-year conflict, Nepal has struggled with the difficult transition from war to peace, from autocracy to democracy, and from an exclusionary and centralized state to a more inclusive and federal one. Economic growth has, however, not been high enough to create enough quality jobs for a growing, youthful population.

As a consequence, an increasing number of Nepalis are pursuing employment opportunities in the informal economy. Looking at all sectors, it is estimated that more than 96.2 percent of workers are informally employed. An increasing number of Nepalis are also seeking employment outside the country. Remittance inflows to Nepal reached US\$5.87 billion during the first eight months of the fiscal year 2013-2014, representing 29.1 percent of GDP. Compared to only US\$771 million in 2003, remittance flows have increased by 661 percent over a ten-year period.

Due in part to the rapid growth in remittance inflows, poverty rates in Nepal have declined since the 1990s, despite slow growth and the intervening years of conflict. Data from the National Living Standards Survey (NLSS) reveal that the poverty rate has fallen from 41.8 percent in 1995-1996 to 30.8 percent in 2003-2004, before dropping to 25.2 percent in 2010-2011. According to the 2008 Labour Force Survey (LFS), the labour force participation rate for men was 87.5 percent in 2008 and 80.1 percent for women, far higher than witnessed in other countries in the region. Although the total work volume carried out by children has declined over the past decade, child labour remains a concern in Nepal: 33.9 percent of children aged 5-14 were economically active in 2008, compared to 40.9 percent in 1998-1999.

There are considerable differences between urban and rural areas: Outside of Kathmandu Valley, workers are more likely to be women due to the out-migration of men. Moreover, economi-



cally-active individuals in the rural districts hit by the earthquake are more likely to be uneducated: 66 percent of them have no education compared to 31 percent in Kathmandu Valley.

In light of these significant long-term and structural challenges, job creation and employment have been prioritized by the Government of Nepal as reflected by the two preceding Three Year Plans (2007- 2010 and 2010-2013). In February 2015, the Government of Nepal adopted the National Employment Policy, outlining a comprehensive and coordinated commitment to making employment a key development objective and improving implementation of related activities.

#### **AGRICULTURE**

Most Nepalis are dependent on agriculture for a living. Although agriculture contributes around a third of GDP, majority of workers in agriculture are subsistence farmers and generate a modest personal income. A district-wise breakdown reveals that the population (10 years and above) engaged in agriculture varies from 5 percent in Kathmandu to 61 percent in Solukhumbu. It is estimated that a farmer spends around 182 days per annum on direct agriculture related activities, which includes land preparation, tilling, sowing, weeding and harvesting.

The agricultural sector is highly dominated by women, largely due to a 'feminization of agriculture' as more and more men migrate to urban centres and abroad. According to the 2008 LFS, 84.3 percent of working women are employed in agriculture, compared to only 62.1 percent for men. The great majority of working children, 82.1 percent, are engaged in agricultural activities and predominately support the subsistence farming activities of their households.

#### **COMMERCE AND INDUSTRY**

Although majority of the Nepali population continues to depend on agriculture for a living, Nepal's labour market contributions to the economy have shifted over the past decade and are increasingly driven by the non-agricultural sector. In the period from 2001-2002 to 2013-2014 the contribution of services to GDP has increased from 45.1 to 52.2 percent. At the same time, GDP contribution of industry has declined from 17.1 to 14.4 percent. As seen in many other low-

income countries, Nepal could be argued to be a case of 'premature de-industrialization'.

According to the Department of Industries (DoI), a limited number of registered small, medium and large enterprises (5,274 in all) provided employment to 458,000 people in 2013. However, only a fifth of all enterprises in Nepal are formally registered and hence the majority of non-farm employment opportunities are generated by informally-operating, household-based and micro enterprises. According to the 2011 NLSS, 35 percent of households operate a non-farm enterprise. Of this, 36 percent are in trade, 35 percent in manufacturing, 17 percent in services and the remaining 12 percent in other types of industries. In urban areas, non-farm enterprises are primarily engaged in trade and services, such as operating petty shops and tea stalls, while manufacturing, such as producing handicrafts and weaving, is dominant in rural areas. The wealth of a household appears to determine the kind of business activities conducted: Households from the poorest consumption quintile have a disproportionately higher share of manufacturing enterprises while those from the richest quintile are primarily engaged in trade and services.

#### **TOURISM**

Despite a modest direct contribution of 4.3 percent to GDP in 2014 according to World Tourism and Travel Council (WTTC) report 2015, tourism is increasingly recognized as an important contributor to job creation in Nepal. Reliable data on the total employment generated by the tourist sector remain scant: whilst the Economic Survey 2013 states that 178,000 jobs are directly created by tourism, the World Travel & Tourism Council (WTTC) estimates that 504,000 jobs were directly supported by the tourism sector in 2013, along with an additional 608,000 indirect jobs.

Tourist activity in Nepal stimulates employment among a number of formal businesses including international and domestic airlines, hotels, homestays and travel agencies which multiply income generating opportunities in the informal economy through value chains, e.g., porters, minibus/taxi operators as well as vendors that sell handicrafts and other goods to tourists.

According to the Ministry of Tourism, Culture and Civil Aviation (MoCTA), employment in tourism is marked by a number of gender disparities. About four out of five (80 percent) workers in tourism are male. Likewise the proportion of male workers is higher than female workers in all types of tourist businesses, except in homestays, which employs more women (57 percent). Stark discrepancies also exist in employment status: the proportion of women is higher among the self-employed (26 percent) than among employees (19 percent).

#### **MIGRATION AND OVERSEAS EMPLOYMENT**

Over the past five years, the number of Nepali seeking foreign employment has increased steadily. According to the Department of Foreign Employment (DoFE), in 2013-2014, 521,878 Nepali received official approval to seek employment abroad, representing an increase of 177 percent over 2009-2010. The International Organization for Migration (IOM) estimates, as of 2015, a total of 4.06 million Nepali are abroad.

Records of the DoFE reveal that overseas employment is male dominated; about 95 percent of all labour permits were granted to men. The actual number of female overseas workers is however likely to be somewhat higher as the National Population and Housing Census (NPHC) 2011 documents a female absentee population of 12 percent. This omission can be partly explained through irregular overseas migration and undocumented border migration to India, which is not captured by the DoFE and accounts for approximately 37.6 percent of total migration in Nepal. The increase in labour migration has been accompanied by various problems, including labour exploitation sometimes amounting to forced labour and trafficking. Many Nepali migrant workers pay high fees to recruitment agencies, taking on loans from families and friends, which places them in a state of indebtedness and in turn can compel them to continue to work in abusive, exploitative and unsafe working environments in order to repay the loans. Many of them face severely exploitative conditions that can include withholding of passports, restriction on movements and non-payment of wages.

Despite many challenging work conditions, Nepali overseas workers contribute significantly to

household incomes in Nepal and continue to fuel their home economy with one of the highest global remittance flows. According to DoFE statistics, a professional Nepali worker in the Gulf countries earns an average monthly income of US\$868 compared to only US\$320 at home. However, most migrant workers are unskilled and earn far less. In 2013, Nepal ranked third among countries receiving the highest proportion of remittances in terms of GDP. During the first eight months of FY 2013-2014, remittances amounted to US\$5.87 billion, representing 29.1 percent of GDP.

The 2011 Nepal Living Standards Survey (NLSS) reveals that there is a striking difference between the per capita remittance received by an individual in the poorest and richest consumption quintiles. In per capita terms, the poorest consumption quintile receives one-twelfth of what the richest quintile receives.

#### **DISASTER EFFECTS AND IMPACTS**

The disaster effects on employment and livelihoods has been estimated based upon sectoral output losses in the productive sectors, namely, agriculture, commerce, industry and tourism. A complementary analysis was done by the World Bank that took additional secondary sources as well as 75 (instead of 31) districts into consideration. Due to differences in data and scope, the World Bank study derives a higher estimate of lost work days and income.

The earthquakes have affected the livelihoods of 2.29 million households and 5.6 million workers across 31 districts, of which 51 percent are women. This resulted in the loss of 94 million work days and NPR 17 billion) of personal income in FY 2015-2016 (Table 17.1).

Analyzing geographical coverage, the highest losses are expected to occur in Kathmandu (12 million work days lost, NPR 2,195 million personal income losses), followed by Sindhupalchowk (8.5 million work days lost, NPR 1,540 million personal income losses) and Nuwakot (7.2 million work days lost, NPR 1311 million personal income losses). The lowest losses are expected to occur in Rasuwa (995,447 work days lost and NPR 179.8 million personal income losses).



**EFFECTS ON AGRICULTURE**

Agriculture and livestock rearing are the main economic activities in the 31 affected districts. Damage to standing crop and livestock are reported to be modest; however, the risk of livestock mortality and sickness has risen due to inadequate feed and shelter. Additional damage to stored crops (for own consumption and market sale), seeds (for planting) and basic farming tools are reportedly moderate to high. While the use of irrigation is limited, a significant portion of the irrigation infrastructure has been damaged. Labour and other inputs (seeds, tools) may fall critically short for the planting of paddy, maize, millet and potato, especially in the months of June to September.

It is estimated that approximately 1.46 million agricultural households have been affected by the earthquakes, losing 46 million work days and personal income losses of NPR 4,603 million over the next 12 months. This will in particular affect women who make up 60 percent of the agricultural labour force and account for 28 million work days lost. The comparatively low income losses in this sector,

despite the over 40 million work days lost, is due to low annual labour earnings in Nepal (NPR 11,200 for poor self-employed to NPR 31,900 for non-poor).

**EFFECTS ON COMMERCE AND INDUSTRY**

Non-farm, household-based and micro enterprises in the industry and commerce sectors represent an important segment of Nepal's economy. Most micro enterprises in the rural affected areas are informally operating and are agro- or forest-based, comprising mainly food processing, artisanal work and handicrafts, and carpentry and metalwork. It is estimated that about 50 percent of all household-based and micro enterprises located in the 31 districts have sustained complete or partial damage to premises, machinery, tools and equipment. Of these, approximately 74,500 home-based work places have been permanently destroyed. An even greater share of household-based and micro enterprises is likely to be indirectly affected through damaged road networks and reduced electricity supply, resulting in limited access to markets and interruptions in supply chains. (see the Commerce and Industry Sector).

**TABLE 17.1: EMPLOYMENT AND LIVELIHOODS SECTOR: WORK DAYS LOST AND INCOME LOST PER DISTRICT**

District	Lost work days	Losses in personal income (In millions)	
		NPR	USD
Bhaktapur	3,288,619	594.0	5.9
Dhading	6,466,268	1,167.9	11.7
Dolkha	6,011,318	1,085.7	10.9
Gorkha	6,859,487	1,238.9	12.4
Kathmandu	12,153,573	2,195.1	22.0
Kavrepalanchowk	5,855,575	1,057.6	10.6
Lalitpur	3,399,321	614.0	6.1
Makawanpur	2,410,099	435.3	4.4
Nuwakot	7,260,420	1,311.3	13.1
Okhaldhunga	1,400,633	253.0	2.5
Ramechhap	2,909,959	525.6	5.3
Rasuwa	995,447	179.8	1.8
Sindhuli	2,201,064	397.5	4.0
Sindhupalchowk	8,528,389	1,540.4	15.4
<b>Sub - total (14 districts)</b>	<b>69,740,172</b>	<b>12,596</b>	<b>126.0</b>
Other (17 districts)	25,074,666	4,529	45
<b>Total (31 districts)</b>	<b>94,814,838</b>	<b>17,125.1</b>	<b>171.3</b>

\*Note: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series.

Kathmandu is the largest urban economic centre in Nepal, accounting for one-third of the country's economic activity. A large number of workers have left major urban economic centres in the country, including Kathmandu, to provide relief and recovery support to their families and communities in the villages. Workers who have left for their settlements will experience significant personal income losses. Remaining workers in urban centres will also suffer significant personal income losses due a steep decline in consumer and labour demand in the short term. It is estimated that at least 860,000 workers in commerce and industry, of which approximately 33.9 percent are women, have been affected by the earthquakes. Seven million work days are expected to be lost in the commerce sector and 10 million in the industry sector, resulting in a personal income loss of NPR 2,667 million and NPR 3,654 million respectively over the next 12 months.

#### EFFECTS ON TOURISM

The destruction of and damage to cultural heritage sites will likely discourage cultural tourism in the short and medium terms. Ecotourism and adventure travel have also been affected due to loss of tourism infrastructure and services in affected mountainous areas. Nepal has two high tourism periods over the year and the earthquakes hit in the middle of the first. The impending rainy season is a low tourism period. The second high tourism period is after the rainy season, between September and November. The tourism industry is expected to recover somewhat for the next season and substantially by the April-June 2016 season, although full recovery is expected to take longer.

It is estimated that in the 31 districts at least 84,000 workers in the tourism sector (of which 52 percent are women) have been affected by the earthquakes, losing 29 million work days over the next 24 months, and resulting in personal income losses of NPR 6,200 million. As women tend to occupy less skilled jobs such as housekeeping and waitressing, they are often the first to be laid off, while managerial positions primarily held by men are maintained. It is thus expected that women will account for 15 million lost work days in the tourism sector.

Whilst a quantitative analysis of work days lost and personal income losses provides important information on the effect of the disaster on employment and livelihoods, it should be noted that income levels in Nepal are extremely low and that many Nepali, especially in rural areas, do not regularly participate in the cash economy. A cautious interpretation of the above numbers is, therefore, needed as many poor households did not have a high income prior to the earthquakes and even small income losses may translate into a significant increase in poverty (see the Human Development Impact Sector).

Conducting an analysis on the impact of a disaster on the well-being of households and workers in contexts where economic activity is primarily undertaken through the informal sector, subsistence farming and unpaid family work is a challenging task, and in this regard this PDNA provides an indicative, rather than exact, quantification of the impact of the earthquakes of 25 April and 12 May 2015 in Nepal. The analysis of the disaster's impact on employment and livelihoods, therefore, outlines the anticipated im-

**TABLE 17.2: EMPLOYMENT AND LIVELIHOODS SECTOR: WORKDAYS LOST AND INCOME LOSS PER SECTOR**

Sector	Lost work days			Losses in personal income (in millions)	
	Total	Women	Men	NPR	USD
Agriculture	46,431,436	28,137,450	18,293,986	4,603.3	46.0
Commerce	7,898,324	2,796,371.97	5,101,952	2,667.1	26.7
Industry	10,822,634	4,270,250.29	6,552,384	3,654.5	36.5
Tourism	29,662,443	15,424,470.46	14,237,973	6,200.2	62.0
<b>Total</b>	<b>94,814,838</b>	<b>50,628,543</b>	<b>44,186,295</b>	<b>17,125</b>	<b>171</b>

\*Note: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series.

impact in the short term (FY 2015-2016), medium term (FY 2016-2017 to 2017-2018), and long term (FY 2018-2019 to 2019-2020). The actual impact of the disaster will vary according to the pace and effectiveness of the reconstruction and recovery process.

#### **SHORT-TERM IMPACTS (FY 2015-2016)**

It is unlikely that small agricultural households and home-based enterprises, notably in rural areas, will be able to reconstruct and fully repair their dwellings and places of work before the onset of the monsoon. The subsequent coping strategies of households will depend on their location and sector of work.

For households dependent on agriculture, the loss of income and livelihoods is likely to result in distress sale of assets along with own consumption of livestock. This will in particular affect women who tend to own and control smaller livestock, particularly goats, pigs and chickens, which are most likely to be sold first. The damage to stored grains, seeds and tools will hinder the resumption of agricultural activity, resulting in the failure to plant the monsoon crop. Some rural households will therefore be unable to sustain their subsistence existence in the short term and instead need to purchase products they would otherwise have produced themselves. A surge in child labour may occur, as younger household members might be forced to interrupt their education and take up income generating activities to support their families. The risk of increased child labour is especially high in districts where a large number of schools and classrooms have been destroyed, such as Dhading, Dolakha, Gorkha, Kathmandu, Kavre, Nuwakot and Sindhupalchowk. (see the Education Sector).

Due to the destruction of dwellings, household-based and micro enterprises are facing prolonged business interruptions until workplaces are repaired and equipment, tools and machinery replenished. In comparison, the number of affected workers in larger enterprises is expected to be smaller, though many of them are absent from their jobs, having returned to their home rural districts. Qualitative observations suggest that large enterprises are making an effort to keep their workers on the payroll, whilst small to medium sized enterprises are more likely to have stopped paying wages.

In the aftermath of the earthquakes, the inflow of tourists is expected to remain low for many months to come, which will have a prolonged impact on enterprises and workers dependent on this once-rapidly growing sector. The impending monsoon period is normally the low season for tourist arrivals; therefore, the impact on workers in this sector will depend on whether tourists return for the main season between September and November 2015. Projections made in this report (see Tourism Sector), however, suggest that a deficit in arrivals and spending is likely to continue over 2016-17.

Overall, unless support measures as outlined later in this chapter are provided, households will have to seek alternative sources of income, which is likely to precipitate greater internal and external migration in the coming months. As migration is primarily a male phenomenon in Nepal, women will typically stay at home to attend to childcare and household duties. The overall workload for women in extended economic activities is therefore expected to increase significantly.

The immediate response of households to the earthquakes resulted in many people leaving their residence to return to their villages to assist with relief efforts. Based on data from NCELL (the country's leading mobile service provider), figures provided by flowminder.org and World Pop indicate that approximately 340,000 persons left their homes in the Kathmandu Valley (Kathmandu, Bhaktapur and Lalitpur districts) after the 25 April earthquake and temporarily relocated to other districts as of 27 May 2015.

The short-term impact on overseas migration is constrained by the lack of precise figures on the number of persons leaving Nepal for foreign employment after the earthquakes. However, some sources estimate that the number in May 2015 has reduced by 20 to 25 percent and is likely to stay at this level for one or two months before it gradually increases. How the migration flows from Nepal will develop over the next few months depends on several factors, including: (i) how quickly District Administration Offices respond to passport applications, including the extent to which ID and other personal documents have been destroyed/lost; (ii) access to resources to finance migration; and (iii) the avail-

ability of local employment opportunities and wage developments that can offer an alternative to employment abroad. Cross-border migration to India might increase further as it does not require a long preparatory process or high costs associated with recruitment and travel. Typically, migration outflows from Nepal are relatively low in the months before Dashain (the national festival in late September/early October) and picks up after that. It is likely that this pattern will be seen this year as well. In general, remittances are expected to be higher in the short term as Nepali migrant workers are likely to send higher amounts of remittances back home. Remittances to the 31 affected districts are expected to amount to NPR 3.72 billion in 2015.

According to a rapid assessment conducted by the Centre for the Study of Labour and Mobility in four severely-affected sites (Kathmandu Valley, Dhading, Kavrepalanchowk and Sindhupalchowk), a large number of external migrants did try to return but were unable to due to: (i) not receiving permission from the employer; (ii) not having the money to buy a ticket at the time; and (iii) being told by families not to return since the migrant's earnings had become more important in the post-disaster situation. The assessment also revealed that, in the short run, there is a preference for migrating within the country rather than abroad. However, in the long run, foreign employment is likely to increase.

Increased migration later in the year implies that a downward pressure on wages in the local labour market is unlikely to occur. Nonetheless, there may be increased pressure on households to send previously inactive members out to work, including children and the elderly. Special consideration should be given to women who may struggle to access employment opportunities, as they are likely to dedicate more time to childcare and other caring responsibilities while social infrastructure such as health centres and schools remain destroyed and/or damaged.

The construction sector, though initially disrupted, will experience a surge in demand for workers to carry out demolitions, clearing, site preparation and reconstruction of destroyed and damaged buildings and other physical infrastructure. The main challenge will be meeting the de-

mand for skilled workers in construction, which represent some 40 percent of the needed workforce (See Community Infrastructure Sector and Housing Sector). The industry relies heavily on Indian sources for skilled construction workers, and their availability is far less certain. The housing sector alone may need 17,500 masons who are often part-time workers, or migrating between Nepal, India and the Middle East. This sector of the labour market will have to be augmented by a rapid input of skills training. The increased demand for construction workers, especially skilled ones, will create new employment opportunities while pushing up wages in some occupations such as masonry. Finally, in the short term it is also possible that hunger, sickness, despair and distress may take a toll on affected people's lives and ability to work and cope.

#### **MEDIUM-TERM IMPACTS (FY2016-2017 TO 2017-2018)**

Over the medium term, employment and livelihoods will continue to be impacted by the destruction of buildings and infrastructure, while migration will remain one of the key coping mechanisms for households.

Agricultural production will continue to be negatively impacted if households are unable to access inputs and re-engage in farming activities. Similarly, micro enterprises will require restoration of work places and access to inputs in order to return to and maintain their economic activities. Even if economic activity is restored, there is likely to be a negative impact on productivity, unless households are able to access productive inputs and benefit from improved infrastructure and other facilities. Tourist arrivals will remain subdued over the medium term if restoration of cultural sites, trekking routes and other relevant infrastructure is slow paced.

Housing reconstruction is likely to generate 322 million workdays of employment over the next five years (see Housing Sector). Most of this will occur in rural areas, reconstructing mud/stone structures and utilizing significant amounts of salvaged materials. Assuming that the majority of reconstruction will occur in the first three years, it is estimated that the labour demand will peak at 0.54 million workers, which is a significant number compared to the current estimates of one



million workers already involved in the housing sector. However, as noted elsewhere, a significant quantum of the unskilled work will be undertaken by existing family members currently outside the sector, so this may not be a major problem.

The main concern is the skilled workforce, which constitutes around 46 percent of the needed workforce. The industry relies heavily on Indian sources for skilled construction workers, and their availability is far less certain. The housing sector alone may need 17,500 masons who are often part-time workers, or migrating between Nepal, India and the Middle East. This sector of the labour market will definitely have to be augmented by rapid training. The recommendations therefore include a significant training element to upgrade the skills of local craftsmen in combination with the introduction of improved earthquake-resistant technologies.

Prior to the 25 April and 12 May earthquakes, the number of labour migrants from Nepal was increasing every year; the number of labour permits issued between 2008-2009 and 2013-2014 increased by a staggering 137 percent. Thus, the likely medium-term scenario for the affected districts is that migration will continue to increase, resulting in a corresponding increase in remittances to these districts.

#### **LONG-TERM IMPACTS (FY2018-2019 TO 2019-2020)**

The long-term impact of the earthquakes on employment and livelihoods will depend on both macroeconomic factors, such as the ability of Nepal to grow more robustly and attract investments, and constraints at the micro level, including the pace and extent of the restoration of dwellings and infrastructure. The changes in labour demand, which will eventuate over the short and medium terms, may further induce structural changes to the economy and labour market. In this regard, the Nepali economy was already distorted by the significant inflow of remittances, which resulted in a service-led growth path. At the same time, manufacturing was stagnating and the share of workers in this sector stood at just 6.6 percent according to the 2008 LFS.

The likely increase in migration of workers and inflow of remittances, along with sustained de-

mand for construction workers following the earthquakes, is unlikely to result in a more sustainable path of structural transformation. For this reason, it is critical that suppliers of manufactured goods are supported to take advantage of the increased demand in the construction sector. Otherwise, the reconstruction efforts will contribute to higher imports of such goods, mainly from China and India, subduing the impact on job creation in manufacturing.

### **Recovery Needs and Strategy**

Enabling households and workers to recover their productive and income-generating activities whilst also increasing their livelihoods' resilience towards future shocks must be a key component of the reconstruction and recovery process. This challenge can only be met through a joint effort of authorities at national and district levels, the private sector, including financial service providers, workers' and employers' organizations, civil society organizations and international agencies in order to address immediate, short-term and medium- to long-term recovery priorities.

Recognizing that recovery paths in the different productive sectors may differ, and that of Kathmandu may be faster than other affected districts, this section attempts to focus mostly on ensuring a strong employment and livelihoods recovery for the largest number of poor people, with a focus on areas where the immediate earthquake effects have been largest on income and earnings – agriculture and micro enterprises. In addition to the recommendations and activities proposed below, the Social Protection Sector chapter provides complementary recovery needs.

In order to guide prospective interventions, a comprehensive *Working Out of Disaster, Building Resilient Livelihoods Strategy* is proposed. The strategy consists of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation activities to medium- and long-term employment recovery. It requires a comprehensive institutional framework, which builds on existing policies and programmes, including the National Employment Policy in March 2015, and instils decent work values.

Three key considerations around gender appropriate strategies have also been made: first, that informal sector and all types of work need to be counted; second, recognizing micro enterprises where many women are engaged; and third, recognizing women's contribution as migrants and remittance providers in the country's path to recovery (while seeking to improve protection against their trafficking and exploitation as migrant workers).

It will be critical that the policy environment for recovery be supportive of opportunities for affected people to rebuild their livelihoods. As such, several policies and mechanisms related to construction employment opportunities, skills development, overseas employment, and financial support to micro enterprises and small farmers will be key to the success of the activities proposed. In addition, there will also be a need for people in Kathmandu or those moving back and building in Kathmandu to be incentivized to reconstruct according to the building codes. The policy recommendations given below are suggestions that will allow and support building back of people's livelihoods in all the affected districts.

#### **RELIEF, RECONSTRUCTION AND RECOVERY**

- Mainstream labour-intensive and climate-resilient reconstruction in earthquake-affected areas.
- Restore access to markets to revive supply chains and to stabilize the local economy.
- Establish employment/skills services coordination mechanisms/arrangements.
- Integrate concerns, issues and responses to address child labour, particularly its worst forms, with special consideration to vulnerabilities of children and youth, drawing on guidance provided in the Child Protection Minimum Standard 19: Economic Recovery and Child Protection and gender considerations.
- Monitor delivery of relief goods during the monsoon season and ensure that the provision of humanitarian aid does not distort local markets.
- Procure goods and services locally, whenever possible, during the relief and reconstruction process.

#### **REMITTANCE FLOWS AND NEPALI DIASPORA**

- Extend the waiver of remittance transfer fees in the affected districts.
- Implement the Working Procedure for Domestic Workers - 2015 approved by the Cabinet as part of the promotion of safe and legal mechanisms for domestic work for women migrants.
- Engage the Nepali diaspora and facilitate their investment (e.g., through bonds) in the recovery.

#### **POOR AND VULNERABLE HOUSEHOLDS**

- Improve access to homes and workplaces for the poor, particularly in urban areas, to promote sustainable livelihoods.
- Provide soft loans/zero collateral loans to enable micro entrepreneurs and smallholder households to replenish their assets and to re-start their livelihoods.
- Target workers engaged in the informal economy to ensure that the most vulnerable households receive livelihoods support.
- Promote partnerships with community level organizations.

#### **GENDER EQUALITY AND SOCIAL INCLUSION**

- Target female workers in agriculture and ensure access to extension services and farm inputs.
- Reduce the feminization of agriculture by providing skills development for women in entrepreneurship and masonry skills.
- Ensure the participation and benefit of women and Dalit communities in labour intensive and cash-for-work programmes.
- Provide access to soft credit or non-collateral loans for women whose homestays are less likely to be insured and have limited resource base for reconstructing their hotels.

#### **SPECIFIC RECOVERY NEEDS/ACTIVITIES**

Short Term (FY 2015-2016): Providing Income Opportunities and Attending Immediate Livelihood Recovery Needs

The short-term phase (FY 2015) aims to attend to immediate needs of people and institutions in disaster-affected areas. The main focus in this phase is to help people restore their livelihoods.

It will mainly target individuals and micro-, small-, and medium-size enterprises. Activities suggested include:

- a. Creating emergency employment opportunities through labour-intensive infrastructure and rehabilitation activities in disaster-affected areas/cash for work: Labour-intensive infrastructure rehabilitation not only provides income for people engaged in the rehabilitation work but also provides access to social service facilities. Debris and landslide clearance activities will accelerate recovery and reconstruction activities as well as economic activities by re-establishing strategic roads. Under the labour-intensive infrastructure activities, workers will be provided with short-term, on-the-job training on basic skills required for rehabilitation and construction work. There will also be a need to recognize that some people will not be in a situation to avail such services, due to family situation such as having young children to care for or being a female-headed households with an absent spouse.
- b. Providing rapid skills development training for the rehabilitation and construction of housing and other infrastructure: Construction of housing is one of the most urgent issues. The lack of skilled workers poses a major risk in delaying the process. Most of the work will be carried out by householders themselves who were not involved in construction before. Short-term, intensive skills development training on constructing housing will therefore need to be provided to householders who are expected to engage in building their own houses, as well as job seekers who wish to enter the housing construction sector. In addition, coordination of skills provision across skill providers, skill types and trainees will be critical to ensure opportunities are maximized. Skills related to entrepreneurship as well as safe migration will also be needed.
- c. Establishing employment services: Demand and supply in the post-earthquake labour market is rapidly changing. In this context, functional employment services are indispensable in order to match job seekers and potential employers, especially in the context of reconstruction efforts. The centres can also match potential workers with training. Special attention will be given to returning

migrant workers (e.g., through matching job seekers with labour needed for public works for infrastructure recovery). These centres will need to be institutionalized at the district level in the form of employment information and facilitation centres. Crucial to this will be working with both men and women as well as recognizing opportunities which are appropriate to their needs.

- d. Supporting the recovery of micro and small enterprises: Enterprise development training will be provided to help disaster-affected micro and small businesses survive and even prosper in what is currently a very difficult business environment. Specific attention should be given to informal micro entrepreneurs, preparing for a gradual transition into the formal economy. Stimulating entrepreneurship will include improving access to microfinance by working with micro-finance institutions and facilitating partnerships with national banks.
- e. Preventing child labour: Mainstreaming of child labour issues and concerns in programme activities is critical, with a focus on: community-based mechanisms to ensure no child labour is involved; integration in training and monitoring/evaluation; mechanism for referring vulnerable children and/or those identified as child labour for rehabilitation; and awareness raising among families and concerned functionaries, including officials of the districts, municipalities, Village Development Committees (VDCs) and teachers.

**MEDIUM TERM (FY 2016-2017 TO 2017-2018):  
PROMOTING EMPLOYMENT RECOVERY BY  
MEANS OF BUILDING THE CAPACITIES OF  
PEOPLE AND INSTITUTIONS**

The post-earthquake labour market is expected to evolve dramatically because of emerging needs for reconstruction activities in various sectors. To create a recovery process that provides sustainable job opportunities for disaster-affected people and preparing them with usable skills is crucial. Enterprise development and support for small, medium and micro enterprises will be another focus to sustain job-rich recovery. The medium-term strategy therefore consists of the following activities:

- a. Establishing a labour market information system: A labour market information system



enables a more accurate identification of labour supply and demand trends, while also providing the basis for a more effective assessment of shocks to the Nepali labour market in the wake of such disasters.

- b. Further strengthening employment service centres: The emergency employment centres established during the short-term phase can be further strengthened to continue providing services to match job seekers and employers.
- c. Expanding migrant resource centres and skills training for migrants: Establishing migrant resource centres at the district level that provide information on safe migration, pre-departure training and financial education to migrant workers and their family members is crucial in ensuring safe and productive migra-

tion behaviours. Enhancing the skill levels of prospective migrant workers so that they can apply for better paid, higher skilled positions, thereby increasing future remittances to the affected districts, is crucial. Focusing on offering women skills outside of the domestic work sector needs to be part of the strategy.

- d. Providing skills development training for under-skilled and vulnerable workers: During the second phase of the recovery process, job seekers will be equipped with skills demanded in the evolving labour market. For instance, in the construction sector, disaster risk reduction (DRR) related skills such as retrofitting and building earthquake-resilient infrastructure will most likely be in high demand in the coming years. Skills training based on actual demand in the labour





market should be offered to low-skilled job seekers. It is indispensable to ensure that certificates issued at the completion of skills development trainings are accredited by the national technical and vocational education and training (TVET) institution. Training-of-trainers programmes should be enhanced. Coordination of these additional skills being provided will need to be a priority.

- e. Continue labour-intensive infrastructure and rehabilitation activities in disaster-affected areas: The creation of employment opportunities would need to continue during this period, but is likely to be on a smaller scale. Labour intensive reconstruction could gradually expand into employment intensive investment programmes (EIIP) contributing through community contractors to local development, especially in rural areas.

#### LONG TERM (FY 2018-2019 TO 2019-2020): SUSTAINING JOB-RICH RECOVERY AND PROMOTING RESILIENT LIVELIHOODS

In the long term, there will be a need for continuation of the earlier years' support to ensure affected people are able to sustain their recovery and livelihoods. This will include ensuring that the systems built up in the earlier years and the support these systems provide to people in sustaining their employment and livelihoods are continued.

#### Assessment Methodology

The analysis of the disaster effects on the employment and livelihoods sector is based upon a cross-cutting analysis and takes into consideration the estimated sectoral output losses in other sectors, in particular the productive sectors of agriculture, commerce, industry and tourism. Through comparing the estimated reduction in sectoral GDP in FY 2015-2016 to 2016-2017 with the sectoral

**TABLE 17.3: COSTING OF RECOVERY ACTIVITIES**

	Financial year (NPR million)						Total
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	
Recovery needs	5,927	3,247	3,247	63	63	-	12,547
Awareness and sensitizing measures to mainstream occupational safety standards and non-discriminatory practices during reconstruction and recovery - 14 districts	2						2
Skills training programme-focused on disaster-resilient skills development for rebuilding (masons, carpenters, contractors), entrepreneurship, financial literacy, including to migrants	2,514	-	-	-	-	-	2,514
Cash-for-work and labour-based programmes focused on rebuilding public and private assets pertaining to livelihoods	3,393	-	-	-	-	-	3,393
Establish employment information/facilitation centres districts (including on migration) - 14 districts	14	-	-	-	-	-	14
Mainstream child labour issues and concerns in all programme activities	3	-	-	-	-	-	3
Skills provision coordination mechanism	1	31	31	1	1		65
Establishment of Labour Management Information System	-	200	200	-	-	-	400
Employment facilitation services – 31 districts	-	31	31	31	31	-	124
Migrant resource centres – 31 districts	-	31	31	31	31	-	124
Skills training programmes	-	1,257	1,257	-	-	-	2,514
Labour-based programmes through community contracting	-	1,697	1,697	-	-	-	3,394
<b>Total</b>	<b>5,927</b>	<b>3,247</b>	<b>3,247</b>	<b>63</b>	<b>63</b>	<b>-</b>	<b>12,547</b>

GDP contribution in FY 2013-2014, the employment and livelihoods effect is calculated and expressed as ‘work days lost’ and ‘income loss’.

Secondary data sources such as the 2011 National Population and Housing Census (NPHC), the 2010-2011 Nepal Living Standards Survey (NLSS) and the 2008 Nepal Labour Force Survey (NLFS) were used to construct the baseline scenario, including a basic employment and earnings profile before the April/May earthquakes. Complementary qualitative insights, gathered during field visits and consultations with key stakeholders, informed the impact analysis of the earthquakes in the short, medium and long term.

Under the authority and overall guidance of the Ministry of Employment and Labour (MoLE) and the National Planning Commission (NPC), the employment and livelihoods sector assessment team was co-led by the World Bank and the International Labour Organization (ILO) with support from the Asian Development Bank (ADB), International Centre for Integrated Mountain Development (ICIMOD), International Organization for Migration (IOM), Swiss Development Cooperation (SDC), United Nations Development Programme (UNDP) and World Food Programme (WFP). Contributions were also made by the Ministry of Federal Affairs and Local Development (MoFALD).

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# 18. Gender and Social Inclusion

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## Summary

*“It is the everyday inequities, and not just in time of a disaster, that create greater risk and reduce the life chances of women and girls.”*

Disasters do not discriminate, they hit the young, the old and the rich and the poor alike. However, their impacts are felt differently by different social groups. Women; senior citizens; lesbian, gay, bisexual, transgender/transsexual and intersex communities; and Intersexed (LGBTI) communities; people living with disabilities (PLWD); children; Dalits and other ethnic and caste-based minorities were disproportionately affected by the earthquakes. The social constructs and widespread inequalities, exclusion and discrimination against these social groups have not only shaped who has died as a result of the earthquakes, but also their capacity to cope and respond effectively to the disaster. These social groups are over-represented in the lowest wealth quintiles, and therefore have fewer resources for coping with disaster impacts. Their status in Nepali society will also determine their participation and benefits from the post-disaster relief and recovery interventions and their general resilience to future disasters.

Women, who make up the largest disadvantaged population (more than half the population), have been the most negatively affected across the key sectors of housing, agriculture, water and sanitation, and tourism. A high number of female-headed households (FHHH) have lost their homes and yet as per official data only 19.7 percent of the women own homes or land. Lack of house and land ownership among women and Dalits, compounded by constrained access to economic resources, means that these groups could be marginalized by the post-disaster house reconstruction programmes. Another sector worth noting is agriculture, on which a large proportion of Nepali women and other disadvantaged groups such as Dalits and Janjatis depend for their livelihood. Loss of food stocks, potentially reduced agricultural productivity and

time poverty could set back these communities that depend on the sector and push them further into poverty. The combined factors of poor living conditions, disruptions in economic activities and loss of income could compel families to adopt negative coping strategies such as stress selling of assets, child labour, human trafficking and early marriage, which would impact girls in particular. Added disruptions in policing, justice systems and loss of family protection also mean that vulnerable groups are at heightened risk of violence, abuse and exploitation.

While women and vulnerable groups have been disproportionately impacted by the earthquakes, simply viewing them as victims only exacerbates their vulnerability. They have knowledge, relationships and practical skills that are critical to post-disaster recovery. Although their quantifiable contribution in the national accounting framework often remains invisible, women make the largest contribution to the agricultural economy in Nepal. However, relative lack of opportunities, ownership and access to land resources, combined with the lack of specific attention of the recovery programmes at the micro level, could contribute to the poorest sectors remaining below the poverty line.

Equitable post-disaster recovery could help to reduce their disadvantaged condition and increase their overall resilience. It is crucial that there is no discrimination based on sex, age, sexual orientation, gender, class, ethnicity or ability at all stages of recovery. This includes the discussions and decision-making processes that determine the shape of recovery activities, as well as in the mechanisms to monitor how effective these activities are. In this sense, it is very important to orient the recovery resources towards vulnerable groups and to strengthen the capacities and skills that they are already using to cope with the disaster. Women, men and vulnerable groups must have access to reconstruction and rehabilitation jobs as well as public works, investment funds and income-generating projects to support their long-term economic recovery.



## Pre-disaster Context and Baseline

Nepal ranks relatively low on the UNDP Human Development Index; 145 out of 187 countries, which places it within the least developed country index. The percentage of the population living below the poverty line has steadily fallen from 42 percent in 1996 to 23.8 percent in 2013. Nepal ranks 98 out of 187 countries on the Gender Inequality Index. There is a significant education gap between women and men. In the 15-49 age group, over 40 percent of the women have never been to school, compared to 14 percent for men. Male literacy rate is 75.1 percent compared to female literacy rate of 57.4 percent. It is estimated that FHHH make up 25.7 percent of all households at the national level. Due to significant male emigration, women have crossed all 'traditional' boundaries of gender division of labour and socio-cultural norms. The share of women's paid employment in the non-agricultural sector has more than doubled, from just under 19.9 percent in 2009 to 44.8 percent in 2011.

Children, particularly girls, face significant inequalities in Nepal, which has some of the highest rates of child marriage in Asia. Children also face the risk of dropping out of school to help with household work, but also to work in worse forms of child labour. Dalits are another disadvantaged social group that has historically been victimized. They continue to lag at the bottom of the social structure and are excluded from the national development mainstream due to the caste system. The elderly, PLWD, LGBTI and people living with HIV are some of the other social groups that face inequalities and discrimination.

Although there has been some progress, women remain poorly represented in state mechanisms and decision-making processes at all levels (community, village, district and national). Poor participation and representation is lowest amongst Dalit women and women of other ethnic and caste-based minorities. The share of women's representation in the Constituent Assembly (CA), the Cabinet and in public life is less than the 33 percent required by the constitution. Similar to decision-making processes, women have limited access to and control over

household and economic assets. For example, only 19.7 percent of land, houses or both are registered in the name of a female member of the household.

The national mechanism for promoting gender equality and women's empowerment is through the Ministry of Women, Children and Social Welfare (MoWCSW). The ministry is responsible for formulation, implementation and monitoring of national policies and strategies, as well as providing support to other line ministries on gender mainstreaming in sectoral activities. This structure is reflected at the subnational level through the Local Development Ministry at the district level and the Village Development Committees (VDCs). Yet, participation of women and disadvantaged groups remains low (16 percent) in VDC meetings. However, participation of women in Ward Citizen Forums (WCF) and Community Awareness Centres (CACs) is as high as 80 percent.<sup>66</sup> These play an important role in facilitating women's participation in the integrated planning process. Furthermore, Nepal has adopted Gender Responsive Budgeting (GRB) with the aim of ensuring that the needs and interests of women and men from different groups are addressed in the government budget. In recent years, MoWCSW has put significant emphasis on the importance of translating policies aimed at addressing gender inequalities into targeted and funded programmes.

The Government of Nepal has been a leading global example in its adoption, institutionalization and practice of gender-responsive budgeting (GRB) principles and their application to the Government's planning and budgeting processes. A GRB Committee (GRBC) provides guidance and monitoring support to the government's budget allocation and expenditure from a gender-responsive perspective based on set criteria. The GRB classification criteria include: women's participation in the formulation and implementation of programmes; women's capacity development; women's share of the intended programme results; promoting employment and income generation for women; qualitative improvement of women's time use or reduced workload. The Government

<sup>66</sup> It is difficult to ascertain the level of participation and influence that women have in these fora

of Nepal recently took the forward-looking decision to constitute a GRBC in all sectoral ministries and in all District Development Committees (DDC).

Based on the 2011 national census, the 14 most-affected districts include the following social groups:

**TABLE 18.1: SOCIAL GROUPS AND POPULATION SIZE**

Social group	Population size (based on % of total population)
Total affected population	5.7 million
Total population of affected women and girls (50.5%)	2.8 million
Senior citizens (over 60 years) (women only)	0.163 million
Dalit population (16.3%)	0.929 million
Female headed households (26.6%)	0.123 million
No. of elderly households	0.104 million
No. of children out of school	1.399 million
People living with disabilities	0.322 million
Girls under the age of 14 years	0.794 million
Pregnant and lactating mothers	0.092 million

## Post-Disaster Context

### DISASTER EFFECTS

A total of 8,792 people died in the earthquakes of 25 April and 12 May. More women and girls died (55 percent) than men (45 percent)<sup>67</sup> (Figure 18.1). The higher mortality levels for women and girls has been attributed to a number of factors including male migration to the capital and out of the country. This phenomenon could also explain the higher number of male deaths in Kathmandu, which has a higher male population. The higher number of female deaths also reflects traditional gender roles (women and girls are more likely to be inside the house than men), but it was also reported that women delayed their escape during the earthquakes to rescue their children, older family members and

valuables.<sup>68</sup> Similarly, it is likely that more men and boys were injured than women and girls, because they were able to escape death.

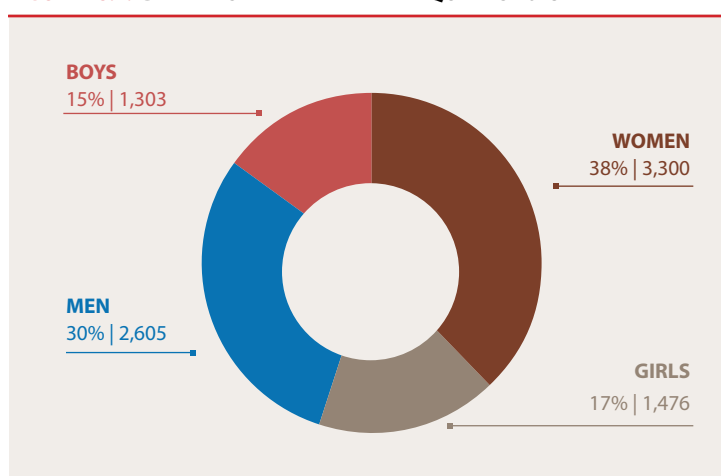
## Disaster Impacts

### SOCIAL SECTORS

All social groups have been hugely affected by loss of homes and shelter. For women, however, homes can also be places for income generation and their loss is also one of home-based economic resources and assets for their livelihood and well-being. Some social groups may face difficulties in rebuilding their homes due to the fact they have limited resources to respond to the disaster. It is estimated that 123,937 households in the 14 affected districts are female-headed (26 percent of all affected households). However, it can be anticipated that this figure will increase given households who have lost husbands. Likewise, an increase in single male households can also be expected due to higher fatality rates among women.

Among the different marginalized groups, FH-HHs have sustained the largest damage and loss of approximately NPR 85.28 billion in the 14 most affected districts (see Table 18.2 below). The Adivasi Janajatis households have suffered damage and loss of NPR 80.56 billion rupees, followed by senior citizens at NPR 75.01 billion, and the Dalits at NPR 53.16 billion rupees.

**FIGURE 18.1: DEATH TOLL IN NEPAL EARTHQUAKES 2015**



<sup>67</sup> Based on data from the Nepal Disaster Risk Reduction Portal: <http://drrportal.gov.np/> as of 11 June 2015

<sup>68</sup> Based on inputs from the Nepal Humanitarian Gender Task Force

Within FHHHs, households headed by widows, divorced women, separated women and single (unmarried) women are at a greater risk of living in poverty. Furthermore, women living in their homes may not be the house owners. Women's land and house ownership only stands at 19.17 percent due to discriminatory ownership rights. FHHHs will therefore need targeted housing reconstruction interventions. Based on ownership patterns observed in the 2011 Census, it can be assumed that damage and losses incurred by women and marginalised groups are very high, especially considering that the housing quality of marginalised groups tends to be poor.

Considering the high levels of FHHHs, it is recommended that at least 25 to 30 percent of the house reconstruction and rehabilitation funds should be allocated to them. Care should be taken that this assistance reaches single women, divorced women and widows who are the poorest groups within the FHHHs, PLWD, older people, and ethnic/caste-based minorities. Furthermore, considering that only 19.17 percent of women own land and houses, access to new homes or home building finance should be made on condition of joint spouse ownership and full ownership to female heads and single women. Recovery should enforce the rights ordained by the Interim Constitution, National Shelter Policy, which requires the state to avail land and housing to people from economically weak sections as well as those residing in unsafe settlements.

The earthquake has had a disastrous effect on education as almost 1.4 million children are out school (699,100 girls and 699,937 boys) in the 14 most affected districts. Toilets in public schools have also been damaged and inadequate access to safe, hygienic and private sanitation facilities can be a source of shame, physical discomfort and insecurity for school going adolescent girls.

There is already a lower enrolment of girls in schools in comparison with boys; this gap may increase because there is an added risk of girls being pulled out of school to help with household work. Another imminent risk to girls in school is child and early marriage, which is still common in Nepal. Okhaldhunga, Dhading, Gorkha and Rasuwa have the highest risk of early marriage for girls as more than 70 percent marry before the age of 19. Parents could resort to marrying their daughters young as a coping mechanism against the impacts of the disaster on household expenditure. For the family of the groom bringing a new member in family would mean adding working hands, particularly in the rural agricultural contexts.

Reconstruction of segregated and disability friendly school toilets should be prioritised, even where children are in temporary schools, to provide privacy for menstruating girls. Furthermore, sustained monitoring by the MoWCSA for the next 12 months of school attendance rates for boys and girls will be critical to monitor the potential of children dropping out of school to support household work, income generation through child labour and early marriage.

The UN estimates that there are approximately 1,408,189 females of reproductive age in the 14 districts and approximately 138,367 of the female population are or will be pregnant in the next 12 months. Of this figure, 18,600 will need obstetric care in the same period. It is also estimated that 10,327 babies are born every month in the 14 affected districts without access to basic health-care<sup>69</sup>. Damage sustained by local hospitals and health centres will further limit women's access to sexual and reproductive health services. It was noted in Nuwakot, for example, that all 27 birthing centres have been destroyed. The approaching monsoon rains, compounded by displaced people

**TABLE 18.2: DAMAGES AND LOSSES SUSTAINED BY DIFFERENT VULNERABLE SOCIAL GROUPS**

	Total damage and loss (NPR million)	Female HHHs	Senior citizen HHHs	Dalits HHHs	Janajati HHHs
Ownership rate		26%	23%	16%	25%
Total effect per social group (NPR million)	326,169.00	85,279.21	75,018.87	53,165.55	80,563.74

<sup>69</sup> Based on information provided by UNFPA Nepal Country Office

sleeping outdoors, could promote an increase of vector borne diseases such as malaria, which may affect children and pregnant mothers more negatively. Additionally, potential disease outbreaks could add an additional work burden on women who are the normal caretakers of the sick.

The impact of the disaster on the mental health of the affected population is not well documented. But interviews with women and children show that they live in constant fear of buildings collapsing and of another big earthquake. In Kavre, women reported that they are afraid to let their children out of sight, the main reason being that children are constantly wandering into condemned homes as they don't understand the dangers a damaged house presents. The women reported sleeping while holding their children to prevent separation should another earthquake occur in the middle of the night.

The earthquakes have led to changes in food consumption patterns ahead of the monsoon and this will have implications on the nutritional status of individuals. Protein consumption is reported to have decreased in 10 out of 18 surveyed VDCs in Gorkha, Sindhupalchowk, Nuwakot, Dhading, Rasuwa and Dolakha, where people are eating less meat, milk and eggs due to loss of livestock and market disruption. This situation may be worse for Dalit communities, whose food sufficiency level is the lowest among all major caste and ethnic groups. Malnutrition among Dalit children is as high as 33.9 percent. The combination of cultural norms (women and girls eat last) and the impact of the disaster on food security and nutrition could be detrimental to women, particularly pregnant and lactating mothers. Sustained support on food supplements and nutrition for children and pregnant women is essential. Targeted nutrition programmes for Dalit children, pregnant and lactating mothers and senior citizens are also important. The continuing food distribution programmes should provide for older people who have specific food requirements.

### Infrastructure Sectors

Destruction of critical infrastructure such as water sources, roads, electricity and community buildings can have a profound effect on women's

and men's ability to engage in economic activities. They can also impede access to social capital and increase household work burden. Disruption in water supply and electricity has had a disproportionate negative effect on women and girls who are traditionally responsible for 75 percent of all household water management and for collecting firewood. For example women in Dhading, Lamjung, and Gorkha are spending as much as three hours collecting water<sup>70</sup>. This has increased the work load of women and girls considerably. The earthquake has also resulted in an estimated loss of more than 180,000 household toilets. Destruction of toilets compounded by lack of water and poor living conditions, which do not offer privacy for women and girls, have had a serious impact on the personal and menstrual hygiene of women and adolescent girls. Collapse of women cooperative buildings and possibilities of displacement of members to new places may also create disruptions to future women development programmes.

It is imperative that both men and women should equally participate and benefit from reconstruction programmes around infrastructure, such as rehabilitation of rural roads, community buildings, irrigation systems etc. A percentage of the funds should also be targetted towards disadvantaged Dalit communities and other ethnic minorities. In readiness for the monsoon, water purification awareness programmes targetting women and school children in the most-affected areas should be undertaken. Rehabilitation of water supply is urgently needed before the monsoon season begins, which will ease the burden of work on women and will also act as a disease prevention measure. Construction of public and private toilets with proper lighting as part of the housing programme will alleviate the problems that women and girls face regarding privacy.

### Productive Sectors

Due to significant male emigration, women have crossed all 'traditional' boundaries of gender division of labour and socio-cultural norms. The impact on the productive sectors has therefore meant that women have suffered significant losses, especially in the agriculture sector. Agriculture is highly dominated by women, largely due to feminization of agriculture as men

<sup>70</sup> Based on data from the PDNA water supply and sanitation field visit report by the Finish Embassy.



increasingly migrate to cities within Nepal and abroad. Agricultural labour is comprised of 60 percent women and 40 percent men. Women have an even larger share in the livestock sector. As a consequence, the disaster has had a disproportionate effect on women (see Figure 18.2 below<sup>71</sup>). Women have lost approximately NPR 15 billion to men, who have lost NPR 10 billion. The loss of seed stocks will mean that women will struggle to find good seeds for planting, which could affect subsequent yields. In addition, the combination of loss of home, food stocks and disruptions in essential services will mean that women face an increased work burden in household and agricultural work. The expected increase in animal diseases due to lack of fodder and adequate shelter, combined with potential distress sale of assets, will affect women the most. Women own and control smaller livestock, particularly goats, pigs and chickens, which are more likely to be sold first, thereby eroding their livelihoods. Agriculture will also be negatively affected due to lack of inputs. Although women provide most of the labour, their lack of ownership also means that they have no collateral for accessing inputs on credit.

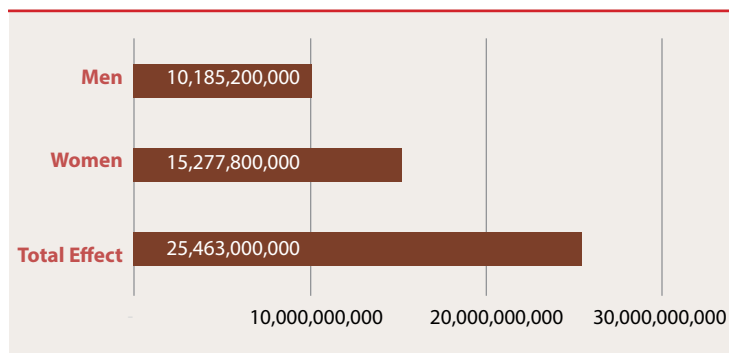
Long-term training of female extension workers is needed to ensure that women, who contribute the most to the sector and are excluded from extension services, are able to access such services. Currently, only 31 percent of women farmers receive extension in comparison to 69 percent men. The number of women professionals in the agriculture and natural resource management sectors is very low, both in the government

and private sector, which means there are very few professional women who could help ensure provision of gender-responsive information and services to rural women farmers. With regard to resettlement, land ownership certificates will be issued jointly in the name of both husband and wife, while prioritizing land to Dalits and landless ethnic minorities to ensure equal access.

Beyond agriculture, manufacturing, commerce, and personal and community services provide significant employment in Nepal. However, women’s economic activity in these non-agriculture sectors is traditionally low. Non-farm household-based and micro enterprises in the industry and commerce sectors represent an important segment of Nepal’s economy. Most micro enterprises in the rural affected areas are agro- or forest-based, comprising mainly of food processing, artisanal work and handicrafts, and carpentry and metalwork. Damage to premises has affected assets that women and men use for their livelihoods, such as looms and tools for metalwork. The damage is further compounded by reduced demand for crafts due to depressed tourist numbers and disruptions in transport and marketing. Overall, it is expected that men have suffered more as they are employed in larger numbers in this sector. It is estimated that about 50 percent of all household-based and micro enterprises located in the 31 districts have sustained complete or partial damage to premises, machinery, tools and equipment, which will affect their ability to re-engage in economic activities.

Based on the NLSS 2011, more women than men are engaged in the tourism sector. Analysis of the hotel and restaurant survey indicates that 52 percent of those employed in this sector are women. However, despite this high number, women tend to occupy less skilled jobs such as housekeeping and waitressing. The tourism sector analysis shows that tourist numbers are down by 90 percent, some of the hotels and homestays have been extensively damaged, all of which have an implication on income and job losses. The tourism sector estimates that 200,000 people have lost their jobs. Women, who often occupy less skilled jobs, are often the first to be laid

**FIGURE 18.2: AGRICULTURAL DAMAGE AND LOSS BY GENDER**



<sup>71</sup> The calculation uses women’s contribution to the sector as proxy of the damage and loss they have suffered as a result of the earthquake, the table above shows that women suffered 60 percent of the effect. This figure is probably higher taking into account for women’s even higher contribution to livestock sector.

off, while managerial positions held by men are maintained.

According to the Tourism Survey 2014, 57 per cent of homestay owners are women. Women therefore have incurred the largest loss within the homestay accommodation. Men on the other hand have been most affected in the trekking sector and tour operations. Table 18.3 table below shows that women engaged in the accommodation subsector<sup>72</sup> have lost approximately NPR 3.6 billion. Men, however, will bear a higher will bear a higher loss of about NPR 14.3 billion.

Recovery efforts should focus on facilitating access to soft credit and low interest rates for female owners of hospitality establishments. This is particularly needed for female-owned homestays, who may struggle more than their male counterparts to recover. Skill development and direct access to external markets is needed for women entrepreneurs to reduce their reliance on local tourist markets and to enhance their resilience against future disasters.

An analysis of the impact on employment and livelihoods indicates that more women than men (50.63 million and 44.19 million work days respectively) lost a high number of work days in commerce, tourism and agriculture, except for industry (see the tourism chapter for more details). This is more pronounced in the agriculture sector, which employs more women than men. The high loss of work days also corresponds to a high time poverty being experienced by women. Women's dependence on the sector compounded by limited access to economic resources means that they will struggle the most to recover from the disaster.

Taking into account women's large contribution to the Nepali labour force and the constraints

they face in accessing economic resources, efforts should be made to ensure that recovery programmes do not contribute to greater inequalities. Targeted investment in women should be an integral part of the agricultural recovery strategy. This should include the provision of extension services and farm inputs. Skills development for women in entrepreneurship, masonry skills, accompanied by market development will be important in reducing women's dependence on agriculture and build their resilience against future disasters. There should be affirmative action in ensuring the participation of and benefits to women and Dalit communities in cash-for-work programmes, such as building of community infrastructure, rural road rehabilitation etc. At least 40 per cent of the labour force should be women. Soft-credit or non-collateral loans should be made accessible to women and men whose homestays are less likely to be insured and who have limited resources base for reconstructing their hotels.

Given the gender disparities in time use and the unequal distribution of unpaid work between women and men, analysis of disaster impact on time use for women and men is critical. Disasters tend to increase the time allocated to productive, reproductive and community work for women, more than for men. A quick time-use survey in Sindhulpachowk and Kavre indicated that women are spending an additional four to five hours per day clearing debris, salvaging of household items buried under the rubble and salvaging home construction materials for shelter construction (see Annex C). Women also indicated that they are going to sleep later than normal at around 10:00 pm instead of 8:00 pm. Men are also allocating similar hours for home rebuilding. Caring for children is also said to have increased due

**TABLE 18.3: DAMAGES AND LOSSES TO WOMEN IN TOURISM SUBSECTORS**

Type of establishment	Total damage (NPR million)	% of women self-employed in the sector	Damages and losses incurred by women (NPR million)
Hotels and other accommodation	16,294	17 %	26,88
Homestays	1,720	57 %	9,80
<b>Total</b>	<b>18,014</b>	<b>20 %</b>	<b>3,668</b>

<sup>72</sup> It was not possible to calculate loss on the whole tourism sector due to lack data on male and female ownership in restaurants.

to children being out of school, and it is done concurrently with other chores. Women also indicated that the constant need to check on children, out of concern for their safety, is limiting their mobility beyond their homes. Fetching time of water has increased up to three hours, which has also increased the work load of women considerably than for men. The approaching planting season, compounded by the absence of working males, will also put an additional work burden on women and girls. Table 18.4 below<sup>73</sup> shows the economic quantification of emergency and rehabilitation tasks that women are now engaging in as a result of the earthquake. This is the time women would have used for income generating activities, socializing and resting under normal circumstances.

#### GOVERNANCE ISSUES

Gender inequality and other social inequalities are a governance failure. Limited participation of women in politics and insignificant numbers of women in the professional and civil service categories compared to men reflects the exclusion of women from decision-making and control over resources. The share of women's representation in CA is 29.41 percent and as of January 2015, and Nepal only has 16.8 percent of women in the civil service overall. Participation and representation of women is the lowest amongst Dalit and indigenous women. Low representation of women in decision-making processes has an implication on women's ability to influence how and where the reconstruction and rehabilitation resources are allocated and utilized. Furthermore, women's limited voice also means that women may not be able to

benefit equally from the resources made available for post-disaster recovery. Various women development groups, committees, women-led cooperatives and watch groups are operate at local level. Women's cooperatives and mothers' groups are important means for income generation, social awareness and collective action especially and safety nets for women. It also acts a platform for women to influence community decision making process.

Access to courts and functioning of family protection units have been compromised by the earthquake. District courts are prioritizing serious crimes, which means cases of sexual and gender-based violence (SGBV) would not be a priority. All of the above could impact women's access to justice, especially if they have to travel away from home. Other areas of concern are the loss of citizen identity cards, particularly for women and men under social protection, such as people with disabilities and senior citizens.

#### PROTECTION ISSUES

Although all interviewed district officers recognized the need to give special attention to the needs of women and girls, PLWD, Dalits, older people and excluded ethnic and caste-based minorities, they indicated that this was not strictly observed in the distribution of relief items. The main reason for this was the need to maintain community cohesiveness over meeting special needs of marginalised social groups. One such group is the newly widowed males who may suddenly have to take on the sole responsibility of parenting, childcare and household work. In addition, very little is known of how people living

**TABLE 18.4: TIME-USE CHANGE/INCREASE**

Type of Task	Time allocated for recovery activities/day	No. of days the activity is likely to continue	Total No. of hours allocated to recovery tasks	Average wage/hr for the task	Total value of missed income per woman	No. of affected households	Total economic impact (NPR)
Salvaging building material	3	60	180	18.7	3,366.00	416,136	1,400,713,776
Fetching water	2	120	240	18.7	4,488.00	83,277	373,747,176
Childcare	7	120	840	18.7	15,708.00	416,136	6,536,664,288
<b>Total</b>	<b>12</b>						<b>8,311,125,240</b>

<sup>73</sup> Although child care is done concurrently with other household chores, it is calculated separately and wholly because of the intensity of constant oversight over children and because under normal circumstances a nanny or relative would take care of the children.

with HIV/AIDS and LGBTI communities have been affected. This will require detailed investigation to ensure that their needs are not overlooked during recovery. There is also a potential increase of SGBV, human trafficking, early marriage and child labour as families strive to cope with the disaster as a result of break down in security.

#### **SEXUAL AND GENDER-BASED VIOLENCE**

Nepal has significantly high levels of violence against women and girls. It is estimated that one in five women have been the victims of physical violence and more than one in ten reported experiencing sexual violence. Domestic violence, marital rape, dowry-related violence and trafficking of women and girls for sexual and non-sexual labour exploitation are particular problems. A variety of factors construct and reinforce both the violence and the failure to report it. These include gaps in legislation and weak implementation of laws. Furthermore, women's lack of autonomy, high economic dependence, men's perceived entitlement to sex, lack of education and knowledge of sexuality, marriage practices, lack of family and legal support to women and husband's use of alcohol are all noted to contribute to the risk of violence.

Global studies in other disasters have shown that women and girls are likely to face elevated levels of violence after disasters. Increased stress and feelings of powerlessness due to bereavement, loss of property and loss of livelihood, mental health problems such as post-traumatic stress disorder, the scarcity of basic provisions and other factors leading to hegemonic masculinity crises contribute to higher levels of violence. For example, in Kavre the Women and Children Officer reported one rape and three attempted rape cases within one week in contrast with 26 cases per year or about two cases a month. Furthermore, reports of SGBV received through safe spaces show that there is concern for young girls' safety after the death of parents and other relatives who would normally look after them. Interviews<sup>74</sup> with the affected women in both Kavre and Sindhupalchowk indicated that FH-HHs are very worried for their safety, because they are now sleeping under unsecured tarpau-

lins. In addition, poor lighting, lack of segregated toilets and wash facilities in temporary shelters can contribute to an increase in sexual violence against women and girls. Reports from the shelter cluster indicate that overcrowding is one of the challenges facing communities staying in shelters and camps.

#### **HUMAN TRAFFICKING OF WOMEN AND CHILDREN**

According to International Labour Organization, 12,000 women and children are trafficked to the Middle East and India every year, mainly for exploitation in brothels or as forced labour and other forms of servitude. Girls aged over 14 to 16 years are more likely to enter sex trafficking through a route of fraudulent marriage. The risk in being trafficked is even more heightened for girls in districts with high levels of child marriage. Some of the severely affected districts, particularly Sindhupalchowk, Nuwakot Dhadhing, and Kavre are historically known for high rates of trafficking of women and children and hence may face elevated levels of human trafficking. There are cases of 64 children being trafficking from Dolakha and Dhading districts, after the earthquakes, and other 11 from between the ages of 10 and 12 from Dolakha to Kathmandu and this seem to be increasing. The move by the government to ban the travel of children under age of 16 without parents or approved guardians could deter human traffickers who authorities fear are targeting vulnerable families. For example, reports indicate that in Dolakha, Sindhupalchowk and Nuwakot traffickers are entering temporary shelters disguised as relief workers.<sup>75</sup> Sustained surveillance in the coming 12-24 months will be needed. The situation could worsen as traffickers target newly-orphaned children and vulnerable families.

#### **CHILD PROTECTION**

Children in the most-affected districts could be facing an added risk of child trafficking, child labour, early and forced marriage and violence (including SGBV) as a result of the disaster. As already mentioned above, there is a heightened risk of human trafficking for children who have lost their parents. Data is not available in all the

<sup>74</sup> Based on PDNA field assessment done in Kavre, Sindhupalchowk and Nuwakot

<sup>75</sup> Based on information gathered from the Gender Equality Bulletin No. 1 - Response to the Nepal Earthquake -20 May 2015



14 districts; however, in Sindhupalchowk, it was reported that 89 children had lost their mothers. Increased child marriage is also a real risk, considering the already high current 41 percent rate of child marriage by the age of 18; and one in 10 girls being married before the age of 15. Dalit women marrying age is below 16 years. There is concern that the underlying vulnerability that girls face in terms of early marriage could be exacerbated as families marry off their daughters at an early age as an economic survival strategy to reduce their economic burden. Similarly, families may force their children to support household income and household work. Of particular concern are girls who may be asked to drop out of school to help with household work.

Overall, incidence of child labour is 42 percent. This is much higher among 10-14 year olds than among 5-9 year olds (61 percent as opposed to 21 percent). Females have higher incidence than males. According to the NLSS III, 53 percent of these children are attending school but not working, 38 percent are attending school while working, 4 percent are working only, and the remaining children are idle. Another dimension of the disaster impact is the loss of birth certificates for children and the registration of babies whose parents died before they were registered.

### People Living with Disabilities (PLWD)

About 2 percent (or 513,321) of the total Nepali population are reported to have some kind of disability. Physical disability constitutes 36.3 percent; followed by blindness/low vision (18.5 percent), deaf/hard to hearing (15.4 percent), speech problem (11.5 percent), multiple disability (7.5), mental disability (6 percent), intellectual disability (2.9 percent) and deaf-blind (1.8 percent). Within the 14 most affected communities, it can be deduced that 322,110.78 have physical disability, 163,043 of which are women and girls. However, although there is no data available, it can be assumed that this figure has increased due to injuries sustained in the earthquake.

Disasters make the situation worse for PLWD with regard to access to essential services. Presence of debris as a result of the earthquake will create challenges for people with physical disability to move

around, but also in accessing relief items. Access to temporary shelters, toilets, etc., could be another challenge which needs to be addressed in the design of community shelters. Furthermore, there will be a great many needs in the next 12 months for physiotherapy services for people who are recovering from their injuries. Effort should be made to reach women with injuries who may not be seek these services or family members may not see the need to support them in seeking medical help. Many PLWD are taken care of by their household members who are often female. Disasters can lead to loss of caretakers and or additional burden on the caretakers. In addition, women with disabilities often experience multiple discriminations and are more exposed to GBV.

### Senior Citizens

Senior female citizens were identified as the most vulnerable social groups that will struggle the most in coping with the disaster, followed by children. In the aftermath of a disaster, senior citizens face additional challenges in accessing livelihood opportunities. They also have restricted mobility in accessing post disaster recovery activities. Furthermore, the increased number of orphans will create a new burden for the surviving elderly guardians in providing care for their children.

### Caste Designation and Ethnicity

According to the Disadvantaged Group Mapping data, 38 percent of the VDCs in all earthquake affected districts have 'high' to 'very high' concentration of disadvantaged groups. This is particularly so due to the high prevalence of Janajatis ethnic groups and Dalits and those in the bottom income quintiles in the affected districts (See Table 3). Furthermore, 42 percent of Dalits live under the poverty line, 80 percent of which are Dalit women. They face multiple forms of discrimination and exclusion, which has affected how they have experienced the disaster but will also affect their ability to recover from the disaster. As a result of the earthquake, Dalits have faced discrimination and exclusion in the rescue and relief efforts as the services are reachable to the headquarters. Dalits on the other hand live in a different settlements away from the dominant habitants. Their social status means that Dalits are some of the worse affected social groups.

## Recovery Needs and Strategy

Institutional participation and representation of discriminated social groups through District Disaster Relief Committee (DDRC) in all recovery programmes is essential to ensure they benefit equally but also to ensure that recovery programmes do not further marginalize them. Furthermore, measures to support and promote attainment of ownership rights and tenure rights are essential to ensure that post-disaster recovery programmes do not re-enforce the inequalities faced by women and vulnerable social groups. Similarly, mechanism to support certification and registration of women, which could facilitate ownership of land and homes and women and children who have lost their spouses and their parents respectively should be in place. Monitoring mechanism to ensure issues mentioned above are addressed should also be established. The table below outlines the recovery needs to support protection issues. Gender-related recovery needs for sectors are captured in respective sector chapters.

From a macroeconomic recovery perspective, women play a major role on the agricultural economy and the informal sector in addition to reproductive work. It goes without saying that women will also play a critical role in rebuilding Nepal's household and macro-economy. Yet, their contribution and that of other disadvantaged social groups, to the national accounting system often remains invisible. However, equitable economic growth and investment in women can lead to a reduction in their disadvantaged condition, increase overall resilience and higher rates of economic growth. On the other hand, lack of specific recovery investment

in women and vulnerable social groups at the micro level can contribute to the poorest sectors staying in below the poverty line.

National plans, policies, institutions and budgets reflect how governments translate commitments to gender equality into results for women. The post-disaster recovery presents an opportunity to start redressing inequalities and at the very least not perpetuate unequal access to power and resources through the allocation of recovery financial and human resources. It is recommended, therefore, that budget allocation under the government's institutionalized gender responsive budgeting framework should be increased in addition to the specific recovery needs identified in this sector. Post-disaster recovery strategies and resources must strive to safeguard, restore, and promote economic engagement of disadvantaged groups, such as women and caste-based groups. These efforts must also seek to redress inequalities and at the very least not perpetuate unequal access to power and resources. Women's economic recovery under the post-disaster recovery programmes must therefore be protected and accorded the same status and importance as that of men.

### INTEGRATED RECOVERY NEEDS FOR CHILD PROTECTION, SGBV AND HUMAN TRAFFICKING:

The government has taken the following measures to strengthen child protection. These include a ban on inter-country adoption for the next three months starting from 26 April 2015, no new registrations of new child welfare homes, and a ban on transfer of children from one district to another without approval from the District Child Welfare Board of the government. However, more measures are still needed.

**TABLE 18.5: COST OF RECOVERY NEEDS**

SN	Main activities	Budget requirement (NPR)
1.	Integrated protection and support of women and girls, children, PLWD, disability and senior citizens and issues around human trafficking	121,400,000
2.	Support to prevent sexual and gender-based violence	93,100,000
3.	Support for child protection	45,750,000
4.	Support for people living with disabilities	87,000,000
5.	Support to senior citizens	30,000,000
6.	Documentation and registration of vulnerable groups	58,000,000
7.	Governance and accountability	164,260,000
8.	Construction and rehabilitation	486,000,000
<b>Total</b>		<b>1,085,510,000</b>

**Short to medium term**

- a) Capacity development and training to the police and the judiciary on gender sensitivity to treat SGBV cases seriously and mobilisation of community and engagement of men and boys;
- b) Community awareness and sensitisation messages on risks associated with child and early marriage, internal migration, forced migration and human trafficking through the media and mobilisation of parents, teachers, community leaders;
- c) Establishment of alert systems, confidential counselling and community safety nets, paying particular attention to the most vulnerable and marginalized groups of children and women who are at risk of trafficking, violence, abuse and exploitation and sharing of information to enable stakeholders to take appropriate measures;
- d) Establishment and strengthening of referral systems to support women and girls who are victims of violence;
- e) Provision of information 'listening posts' on where women and girls and children can report concerns and get support and information on services and focal points and through the strengthening of government and local actors who provide these services;
- f) Registration of children who have lost their birth certificates are able to obtain a new one;
- g) Strengthening community-based child protection mechanisms to ensure child protection cases are identified, reported, documented and responded to;
- h) Training of healthcare providers on psycho-social support
- i) Provision of livelihood options to reduce the risk of forced migration and human trafficking for women and parents who are desperate to find livelihood alternative opportunities.

**Long term**

- j) Review and reform the legal process for reporting and responding to rape and gender-based violence in order to make it more accessible to women and girls.

- k) Strengthening the Civil Registration and Vital Statistics System to ensure that it is resilient to future shocks and disasters, ensuring that children are able to easily replace lost birth certificates;
- l) Supporting relevant government agencies<sup>76</sup> to review and enhance the implementation of the National Master Plan on Child Labour;
- m) Strengthening the National Child Protection System and child protection services through capacity building, inter-institutional networking, and strategic partnerships at the national and sub-national levels;
- n) Undertaking a comprehensive review of existing child protection systems and their appropriateness to respond in the context of humanitarian situations to inform the development of strategies for child protection in emergencies;
- o) Establishment of systems of accreditation for social workers and development a common social work curriculum including specific content on child protection and child case management in emergencies;
- p) Enacting the Children's Bill ensuring that it includes, inter alia, legal prohibition of all forms of violence against children and legal provision for the establishment of child protection committees at the village level.

**Recovery Needs for PLWD**

- a) People who have become disabled because of the disaster may find difficult to accept this new reality and may need peer counselling. Connecting them with other PLWD for counselling would be essential;
- b) Provision of information on government services available to PLWD, and expedition of disability registration to enable access to government social protection schemes;
- c) Establishment of integrated mobile teams in the most affected areas to ensure that PLWD who have lost their social benefit documents are able to obtain new ones;
- d) Design and reconstruction of homes and shelters need to take into account of the accessibility for people with disabilities;
- e) Important to ensure that PLWD are resettled or relocated in areas where they can easily access essential services such as schools, health facilities etc.

<sup>76</sup> Ministry of Labour; Ministry of Women, Children and Social Welfare, Nepal Police and other justice counter-parts.

### Recovery Needs for Senior Citizens

- a) Ensuring senior citizens, have access to information, aid (medical care and emotional support especially with possible loss to social networks and isolation from a familiar environment);
- b) In case of relocation and resettlement, senior citizens should be resettled in areas that have easy access to essential services;
- c) Consultations with the elderly in the design/development of housing structures that support mobility of the elderly;
- d) Establishment of integrated mobile teams in the most affected areas to ensure that senior citizens who have lost their social benefit documents are able to obtain new ones;
- e) Provision of social protection support to the elderly who have the additional burden of caring for children who have lost their parents;
- f) Housing rebuilding support for old people who may not be able to take the responsibility or have the manpower support to repair or reconstruct their shelters or houses. Designs of shelter and houses should also take into account the needs of senior citizens.

### Recovery Need for Disadvantaged Groups

- a) It is important to consider the issues and concerns of 'minorities within minorities' across all sectors being considered in the recovery framework. Recovery efforts should consider the multi-dimensionality of discrimination and exclusion of the Dalits and ethnic minorities;
- b) To avoid urban bias in post disaster recovery efforts, recovery funds should be earmarked to support Dalits and other minority groups;
- c) Targeting of livelihood restoration programmes such as cash for work as well reconstruction programmes at the Dalits, particularly Dalit women;
- d) Promoting the participation of Dalits in the design, implementing and monitoring of recovery programmes and activities.

### Implementation Arrangements

The implementation of the above strategy will be led by the MOWCSA. As appropriate, the Ministry will also collaborate with the Ministry of Labour and Employment (MOLE) for child labour awareness, prevention and monitoring; MOLE for public works and cash-for-work programmes; Ministry of Education for school drop-out rates and child marriage; and the Ministry of Federal Affairs and Local development in identifying and supporting vulnerable households through social protection. The MOWCSA will also work with the police district departments in monitoring human trafficking of young women and children.

With regard to addressing gender equality and social inclusion issues in the social, productive and infrastructure sectors, the MOWCSA will collaborate with the relevant ministries to provide technical support to address these issues. For effective delivery of the recovery programmes, collaboration with the Ministry of Finance, the National Planning Commission, development partners, and international and local civil society organizations will be key.

### Assessment Methodology

Most of the data provided was gathered from other sector assessments presented in this report. Furthermore, impact data was also gathered from humanitarian needs assessment undertaken by the Humanitarian Clusters in Nepal. A desk review was also conducted to collect baseline data related to the sectors to enable analysis on what has changed after the disaster. The Gender and Social Inclusion team also undertook a field assessment in Nuwakot, Kavre, Sindhupalchowk and in Kathmandu to verify information gathered around child protection, SGBV, human trafficking and how other social groups such as people with disability, ethnic minorities were affected.





# 19. Social Protection

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## Summary

The objective of social protection is to help households manage risks (including vulnerabilities across different life-cycle stages) and cope with adverse events. Reflecting the constitutional provision of social protection as a right, Nepal's social protection system has broadened in terms of range of schemes. However, the baseline situation of the social protection system inadequately covers a range of risks and vulnerabilities.

Following the earthquakes, households have faced negative income and consumption shocks, resulting in a greater need for social protection and insulation from vulnerabilities. Using welfare analysis, it is estimated that the earthquakes would cause average household consumption in most-affected districts to decline by 20 percent. The condition of households that were already vulnerable prior to the earthquakes is more likely to be exacerbated.

About NPR 23.5 billion is needed to restore consumption of vulnerable groups (households with persons with disabilities, single women, children and elderly) in the 14 most-affected districts to pre-earthquake levels. This estimate increases to about NPR 32.7 billion if vulnerable households in the 31 affected districts are covered. This further increases to NPR 47.5 billion if all households in the 14 most-affected districts are covered. If all households in the affected 31 districts are covered, the estimated welfare losses reach NPR 63 billion.

The recovery strategy seeks to promote the adoption and expansion of social protection where it is absent or where coverage and levels of benefits are low in terms of social assistance, social insurance and work-related measures. Initiatives that support steps in this direction include:

- in the short term: the provision of cash injections through existing cash transfer programmes, providing assistance to vulnerable groups in affected districts and improving social protection service delivery;
- in the medium term: finalizing the draft National Framework for Social Protection

(properly costed), further strengthening of administrative systems for efficient roll-out of social protection service delivery with particular emphasis on quickly scalable disaster responsiveness, temporary social protection schemes, as well as enactment of the Unified Social Security Act; and

- in the long term: addressing the coverage gaps in the current social protection system, developing an integrated system for all social protection programmes, and addressing different kinds of contingencies and risk management following the concept of minimum social protection benefits based on the ILO Social Protection Floors Recommendation, 2012 (No. 202).

## Pre-Disaster Context and Baseline

Nepal is in the process of establishing a comprehensive national social protection system based on social insurance principles and the concept of minimum social protection benefits. The Interim Constitution of 2007 provides for a series of basic rights, such as the right to food sovereignty (Article 16), free education up to secondary level (Article 17), prevent children from economic exploitation and entering into any form of hazardous work (Article 22), and the right to employment and social security (Article 18). Important clauses also address the right to equality (Article 13), the right against untouchability and racial discrimination (Article 14), and the right to information (Article 27). The last two Three Year Plans (2007-2010 and 2010-2013) laid emphasis on inclusive development. The National Planning Commission (NPC) has drafted a framework, which utilizes the social protection floor approach in furthering the social protection system in Nepal. The current 13th Plan underscores the need to ensure a minimum social protection floor for all, as articulated in the draft framework.

## FORMAL SECTOR SOCIAL INSURANCE

Social insurance systems currently cover only formal sector workers, such as teachers, civil servants, and the army and police. Any private enterprise with more than 10 employees may join



the Employees Provident Fund on a voluntary basis, while all enterprises may join the retirement plan under the Citizen Investment Trust. However, there is no mandatory social insurance provision for the private sector.

In June 2011, the government established the Social Security Fund (SSF) which has approximately one million declared members, both from the public and private sectors. However, the SSF has not yet rolled out any benefit scheme to its members.

The Budget Speech of 2014-2015 mentions that 'the Unified Social Security Act will be enacted for the effective implementation of social security programmes'. In accordance with the ILO Social Security (Minimum Standards) Convention, 1952 (No. 102), the following nine social security schemes are currently under consideration: (i) medical care, (ii) sickness benefits, (iii) unemployment benefits, (iv) old-age benefits, (v) employment injury benefits, (vi) family benefits, (vii) maternity benefits, (viii) invalidity benefits, and (ix) survivors' benefits. It is currently planned that these nine branches of social security will be implemented in a phased manner, starting with schemes for unemployment benefits, maternity benefits, medical care, sickness cash benefits and employment injury benefits through the SSF.

#### **EMPLOYMEN-RELATED SOCIAL TRANSFER PROGRAMMES**

In terms of its coverage and public expenditure, the labour market-based social protection system is by far the most underdeveloped area in Nepal. Food or cash-for-work programmes aimed at food security at the local level, through the construction of public infrastructure such as roads, schools or health centres, have been in place for many years. They have the common objective of improving rural infrastructure and generating employment for the poor, which are self-targeted. An employment related social transfer programme, the Karnali Employment Programme, was introduced in 2006 as a labour market-based social protection programme. In addition, the Rural Community Infrastructure Works (RCIW) is under implementation from 1990 in the food

insecure areas of Western and Far Western Regions to provide benefits to poor communities.

#### **SOCIAL ASSISTANCE**

The government runs a wide variety of social assistance programmes. They include the universal old-age pension for all citizens above a certain age; the child protection grant for children under five among disadvantaged castes or those living in particularly deprived regions; a disability allowance; education-related social transfers such as caste-based stipends, school meals in government schools, cash transfers to endangered ethnic communities, support to the families of martyrs and victims of conflicts; and a birthing grant to financially subsidize the cost of access to health facilities for women in remote areas.

The current portfolio of social assistance programmes is intended to address vulnerabilities across the life-cycle.<sup>77</sup> However, significant overlaps and coverage gaps persist.

For example, the child grant, which is intended to help improve the nutrition of young children, is presently limited to households in the Karnali area and only Dalits in the rest of the country. In addition, the scheme is limited to two children per household, thus leaving a number of children in poor households with no coverage. The level of benefits provided under different social assistance schemes are small and not indexed to inflation. As a consequence, they have little impact in reducing poverty or other intended outcomes, such as food security or improved child nutrition. In short, despite the existence of a wide range of programmes that seemingly address most life-cycle contingencies, many of these programmes are inadequate in fully and efficiently addressing these contingencies.

#### **BASELINE PROFILE OF HOUSEHOLDS IN AFFECTED AREAS**

Data from National Living Standard Survey (NLSS) 2010-2011 and Population and Housing Census 2011 was used to sketch a general profile of the households in the affected areas. The NLSS data does not allow district-level estimates because the survey is designed to be representative at 14 analytical domains, where each

<sup>77</sup> World Bank, 2014; Khanal, 2013; Koehler et al. 2009

domain includes multiple districts or specific areas of a district (urban areas, for example). For the purposes of this PDNA, it is sufficient to select the analytical domains that correspond closely to the 14 most-affected districts.

### Labour Income

Households in the mountainous districts rely predominantly on the agriculture sector. Farm income is approximately 39 percent of total income in the mountains and agriculture is the primary sector of employment for 60 percent of household heads. Farm income constitutes a small proportion of total income in urban hills (17 percent) and is smaller still in Kathmandu Valley (1 percent). Corresponding to the income shares, the share of household heads employed in agriculture is 3 percent in Kathmandu Valley and 34 percent in urban hills. The share of non-farm wage income is the highest in Kathmandu Valley (41 percent) and it forms roughly a quarter of total income in other areas. Household heads are predominantly wage- or self-employed in non-agriculture sectors in urban areas.

### Non-labour Income

The primary source of non-labour income is housing rent. On average, almost two-fifths of total income of households in Kathmandu Valley comes from renting out houses. Housing rent is a less important source of income for households in the mountain region or other rural areas.

### Transfer income/other Sources of Income

Remittances constitute an important share

of total income for households in all regions. From a high of 22 percent in rural Western hills to 10 percent in Kathmandu Valley, remittances from internal or external migrants are important lifelines for households in the affected areas. Other sources of income, including returns on investment, private pension, and social insurance and social assistance programmes form a relatively small share (2 to 6 percent) of total income in these areas.

### Vulnerability Profile

On average, the share of households with at least one PWD member, single woman, children aged 0-5 and elderly (aged 65 or older) is 8.3 percent, 10 percent, 21 percent and 41 percent, respectively. However, there is a lot of variation across districts and across earthquake-affected areas. Table 19.1 shows the percentage share of vulnerable households across earthquake-affected districts. The share of households with children in affected districts is relatively higher than the overall average, while the share of households with elderly is relatively lower in affected districts. About 60 percent of households have a household member from at least one vulnerable group.

### FRAMEWORK OF ANALYSIS

A rapid welfare analysis was conducted by the team to measure the effects and impacts of the earthquakes. Consumption is used as the proxy for welfare, since the primary aim of social protection is to ensure that household consumption does not fall below some minimum threshold. Baseline consumption levels are estimated

**TABLE 19.1: VULNERABILITY PROFILE OF HOUSEHOLDS IN AFFECTED AREAS**

District categories	% of households with a disabled member*	% of households with a single woman**	% of households with children (aged 0-5)	% of households with an elderly (age 65 or above)
Crisis hit +	8.8	9.0	33.4	27.5
Crisis hit	6.4	8.4	35.3	20.2
Hit with heavy losses	10.6	9.4	37.3	24.3
Hit	9.5	11.6	35.4	25.0
Slightly affected	12.0	10.9	38.7	24.6
<b>All districts</b>	<b>8.26</b>	<b>9.6</b>	<b>20.7</b>	<b>40.9</b>

Source: World Bank calculation based on Housing and Population Census 2011

Notes: \* This includes those with the following: physical disability, blindness and low vision, deafness, speech problem, mental illness and intellectual disability; \*\* This includes widows, divorced and separated but excludes never married.



from NLSS 2010-2011 and post-earthquake consumption is simulated using reasonable assumptions on the severity of the earthquakes and the size and direction of shocks on various income sources.

Households face negative income and consumption shocks due to the earthquakes for a number of reasons. Many households have lost their primary bread winner while others have incurred catastrophic health expenditure on medical treatment of the injured. Household labour has been diverted from productive activities to caring for the injured, clearing rubble, making alternative arrangements for shelter, and rebuilding damaged houses. Along with their dwellings, many agricultural households have lost seeds, fertilizers, cattle, draught animals and agricultural equipment, inputs that they rely on. Households with enterprises have lost places of business and physical assets. Homeowners who rented out part of their dwelling and whose house was damaged stand to lose rent income, an issue particularly relevant in urban areas. In the aftermath of the earthquakes, there has been a large outflow of migrants from Kathmandu and other urban areas. This includes those who have returned temporarily to help in relief and rebuilding and those who are considering never to return to areas of seismic risk. The time migrants spend away from their economic activity cause earnings losses.

To model the impact of the earthquakes on household welfare, three sources of income are identified: labour, non-labour and transfer income. Labour income constitutes income from

the agriculture sector, wage employment in non-agricultural sectors, and income from enterprises. The largest share of non-labour income is rent from dwellings. Finally, private remittances from household members residing inside or outside the country dominate transfer income. Table 19.2 outlines the framework to analyze the effects and impact of the earthquakes on income and, consequently, consumption. The magnitude of income losses depends on the intensity of the earthquake in the district, source of labour income, if a household rents out part of a dwelling, and if it receives remittances from household members residing inside and/or outside the country.<sup>78</sup>

#### DISASTER EFFECTS AND IMPACTS

In the assessment model used, it is assumed that the impact of the earthquakes was more severe on the agriculture sector. The earthquakes occurred just before the main planting season. At a time when farmers should have been busy making preparations for transplanting paddy, they lost household labour due to the death of family members, found themselves injured or caring for the injured, and busy clearing rubble. The loss of agricultural inputs may cause severe decline in agricultural productivity in the coming season. Some households have been displaced from their area of residence because their settlements have been deemed unsafe due to continuing risk of landslides. Such households have lost access to their plots of land for cultivation. To the extent that households derive a significant share of total calories from home-produced food, poor harvests will cause severe food deprivation. Net food buying households will suffer further due to loss of purchasing power.

**TABLE 19.2: FRAMEWORK FOR ANALYSIS FOR WELFARE SHOCKS**

Consumption			
Income			
Intensity of earthquake			
Labour income	Non-labour income	Transfer income	
		Private	Public
Agriculture	Rent	Internal remittance	Social insurance
Salary/wage	Interest	External remittance	Social assistance
Own economic enterprise	Pension		

<sup>78</sup> A note on the assessment methodology is provided at the end of the chapter.

In contrast, households that rely predominantly on non-agricultural sectors are likely to experience smaller shortfalls and a relatively faster recovery profile. Disruption to the income stream of salaried individuals employed in the formal sector is likely to be relatively minor. Once the economy picks up and commerce resumes, wage employed individuals, especially in sectors like construction and tourism, are likely to see their incomes return faster to pre-crisis levels.

International migration and remittances are expected to increase after the earthquakes. Anecdotal evidence suggests that while some migrants living outside the country have returned to help affected family members, this is expected to be temporary. In the medium term, external migration is expected to rise with earthquake-related employment losses. Meanwhile, month-on-month growth of international remittances has increased by 35 to 40 percent in May according to Nepal Remitter’s Association. There is empirical evidence that international remittances serve as consumption insurance and respond to domestic shocks counter-cyclically.

Households that let out part of their dwellings on rent and whose houses were damaged will see a severe decline in income. A substantial portion of the households in Kathmandu Valley and other urban areas have dwellings given on rent and it forms a sizable component of total income.

Finally, we also anticipate a general slowdown in economic activity due to closure or disruption of transportation networks and markets, de-population of urban areas in the hills, loss in productivity due to psychological trauma, and impact on tourism and other sectors of the economy.

The severity of the earthquakes varies across districts but is assumed to be the same within a district. We use the share of private houses damaged, a continuous variable, as the measure of the severity of the earthquakes. This statistic will be used as an indicator of the probability that a household incurred losses. For example, if 80 percent of dwellings in a district was damaged, either fully or partially, we assume that a household in that district had an 80 percent chance of being directly affected by the earthquake.

Total household consumption, expressed in 2010 prices in the NLSS 2010-2011 data, was expressed in 2015 prices using CPI inflator available from the world development indicator database. In addition, to account for secular increase in household welfare due to economic growth, household consumption was updated with the assumption of distribution neutral growth, i.e., total household consumption of all households increased uniformly by the GDP growth rate between 2010 and 2014.

Corresponding to the loss function detailed in Table 19.3, post-earthquake consumption is calculated in the following manner:

**Post-earthquake consumption** = 0.95\*(pre-earthquake consumption) if household is not directly affected

**Post-earthquake consumption** = 0.95\*pre-earthquake consumption \*((share of agriculture income\*0.7) + (share of non-agriculture wage income\*0.9) + (share of enterprise income\*0.9) + (share of internal remittance\*0.9) + (share of external remittance\*1.1)) if household is directly affected where the probability of being affected is the proportion of dwellings in the district partially or fully destroyed.

**TABLE 19.3: EFFECT OF EARTHQUAKES ON INCOME OF AFFECTED HOUSEHOLDS**

Agricultural income	- 30%
Wage income from non-agriculture	- 10%
Enterprise income	- 10%
Housing rent	- 100%
Internal remittance	- 10%
External remittance	+ 10%
Economy wide effects	-5%
Probability of being affected =Share of dwelling in the district partially or fully destroyed	

*\*Source: Nepal Disaster Risk Reduction Portal*

Figure 19.1 below shows the simulated shortfall in total household consumption by district. First, household consumption is minimally affected in the east and the west of the country, away from the epicentres of the earthquakes, other than

through the secular economy-wide effect. Second, the shortfall is 20 percent or more in the most-affected districts of Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Dhading, Nuwakot and Rasuwa. Third, despite the proximity of Lalitpur, Bhaktapur and Kathmandu districts to the epicentres, the districts fare better because of proportionately fewer damaged houses and low reliance on agricultural income.

While the results of the simulation presented here apply for all households, some households are more vulnerable than others. Loss of labour income is likely to be higher in households with elderly, disabled and young children because of the need for extra care. The incidence of mental and physical health problems is likely to be higher among the elderly, disabled and children. Female-headed households (FHHH) may have weaker access to formal and informal safety net systems to fall back on. Households with young children may cope with the shock by withdrawing older siblings to look after younger ones, leading to these children missing school and potentially dropping out.

The needs assessment is done under two scenarios: (i) all households are targeted, and (ii) only the most vulnerable households are targeted. For present purposes, we define vulnerable households as one with an elderly (aged 65 or above), single woman (widowed, divorced, or separated), disabled, or with children 5 years old or younger.

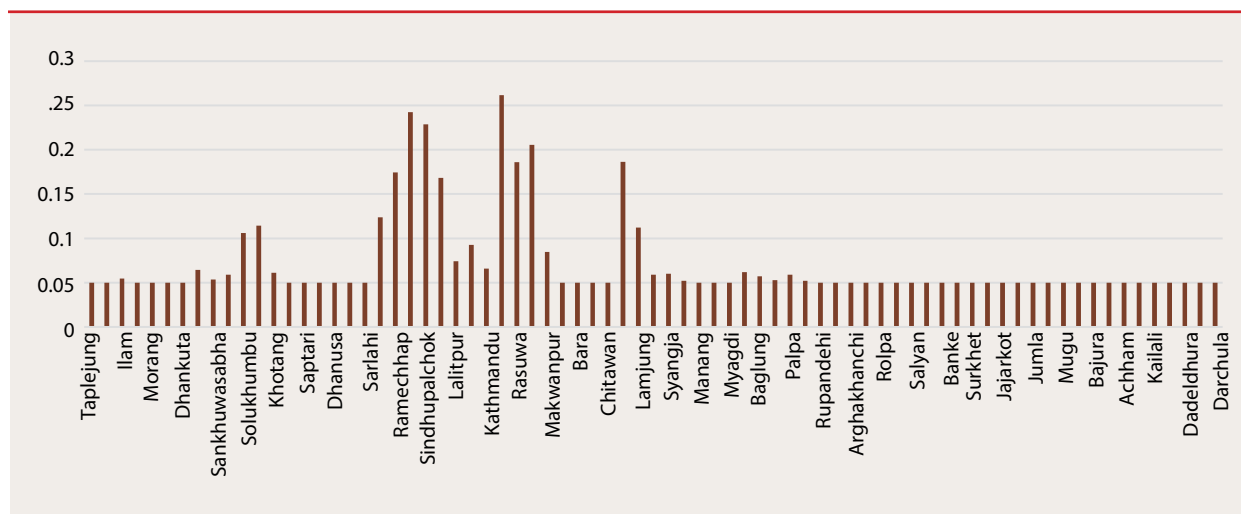
**WELFARE LOSSES FOR ALL HOUSEHOLDS**

Table 19.4 shows the estimated total welfare losses for all households in all districts, all households in the 31 affected districts, or all households in the 14 most-affected districts. The estimated losses in welfare in the entire country due to the earthquake is over a hundred billion rupees, a loss of approximately 7 percent. As expected, the proportion of losses is higher in the 31 affected districts and 14 most-affected districts – 8.6 percent and 10.2 percent respectively – for a value of NPR 63 billion and 47.5 billion.

There is a strong correlation between the proportion of losses in welfare and the severity of the earthquakes (Figure 19.2). Nuwakot, Dolakha and Sindhupalchowk districts, each with a severity index of more than 90 percent, experience welfare losses of 20 percent or higher. The next cluster of districts, with severity between 60 to 80 percent include Dhading, Ramechhap, Rasuwa, Gorkha and Kavrepalanchowk and face welfare losses of 15 to 20 percent. Dhading and Nuwakot districts fare worse than expected given the severity of the earthquakes because, among the most-affected districts, their reliance on agricultural income is relatively high – 68 and 66 percent respectively.

Compared to the correlation between the proportion of loss and severity, the correlation between the level of loss and severity is weaker (Figure 19.2) because some hardest-hit districts

**FIGURE 19.1: AGRICULTURAL DAMAGE AND LOSS BY GENDER**



**TABLE 19.4: ESTIMATED WELFARE LOSSES**

All households	Value of loss (In NPR)	Proportion losses	Number of affected households
31 affected districts	63 billion	0.083	528149
14 most-affected districts	47.5 billion	0.100	485777

**TABLE 19.5: ESTIMATED WELFARE LOSSES OF VULNERABLE HOUSEHOLDS**

Vulnerable households	Value of loss (in billion)	Proportion loss	Number of affected households
31 affected districts	32.7	0.085	301473
14 most-affected districts	23.5	0.105	276255

have lower baseline levels. Of the eight districts with severity of 60 percent or higher, five have average welfare losses less than would be expected, evidenced by their position below the line of best fit. In contrast, loss levels in Kathmandu, Bhaktapur and Lalitpur are far above the line of best fit as they start from a higher baseline level.

From the social protection perspective, the amount necessary to restore the welfare of households is the level of welfare losses. For this purpose, the relevant measure is the average welfare loss of directly affected households, as the state cannot be expected to lessen the burden of households resulting from a general contraction of the economy.

The necessary level of transfer in the districts in Kathmandu Valley ranges from NPR 78000 in Lalitpur to about NPR 1,50,000 in Kathmandu. In comparison, in districts like Sindhu-palchowk, Dolakha, Ramechhap, Rasuwa and Dhading, the necessary transfer amount to fully restore the lost household welfare of affected households ranges from NPR 40,000 – NPR 50,000 because of the lower baseline level of welfare in the districts.

#### **WELFARE LOSSES FOR VULNERABLE HOUSEHOLDS**

The losses experienced by vulnerable households in the 31 affected and 14 most-affected districts (Table 19.5 below) represent a slightly larger share of household welfare compared to the average. Vulnerable households experience losses of 8.5 and 10.5 percent in the 31 and 14

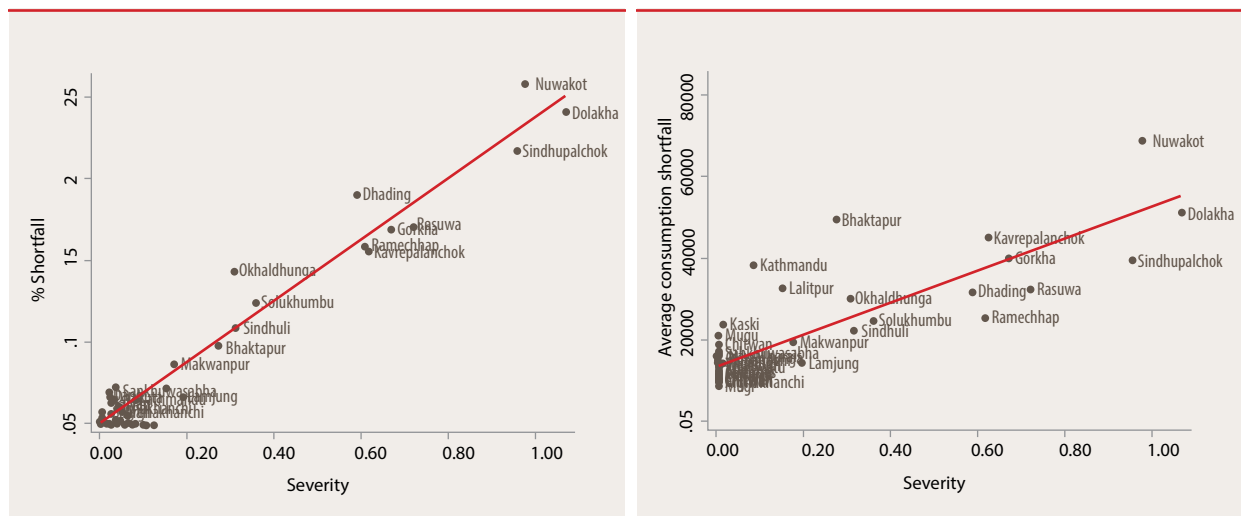
districts respectively, compared to 8.3 and 10 percent for all households.

Although vulnerable households do not appear to suffer disproportionately from the earthquakes, there are reasons to think they will have a slower path to recovery and are vulnerable to irreversible damages. First, if the earthquakes resulted in disability among any of the household members, then the household's earning capacity may be temporarily or, at worse, permanently affected. Second, able members may also reallocate a portion of their working hours as well as their monetary resources to care for disabled family members. This holds true for households with elderly members. Third, children in these households are at risk of child labour, dropping out from school and higher rates of malnutrition. This may have irreversible damage on these children's human capital.

This analytical approach is subject to a number of limitations. First, the estimates for losses do not account for an increasing need to consume more goods and services to address earthquake-related health problems and to rebuild damaged properties. Second, the model does not account for no-income transmission mechanisms that affect welfare. For example, it does not account for the possible impact of higher prices (induced by supply shocks) on welfare. This may be marginal because prices have not noticeably increased one month after the disaster. Lastly, the number of vulnerable households is fixed in the model. As such, the calculated losses and amount of social protection needed to restore welfare can be interpreted as lower bounds.



**FIGURE 19.2: PROPORTION OF CONSUMPTION SHORTFALL AND CORRELATION BETWEEN SEVERITY OF SHOCK AND AVERAGE WELFARE LOSS**



**UNDERLYING RISKS AND VULNERABILITIES**

**Malnutrition**

Malnutrition rates in children in Nepal are among the highest in the world; 41 percent of children under five are stunted. Poor infant- and child-feeding practices are prevalent – only 24.4 percent of children between six and 24 months are fed adequately and 13.4 percent of babies are born with low birth weights to mothers below 20 years of age. Almost half (48 percent) of the pregnant women are anaemic and chronic energy deficiency in women remains high, at 23.9 percent in the Far Western region and 19.3 percent in the Mid-Western region.<sup>79</sup>

**Gender**

Women continue to experience greater vulnerability to poverty and score lower in other areas of human development because of gender-based discriminatory practices, unequal access to services like health and education, and inequitable control over resources such as property. In terms of employment, males dominate in formal sector employment and majority of informal sector workers are female. Female workers account for only about 3.5 per cent of the non-agricultural formal sector, while the agricultural sector is fully female dominated. Women in the informal sector have job insecurity, low wages, long working hours, no fringe benefits and no incentive

earnings. On the other hand, it is usually women who will be out of a job in case of any losses in the informal economy. Social protection measures applied in the employment sector usually protect workers in the formal sector and tend to exclude women working in the informal sector. The situation makes women of earthquake-affected districts more vulnerable and inhibits their ability to recover from damages as a result of the earthquakes.

**Education**

The Ministry of Education (MoE) provides four types of basic education (grades 1-8) scholarships for girls, Dalits, the disabled and marginalized ethnic groups. These scholarships are aimed at enhancing gender equity and inclusion. The MoE also provides a secondary education (grades 9-10) scholarship for the same groups. Other scholarships are targeted at various categories: martyrs’ children, the conflict-affected, freed Kamalaris (victims of bonded labour or domestic slavery as young girls), and students in model schools and feeder hostels. The secondary scholarship for Dalits is NPR 500 per year, while for the disabled it is NPR 1700 per year. Similarly, the secondary scholarship for martyrs’ children is NPR 18,000 per year, while for the conflict-affected it is NPR 14,000. The extent of overlap among the scholarships or the impact of each has not been fully analysed.<sup>80</sup>

<sup>79</sup> World Bank, 2014

<sup>80</sup> World Bank, 2014

### Governance

Strengthening the administrative systems that distribute social assistance to beneficiaries is an important issue. Therefore, policy decisions are needed either for relaxing or making alternative provisions for transferring social assistance to those who have lost documents due to damages that have occurred to their own houses or loss of records due to damage to VDC buildings. Similarly, it is important to improve accountability in the implementation of social protection programmes, and introduce/strengthen downward accountability mechanisms by mobilizing Ward Citizen Forums (WCFs) to play civic oversight functions.

### People living with HIV/AIDS

There are an estimated 78,000 affected people residing in the 14 hardest hit districts in Nepal. Out of the 53 Antiretroviral Therapy (ART) sites in the country, 16 are located within these 14 districts. As of December 2014, there are 2,940 reported people living with HIV/AIDS (PLHIV) (1,854 male, 1,079 female and seven transgender people) in these affected districts, of which 2,463 are receiving ART services from the 16 ART sites. After the earthquakes, as per emergency relief response, ART has been ensured for a period of two months through the joint efforts of communities, government and partners. However, other essentials, including shelter, food, nutrition, livelihood support, safe drinking water and hygiene, also need to be ensured. There are 223 children (113 male and 110 female) with HIV residing in these districts who are getting cash support through a Global Fund to Fight AIDS, Tuberculosis, and Malaria grant.

### Child Labour

The ILO Nepal Child Labour Report<sup>81</sup> provides statistical data on working children aged 5-17 years (40.4 percent of total child population in 2008), of which nearly 51 percent (around 1.6 million) are child labourers. Of these child labourers, nearly 20 percent (or 621,000) were found to be engaged in hazardous child labour, with girls dominating. As per the National Labour Force Survey Report, 2008, the labour force participation of under-14 children constitutes nearly 34 percent of all children among

this age group. On the basis of population projections from 2011 census data, a total of 30,980 children (16,050 male and 14,928 female) were already engaged in child labour in the 31 affected districts before the earthquakes. The situation has further worsened for children in the disaster-affected districts with schools, institutions and social services (that would normally engage and care for these children) being damaged or destroyed, children have become more vulnerable to trafficking. Additionally, the loss of family members and their income and livelihoods is the most significant risk factor contributing to children becoming involved in child labour.

## Recovery Needs and Strategy

### SHORT-TERM STRATEGY (FY 2015-2016)

#### Emergency Top-ups in Existing Cash Transfers

It is recommended to provide a temporary benefits top-ups in social assistance allowances for senior citizens, single women, people with disabilities, and endangered ethnicities in the 14 affected districts. Two rounds of emergency top-ups, each for NPR 3,000 per beneficiary, should be extended. This support should be delivered together with the next social assistance payments which will be due in June 2015; a second payment is foreseen in September 2015 (before the Dashain festival).

In order to improve the delivery of social assistance by reducing human errors, digitization of beneficiary data is suggested. The establishment of a beneficiary registry, which is unified across districts and accessible online, could ensure timely updating of critical information such as registration of new beneficiaries, updating of vital event data and verification of payments to individual beneficiaries.

#### Scaling up the Child Grant in 11 Earthquake-affected Districts

In addition to the top-ups, it is recommended the child grant in the most-affected districts be scaled up. While the short-term emergency top-ups are being implemented, the process of identification of all children under five years old in 11 most-

<sup>81</sup> ILO, 2012

affected districts will be initiated. It is expected to take a couple of months to identify and register all children under the age of five years. This will allow the government to scale-up and universalize the child grant to all 14 districts most severely affected by the earthquake. This intervention would have a triple effect: (i) it would signal to the population that the government is doing what is in its capacity to help them; (ii) it would serve as an immediate response to the economic needs of the affected population; (iii) it would maintain coherence in the system of social protection, while at the same time contributing to the vision of a consolidated system under the planned social protection framework.

#### **School Feeding Programme**

There is a need to address the issue of vulnerability of children, which will affect their nutritional status and/or those potentially at risk of dropping out from schools. To address the situation, it is suggested to introduce a mid-day meal programme (school feeding programme) as assistance to all children affected by the earthquakes, at least for a period of six months. This is expected to have the following positive effects: (i) improved school enrollment, (ii) improved school attendance and retention through the day, (iii) socialization to overcome caste and gender prejudices, and (iv) in-kind support to poor families.

#### **Identification of Beneficiaries**

All eligible beneficiaries can be identified as per the government list of social assistance available in VDCs and municipalities. Given the urgency, this is the best option for the identification of beneficiaries in the emergency phase. Targeting would require some three to four months while identifying beneficiaries. This delay would not be helpful in the immediate recovery phase of a disaster that has affected large numbers of the population. Children of the pre-primary level and students up to secondary level who have lost their parents in the earthquakes can be identified as new beneficiaries. These children can be assisted through the school feeding programme.

#### **Child-friendly Local Governance**

From a social accountability perspective, it is very important that duty bearers are informed of the vulnerability of children. Children's participation in relief recovery and rehabilitation is considered

therapeutic to deal with traumatic events. Equally important is to build the capacities of children, since their ability to take action can enhance information delivery, assessments and consultation processes. Child-friendly local governance (CFLG), therefore, provides a platform for local bodies to support issues related to children.

#### **Strengthening Social Protection: MIS-linking with Vital Registration**

In order to realize gains in efficiency and effectiveness, significant investments are necessary to modernize and upgrade the current administrative systems for social protection, in particular the cash transfer system. The disaster provides an opportunity to turn the administrative system into a paperless one. The introduction of an effective MIS would reduce human error as well as undue discretionary power of officials and decision-makers. The establishment of a comprehensive household registry with family folders, which is unified across districts and accessible online, could ensure timely updating of critical information such as registration of new beneficiaries, updating of vital event data and verification of payments to individual beneficiaries. The MoFALD has already developed an MIS for cash transfers and is rolling out its use across select 14 districts to facilitate digitization of beneficiary data. The roll-out of this MIS across another 14 districts could similarly ensure better record-keeping, transparency and transfer delivery. The MIS of the SSF for the design and delivery of the five selected social security schemes and for other labour market-based social protection schemes also needs to be strengthened. In the context of Nepal, it is to be expected that establishing a robust MIS will have cross-sectoral external effects on strengthening policy implementation as well.

#### **Costing of the MIS Roll-out**

Rolling out the MIS system in the affected districts needs both institutional capacity building and technology support. Thus, some equipment and human resource support will be needed to make the MIS functional. The tentative cost for rolling out the MIS system in 14 affected districts would amount to around US\$275,000.

#### **Strengthening the Capacity of Service Providers**

Implementation and monitoring of social assistance and social insurance programmes rely on

the existing administrative structure at the local level, such as VDCs for MoFALD cash transfers, schools for MoE scholarships and SSF for rolling out different social security schemes. To overcome the capacity constraint of these service providers, significant investments of human and financial resources is required. To supplement existing monitoring and evaluation systems, with specific focus on tracking potentially lasting impacts of the earthquakes among affected households, it would be advisable to carry out waves of household surveys with a sample large enough to be representative at the district level, at least over the next few years.

#### **MEDIUM-TERM PERSPECTIVE (FY 2016-2017 TO FY 2017-2018)**

##### **Finalization of the National Framework for Social Protection**

The NPC is currently preparing a properly costed National Framework for Social Protection (2012-2022) under an effort led by the National Steering Committee on Social Protection Framework. This is a crucial process, since one important effect of the completed Framework would be to provide a common strategy, such as one based on a life-cycle approach. The document would provide the conceptual framework for building a nationally determined social protection floor on the basis of which policy and operational coherence and harmonization of different social protection provisions could be ensured, and adequate levels of social protection could be provided to all members of society throughout their life-cycle. The Framework should also emphasise the value of social protection schemes for disaster preparedness. This would pave the way for envisaged long-term interventions.

##### **Strengthening the Administrative Systems through Electronic Payments System**

An electronic payments system would help ensure payments to beneficiaries are processed on time, in the right amount, and generally in a more accessible manner. The MoFALD started a branchless banking pilot in five districts in FY 2013-2014. The use of biometrics by banks to verify the identity of the individual beneficiaries helps ensure that the cash allowance is received by the intended beneficiary. In the context of building back better, a Single Window Service (SWS)

could be introduced, which is a one-stop shop for the delivery of social protection programmes and employment services at the local level. Families register in a single office at the district level. A social worker takes charge of them and evaluates their needs. Based on the identified needs, the social worker proposes an integrated package of programmes and services (social assistance, skills and employment support) provided by the government, development partners and NGOs. Thus, the SWS performs the following tasks on behalf of service providers: (i) information desk, (ii) registration of households, (iii) collection of information, (iv) vulnerability assessment and skills assessment, (v) up-dation of database, (vi) enrollment of families under the appropriate services and programmes, and (vii) collection of contributions. The SWS goes hand-in-hand with an integrated MIS.

##### **Enactment of the Unified Social Security Act**

Following the Budget Speech of 2014-2015, by enacting Unified Social Security Act, nine branches of social security will be implemented in a phased manner, starting with the schemes for unemployment benefits, maternity benefits, medical care, sickness cash benefits and employment injury benefits through the SSF. Poor and vulnerable households will be provided with cash and other labour market-based social protection based on the Poor Household Identification Survey of the 14 most-affected districts by the Ministry of Cooperatives and Poverty Alleviation. Coverage of schemes will be progressively extended to all workers and their families in Nepal.

#### **LONG-TERM PERSPECTIVE (FY 2018-2019 TO 2019-2020)**

*Goal: Addressing the coverage gaps in the current social protection system, and developing an integrated system across all social protection programmes addressing different kinds of contingencies and risks.*

Enhancing the poverty impact of current mix of social protection schemes by the extension of social protection measures to provide a basic income to all in need of such protection and comprehensive medical care through an efficient administrative system and prudent fiscal management.



As per the Article 18 of the Interim Constitution, National Framework for Social Protection and the ILO's Social Protection Floors Recommendation No. 202, the coverage gaps should be closed through appropriate and effectively coordinated social protection schemes, whether contributory or non-contributory, or both, including through the extension of existing contributory schemes to all concerned persons with contributory capacity. Considering the fiscal sustainability of existing non-contributory social insurance schemes, there is an urgent need to design and implement contributory pension products in the country. Raising public awareness about the benefits of such contributory

pension system should be an inherent part of long-term social protection strategy.

Social assistance should be extended to all the poor and vulnerable households identified by the Poor Household Identification Survey by the Ministry of Cooperatives and Poverty Alleviation.

Recognizing constitutional provision of social protection as a human right and a socio-economic necessity in the presence of recurring natural and non-natural disasters, it is recommended that social protection should mainstreamed in the overall disaster management strategy of the country.

**TABLE 19.6: SUMMARY COSTS FOR IMPLEMENTATION OF NEEDS STRATEGY**

Intervention	Quantity	Unit description	Cost per unit (NPR)	Total (NPR)	Assumptions
<b>SHORT TERM</b>					
<b>Emergency top-up</b>					
To all existing social protection beneficiaries	229657	Person	6,000	1,377,942,000	Top-up of two installments to all cash transfer beneficiaries for 11 districts out of the 14 most-affected districts, excluding Kathmandu Valley districts
To Dalit children below 5 years	30000	Person	6,000	180,000,000	Top-up to all children below five years for two months for 11 districts out of the 14 most-affected districts, excluding Valley districts
<b>Child-friendly local governance (CFLG)</b>	14	Districts	10,080,000	141,120,000	As per estimates received from MoFALD
<b>Strengthening of the Management Information System (MIS) of MoFALD and SSF</b>	14	Districts	2,142,860	30,000,040	As per estimates received from MoFALD and training requirement of SSF
<b>School feeding</b>	500000	Districts	3,300	1,650,000,000	As per estimates received from MoE
<b>Capacity building training for VDC, DDC, DEO and SSF</b>	14	Districts	645,000	9,030,000	As per estimates received from MoFALD, MoE and SSF
<b>MEDIUM TERM</b>					
<b>Finalisation of SP Framework</b>	1	Document	10,000,000	10,000,000	As per ILO estimates
<b>Electronic payments system</b>	75	Districts	6,666,666	499,999,950	As per estimates received from MoFALD
<b>Enactment of Social Security Act</b>	1	Document		NA	
<b>Targeted social assistance to the poor and vulnerable households</b>	250000	Households	10000	2,500,000,000	Based on the Poor Household Identification Survey by the Ministry of Cooperatives and Poverty Alleviation for the 14 most-affected districts
<b>LONG TERM</b>					
<b>Strengthening social protection institutions for addressing coverage gaps</b>	75	Districts		NA	Will be estimated after the approval of properly-costed National Framework for Social Protection and based on the Poor Household Identification Survey by the Ministry of Cooperatives and Poverty Alleviation for the whole country
<b>Total</b>				<b>6,398,091,990</b>	

## Assessment Methodology

To analyze the impact of the earthquake on social protection needs, we conducted welfare analysis by examining the likely impact on household consumption due to the earthquakes. The social protection needs arising from the disaster is the amount needed to help households afford their original level of consumption.

Annual consumption of households in the absence of the earthquakes is estimated from the Nepal Living Standards Survey (NLSS) 2010-2011 adjusting for inflation and economic growth. To estimate the drop in annual household consumption due to the earthquake, a number of assumptions are made. First, we allow a household to be affected either directly, due to damage to its dwelling, loss of a family member, or loss of an income earner, or indirectly due to the weakness in the overall economy. The probability that a household is directly affected is equal to the severity of the earthquake in the district of its residence.<sup>82</sup> If, for example, the severity of a district is 60 percent, we randomly select 60 percent of the households in the district to be directly affected.

For the directly affected households, we calculate the magnitude of the decline in consumption by assuming a consumption shock (conditional on the sources of household income in the baseline scenario) weighted by the share of the source of income to total income. We assume that the impact of the earthquake is the most severe on agriculture sector. In comparison, households that rely predominantly on non-agricultural sectors are likely to experience smaller shortfalls and a relatively faster recovery profile. While domestic remittances is

expected to decline, international remittances are expected to increase after the earthquake. We assume the secular fall in consumption due to the weakness in the overall economy to be 5 percent, i.e., consumption of unaffected households in affected districts and all households in unaffected districts falls by 5 percent. These assumptions are further discussed in the text.

The loss in household consumption compared to if there was no earthquake, and the aggregate losses gives the cost of a social protection program that will cover the consumption losses of affected households. Since vulnerable households – households with elderly, single women, people with disabilities, and children under the age of 5 – are likely to have a more difficult time to recover, we also estimate the loss to these households in particular.

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<sup>82</sup> Severity of earthquake is the share of fully-damaged houses in the district. A severity level of 1 implies all the houses in the district were fully damaged. The information is available from <http://drportal.gov.np>.





# 20. Governance

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## Summary

The ability of the government to lead the post-earthquake recovery work has been severely affected by damage to government infrastructure, the loss and damage to equipment and materials in government offices, and the loss of vital government records. The governance sector for the purpose of this PDNA covers: local government and non-service delivery, national-level institutions concentrating on administrative and rule of law-related service delivery, as well as civil society.

The Government of Nepal (GoN) urgently needs to restore functionality to the 1,711 buildings destroyed or damaged in the most-affected districts as well as those damaged or destroyed at the central level (including army buildings). Temporary accommodation will be needed to ensure the efficient resumption of administrative services and to ensure that local governments can coordinate the recovery. The cost of damage to the governance sector is estimated at NPR 18,575 million, with a reconstruction cost of NPR 15,413 million and a recovery cost of NPR 3,028 million based on self-reported data and information provided to the Ministry of Federal Affairs and Local Development (MoFALD), Ministry of General Administration, Ministry of Home Affairs (MoHA), the Supreme Court, the Office of the Attorney General, the Nepal Army and the Financial Comptroller-General.

The GoN will work to strengthen governance systems more broadly in line with the Good Governance Act of 2006. This will include strengthening accountability processes, working collaboratively with civil society, strengthening citizen service centres and rule of law processes, and ensuring the participation of the most vulnerable, affected populations in decision-making processes. To achieve this, the staffing and financial management capacities of the government need to be augmented at the district, municipal and village levels. To best serve recovery needs of the local population, the government will look to overcome one of the main challeng-

es of delivering government services, namely, the capacity and functioning of local bodies. To date, these challenges include strengthening accountability, ensuring staff are present in their current positions and trying to reduce the high turnover of staff.

## Pre-Disaster Context and Baseline

The governance sector of the PDNA is subject to a number of relevant legislation, including the Natural Calamity Relief Act 1982, which mandates MoHA as the lead agency for immediate rescue and relief works as well as disaster preparedness activities. The enactment of the Local Self-Governance Act (LSGA) in 1999 expanded the mandates of local bodies, devolving the powers, responsibilities and resources required to allow local governments to meet the basic infrastructure needs of the locality. The LSGA was a landmark legislation in the devolution of power and resources in that it established an important foundation for the provision of socially inclusive services to the citizenry through grassroots democracy. The Act not only makes arrangements for ensuring that local bodies are accountable to their citizens, but also works towards active citizenship involvement in local democratic processes, including integrated planning processes and social audits.

### FOURTEEN-STEP PLANNING PROCESS

The government planning process begins with (1) directives on the budget ceiling for the coming year sent by the National Planning Commission (NPC) and the ministries. District Development Committee (DDC) officials (2) review the ceilings and (3) plan formulation workshops in the local bodies. These workshops discuss policies, goals and resource availability, including estimates for each Village Development Committee (VDC). VDCs then convene (4) meetings on programmes to be implemented at the ward/settlement level. The selection of programmes occurs at settlement level (5) involving the villagers, user committees and other community level organizations. The ward



committees meet (6) to discuss local grant requests. VDCs then meet (7) to prioritize programmes, prepare resource estimates and select programmes that can be funded with the VDC budget. Those that would need external support are separated for further referral. The next step (8) involves the Village Council. The Council approves the programmes and submits them to the Ilaka-level planning workshop (9). These workshops prioritize sectoral programmes requested by VDCs and municipalities, which are then forwarded to DDCs. Sectoral committees in the DDCs review the recommendations of the Ilakas<sup>83</sup> (10), identify those that can be funded at the district level and those that would need central support, and send their recommendations to the Integrated Plan Formulation Committee. This committee reviews the recommendations, prioritizes and submits a draft district development plan to the DDC (11). The DDC meeting discusses the draft plan along with the guidelines from NPC and other government agencies and identifies programmes that can be implemented with local resources and those that need central government support. This draft plan is sent to the DDC Council (12). The DDC Council approves the final document (13). The plan and programmes approved by the DDC Council are sent to the NPC, MoFALD and sectoral ministries. (14) The approved programmes are included in the Red Book, the official allocation register.

Specifically, the Local Body Resource Mobilization and Management Operation Guidelines (LBRMMOG) approved by the Cabinet in 2012 includes a number of procedures to promote accountability and transparency at the local level. These require local bodies (VDCs, municipalities and DDCs) to:

- publically display on notice boards and over radio full details of all programmes or projects with cost estimates of NPR 200,000 and NPR 500,000 or above;
- make public their income and expenditures on quarterly and annual basis;
- audit completed projects before a final instalment is paid; and
- conduct social audits at least once a year.

This is in line with Nepal's 13th Three Year Plan that includes poverty alleviation, inclusive

growth, social transformation, sustainable peace and good governance as its major objectives, along with an emphasis on devolution, decentralization and development of local governance.

The Good Governance Act (GGA) formalizes this good governance intent by transforming the system's administrative structures into service providers and facilitators with responsibility for upholding rule of law, promoting human rights, ensuring government accountability, and encouraging financially prudent and corruption-free public administration.

The powers relating to justice are exercised by courts and other judicial institutions in Nepal in accordance with the provisions of the constitution and other legislation. There are three tiers of courts: (i) Supreme Court, (ii) appellate courts, and (iii) district courts. There are altogether 16 appellate courts, 75 districts courts and one Supreme Court, which function as an apex court.

This PDNA pays particularly close attention to local authorities in the 14 most-affected districts. The administrative structure of Nepal is currently divided into three levels: central, district and local (municipalities and villages). In terms of build back better, Nepal's new federal structure will have to be considered when making final decisions on reconstruction to ensure greater efficiencies and effectiveness. Overall, the local government structure has limited capacities.

There are 75 districts across the country. Each district has a DDC headed by the Local Development Officer (LDO), who reports to MoFALD, and a District Administration Office headed by the Chief District Officer, who reports to MoHA. The Chief District Officer is responsible for law and order and security. As elections to local bodies in Nepal have not been held for more than 13 years, the DDCs are headed by LDOs pending elections. LDOs are responsible for coordination with all line departments for development activities such as health, education, forestry and environment.

In 2014, the government announced the creation of 133 new municipalities (prior to which there were only 58 municipalities) through a

<sup>83</sup> An Ilaka generally consists of five to eight VDCs

two-round process. Municipalities are cities that meet minimum criteria in terms of population and infrastructure. Each municipality has a different structure based upon needs and available revenues. Many of the newest municipalities are not yet fully staffed and have not received the requisite budgets to fulfil their legal mandates.

There are currently 3,276 VDCs in the country. Usually around 10 percent of the VDC Secretary posts are vacant at any given point. There are only 81 women Secretaries. Political and administrative commitments have been made by the GoN to significantly increase the number of women and diversity candidates within the civil service. Challenges remain in ensuring presence of the VDC Secretary, of staffing the VDC assistants' position, and in ensuring they have the ability to undertake prime functions that include issuing vital documents (certificates of births, deaths and marriages) and, in conjunction with the Ward Citizenship Forum (WCF), prioritise development plans and monitor activities of line ministries.

The GoN has acknowledged an accountability gap at the local level due to a number of factors, including limited GoN staffing at the VDC level, no local elections since 1997, administrative weaknesses identified in the previous All-Party Mechanism and lack of official audits of VDC expenditures. Currently, audits are carried out but by contracting private firms. There remain political challenges to holding elections until after the new constitution has been finalized. Procedural requirements imposed on local government bodies with limited capacity and resources, compounded by political influence on public finance allocation decisions and other developmental activities, have resulted in an 'informalization of the processes and procedures of local governance', making it difficult for the mechanism to ensure accountability in public services.

While local elections can be a remedy for the lack of representation and accountability at the local level, given the uncertainty of such dates, the government, through its Local Governance and Community Development Programme (LGCDP), is working with WCFs and Citizen Awareness Centres (CACs) to strengthen

participation and representation in local governance processes. An interim arrangement was established by MoFALD in 2008 and rolled out in 2010 where 25 members are selected to the WCF to undertake many of the functions normally undertaken by the elected Ward Council. Members are selected with attention to gender balance and ethnic diversity, including disadvantaged groups. This lack of electoral representation disconnects government from the population during the present planning and delivery of relief goods and provision of other local services.

### Post-Disaster Context

Central government infrastructure damaged by the earthquakes includes the prime minister's office, the NPC, the Election Commission, the Supreme Court and the personnel records department of the Ministry of General Administration.

The Ministry of General Administration has been working to ensure that the required staff for damage assessment and relief work is available, and the government has set up an assessment process for damages at the district and sub-district level. Over 2,500 civil servants are currently part of the assessment process, which is made up of 200 volunteer engineers and 1,300 permanent civil servants from different districts and the central level. In total, 14 Secretaries, 57 Joint Secretaries, and 60 Under Secretaries were also deployed from the central government to the affected areas for periods of one week to a month in order to help supervise the setting up of the relief effort.

Daily operations of treasury functions were restored within one week of the first earthquake with no major effect on fund release or payment transactions. The main building of the Financial Comptroller-General's Office has several cracks and, whilst habitable, may require retrofitting, according to engineering estimates. The main server in the building, which houses the financial management information system is operational. Of the five affected District Treasury Comptroller Offices, daily operations are being carried out in available space in other offices. Where information flow is affected due to collapse of buildings, information is still available in the central server and hence further transactions are still being managed.

### DISASTER EFFECTS

In total, 1,711 (602 excluding the army) central, district, village and municipal structures have been fully or partially damaged as per data received by the team. This includes: district courts; police buildings; VDC, DDC and municipality offices; appellate attorney, district attorney, bar association and district administration offices; prisons; central ministry buildings and the District Treasury Comptroller Office. Of the 580 VDCs in the most-affected districts, 507 (87 percent) possess physical office buildings. Some of these buildings have been reduced to piles of rubble whilst others have severe cracks and have shifted on their foundations, losing roofs and destroying equipment. Before buildings can be rebuilt, the debris and rubble from the previous building needs to be removed. This will include safely removing and pulling down the destroyed buildings.

After the earthquake on 25 April, the local government structures reoriented their work to coordinating the relief sent by GoN, volunteers and non-governmental organizations. With many of the sources of government revenue, such as business premises, destroyed or damaged, there will be a reduction in the budget for the affected districts over the coming financial year due to lost revenue. This will affect their ability to deliver services.

In terms of the sub-national governance structure in Nepal, it is worth recognizing the impact of the small average size of VDCs, which – on average – have a population of less than 6,000 to 7,000 people. VDCs are generally considered too small to capture relevant scale economies in the delivery of public services and are currently administratively weak. Despite this they have been called upon to be the frontline in the recovery process and have been delivering services to the entire population under the current administrative structure. They represent one of the key governance assets for the delivery of the recovery programming and as such will be strengthened. However, the proposed future federal structure of Nepal may require a reduction in the number of VDCs. One consideration for government is whether all damaged and destroyed VDCs should be reinstated, or whether some restructuring is possible now.

The district records of birth, death and marriage certificates and citizenship certificates is paper based, as is the information for identity records. Some of these have been lost as 173 VDC buildings, nine district offices and 11 municipalities have been fully destroyed. These records are necessary for the reissuance of ID/property documentation, and issuance of new documents is necessary to allow the population to receive relief services and continue to receive regular services like social security allowances.

The workload of civil servants increased during the post-earthquake period as the local government structures were responsible for coordinating the relief received from GoN, volunteers and non-governmental organizations. The VDC Secretaries are working with the District Disaster Relief Committees (DDRCs) to assist in distribution of relief (for instance, the cash grant of NPR 15,000 given as relief grant, and the LGCDP emergency relief grants to all VDCs and municipalities); assessment of all damages at the village level with the MoGA team; assisting in the re-issuing of identity documents; and coordination and monitoring of relief being provided by non-governmental organizations and civil society organizations. Realistically, it has not been possible for the VDC Secretaries to accomplish all of this on their own. Therefore, additional staff are urgently required at the local level. As much as possible, gender and social inclusion should be encouraged for new positions. In addition, there has to be clear direction and delegated authority to the VDC Secretaries for them to effectively manage relief and recovery. The VDC Secretary has taken on many of the responsibilities of the VDC.

Functions of the Supreme Court were disrupted for more than three weeks after the initial quake. The Supreme Court, under the chief justice, has responsibility for the administration of all courts in Nepal, including facilities management. Its building suffered critical damage and will need to be replaced. The court, at the time of writing, is still working on establishing benches in alternative buildings. This will compound the case backlog, which at present stands at nearly 20,000. At the district level, courts are just starting to operate again. In some lesser affected areas, the courts have prioritized *habeas*

*corpus*, serious crimes and any criminal cases with a looming statute of limitations issue. In the more heavily-affected districts, courts are offering even more limited services out of tents. In several districts where the court buildings collapsed, court records have been destroyed/lost. Lack of appropriate office facilities for the Attorney General will impede the work of prosecutors and could create additional backlogs.

Beyond structural damage to buildings, the justice sector is facing enormous challenges due to the fact that the administration of justice in Nepal is largely still paper based. In the 14 most-affected districts, records and files have suffered varying degrees of damage and loss.

The National Women's Commission and the National Dalit Commission structures have suffered damages. To ensure that these national GoN institutions are able to perform their essential work protecting some of the most vulnerable populations, their buildings should be assessed and supported.

The Nepal Police is also reporting significant damage to police stations and posts in various locations (16 different districts). A total of 92 police facilities have suffered some level of damage. It is not clear how many of these installations are rented and how many are actually owned by Nepal Police. Even without static facilities, police continue to provide law and order and, where needed, the Armed Police Force have deployed troops in tents.

The Nepal Bar Association (NBA) plays an integral role in ensuring access to justice along with the Ministry of Law and Justice. In a large number of districts, the Supreme Court allocates land within the district court's property for the NBA. It is then that the bar association collects money from its members to build an office. It is clear that members of the bar will face difficulty in raising money at this critical time to fund the reconstruction themselves. The NBA has lost two buildings, with four others partially damaged. Without these premises, services to the locally affected communities will likely suffer.

The National Human Rights Commission (NHRC) building in Kathmandu has suffered

severe damage and is no longer habitable. The loss of this building is impeding the functioning of the commission, which is a constitutionally established body with central and regional offices responsible for ensuring the respect, protection and promotion of human rights. There are numerous files that are at risk of damage or destruction due to the condition of the building. The commission is expected to have a significant role in monitoring the situation in earthquake-affected districts and overseeing the human rights approach to ensure equitable recovery planning and implementation.

Several prisons in Nepal were also affected by the earthquakes. In particular, the central prison in Kathmandu, Bhadra Bandi Griha, suffered severe damage. Buildings collapsed, killing 16 inmates and injuring another 23. In Sindhupalchowk, the prison collapsed, allowing more than 200 prisoners to escape. Similarly, in Dolakha district, a prisoner housing block has collapsed.

The cost of damages to the buildings is NPR 18,757 million, calculated from data available at the time of the assessment. The data in this PDNA is from government sources as of 10 June 2015. This includes data from the Nepal Army that estimated damages for the entire country.

Data gaps remain (e.g., the Ministry of Urban Development is awaiting more formal estimates of rebuilding/renovation costs for central-level buildings such as the Election Commission building, the Office of the Auditor General, the Department of Personnel of the Ministry of General Administration, etc.). The GoN is carrying out assessments of damages to the institutions in each of the villages within the 14 most-affected districts. Five hundred teams have been deployed for this exercise, each team comprising five civil servants. The results are expected to be ready in mid-June and will give more detailed information.

As governance is a cross-cutting sector, losses to revenue and staffing costs will be considered in the needs assessment of all other sectors.

#### **DISASTER IMPACTS**

Before the earthquakes, filling all positions at municipal, district and village levels was challenging. At the district level, most DDCs had gaps in of-



ficer level positions and there were frequent staff transfers of LDOs, with the standard two-year term often cut short due to personal preferences or upon requests from political parties.

Challenges are exacerbated at the village level, where civil servants are often reluctant to be posted, particularly in remote areas. With the bulk of the response and expectations of the population resting firmly on the VDC Secretary, these posts – at a time when they are particu-

larly needed – may become even more difficult to fill. In some cases, the VDC Secretaries also feel personally insecure as they are unable to deliver the needed relief. Much of the civil service housing has been destroyed so until this is rebuilt, the posts are even less attractive. Restoring infrastructure at the VDC level, along with enforcement of GoN policies mandating staff to remain in such posts for a minimum period of time, will strengthen government services and relations with local communities. The GoN In-

**TABLE 20.1: BREAKDOWN OF TYPE, NUMBER AND COST OF DAMAGED BUILDINGS**

Description	Disaster effects (NPR million)			Share of Disaster effect	
	Damage	Loss	Total	Private	Public
Appellate Attorney	8	-	8	-	8
Auditor General	340	-	340	-	340
Bar Association	21	-	21	-	21
Border Office	43	-	43	-	43
Central Registration Department, Narayan Bhawan (Women's Development Training Centre)	85	-	85	-	85
DDC building	604	-	604	-	604
District Administration Office	638	-	638	-	638
District Attorney	45	-	45	-	45
District Court	295	-	295	-	295
DoLIDAR Building, Shree Mahal, Pulchowk	213	-	213	-	213
DTCO	85	-	85	-	85
Ilaka Office	128	-	128	-	128
Judgement Execution Directorate	17	-	17	-	17
Kathmandu Metropolitan City, Bagh Durbar	213	-	213	-	213
Ministry of General Administration	298	-	298	-	298
Ministry of Home Affairs	298	-	298	-	298
Municipal Building	551	-	551	-	551
Municipal Ward Building	625	-	625	-	625
National Human Rights Commission	866	-	866	-	866
Nepal Army	4,845	-	4,845	-	4,845
NPC	850	-	850	-	850
OPMCM	850	-	850	-	850
Police office	319	-	319	-	319
Police post	281	-	281	-	281
Prisons	3,640	-	3,640	-	3,640
Supreme Court	51	-	51	-	51
VDC building	757	-	757	-	757
Sports facilities and training centres	1,797	-	1,797	-	1,797
<b>Total</b>	<b>18,757</b>		<b>18,757</b>		<b>18,757</b>

egrated Action Plan 2015 states that the Ministry of General Administration should ensure all deputed staff return to their positions in the earthquake-affected areas, which should increase the number of VDC Secretaries on the ground.

While there is no doubt that every institution and its personnel concerned did their best to cope with the unimaginable level of challenges, the response to the disaster showed the need for a coordinating body with the overriding authority to mobilize resources, both human and capital, at the central level. These lessons will be reflected in engineering an intergovernmental system that builds back better. This coordination body should be governed by a new law on disaster risk management that sets out the roles of the different institutions, including ministries such as the Ministry of Women, Children and Social Welfare and the different district level institutions.

Concerted actions will need to be taken by the government to ensure transparency and accountability during the post-disaster period. This is especially important for financial resources, and systems and procedures that already exist, such as the central treasury system for government resources which should be used rather than creating new ones.

The district plans for the next fiscal year (2015-2016) have already been completed and these will need to be reprioritized. Due to the tight timeline, the participatory planning process set up by the MoFALD may not be fully utilized for this reprioritization exercise. Social mobilizers can be used to ensure participation of local communities.

The impact on the more vulnerable populations will be particularly severe due to their lack of access to services and economic opportunities. Caste, ethnicity, language and religion remain the major sources of cultural identity. The country is struggling hard to reduce, if not eliminate, gender-based, caste-based, ethnicity-based and spatial exclusions created by socio-economic and geo-political structures. For instance, women and girls lag behind men and boys because of disparities in education, lack of fair representation in decision making, low access to employment opportunities, limited access to and utilization of essential healthcare services, and high vulner-

ability to gender-based violence. These vulnerable communities need to be initially prioritized within the recovery planning framework as the most-affected areas are the more remote regions which have been historically marginalized.

Dalits represent 10 to 17 percent of the population and are often among the poorest, separated from other caste/ethnic communities in settlements. As Dalits were traditionally not permitted to own land, they often still lack any landholdings and rely on the local cash economy to support their families. If the GoN requires land title for resettlement, this presents a barrier to those without land title. Also, nearly 100,000 Nepali citizens, often Tamang, Gurung or Ghale, live in the northern VDCs along the Chinese border. Often these communities lack political influence in the district centres or central GoN due to language, religion and ethnic distinctions, and isolated geographical locations. Given the high Himalayan environment and harsh winters, families in these remote VDCs should receive priority for early housing support – preferably before the snows of 2015 set in.

The monsoon will further compound the impact of the earthquakes. Waterproof temporary office space needs to be provided to districts, municipalities and villages to ensure that administrative services can continue to be provided. On a practical level, where some paper-based records have been salvaged, temporary storage is critical to save these from further deterioration during the monsoon. In addition, physical access to certain areas will be reduced due to landslides and this will compound the already difficult situation for the civil servants and population in these areas. In addition, this period will be when the district plans need to be revised; the monsoon will prevent access to more remote areas for consultation on priorities. Alternative consultation methods will be used such as phone communication with WCF members.

## Recovery Needs and Strategy

### RECOVERY AND RECONSTRUCTION FOR GOVERNANCE SECTOR

Reconstruction should take into account factors, which would mitigate future hazards and risks. The new designs for government buildings should include considerations for more

responsive service delivery, electricity provision through solar power and earthquake resilience. Recovery should be carried out in a participatory manner with improved accountability mechanisms, planning and basic service delivery. This includes both coordination amongst the different ministries and with different development actors, including non-governmental organizations and, most importantly, the people.

The total cost of reconstruction is estimated at NPR 15,413 million. The recovery plan for the governance sector will ensure capacity for service delivery at a total cost of NPR 3,029 million.

Key recovery needs are as follows:

- Staffing, both numerically and in terms of new technical capacities, to strengthen existing institutions. Priority could focus on recruiting locally from affected communities.
- Fiduciary risk mitigation at all levels, especially local levels.
- Service delivery through participatory governance.
- Expansion of effective patrolling and security provisions, in collaboration with local stakeholders, to address the issues of violence against children and women, especially to control trafficking, sexual violence and child labour.
- Strengthening coordination, participation as well as equitable distribution of resources and opportunities among different groups of the population.

These need to be applied specifically to the 14 most-affected districts as a first priority and then to the other 17 districts, while policy frameworks and coordinative mechanisms are being strengthened at the central level. Following the principles of BBB, the goal will be that these districts can serve as local governance and disaster risk reduction (DRR) models once the reconstruction and state restructuring has been completed.

#### **BROADER GOVERNANCE STRATEGY TO SUPPORT RECOVERY**

Support to governance functions in the post-disaster period is critical for timely reconstruction and economic recovery, but equally for the continuous delivery of social security entitlements and other public services to local communities, including more marginalized groups and Inter-

nally Displaced Persons (IDPs). This will also improve public trust towards the capacities of the state to play its role in protecting all citizens, including the most vulnerable. There is an opportunity to address underlying institutional weaknesses and imbalances, and ensure that the governance systems for recovery are built back better. The strategy aims to strengthen the processes that the government needs in order to deliver recovery and reconstruction in a secure environment, whilst recognizing the current discourse on state restructuring

The post-disaster recovery presents an opportunity to further redress inequalities through the allocation of financial and human resources. The GoN's long-established and institutionalized principles and practices in gender-responsive budgeting (GRB) will be applied to all the recovery strategies. It is therefore recommended that budget allocations under the government's GRB framework should be increased.

As gender and inclusion are cross-cutting issues, it is important that the district women, children and social welfare officers participate in all DRCC committees/clusters. This will help ensure that the specific needs of women, children, PLWD, and senior citizen are identified and addressed in a coordinated and comprehensive manner. Therefore, the capacity of the district office of women, children and social welfare needs to be strengthened immediately with additional human resources and logistics, particularly with respect to vehicles and office equipment.

Also, given the widespread response of civil society to the crisis, it is vital to strengthen the capacity of both GoN as well as civil society institutions. Nepali civil society has evidenced an immediate self-organizing capacity to the earthquakes. A broader governance strategy will seek to tie the official responsibilities of GoN closer to this vibrant civil society that has responded with such generosity and dedication to the national disaster. In this regard, as much as possible, new capacity building activities should be planned in a way that strengthens Nepali civil society organizations, both the established agencies as well as newly established professional associations, volunteer associations and community leaders for whom these skills, trainings and curricula will

further strengthen their relationship with GoN in order to respond to future natural disasters.

Based on the initial qualitative impact assessment, the governance sector needs multidimensional support as follows:

- Restoration of infrastructure and assets as needed to sustain their operations.
- Policy guidance for recovery strategy and planning.
- Accountability mechanisms such as social audit, public audit and public hearing, including Right to Information (RTI), strengthened at the district, VDC and municipality levels.
- Inclusion of women, youth, historically marginalized communities and vulnerable groups in decision making, especially those adversely affected by the earthquakes.
- Capacity development for crisis response coordination, horizontally and vertically.
- Expansion of awareness, security/patrolling and community-based monitoring to respond to the issues of violence against women, girls and children, such as trafficking, sexual violence and child labour.

Specifically the strategy will be to strengthen coordination, participation and equitable distribution of resources and opportunities.

The total cost for reconstruction and recovery is NPR 18,442 million.

### Implementation Arrangements

The strategy for recovery of the governance sector is set out in three areas: (i) Rebuilding and repair of government infrastructure, (ii) Ensuring capacity for service delivery, and (iii) Strengthened coordination and participation.

#### REBUILDING AND REPAIRING GOVERNMENT INFRASTRUCTURE

An immediate priority is to repair or rebuild damaged or destroyed buildings. This assessment estimates government buildings in need of repair or rebuilding at a cost of NPR 15,413 million. These figures are estimates and government engineers will develop detailed structural assessments and designs. As the assessment is deepened, it will be necessary to differentiate – particularly for police and VDCs – which buildings were owned by government and rented by

government, and the appropriate mechanisms for financing repair or reconstruction. It will also be necessary to examine the in-depth analysis produced by the government assessments team at the district and village levels.

#### ENSURING CAPACITY FOR SERVICE DELIVERY

##### Human Resource Management in Local Bodies

###### *Short Term*

The VDC structure needs to be urgently strengthened with additional human resources. The two key positions that are needed are an accountant/book-keeper and an engineer/overseer. These positions should be recruited initially on a temporary basis within the short term, with a process for permanent recruitment following. These positions could be placed at the Ilaka level to cover a cluster of VDCs.

For the 14 most-affected districts covering 580 VDCs, 116 engineers and 116 accountants will be needed. Specific measures should also be undertaken to provide additional incentives or bonuses for the work of the VDC Secretary in coordinating the relief.

While the debate regarding the restructuring of the State of Nepal and federalism is ongoing, the district level should be strengthened on a temporary basis for recovery planning and implementation. Once it becomes clear how this will dovetail into the potential provincial level, then permanent appointments can be made.

###### *Medium/Long term*

At the municipal level, planning and technical officers, and accounting personnel should be prioritized for recruitment within the 37 new municipalities in the 14 most-affected districts.

###### *Financial Management*

Financial management needs to be strengthened at the village and municipal levels, including: (i) setting up a guideline and template for expenditure reporting at this level; (ii) training the new accountant/book-keeper; and (iii) making this a requirement for funding tranches for recovery.

Short term: The GoN has authorized the treasury to utilize all available budgets for relief and



**TABLE 20.2: RECOVERY AND RECONSTRUCTION INITIATIVES AND COSTS**

Functions	Description of initiatives	Year one	Year two	Year three	Estimated cost (NPR)
Reconstruction of buildings	Rebuild district and central level government buildings	5,138,000	5,138,000	5,138,000	15,413,000
<b>Sub Total</b>					<b>15,413,000</b>
Building capacity for service delivery		1,439,000,000	768,100,000	533,900,000	2,741,000,000
	Provide technical assistance and training to districts in planning, financial management, procurement, geology and engineering	x	x		
	Capacity development at the central level	x	x	x	
	Incentives to VDC Secretaries	x			
	Set up guidelines for unspent funds in the 14 most-affected districts to be reprogrammed for the next fiscal year	x			
	Strengthen capacity of WCFs and Social Mobilizers (from LGCDP) to support VDC Secretary in identifying the population and reissuing identity documents	x			
	Clarify guideline/ budget for expenditure reporting at the village level and make it a requirement to receive funding at the village level	x			
	Provide temporary structures for district buildings	x	x		
	Information campaign on building codes	x	x		
	Hire temporary engineering staff (cluster VDC)	x	x		
	GoN permanent book-keepers and engineers at Ilaka level/cluster VDC level, including women and people from marginalized communities	x	x	x	
	GoN permanent employees for new municipalities, including women and people from the marginalized communities		x	x	
	Set up electronic records and guidelines for land and identity documents		x	x	
	Building code enforcement through technical assistance to the District Technical Office, VDC and municipality (mason, contractor, technician, house owner)	x	x	x	
Promote coordination and participation		91,000,000	102,500,000	94,000,000	287,500,000
	Develop participatory recovery planning guidelines (including DDRC)	x			
	Technical assistance for recovery planning and budgeting	x			
	Legislation on audit at sub-district to be passed	x			
	Provide information to people about grievance procedures, anti-corruption bodies and processes	x	x		
	Right to Information campaign targeted at WCFs and the general population	x	x		

Functions	Description of initiatives	Year one	Year two	Year three	Estimated cost (NPR)
	Support the coordination of recovery through technical assistance to the central body responsible for recovery	x	x	x	
	After cabinet approval, accountability mechanism used across each institution at the district and sub-district levels - Local Body Resource Mobilization and Management Operation Guidelines (LBRMMOG)		x		
	Review district recovery plan every four months through public hearings		x	x	
	Strengthen the Office of the Auditor General to carry out audits in all 14 most-affected districts with additional temporary staff		x	x	
	Public audit systems strengthened with technical audit from DTO and capacity-building of WCFs		x	x	
	Set up a permanent secretariat for DDMC and a contingency fund		x	x	
<b>Sub Total</b>		<b>1,530,000,000</b>	<b>870,600,000</b>	<b>627,900,000</b>	<b>3,028,500,000</b>
<b>Total</b>		<b>6,668,000</b>	<b>6,008,000</b>	<b>5,766,000</b>	<b>18,442,000</b>

reconstruction. In the 14 most-affected districts, unspent budgets from the present fiscal year should not be recouped and considered as unspent capital budgets, but be utilized for relief expenses up to the end of the fiscal year. Any remaining monies can be allocated to relief activities in the coming fiscal year. Clear yet succinct GoN guidelines should be written and approved before the close of the financial year to allow for this VDC-level reprogramming, including the use of the 35 percent block grant for women, children and disadvantaged groups, to ensure that such funds benefit all earthquake-affected persons, including marginalized groups.

#### *Records Management*

Short term: The assessment of the damage to the records is being carried out by the assessment teams that the Ministry of General Administration has sent out. It is not yet clear what number of records have been destroyed. With 178 VDCs fully destroyed, it is assumed that the number of VDCs lacking records will be higher than this. However, these records are vital for the re-issuing of identity documents and the government will reinstate lost documents using consultations within the local community through the VDC Secretary. An urgent guideline should be shared with the districts on how to issue earthquake victim ID cards, re-issue citizenship documents, and re-establish vital events records and social security beneficiaries. This guideline should in-

clude using the WCFs to assist in confirming the identity of individuals; additional temporary staff to assess land documents and provide new documentation; and working with the district technical officer as the arbitration/grievance mechanism for the process.

#### *Medium/Long Term*

These records should be put on databases in a comprehensive manner and backed up at the provincial and central levels. A citizen service centre should also be set up at the district level with mobile units at the village level to make it easier for people to procure relevant identity documents.

Guidelines on how to re-establish other critical information such as accounts, bills and audit records need to be provided as failure to provide these will cause an automatic failure of minimum conditions in annual assessments and result in a significant reduction of capital grant allocations in the following year.

Under the third Five Year Justice Sector Strategy 2014-2017, the Supreme Court was already setting targets to begin automating certain court processes. This crisis provides an opportunity for the justice sector to look at digitizing court records in addition to increasing court administration efficiency. As part of the Strengthening Rule of Law and Human Rights Project (RoLHR) there is currently an ongoing effort in the Office

of the Attorney General to digitally archive closed cases at the central level. This programme could be accelerated and expanded to include open cases and those at the districts to mitigate any future issues with loss of files and documents.

#### **BUILDING CODE**

*Short term:* Infrastructure projects at the DDC are supported by the District Technical Office (DTO), but they normally do not have the capacity to provide technical support to VDCs and only serve the largest infrastructure projects in municipalities. With the injection of engineering skills to the district and village, there will be more capacity to share information about building codes. The capacity of the municipalities and districts, specifically the District Technical Officer, will be built in terms of understanding the code and how to apply it. A tax break for the housing tax can be explored as an incentive to ensure that the building code is followed. An information campaign should be set up to ensure the population knows the building code and the main characteristics of a safe building. Under the GoN's Integrated Action Plan, MoUD and MoFALD are responsible for this action. Legal enforcement of the building code will in all likelihood ensure greater compliance with the code.

#### **STRENGTHENED COORDINATION AND PARTICIPATION**

##### **Coordination at the Central Level**

*Short term:* A priority is to identify the gaps in the existing mandates and authorities granted to the Central Natural Disaster Relief Committee (CNDRC) so that they can respond in a timely and effective manner to the unfolding situation on the ground. Coordination will be needed across a multi-stakeholder platform for possible engagement in emergency operations, and media to ensure broad communication. The GoN has developed an Integrated Action Plan that sets out the different roles of government ministries and is in the process of defining an appropriate structure to lead the earthquake response. Once this is decided, the institution should be strengthened for implementation and data management.

##### **Coordination at the District Level**

*Short term:* A lot of the immediate response to the earthquakes has been carried out efficiently

and quickly by civil society organizations and international non-governmental organizations. The GoN will continue to work in collaboration with these and other civic organisations at the local and national levels to ensure they have the required support and guidance to provide relief and reconstruction to the nation's citizens.

*Medium/Long term:* The District Disaster Management Committee (DDMC) will be strengthened through a secretariat to ensure that it is able to function as the main coordinating body for the response; this secretariat can also serve the DDRCs during the relief phases of any possible future crises. Technical assistance will be provided for recovery planning, budgeting and implementation.

#### **Accountability**

*Short term:* Detailed expenditure reporting from the VDCs is currently not a requirement for funding disbursement (from DDCs) within current GoN regulations. As they become the focus for recovery, transparent systems of reporting on financial resources will need to be strengthened. The Planning and Administration Officer in the DDC has also been appointed as the Grievance Officer, although it remains unclear how effective this has been in the aftermath of the immediate emergency, nor their pro-active role in handling any grievances or complaints.

To tackle the issue of accountability at the local level, the GoN, as a matter of priority, needs to pass legislation which, for the first time, would permit the Office of the Auditor General to carry out audits at the municipality and VDC levels. Audits are currently carried out at the district level, and to promote district level transparency and accountability the results of these district audits should be published locally and form the basis of three-yearly public hearings within the district. In addition, MoFALD will give priority to implementing existing internal control mechanisms.

At the national and local levels, more public information should be provided to the local population, including through the internet and community radio, on how citizens can use grievance management mechanisms so they can have their say on issues related to transparency and

inclusion, as well as the specific priorities and means of implementation of recovery. The Citizen Awareness Centres can be strengthened to deliver these campaigns. These Right To Information campaigns will be supported by the National Information Commission. The Right to Information Act has been used more extensively at the central level to promote greater transparency. Similar promotion of this agenda at the district level will increase both the supply of and demand for transparency.

*Medium/Long term:* The MoFALD Local Body Resource Mobilisation and Management Operation Guidelines (LBRMMOG) approved by the Cabinet in 2012 includes a number of critical procedures that have proven effective to promote accountability and transparency at the local level. The GoN is committed to implementing these mechanisms across the local bodies and devolved line departments to ensure that the earthquake recovery delivery is perceived as transparent and participatory.

### **Recovery Planning**

*Short term:* The introduction of the WCF has allowed for a participatory planning process in Nepal. The detailed description of procedures are to be found in the LBRMMOG. This includes holding a ward gathering to obtain demand for projects from the wider community and holding Integrated Planning and Formulation Committee (IPFC) meetings, including members from WCFs as well as local political leaders to recommend projects within the budget provisions to the local body council. Given that the FY 2015-2016 participatory planning process was concluded for the next fiscal year prior to the earthquakes, it needs to be reprioritized and re-budgeted to reflect new, more urgent priorities.

In order to set up a recovery plan and ensure its implementation, technical assistance would be provided at the district level to support the District Planning Officer to reprioritize the district plan by the end of August and to assist in its implementation. The GoN will develop a guideline based on the 14-step planning process to ensure the timeliness of the recovery planning process as well as participation of the population, including women, Dalits and other vul-

nerable communities. The GoN will commit to greater gender and social inclusion in the provision of these new positions, promoting women and marginal groups to increase representation in the civil service. This guideline will look at the role of social mobilizers and the WCF; it will attempt to rationalize the different mobilizers and combine them where possible.

The following assistance will be provided at the district level: (i) planning, (ii) finance, (iii) procurement, and (iv) engineering. They will also coordinate with the DDMC and the newly established units of book-keepers and engineers at the ilaka level. The GoN will ensure that new local staffing opportunities will recruit a broad mix of citizens, including women.

### **Assessment Methodology**

Data has been collected through secondary sources from the central government through the questionnaire developed jointly by GoN, UNDP and other development partners. The data on damaged buildings was received from GoN. This data is not in every instance broken down by district. The data from MoFALD and the Financial Comptroller's Office covers the 14 most-affected districts. The data for the MoHA and the justice sector cover the 31 districts ascribed by the PDNA. The data from the Nepal Army has a figure that covers damages (both minor and major damage) for the whole country. For the purpose of this assessment, all buildings are considered partially damaged. Three district visits were undertaken to assess the effect of the earthquakes on government structures at the district and village levels. Government counterparts from major governance-related departments have also been consulted at the central level to gain information on recovery needs and the effects of the earthquakes on governance processes. The cost of reconstruction is based upon prices given for buildings by the GoN. This includes equipment for the buildings, such as search and rescue equipment for the police, computers and furniture, amongst other items. The damage cost is considered 15 percent less than the reconstruction cost. Partially damaged buildings are considered to be 40 percent of the reconstruction cost. All costs include equipment as well as building costs.





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# 21. Disaster Risk Reduction

## Summary

The Post-Disaster Needs Assessment (PDNA) for the Disaster Risk Reduction (DRR) sector is a joint effort of the Government of Nepal's relevant agencies, led by the National Planning Commission (NPC) and the Ministry of Home Affairs (MoHA) and development partners. The DRR sector assessment team undertook consultations with relevant national and local government entities as well as field visits on 31 May 2015 in three affected districts.

The DRR sector assessment has estimated the cost of damages and losses on DRR system assets affected by the 25 April earthquake and its aftershocks. DRR assets consist of search and rescue (SAR), seismological observation networks, hydro-meteorological networks, national and district Emergency Operations Centres (EOCs), and water induced disaster prevention measures. The total cost of damages and losses is NPR 154.88 million with the highest reported damages and losses on SAR related assets. Prior to the earthquakes, investment in DRR assets was relatively low to have adequate disaster preparedness capacity and to respond effectively to the high number of natural multi-hazard risks that Nepal faces.

DRR actions need to be multi-hazard and multi-sectoral, inclusive and accessible in order to be efficient and effective, enhancing a broader and more people-centred preventive approach to disaster risk. It is crucial to take this disaster as an opportunity to rebuild a better, safer and more resilient society by mainstreaming DRR in recovery strategy and encouraging DRR investment with a build back better (BBB) approach. In the recovery and reconstruction phase, it is critical to increase public education and awareness of disaster risk, especially with the increased risk of landslides induced by the earthquakes in the monsoon season (June –September). Noting the limited priority and resources given to DRR prior to the earthquakes, improvements are urgently needed in Nepal's DRR system in the short (six months), medium (two years) and

long (five years) terms to enhance the resilience of the country.

The following priorities are recommended:

Short term:

- Reconstruction of damaged DRR assets and improvements
- Improving preparedness, response, relief and logistics systems
- Strengthening information and communication capacities for relief, response and recovery
- Enhancing multi-hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness

Medium to long term:

- Improving legal and institutional arrangements
- Mainstreaming Disaster Risk Management (DRM) into the development sectors, particularly, housing, private and public infrastructure, social sectors (health and education), and livelihoods
- Improving integration of Climate Change Adaptation (CAA) and DRR into policy guidelines and institutional development.

The total estimated reconstruction needs for DRR is NPR 504.44 million. Based on the BBB concept to further build resilience, a total additional recovery cost of NPR 76.99 million is estimated.

## Pre-Disaster Context and Baseline

The intensity of the 25 April earthquake on Modified Mercalli Intensity (MMI) scale at the fault area is mainly VIII (severe) with a very limited area of IX (Figure 20.1). The salient feature of ground motion records is a low peak value (PGA=164 cm/s/s), small response spectrum at short period (less than 1 second) and very long dominant period (around 4.5 second) compared to that of the events recorded in other areas. The most severe damage occurred mainly in the hilly areas northwest to northeast of Kathmandu Valley. The reported losses as of 9 June 2015 are 8781 dead, 22,303 injured, 6,266 public build-

ings damaged, 798,897 private houses damaged and several cultural heritage buildings destroyed.

**AFTERSHOCKS**

Following the earthquake of 25 April 2015, 327 aftershocks with M>4.0 have occurred until 22 June. Four aftershocks were larger than M6.0 and the largest one of M6.8 (M7.3, USGS) occurred on 12 May, which caused additional casualties of more than 200 dead and 2500 injured. The distribution of aftershocks and their magnitude range is presented in Figure 20.2. The large aftershocks were strong enough to cause further damage to vulnerable structures that had been weakened by the main shock. Aftershocks still continue and attention should be paid to damaged buildings and possible landslide disasters.

**SECONDARY DISASTERS**

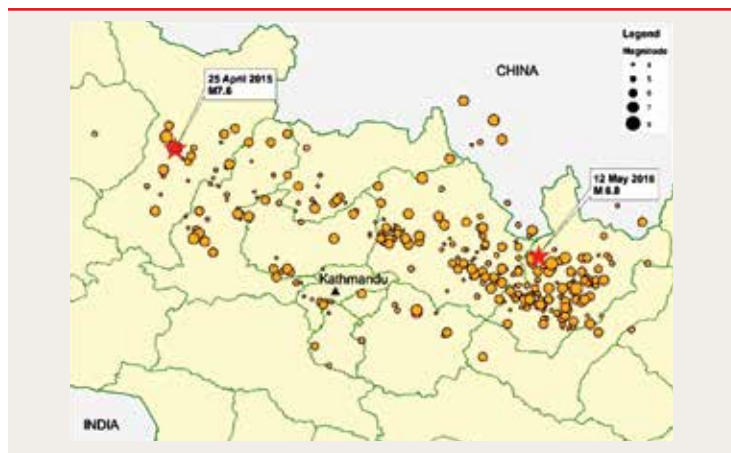
The ground motion of a strong earthquake not only causes direct damage or collapse of buildings but also can trigger geological and/or geotechnical failure, or other phenomena causing secondary disasters. The typical secondary disasters are fire, landslides, soil liquefaction, avalanches, etc. There were only three cases of fire in Kathmandu Valley after the 25 April earthquake. Avalanches and a number of landslides in the mountainous areas were identified by satellite imagery and field survey, and caused fatalities and damages to roads, constraining relief activities.<sup>84</sup> A large landslide on 24 May 2015 buried 25 houses and blocked the Kali Gandaki River. Liquefaction was observed in Kathmandu Valley, without serious consequence. There was an avalanche in Langtang Valley, a popular tourist destination, reportedly claiming more than 400 lives. The numerous landslides in the 14 most-affected districts damaged over 5000 hectares of land.

Key issues relate to the general state of shock caused by the massive scale of the disaster, its high mortality and destruction of several decades' worth of housing stock. Continued seismicity in the country, combined with threat of monsoon related hazards and current status of preparedness and risk reduction, remain significant concerns.

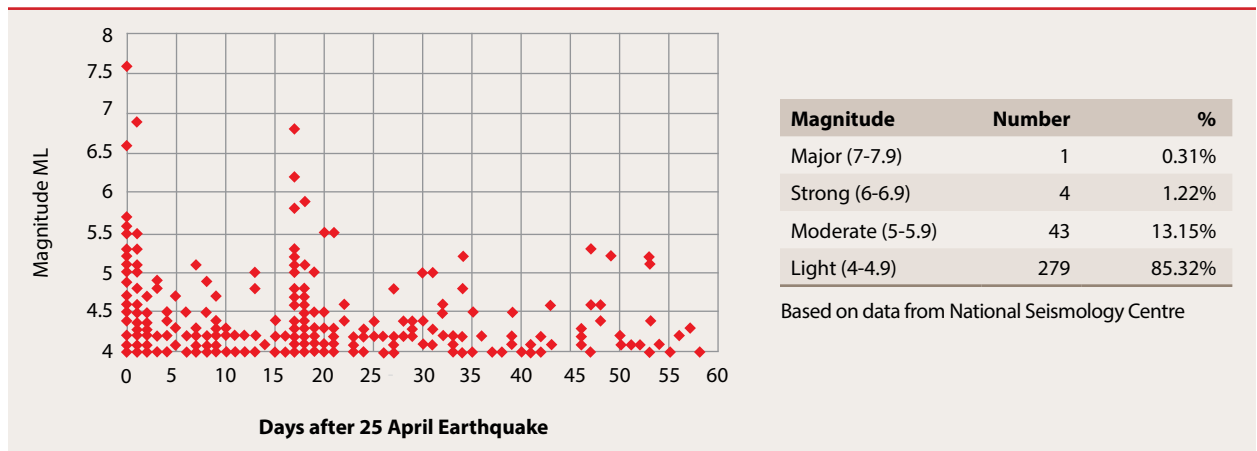
**HAZARD, VULNERABILITY AND RISK PROFILE**

The vulnerability of the population in Nepal is a result of the interplay of low per capita income (\$742), poverty incidence (24 percent) and high rural population (83 percent) where poverty rates

**FIGURE 20.1: SPATIAL DISTRIBUTION OF AFTERSHOCKS AFTER APRIL 25, 2015**



**FIGURE 20.2: TEMPORAL DISTRIBUTION OF AFTERSHOCKS TILL 22 JUNE 2015 (MAGNITUDE>4)**



<sup>84</sup> International Centre for Integrated Mountain Development (ICIMOD), <http://www.icimod.org/?q=18072>



are higher (27 percent)<sup>85</sup>, compounded by the rugged terrain in the middle and high mountains that is home to almost half the total population scattered in settlements, many of which are remote and difficult to access even in normal times. More than 55 percent of the poor rely on agriculture, which is highly dependent on the monsoon and impacted by climate variability.

Nepal's geophysical location in one of the highest seismic risk areas and propensity of flash floods and landslides due to steep, unstable slopes are some of the natural factors that contribute to the country's high vulnerability.

### Earthquakes

Nepal is located in a very high seismic risk area; large parts of the country is Himalayan mountain range, where seismicity predominantly is due to collision of the Indian and Eurasian continental plates. Over the last 100 years, four large earthquakes (in 1934, 1980, 1988 and 2011) preceded the 25 April 2015 Gorkha earthquake. Most of the country has experienced earthquakes with intensities on MMI scale of VIII (Severe), IX (Violent) or X (Extreme).<sup>86</sup>

The impacts of these earthquakes are magnified several-fold due to the high physical vulnerability of traditional (stone and mud) or inadequately designed masonry, or reinforced cement concrete (RCC) framed structures; remoteness; rugged terrain and other societal vulnerabilities that place Nepal 37 out of 172 countries as per Pacific Disaster Center's Global Risk and Vulnerability Assessment.

### Floods

The Tarai plains are affected by riverine floods due to huge sediment loads. The mid hills are prone to flash floods due to high intensity or continuous rainfall, while high mountain areas are at risk from glacial lake and landslide dam outburst floods. The monsoon period from June to September poses the highest flood risk in the country. The impact of floods on lives and livelihoods is enormous – as per DesInventar, in the last three decades alone, over 3.8 million people and 200,000 hectares of crop lands have been affected, resulting in losses of over 3,100 lives NPR 6 billion.

### Landslides

Landslides and slope failures are among the most common hazards in Nepal, due to geography (steep, fragile slopes), triggered by natural causes (earthquakes and heavy or intense rainfall) and human influence (deforestation, unplanned development, cultivation and settlements). The hilly districts of Siwalik, Mahabharat range, mid hills, fore and higher Himalayas are all vulnerable; and the central, eastern and western regions have reported most frequent and severe impacts. In August 2014, a landslide in Jure, Sindhupalchowk killed 156 people and blocked the Sunkoshi River creating a huge lake for 37 days, raising concerns of flooding downstream. Overall, over 4,000 lives and NPR 1 billion have been lost due to landslides in Nepal over the last three decades.

### Droughts

Droughts are very common in hill and mountainous districts in the ecological zones of the far and mid-western regions, and the Tarai ecological zone of the eastern region. Droughts over the previous decade alone have resulted in a production loss of 1.7 million tonnes of food grains, affecting over 12 million people, which is four times more than floods and landslides put together.

### Others

Avalanches, cold waves, windstorms, hailstorms, thunderbolts, epidemics and fires are among the other most significant disasters. Fires, especially in settlements, are among the most reported disasters and resulted in the highest losses (NPR 9 billion in the last three decades), while epidemics have led to over 16,000 deaths, higher than all other disasters put together. The eastern and central regions have reported most losses from fire, and the mid-western region the most deaths due to epidemics.

The records between 1971 and 2010 reveal that climate-related disasters accounted for almost 25 percent of deaths, 84 percent of the population were affected by disasters, and 76 percent suffered economic losses. It is evident that destructive earthquakes occur in Nepal with greater return periods (80 years on average) but have more grave consequences than the frequent disasters such as floods, landslides and droughts. The previous seismic event of comparable magnitude and impact was the 1934 Nepal-Bihar

<sup>85</sup> Nepal in figures, 2012, CBS

<sup>86</sup> National Strategy for Disaster Risk Management, 2009



earthquake which led to liquefaction and severe impacts in Kathmandu Valley.

#### **DISASTER RISK REDUCTION**

##### **SYSTEM IN NEPAL**

The status of the DRR system is elaborated under the five priority actions as envisaged per the National Strategy for Disaster Risk Management (NSDRM), 2009.

##### **Institutional, Legislative and Policy Systems for DRR as National and Local Priority**

The Central Natural Disaster Relief Committee (CNDRC) and the District Disaster Relief Committees (DDRCs) coordinate all post-disaster rescue, relief and response activities at the national and district levels respectively. MoHA is the national focal agency for disaster management. The Department for Fire Service and Disaster Management, recently established under the Ministry of Federal Affairs and Local Development (MoFALD), needs to develop its capacity for effective fire response. Success of integrating DRM into national and sectoral plans, led by the NPC, is still below expectation and suffers from not having a system of providing coherence guidance to other sectors for DRM budget allocations.

The overarching legal instrument is the predominantly relief and response oriented Natural Calamity Relief Act, 1982 (amended in 1989 and 1992). National Climate Change Policy, National Adaptation Programmes of Action (NAPA) and Local Adaptation Plan of Action (LAPA) articulate the integration of Climate Change Adaptation (CCA) into development processes at national and local levels. The Local Self Governance Act, 1999, (LSGA) empowers local bodies to take charge of disaster mitigation and recovery planning and mitigation, while the Building Act (1998), amended in 2007, makes implementation of the National Building Code (NBC) mandatory in all municipalities. The NSDRM, 2009 outlines over 29 activities and builds on the Hyogo Framework of Action (HFA), but its translation into concrete action has been weak.

The Nepal Risk Reduction Consortium (NRRC) was set up in 2009, bringing together key national agencies and international partners to prioritize and implement key activities of the NSDRM in a coordinated manner. A national DRR platform was established in 2009 for better coordination

and information sharing among DRR actors in Nepal. The Disaster Preparedness Network (DP-Net) comprising of most NGOs, international NGOs, international organizations, and UN agencies involved in DRM serves as the secretariat to the national DRR platform.

##### **Identification, Assessment and Monitoring of Disaster Risks and Early Warning Systems**

Earthquakes, floods and precipitation events are monitored through networks managed by National Seismological Centre of the Department of Mines and Geology (DMG) under Ministry of Industry, and the Department of Hydrology and Meteorology (DHM) under Ministry of Science, Technology and Environment. The seismic network comprises 21 short-period seismic stations, seven accelerometer stations and 29 GPS stations. The Birendranagar Regional Seismological Centre at Surkhet records data from nine seismic stations in mid-western and far-western Nepal, while the National Seismological Centre at Kathmandu records data from 12 stations located from Pyuthan to Taplejung.

Early warning systems (EWS) for floods in 12 high-risk areas of the Tarai are largely community-based, while flood warning with a few hours' lead time is provided by DHM based on upstream real-time gauge and precipitation measurements at 16 locations in six river basins (Karnali, Babai, West Rapti, Narayani, Bagmati and Koshi). EWS for Glacial Lake Outburst Floods (GLOF) were put in place for two of the highest risk locations (Tsho Rolpa and Imja), which need further strengthening and better linkages with the community.

Risk assessments have been carried out in a fragmented manner covering parts of the country and addressing particular sectors or hazards, except for the nation-wide Multi-Hazard Risk Assessment completed in 2010. Landslide risks are assessed by agencies under three different ministries –the Department of Mines and Geology, the Department of Soil Conservation and Watershed Management and the Department of Water Induced Disaster Prevention. A three-phase process was initiated to conduct a nation-wide risk assessment through the NRRC, and is currently in the first (stock-taking) phase. Moreover, 265 schools in the Kathmandu Valley and 60 hospitals have also been assessed for

safety. MoHA maintains a database of disaster events through its SAHANA Disaster Information Management System (SAHANA DIMS).

### **Enhanced Preparedness for Effective Response**

The Nepal Army, Nepal Police and the Armed Police Force comprise the first responders to any emergency in the country. They have personnel for search and rescue (SAR) and limited sets for collapsed structures and water SAR. The three security forces have separate divisions for SAR. In case of a large-scale disaster, the government has mechanisms to seek assistance from neighbouring countries and the international community for SAR, in which case the international teams work under the lead of the national forces.

MoHA has set up the National Emergency Operation Centre (NEOC) and regional, district and municipal EOCs, which are currently active in 46 districts. The MoHA's Guidance Note on Disaster Preparedness and Response Planning, 2011, forms the basis for disaster preparedness and response plans formulated in all 75 districts. The Prime Minister's Disaster Relief Fund and MoHA's regular Central Disaster Relief Fund finance disaster response activities, with the provision for establishing similar funds in districts. Preparedness programmes encompass critical areas like education and health. Security forces, humanitarian clusters and communities living in disaster prone districts actively participate in response coordinated by District Disaster Relief Committees (DDRCs). Simulations/mock exercises have been conducted in some districts in 2013, but the national simulation has not yet been conducted.

The National Disaster Response Framework, 2013 (NDRF) outlines the roles and responsibilities for an effective response involving a range of stakeholders from ministries, departments, security forces, diplomatic missions, UN and international agencies, Nepal Red Cross Society (NRCS), non-governmental organizations and professional bodies. It also identifies 49 key actions to be initiated by relevant lead agencies to operationalize the NDRF. Whilst its implementation is noted to be moving well in some areas, it is also lagging behind in others. MoHA has also formulated several related guidelines for disaster response, e.g., dead body management;

relief, civil and military assets; and international military assistance. The NDRF has specified the roles and responsibilities of different line ministries and government agencies. The positioning of relief and response stocks is limited to some agencies like NRCS, some international non-governmental organizations and the UN. Methodologies and capacities exist for Initial Rapid Assessment (IRA), multi-cluster/sector IRA and detailed cluster-specific assessments, and the contextualization of post-disaster needs assessment methodologies and related training is planned.

### **Reduction of Underlying Risk Factors and Policies for Mitigation**

The vulnerability of the population in Nepal is greatly linked to higher incidence of poverty and majority of the population living in rural areas in scattered settlements. This is compounded by the fragile mountainous terrain. This trend however is rapidly changing with a dramatic increase in urban risk with consequent impact on vulnerability patterns.

Legislation, policies and plans for environmental management exist through the Environment Protection Act, 1996, Rules, 1997 and Environment Impact Assessment (EIA) Guidelines. The National Adaptation Programme of Action (NAPA) offers opportunities for integrating DRR. Likewise, sound forest management, soil conservation and watershed management practices contribute to DRR but integration of climate risks into forest and watershed management planning has still not been fully realized and the underlying risks are not addressed during implementation. Despite agriculture being a national priority, prioritization of strategies and actions in agriculture is not adequately informed by comprehensive assessment of climate/disaster risks and impacts, availability of specific weather-based agro-advisories and needed resources. CCA and DRR have not been sufficiently integrated into sectoral plans and budgets.

Structural vulnerability is addressed through the National Building Code, 1994 and Building Act, 2007, but its implementation is restricted to only few municipalities because of limited enforcement capacities of local bodies and low awareness among the population. A retrofitting guideline drafted for the most common construction typologies is pending approval. Safety standards for infrastructure for multi-hazard risks do not exist.

Implementation of the existing national land use policy, is quite weak. A risk-sensitive land use planning process has been recently initiated for the Kathmandu Valley by the Kathmandu Valley Development Authority.

**Information and Knowledge Management: Building a Culture of Safety and Resilience**

MoHA maintains a database of disaster events through its SAHANA DIMS and through the DRR portal, while DesInventar has records of disasters from 1971. Disaster information is shared through the mass media (television, radio), social media, websites and with the districts through the NEOC. Regular awareness campaigns are held annually, on Earthquake Safety Day (commemorating the 1934 earthquake) and the International Day for Disaster Risk Reduction.

Integration of DRR into curricula of primary and secondary schools and universities is advanced and specific DRR education programmes are offered in a few universities. Training conducted for government officials by the Nepal Administrative Staff College and the Local Development Training Academy also integrate disaster/climate risk management. The security forces (Army, Police and Armed Police Force) conduct specific training on disaster management for their personnel.

Although the DRR system is still relatively new, several milestones have been achieved such as formulation of the NSDRM and NDRF, and setting up of the NRRC. Yet, political instability and other pressing priorities have resulted in a number of set-backs – legislation is yet to be enacted, and lack of technical, financial and human resources hinder implementation of initiatives, which are seen in isolation. The NSDRM and the NRRC were attempts to address these lacunae, but have yielded limited success.

**OVERALL ASSESSMENT OF DRR SYSTEM PERFORMANCE**

**National-level Coordination and Response**

Overall response to the current disaster can be taken as a real test of the coordination and response capacity of the government at national and local levels and effectiveness of the tools and systems built for that. NDRF served as a key tool for coordination. Decisions and instructions

from the central government were based on the objectives and scope of NDRF. The first meeting of the Central Disaster Relief Committee (CNDRC) was held two hours after the earthquake on 25 April, with the NEOC providing an initial report to the CNDRC, recommending focus on SAR, life-saving actions and declaration of a state of national calamity. Financial resources from the Prime Minister's Relief Fund were allocated, an appeal for international assistance was made and the government's cluster mechanisms, comprising 11 sectors and co-led by international and UN agencies, was activated.

Critical decisions and activation of response measures were taken under seven hours of the stipulated response time, indicating that NEOC and CNDRC performed their coordination functions well within the timeframe during the first critical hours. Subsequent CNDRC meetings, held regularly on 27 April, 30 April, 3 May, 10 May and 12 May, focused on plans for effective search, rescue and relief related activities such as transit shelters, facilitation of entry of humanitarian assistance into the country and customs clearance procedures.

Key respondents consulted felt that some of the actions undertaken at the national level would have been smoother if the national simulation, planned since 2014, had been conducted. The scenario for the planned simulation though envisages maximum impact in the Kathmandu Valley, including on vital services and lifelines. This disaster has wreaked much greater impact in other rural areas.

**District-level Coordination and Response**

District authorities were overwhelmed with numerous overlapping and changing versions of reports demanded by various central ministries and international humanitarian agencies. Due to systemic capacity gaps existing at the local level to respond to large-scale disasters, Chief District Officers (CDOs) exercised their crisis management roles using their own experience and judgement. The DDRC mechanism started functioning from the second day. DDRCs are the operational mechanism for local coordination, updating on damages and needs, prioritization of response and discussions, and follow-up with various agencies. District consultations revealed that disaster preparedness and response plans were not effectively utilized in the response.

The use of the humanitarian cluster system was highly uneven by the sub-national stakeholders due to unfamiliarity with the procedures. Although under-resourced, the Village Development Committee (VDC) Secretaries were very active and the Ward Citizen Forum (ACF) and social mobilizers played important roles in operational coordination at the village level.

Multiple sources of information coming in from the districts to the centre in the beginning made the damage analysis more complex and decision-making difficult. Field observations indicate confusion over mechanics for selection of recipients for relief and compensation, particularly of those whose houses were damaged by the earthquakes.

#### **Emergency Operation Centres**

The communication network of the EOCs is very important, and it was functional, connecting the central command system to the districts. Where they are established and operational, district EOCs provided the much needed communication system, especially in the immediate aftermath. In the districts where physical locations of the EOCs were impacted because of the earthquakes, alternative arrangements were made using local police offices to serve as the hub for disaster related information. The effectiveness of the district EOC in terms of communication was limited by turnover of trained staff (police), unfamiliarity with SAHANA DIMS and lack of reporting templates. The district EOC's potential for serving as a coordination platform at the lower level was further constrained by limited attention given to information management. Districts visited lack basic systems for information management, including display of crisis management information and public information. From the field visits it was found that there was limited operational relationship between district EOCs and VDCs.

Information flow between NEOC and district EOCs needs substantial improvement in terms of data quality, effectiveness in providing timely information, and the basis for appropriate crisis management decisions at national and sub-national levels. The SAHANA DIMS, tailor-made for such situations, was not utilized. However, the DRR portal was used for dissemination of damage and loss related data.

#### **Search and Rescue**

The trained human resources of the Nepal Army, Nepal Police and Armed Police Force carried out effective SAR operations and saved many lives. Four people trapped under collapsed structures in Kathmandu were rescued by Nepal Police and lives of 16 people were saved by international SAR teams. Execution of 4,236 helicopter flights (by government and private) resulted in rescue of 7,558 persons by air; 4,689 persons were rescued by land. MoHA reported that 22,500 civil servants, 65,059 staff of Nepal Army, 41,776 staff of Nepal Police, 24,775 staff of the Armed Police Force, and 4,000 government health workers and private health workers were mobilized for life-saving actions.

Challenges faced were lack of necessary equipment for location, extrication and initial medical stabilization of victims. SAR assets were also trapped and personnel deployed had to contend with a high number of aftershocks in the immediate seven days while SAR was ongoing. The arrival of international SAR teams, even after the 'golden 24-hour mark' where the survival rate of those buried under debris, was questionable. The earthquake highlighted need for a professional and integrated national SAR capacity to be formed in accordance with the National Strategic Action Plan for Search and Rescue, 2014.

#### **Relief and Humanitarian Assistance**

Emergency relief and humanitarian assistance to the affected population was provided with active support and contribution from over 60 countries, UN and international agencies. Fixed wing and rotary aircraft were also engaged from friendly countries in carrying out numerous sorties to bring relief into the country and to distribute it to the most affected, remote areas. A newly constructed humanitarian staging area, established through WFP with support from UK Aid, at Tribhuvan International Airport (TIA) facilitated the receipt of cargo by air and by truck immediately after the earthquake and distribution around the country could commence quickly. If such a facility had not been in place, it would have taken weeks to improvise a logistics hub. The measures undertaken as part of the Getting Airports Ready for Disasters (GARD) programme in 2011 facilitated the continued functioning of TIA.



The flash appeal in support of response to the earthquake was launched on 29 April 2015 for an estimated US\$415 million (later revised to US\$422 million) to meet critical humanitarian needs for next three months. Till date, US\$130.9 million or 31 percent of the appeal has been mobilized.

Transit shelters were established immediately with official support in Kathmandu, using designated open spaces. Non-food items, particularly tarpaulins, were inadequate with a surge in demand even from those families whose houses were not damaged due to fear of being trapped. Outside Kathmandu, in the initial days, almost all response efforts were based on self-help with many affected families staying close to their damaged houses. Prior investments in warehousing and logistics and prepositioning of relief items was very limited. The 'one door' system for receipt of aid and relief distribution via DDRC was adopted, but in many instances this was not followed. At the sub-national level, demand was articulated as a priority for access to 'normal' government services, restoration of livelihoods and cash grants for self-help transitional shelters. CDOs outside of Kathmandu and MoHA believe that challenging topography, limited road networks and risks of secondary disasters strongly influenced their ability to respond on time.

## DISASTER EFFECTS

### Damages and losses to DRR system assets

Prior to the earthquake, investment in DRR assets was relatively low to respond effectively to potential disasters and to have sufficient disaster preparedness capacity. Total damages to DRR assets is NPR 154.88 million, with

the highest cost reported for SAR-related assets (NPR 95.63 million). Damages to hydro-meteorological stations were NPR 41.8 million and damages to the Department of Water Induced Disaster Prevention were NPR 14.16 million. District level EOCs reported damages of NPR 3.3 million, whereas very limited to no damage to the seismological observation network infrastructure was reported.

The damages and losses data were provided by the relevant government organizations: MoHA, DHM under Ministry of Science, Technology and Environment, Nepal Police, Armed Police Force, and National Seismological Centre (NSC) under the Department of Mines and Geology.

The most-affected districts in terms of DRR assets are Kathmandu, Sindhupalchowk, Chitwan, Nuwakot, Dolakha and Rasuwa. The highest damage was recorded in Kathmandu district, which delivers services to the largest populated area of the country.

Damages to DRR assets mostly include damage to EOC office buildings, hydro-meteorological stations, field offices of the Department of Water Induced Disaster Prevention, police stations dedicated for DRM, and fire stations in Kathmandu and other earthquake-affected districts. The majority of hydro-meteorological stations along critical rivers are manual, the presence of a person to record observations. Due to the earthquakes, many of these stations are not functional, as observers have abandoned their homes and relocated elsewhere. Observations from these stations are crucial for DHM to provide uninterrupted services on flood warnings and potential landslide information.

**TABLE 20.1: ESTIMATES OF DAMAGES AND LOSSES TO DRR ASSETS AND RECONSTRUCTION NEEDS**

Category	Damage and loss (NPR million)
Emergency Operation Centres	3.30
Hydro-meteorological observation networks	41.80
Search and rescue and fire services	95.63
Field office buildings of the Department of Water Induced Disaster Prevention	14.16
Seismic network of National Seismic Centre	0
<b>Total</b>	<b>154.89</b>

Source: Internal reports of MoHA, DHM, Nepal Police, APF and NSC

## DISASTER IMPACTS

### Secondary Disasters

The numerous aftershocks since the 25 April 2015 earthquake with several tremors larger than M6 posed a grave threat to the already existing vulnerable, partially damaged buildings, infrastructure and unstable slopes. The 12 May aftershock resulted in over 200 deaths and more collapsed buildings, particularly in Sindhupalchowk and Dolakha districts. Fresh avalanches were noted on Mount Everest and an aftershock caused a landslide on the Koshi Highway which blocked a section of the road between Bhedetar and Mulghat. On 24 May, cracks triggered by seismic activities led to a massive dry landslide near Baisari, in Myagdi district. A total of 25 houses were buried and a huge volume of debris fell into the Kali Gandaki River forming a natural dam that blocked the river's flow, creating a lake over a mile long, until the river level overtopped the dam and broke through. Already vulnerable areas in at least six districts are now more susceptible to such landslides and flooding.

Initial assessments revealed no increased threat of GLOF. However, detailed assessments are planned, including for the high-risk Tsho Rolpa lake, where some cracks in the moraine dam and seepage downstream (in Imja lake) have to be further investigated. Tsho Rolpa GLOF could potentially affect up to 100 kilometres downstream, threatening the lives of about 10,000 people, their agriculture, livestock, roads, bridges and hydro power projects.

### Local Government Capacities

The impact of the disaster has been severe not just on the affected population, but also on local government institutions. Many VDC office premises have collapsed, and staff have been personally affected. The situation is not very different at the district level, with the district administration similarly struggling to provide necessary services to thousands of affected people.

The massive scale of the destruction wrought by the disaster and the urgency of the proposed interventions pose a huge challenge in the current context when district and local government capacities are already depleted. Coordination of recovery activities and their implementation is most likely to require additional capacities at al-

most all levels.

### Access

Even in normal times, many VDCs in the affected districts are not easily accessible. The earthquakes and ensuing secondary disasters have made access to remote, far-flung communities even more difficult. This lack of access not only hinders provision of services and assistance to the affected communities in such areas, but also poses a challenge for the effective linkages of such communities with markets to buy essential items or sell their produce.

## ISSUES RELATING TO EMERGING RISKS AND VULNERABILITIES

### Institutional Aspects

The existing DRM legislation is response-centric and does not adequately address risk analysis and management. Likewise, the current institutional set-up is yet to drive the risk reduction agenda across a range of ministries, departments and sub-national institutions, and provide specific budgetary allocations for implementing risk reduction actions.

The National Strategy on Disaster Risk Management 2009 has not been fully translated into concrete action and DRR activities have been largely driven by project-based international (external) assistance. Lack of adequate capacities at national and sub-national levels, including human resources, will also adversely impacted DRR activities and the ability to respond at the district level. The most critical issue noted is the urgent need to regulate physical development by integrating disaster risks at the district level as well as at the national level.

### Building Codes

The existing risks and vulnerabilities associated with building construction are linked to several urban trends such as addition of storeys, conversion of building occupancy from residential to commercial/educational/health, increased construction in the periphery of municipalities with feeble by-laws, and high rises on small plots compromising on structural stability. The destruction and damage of almost 800,000 houses and buildings is largely attributable to over 90 percent of buildings being non-engineered-

rural areas have stone with mud mortar as the most common housing typology.

National Building Code (NBC) implementation, approved in 2005, is mandatory in all municipalities as per amendment to Building Act in 2007, but its enforcement is weak due to limited governance capacities, technical and financial resources, shortage of skilled workers and a lack of political commitment. NBC compliant buildings even in severely-affected districts and retrofitted schools were found undamaged, which needs to inform the reconstruction programme. However, NBC implementation has not addressed common rural housing typologies in rural areas. Rural vulnerability is associated with socio-economic factors, NBC guidance, low-skill manpower etc. Unless the reconstruction is regulated through risk-sensitive land use planning, NBC, governed by well-resourced local governments and a skilled workforce, the vulnerabilities could increase, creating a perfect breeding ground for future earthquake disasters.

#### **Land Use and Settlement Planning**

The post-earthquake reconstruction in both urban and rural areas could lead to tremendous pressure on land and natural resources. In addition to a staggering increase in built-up areas in already dense urban centres, it can also accelerate the conversion of agricultural land to built-up in the peripheral region of Kathmandu Valley and the newly declared municipalities; and unplanned settlements along the transport network. This scenario will further increase the exposure of the population and assets to different hazards and decrease the capacity of emergency services in case of a disaster. Rural areas that do not consider risk-sensitive land use planning effectively will be at even higher flood and landslide risks.

#### **Hazard and Risk Mapping and Application**

Risk assessments appear to be fragmented and methodology are not unified that suits a particular demand for application, i.e., for contingency planning and preparedness as well as in mainstreaming DRR into development sectors. Limited studies exist for areas outside Kathmandu. The need for studies about emerging risks such as landslides and the onset of monsoon was not anticipated and many districts rely on local knowledge and reports from security forces. Lim-

ited hospital and school safety assessments and follow-up in addressing structural vulnerabilities is manifested in the damage to over 7,000 schools and 500 health facilities. The actual application of risk assessment studies remains low and, when used, it is for prioritizing response, relief and recovery, not for planning risk reducing measures. Coordination among the ministries still needs improvement on integration of DRR, CRM into critical sectors in practical terms.

#### **Preparedness and Response to Address Monsoon Related Risks**

The on-going initiatives to stabilize slopes and reduce landslide risks have not been sufficient in coverage or scope to address the increased risk of landslides after the April 25 earthquake. Cracks have been observed along slopes in several districts indicating occurrence of landslides even by a lower threshold of rainfall intensity. This situation is compounded by a declining trend of forest cover and high annual soil erosion rates, ranging from 2,700 to 57,000 tonnes per sq. kilometre in the middle mountains. Anticipated El Niño conditions could result in increased variability and higher risk due to high dependence on agriculture and other climate-sensitive natural resources.

#### **Possible Relocation of Populations Most At Risk to Other Regions**

Many of the people living in temporary sites would need to be permanently relocated to new sites. This process needs proper consideration of multi-hazard risks along with availability of suitable livelihoods in new locations. The relocation process should also consider socio-economic vulnerabilities related to land and population needs with special attention to most vulnerable households.

#### **Recovery Needs and Strategy**

Due to the multi-hazard risks that confronts Nepal, it is crucial to rebuild a better, safer and more resilient society by mainstreaming DRR into recovery strategy and encouraging DRR investment with a BBB approach.

The affected communities' current living conditions and unsafe environment exacerbate their exposure to hazards and increase their vulnerabilities. They can be affected by the monsoon and these accumulated impacts can further diminish

any existing coping mechanism. Urban and rural communities will be both impacted, but those already living in poverty and living in marginal areas will suffer the most. In addressing their immediate recovery needs if recovery programmes ignore the importance of incorporating DRR, gains can be negated and pre-disaster vulnerabilities can be recreated or worsened.

As a cross-cutting theme, strengthening the DRR system necessary for resilient recovery is an imperative. Damaged assets, such as early warning systems, EOCs, SAR, logistics and other public infrastructure for efficient and timely emergency response associated with the monsoon and potential major earthquakes, need to be restored urgently. Existing DRR assets need to be up-scaled, performance of the system improved, and coherence and coordination enhanced to prepare sufficiently for future crisis events. Restoration of livelihoods, particularly those that are climate sensitive, need to be risk-informed, such as the application of seasonal variability forecast to agriculture and water resource management.

The post-earthquake recovery should also be used as an opportunity to promote strategic changes in how DRM is planned, organized, coordinated, implemented, scaled-up and sustained in Nepal. With a focus on earthquake-affected areas, the necessary enhancement and clarification of policies and institutional set-up must be supported. There is urgency to conduct multi-hazard risk assessment that can guide construction of safer housing and infrastructure, and identification of safer settlements. With danger still lingering in people's mind, generation of science-based risk information and its dissemination through public awareness and community-based approaches is crucial, particularly in rural communities. Development sectors at risk should be guided by appropriate tools and methodology to plan and apply risk reduction measures.

For all this to happen, the enhancement of risk governance, i.e., policy and institutional capacities at all levels of governance, is important both in the short and long term. Tied up with efforts in the governance sector, risk management capacities must be improved and vertical and horizontal integration be promoted. Based on

these, the Government of Nepal has identified the following priorities:

Short term:

- Reconstruction of damaged DRR assets and improvements
- Improving preparedness, response, relief and logistics systems
- Strengthening information and communication capacities for relief, response and recovery
- Enhancing multi-hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness

Medium to long term:

- Improving legal and institutional arrangements
- Mainstreaming DRM into development sectors, particularly housing and private and public infrastructure, social sectors (health and education) and livelihoods
- Improving integration of CCA and DRR into policy guidelines and institutional development.

The total estimated reconstruction needs for the DRR affected sector is NPR 504.44 million. Based on the BBB concept to further build resilience, a total additional recovery cost of NPR 7,699.57 million is estimated. Consultations among sector experts, representatives of governments, civil society and development partners informed this estimate.

The estimate of reconstruction needs is NPR 504.44 million, with the highest cost of needs in hydro-meteorological stations (NPR 343.43 million). Other needs are as follows: NPR 139.76 million for SAR; NPR 14.16 million for field offices of the Department of Water Induced Disaster Prevention, and NPR 7.1 million for EOCs.

The immediate replacement of lost and damaged assets and scaling-up to a minimum level required for SAR and hydro-meteorological related systems (such as flood forecasting and early warning systems) are urgent, particularly given the probability of continued seismic activities and high possibility of floods and landslides with onset of the monsoon. During the recovery phase, by incorporating BBB principles through automation/telemetry of damaged stations, DHM could also contribute to improved



agro-advisory for climate-informed agriculture practices to safeguard livelihoods.

#### DRR RECOVERY NEEDS

Recovery needs in DRR are to improve performance, scale-up and enhance coherence of the DRR system in Nepal. Six broad categories of activities are recommended.

#### Improving preparedness for response, relief and logistics systems

The main lessons learnt is that investment in preparedness, particularly on life-saving capacities and relief materials, were inadequate. While there have been ongoing initiatives on SAR, establishment of EOCs, warehousing and prepositioning of relief supplies, the effectiveness of response to future disaster events can be enhanced through increased support in these capacities. This will require NPR 4,691.32 million

In the aftermath of a disaster, the affected population needs SAR service, especially within the 'golden 24 hours'. Within the first month, communities will need timely support and access to emergency services such as temporary shelter, food, health, water and sanitation, and protection services. There is also a need for improved capacity of government systems for effective coordination and communication to ensure

proper mobilization of response that delivers services to the most needy. Given the remoteness of many places in the country and the need to access them during SAR services, Nepal needs capacity for remote areas operation and this can be supported by institutionalizing cooperation with the private sector, mutual aid schemes with neighbouring countries and enhancing standby arrangements for crucial airborne capacity for SAR with the UN. While acquisition of dedicated air transport is desirable, this is costly. The establishment of a disaster management training centre can play an instrumental role in strengthening disaster response capacity at national and local levels, further bolstering the capacities at Nepal Army, Armed Police Force and Police for SAR and evacuation.

Likewise, stockpiling of life-saving NFRI such as shelter kits remains very useful in addressing immediate needs of displaced populations within the first 72 hours, before international assistance starts flowing in to the country. This further needs to be complemented with increased warehousing and logistics capacity in selected locations outside Kathmandu. The scaling-up and strengthening of the EOC network across the country, along with human resources development, periodic drills at district level and effective information management capacity, will add to emergency prepared-

**TABLE 20.2: COSTING OF RECOVERY NEEDS**

	Financial year (NPR million)			Total
	2015-16	2016-17	2017-18	
<b>Recovery needs</b>	<b>1,403</b>	<b>2,956</b>	<b>3,341</b>	<b>7,700</b>
Enhancing multi-hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness	105	230	665	1,000
Improving legal and institutional arrangements	59	299	312	670
Improving preparedness, evidence-based response, relief and logistics system, public education	1,061	1,937	1,693	4,691
Strengthening information and communication capacities for relief, response and recovery	112	167	145	423
Improving integration of climate change adaptation and DRR, policy guidelines, institutional development	25	90	185	300
Mainstreaming DRM into development sectors	41	234	341	615
<b>Reconstruction</b>	<b>504</b>	<b>-</b>	<b>-</b>	<b>504</b>
Emergency operation centres	7	-	-	7
Hydro-meteorological observation networks	343	-	-	343
Search & rescue and fire services	140	-	-	140
River/ Flood protection embankments	14	-	-	14
<b>Total</b>	<b>1,907</b>	<b>2,956</b>	<b>3,341</b>	<b>8,204</b>

ness, resulting in improved surveillance, and a co-ordination and command system. Key activities and result areas will include:

### **Preparedness for Response**

- Strengthening and expansion of EOCs to all districts and enhancing community outreach for better preparedness.
- Conducting periodic monsoon forums as a regular forum, integrating scientific information providers such as DHM with the climate sensitive user sectors, to improve preparedness at national and district levels.
- Creation of sustainable national SAR capacity with the Nepal Army, Armed Police Force and Nepal Police through the implementation of programmes designed as per the National Strategic Action Plan on SAR. A gap identified is a lack of air rescue capacity at regional levels across the country so that SAR action is immediate, prompt and effective. This could be achieved through provisioning of an MI-8 helicopter at the regional level with its required level of operation management structure. Provisioning budgets for helicopters may require considerable resources. This could be achieved by embedding it within the SAR strategic plan, managed under the Nepal Army annual budgeting system, or by provisioning a standby contract with some air service provider company/ies for emergency air SAR that could be activated through MoHA (or a regional administration office) in the event of a disaster.
- Strengthening preparedness/response effectiveness and information coordination in districts and communities by leveraging existing technologies such as mobile SMS and local radio stations to engage with communities and facilitate their active participation in response and recovery.
- Community-based disaster preparedness programmes are designed and implemented with the participation and engagement of the community, including women and other disadvantaged groups. Women must be given the opportunity to assume leadership positions in the process.
- Disaster preparedness and contingency plans are prepared or reviewed at community and district levels in consultation with the community, including women and other disadvantaged groups. They participate in mock

drills and are trained so that they have the capacity to reduce the impact of the disaster.

- Standardizing cable and wireless communications (CWC) and use of common messages as part of preparedness and response and the need for a sustained (five year) communications campaigns for risk reduction to all communities, including migrants.

### **Logistics Systems and Relief**

- Enhanced effectiveness of emergency relief through logistics hubs for food stocks, pre-positioned emergency response supplies, emergency telecommunications, stacking shipping containers, and temperature-controlled environment to store special nutritious food, medicines and vaccines to cater to vulnerable groups such as pregnant women, elderly citizens, infants and children. It will also strengthen the four existing government warehouses to become disaster resistant and be able to deliver during an emergency. Two major hubs spread across the Tarai region should also be set up to cover the five development zones. Ten additional smaller hubs spread in hilly and mountainous regions can also be set up in a hub-and-spoke configuration.
- Development of logistics management capacity at district, region and national levels.
- Provisioning of life-saving relief materials such as shelter kits and NFRIs in the hubs.
- Provisioning of a system of having virtual stock of life-saving relief materials.

### **Strengthening Information and Communication Capacities for Relief, Response and Recovery**

At a cost of NPR 423.25 million, priority needs should focus on strengthening and harmonizing the existing DRR portal and SAHANA DMIS with associated disaster databases like DesInventory; and capacity building and training for communications personnel at the national level, including the designated recovery agency.

- Capacity building and trainings on Big Data mining for major events, engaging with leading specialized institutions to create national capacities for mining data from social forums to create and validate data points, and effectiveness of various activities and gauge trajectory of on-going relief and response initiatives to make any mid-course corrections.
- Establish more direct, simple, community-

based information and communication whereby affected people can convey their emerging concerns and at the same time local and national governments can relay information on arrangements being put in place to support the affected people.

- Strengthening the DRR portal and SAHANNA as the emergency preparedness response tools for effective and coordinated actions across national and district level stakeholders in any emergency by institutionalizing them across key ministries and departments and building capacities for their effective use in a sustainable manner. Enhance the ability to systematically record disaster damages and losses as a basis for monitoring DRR outcome trends.
- Strengthening the communications capacity of NEOC, including staffing through trained personnel, noting the huge demand for data and information updates from government agencies by national and international media and the public.
- Creating/strengthening centralized communication capacity at the designated recovery agency focused on all recovery strategies and activities for all stakeholders. Trained personnel would undertake regular communications and outreach to national and international stakeholders, including public entities, private sector, UN and international agencies, international NGOs and the general public. Support for updates through website(s), social media and mass media are envisaged. Ensure that the community, including women and other vulnerable groups, have access to information on services in relation to disaster management such as basic health services, including reproductive and sexual health services, compensations, cash transfers, insurance, social security, credit and employment.

#### **Enhancing multi-hazard Risk Monitoring, Vulnerability Assessment, Risk Information Dissemination and Awareness**

Over the years, several institutions in Nepal have undertaken various types of hazard and vulnerability assessments. However there is a need to harmonize the methodologies, identify and standardize the most appropriate level of

risk and vulnerability information (national strategic maps/detailed maps at district level) and disseminate this information widely to benefit long-term recovery, reconstruction and development planning. Cost of needs identified is NPR 1,000 million.

- To improve technical and human resources capacity of relevant national technical institutions (under Ministry of Industry, Ministry of Science, Technology and Environment, Ministry of Irrigation, Ministry of Agriculture, Ministry of Forests and Soil Conservation) and of local government, including production of geo-referenced risk information complemented by community-based vulnerability and capacity assessment (VCA) to support immediate recovery and reconstruction planning and inform sector programmes, and to monitor hazards and produce/enhance early warning and forecast systems for seismic and hydro-meteorological hazards.
- To assess the potential impacts of multi-hazard exposure on vulnerable groups (children, women, people with disability, elderly, ethnic groups) and ecosystems. This risk-based information is to be used at local level in the affected districts during the immediate recovery and reconstruction before being extended to other parts of the country.
- To improve the quality of risk information products and their nationwide dissemination at all levels by developing partnerships between the government, private sector and non-governmental organizations to implement informed preparedness, prevention and mitigation measures.
- To collect and use gender and sex disaggregated data and involve the community, including women, elderly and the disabled, in articulating and understanding their own risks, vulnerabilities and capacities.

#### **Improving Legal and Institutional Arrangements**

At an estimated cost of NPR 670 million, a broader post-2015 DRM Policy Framework for Nepal will be planned as an entry point for policy support and system development. Promulgating the much-needed DRM Act and related regulations will necessitate a dedicated agency for DRM in Nepal. It is proposed to capacitate

the agency in terms of technical, logistics and administrative aspects, both at national and local levels. After the establishment of the agency, a wide range of development policies and guidelines related to mainstreaming DRM issues may be needed. The initiatives in improving risk governance involve the formulation of legislation and establishment of institutional arrangements required to address the current recovery needs as part of the globally agreed Post-2015 MDG commitment on Sustainable Development Goals. These identified recovery needs will require NPR 210 million.

One of the key areas under DRR is implementation of safer building construction practices. The appropriate building by-laws will be formulated to implement the Risk Sensitive Land Use Plan (RSLUP) in settlements. Compliance to

building codes will be ensured through implementing code compliant manuals, standardization of systems, tools and human resources involved in the construction business (engineers, architects, mid-level technicians, masons, etc.), and expanding the electronic building permit system. Compliance will be further strengthened by implementing a Municipal Information System (MIS). In order to address the existing vulnerabilities of building stock, retrofitting guidelines will be implemented. To implement the above initiatives an amount of NPR 340 million has been proposed.

To address gaps in risk governance, standard operating procedures will be developed and, subsequently, human resources involved will be trained and the capacity of stakeholders will be enhanced on DRM. Local government (DDCs,





municipalities, VDCs and line agencies) are the key implementing hands that will be capacitated with the appropriate skills, tools and techniques to implement recovery needs. National training institutes such as Nepal Administration Staff College, Local Development Training Academy and Council for Technical Education and Vocational Training will be mobilized to train government officials. Involvement of the private sector on current recovery needs as well as on DRM is key, and a national strategy on public-private partnership will be developed.

### **Mainstreaming DRM into Development Sector, Particularly Buildings (private and public) and Livelihoods**

One of the broader areas of the recovery needs is mainstreaming DRR into development sectors with the BBB approach. This is estimated to cost NPR 615 million. The National Building Code is one such tool that incorporates earthquake-resistant design of buildings. This existing building code is however 20 years old and needs to be revised. Similarly, appropriate guidelines related to risk sensitive infrastructure design and construction processes will be developed. A common methodology for preparing RSLUPs to be used in all the settlements will be developed. The RSLUP will be integrated with the land management policy. A building research institute will be set up and institutionalized to address the technological gap with regard to the appropriate technology and building materials required to address the needs of the diverse geographical and ethnic population in Nepal.

DRR mainstreaming initiatives in health and educational buildings will be implemented by integration of DRR into health and education development policies, based on which relevant strategies and action plans will be developed. To implement the above action plans, the institutional framework of the agencies will be reviewed and gaps addressed. As part of the livelihoods sector, a risk profile of the communities will be prepared and appropriate mitigation measures will be implemented. Further, multi-livelihood options in areas such as building construction, agriculture, tourism and micro enterprises will

be developed and implemented.

All above sectoral initiatives will be complemented by a series of capacity development activities at national, local and community levels. Technical skills will be enhanced through existing training institutes as well as proposed institutions such as an Engineering Staff College, Building Research Centres and a dedicated agency for DRM.

### **Improving Integration of Climate Change Adaptation and DRR Policy Guidelines in Institutional Development**

It is critical to address the felt need to integrate CAA and DRR into policy guidelines to ensure climate resilient recovery and reconstruction. This will cost NPR 300 million. The following actions are recommended:

- To improve climate change modelling in the country to define future trends, vulnerability indices, and institutionalize climate risk management and adaptation measures. The dissemination of climate change risk information will be highly important at national and local levels to inform planning and sustainable investments in preparedness, prevention and mitigation.
- To operationalize integration of CCA and DRR in sectoral programming at national and district levels. Support district and local bodies to contextualize their needs and priorities for implementation of measures such as watershed-based approach to address DRR and CCA through planning cycle, especially the District Risk Management Plans and District Disaster Response Plans as well as annual and periodic sectoral plans.
- To demonstrate the benefits of integrated and unified CCA and DRR in at least five demonstration projects at national and community levels. These will be designed and implemented in various sectors (energy, agriculture, flood and landslides risk management) to generate evidence for scaling-up of future integrated interventions.

## **Assessment Methodology**

Data was collected in close collaboration with the key government agencies, and the following means were employed:

- a) Baseline data and information was reviewed, including the Self-Assessment reports for Hyogo Framework of Action, DesInventar data, MOHA DRR Portal, Monitoring networks of hydro-meteorology, seismology.
- b) Templates to collect data on damages (and losses) were shared and filled with support from Department of Hydrology and Meteorology, Department of Water Induced Disaster Prevention, Nepal Police, NEOC, MoHA and cross-checked.
- c) Field visits were made to three affected districts (Nuwakot, Kavrepalanchowk and Kathmandu) to meet key authorities, affected population and discuss performance of the DRR system. Focus Group discussions were held with some of the affected communities.
- d) Consultations with relevant national authorities including the NPC, MoHA and others contributed to the assessment and to identify recovery needs based on the BBB principles building on the on-going and planned interventions and strategies.



# 22. Poverty and Human Development

## Introduction

Although human development (HD) is to a large extent intangible, there are several indicators that can capture relevant dimensions of it, such as income, assets, health, education, inequity, social cohesion, gender inequality, child welfare, human rights, security, and psychological well-being. All of these have been affected by the earthquake, the duration of the negative impact depending on the adoption of a careful approach towards resilient rebuilding, meaningful partnership between the stakeholders, and amount of incremental development assistance. Poverty is one of the most important considerations, because it affects all other aspects of HD. There is a significant proportion of the Nepali population that subsists just above the US\$1.25 line but below US\$2. The vulnerability of this group, especially female-headed families and those with a high-dependency rate is a serious concern. The second immediate effect has been felt in education, especially in the schooling subsector due to the destruction of infrastructure and mental trauma experienced by young students.

This assessment enumerates some of the important indicators, such as poverty rates, relating to HD that prevailed even before the event, both at the national and regional level – and, where possible, for the 19 districts categorized as ‘crisis-hit’ and ‘hit with heavy losses’ in the first section. The second section captures the immediate effects on HD through primary field surveys in some of the severely-affected districts. The last section is devoted to the channels through which poverty rates and HD may be affected in the medium to long term.

## Pre-earthquake Poverty and HD Profile

### BASELINE INDICATORS OF THE 19 AFFECTED DISTRICTS

Focusing on the 19 most-affected districts, some key baseline indicators including the human development index (HDI) suggest that the af-

ected districts had:

- a. HDI comparable to the national average (.490) or significantly higher for three districts in Kathmandu Valley, Kavrepalanchowk and Makawanpur;
- b. Per capita GDP well above the national average.

This presents a rather complex challenge: The recovery plan will need to focus on the affected districts but at the same time demonstrate an understanding that the low HDI districts of Nepal require equal attention, financial and otherwise.

The proportion of out migrants in the total population and, consequently, the share of remittances is significant in predominantly female-headed household income. Therefore, given the uncertainty surrounding the readiness or willingness of migrants who returned home after the earthquake, the longer-term effect on household income may be significant. Labour productivity is also on the high side in these districts, directly contributing to the overall growth rate of the economy. Thus, if livelihoods are not restored quickly, the national growth rate will suffer and, consequently, so will HD.

### POVERTY AND INEQUALITY

The national poverty rate declined steadily from 41.8 percent in 1996 to 2011 to 25.2 percent. While rural poverty declined throughout, urban poverty increased in the latter half of the stated period. The fact that the number of *urban* poor doubled between 1996 and 2011 speaks for itself. As the number of rural poor has fallen, the trend towards ‘urbanization’ of poverty has gathered strength, according to the head-count criterion in Nepal.

There is high variation in poverty rates amongst the different analytical domains of the country. The urban hill region (basically Kathmandu Valley) is the least poor region, with a poverty incidence of just 9 percent. The depth and severity of poverty is also the lowest for this region. Within urban areas, poverty ranges from 9 per-



cent in the urban hills to 22 percent in urban Tarai. Within rural hills, poverty ranges from 16 percent in the Eastern region to 37 percent in the mid and Far Western region. Within rural Tarai, poverty ranges from 21 percent in the Eastern region to 31 percent in the mid and Far Western region. Within each of the development regions except the Eastern, the hills have higher poverty rates than the Tarai.

According to World Bank estimates, “poverty in the districts that have been hardest hit range from among the lowest in the country in urban Kathmandu to among the highest in the mountainous VDCs of Gorkha, closer to the epicentre. Overall, the poverty rate is around 9.7 percent in the urban parts of the affected areas and 26.5 percent in the rural parts. Poverty is deeper – that is, those below the poverty line are further away from the poverty line – in the rural parts of the affected regions than the average poverty depths in the other parts of the country. Using a slightly moderate definition of poverty (twice the poverty line) to take into account the larger concentration of households that are vulnerable to falling back into poverty, 51.7 percent of the population in the urban areas and 66.8 percent in rural areas within the earthquake-affected region are either already poor or at risk of falling into poverty.”

Between 1990 and 2004, the ‘below US\$1.25’ poverty rate declined at an annualized rate of 5.11 percent, while the ‘below US\$2’ poverty rate fell at the rate of 0.9 percent. But, if we take the more recent sub-period of 2004-2011, the numbers are very different: Poverty below the US\$1.25 line declined at 2.8 percent, while poverty below the US\$2 declined at 4.2 percent.

This trend is driven mainly by remittances.

Inequality has been a cause of concern in Nepal – among other things, due to its implications for social cohesion, which is an important aspect of HD. The trends in consumption inequality in Nepal over the three rounds of household surveys conducted in 1996, 2005 and 2011 show that the Gini coefficient based on per capita consumption returned to its 1996 value after a temporary rise in 2003. Urban inequality rose moderately but fell more sharply, although it is higher than rural inequality. The shares of the top and bottom 20 percent also remain more or less unchanged between 1996 and 2011. One can conclude that the trend towards rising inequality witnessed during 1996-2003 was somewhat reversed subsequently, during 2003-2011. Having gone through a decade-long conflict, these are remarkable achievements in poverty and consumption-based inequality reduction. The massive destruction of livelihoods in the affected districts, disruption of basic services, limited access to facilities including relief, are likely to increase inequality, given that the poorer sections of the population have been more severely affected.

#### MULTI-DIMENSIONAL POVERTY INDEX

The Multi-Dimensional Poverty Index (MPI) identifies deprivations across income, education and health, showing the number of people who are multi-dimensionally poor and the number of deprivations that poor households typically have to endure. The latest MPI (.217) showed that 44.2 percent of Nepalis live in acute multi-dimensional poverty. But Nepal’s MPI is now below that of India, Pakistan or Bangladesh.<sup>87</sup> Thus, over five years, Nepal reduced the percent-

**TABLE 22.1: POVERTY AND VULNERABILITY PROFILE OF THE EARTHQUAKE-AFFECTED REGIONS**

Profiles	Affected regions		Relatively unaffected regions
	Urban (including Kathmandu valley)	Rural	
Poverty rate (%)	9.7	26.5	26.5
Poverty gap, FGT(1)x100	2.5	6.7	5.4
Squared poverty gap, FGT(2)x100			
Moderate poor (% below 2xpoverty line)	51.7	66.8	76.1
Food poor (%)	11.3	24.8	24.9

Source: WB Staff calculations based on NLSS III (2010/11), 2015

<sup>87</sup> The MPI in 2010, based on data collected in 2006 was 0.35, significantly higher than the latest figure.

age of MPI poor people by 20.5 percent and reduced the intensity by 5 percent. At the national level, Nepal's progress with MPI is driven by three sub-components: electricity, assets and nutrition. It is widely believed that remittances received from abroad are the primary factor as far as asset accumulation and nutrition status are concerned. Assets have been destroyed by the earthquake and nutrition status is also at risk at the moment. The MPI in the affected districts could seriously deteriorate.

However, within Nepal, the fastest reduction in MPI has been in the western Tarai, where the total number of poor went down from 67 percent to 33 percent in five years. The far-western Tarai also saw a dramatic drop from 81 percent poverty to 50 percent. These are not among the areas that were most severely affected by the earthquake. Therefore, while MPI at

the national level may not alter much, regional variances will widen.

#### MILLENNIUM DEVELOPMENT GOALS

Nepal is known as a success story in MDGs. The following table summarizes the achievements in Goals 1-7, according to the latest report published by the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP).

There is outstanding progress in most of the indicators at the national level, although it should be borne in mind that there are spatial and socio-economic group-based disparities. Nepal achieved its poverty reduction target well before the deadline. There are, however, concerns with gender parity, especially women's enrolment in tertiary education. The disruption of schooling, and the loss of motivation of students to study,

**TABLE 22.2: SELECTED MDG INDICATORS FOR NEPAL**

Goals	Indicators	Achievement (year)
<b>Goal 1: Eradicate extreme poverty and hunger</b>	US\$ 1.25 per day poverty (%)	23.7 (2010)
	Country line poverty (%)	25.2 (2010)
	Underweight children (% under 5 age)	29.1 (2011)
<b>Goal 2: Achieve universal primary education</b>	Primary enrollment ratio (%)	98.5 (2013)
	Reaching last grade (%)	55.3 (2012)
	Primary completion rate (%)	99.8 (2013)
<b>Goal 3: Promote gender equality and empower women</b>	Gender parity index in primary education	1.00 (2012)
	Gender parity index in secondary education	1.06 (2014)
	Gender parity index in tertiary education	0.64 (2011)
<b>Goal 4: Reduce child mortality</b>	Under-5 mortality rate (per 1,000 live births)	41.6 (2012)
	Infant mortality rate (per 1,000 live births)	33.6 (2012)
<b>Goal 5: Improve maternal health</b>	Maternal mortality ratio (per 100,000 live births)	190 (2013)
	Skilled birth attendance (%)	36 (2011)
	Antenatal care (>= 1 visit) (%)	58.3 (2011)
<b>Goal 6: Combat HIV and AIDS, malaria and other diseases</b>	HIV prevalence(% ages 15-49)	0.2 (2013)
	TB incidence rate(per 100,000)	163 (2012)
	TB prevalence rate(per 100,000)	241 (2012)
<b>Goal 7: Ensure environmental sustainability</b>	Forest cover(% land area)	25.4 (2010)
	Protected area(% territorial area)	16.38 (2012)
	CO2 emissions per GDP(kg CO2 per \$1 GDP (PPP))	0.116 (2010)
	Safe drinking water(% population)	88 (2012)
	Basic sanitation(% population)	37 (2012)

Source: Asia-Pacific Regional MDG Report 2014-2015

may affect the ‘reaching final grade’ percentage, which is already on the lower side. Due to the destruction of health facilities and disruption of health services, maternal mortality rate – an area where Nepal made outstanding strides, could be affected negatively.

#### **FINDINGS ON IMMEDIATE HD EFFECT FROM PRIMARY SURVEYS**

The immediate effect of an earthquake on human development is that it makes families homeless, jobless or without a livelihood, vulnerable to food insecurity and diseases, and disrupt the normal education schedule. All of these add up to immense psychological stress, which no scale can measure, but leads to job abandonment and productivity, and income losses.

A primary survey of 408 displaced households was conducted in six severely-affected districts, a month after the April 25 earthquake: Sindhupalchowk, Sindhuli, Gorkha, Kathmandu, Bhaktapur and Lalitpur.<sup>88</sup> Half the respondents were women. The main message that comes through is one of extreme uncertainty about what lies ahead, captured by the diverse nature of responses to all the questions asked. The uncertainty is about life (possibility of the disaster repeating itself), and livelihood. This state of mind is in itself a serious negative effect on one’s perception of well-being.

Overall, 95 percent of the people surveyed received relief, 68.8 percent perceived them as fair, 61 percent went back to their normal occupation, 82 percent wanted to return to their original village (of those who did, only 38.3 percent wanted to settle in a new location in the old village), 19.8 percent received remittances before the quake (of which only 26.6 percent did so after the event), 13.2 percent of migrants returned from their jobs abroad, and the average loss of annual income predicted was 32.8 percent.

Ninety nine per cent of households in Gorkha received relief and 95 percent perceived them

as ‘fair’. Nearly 90 percent were back to their normal occupation (which is mainly subsistence farming). This is in sharp contrast to the response received in Kathmandu district, where only 20 percent described relief distribution as fair and 43.8 percent were able to return to their normal occupation. Lalitpur and Bhaktapur responded similarly to Kathmandu. In Sindhupalchowk, only 25 percent of the people were able to return to their normal occupation. Only around 20 percent of the people “did not want” to go back to their village of origin.

Households that are still unable to return to their original occupation are compelled to adopt different kinds of coping mechanisms after the earthquake. The households of each district are adopting a particular type of coping mechanism which differs by district. The following chart summarizes coping mechanisms. The ‘other’ category includes drawing mainly on personal savings, reflected in significant cash demand from banks.

Nearly 44 percent of the surveyed HHs are coping with relief support, while 31 percent have acquired new debt. HHs in Gorkha, as noted before, have resumed their normal livelihoods, but the income generated from them is clearly insufficient to meet their needs: as a result, they are incurring new debt. The loss due to the earthquakes (house, livestock and other productive assets) differs by district. These numbers should be interpreted jointly with the per capita incomes of the districts. For example, Kathmandu has one of the highest per capita incomes, and the reported average loss due to collapsed/damaged house is NPR 2,574,413, which is several times higher than that in Gorkha (NPR 895,600).

#### **GENDER**

Sindhupalchowk, with nearly 95 percent toilet coverage before the earthquake, was about to be declared an ODF (Open Defecation Free) district. But, about 80 percent of the toilets have

<sup>88</sup> The questions focused on the (a) damage/loss of house, livestock and other assets (b) HH Income (without remittance) (c) migration and remittance (do they receive remittance, if yes, what is the monthly average remittance received, if they received remittance after the earthquake, did the family member who was abroad for employment return after the earthquake, if s/he has returned, how long will s/he stay back: one month, 1-3 months, 3-6 months, > 6 months) (d) relief (food, shelter, others; how long will it sustain them, is the distribution fair or up to their expectations) (e) coping mechanism (resumed normal work or not, if not how are they surviving – relief, debt, community support if any, how much longer before they anticipate going back to their original livelihood) (f) relocation/resettlement (if they wish to go back to their original village/home, if not, what could be the reasons, if yes, would they want to be relocated if such opportunity is provided).

now collapsed. Women's and girls' health and safety will negatively suffer. Likewise, the existing 475 drinking water schemes have collapsed. This will have a direct negative impact on women's and girls' work in the form of increased drudgery as they will have to walk much farther to fetch water. Similarly, in Kavrepalanchowk, 22 VDCs were already designated ODF. The DDC was preparing to declare the entire district as ODF by December 2015. But now most of the drinking water schemes have been damaged. An important dimension of poverty is time poverty, which can be broadly understood in the context of the burden of competing claims on individuals' time that reduce their ability to make unconstrained choices on how they allocate their time, leading, in many instances, to increased work intensity and to tradeoffs among various tasks. Time poverty can exacerbate income poverty in poor households in several ways, and many of these particularly affect women.

Poverty and food insecurity will increase in the aftermath of the earthquake. Dalits, the landless, and female-headed households (FHHs) will face a severe crisis as their coping capacity and scale of resilience are usually very low. It is important to note that in 14 hard-hit districts, the share of FHHs ranges between 21.3 percent (Nuwakot

and Kavre) to 37.2 percent (Gorkha). As the number of single-headed households and FHHs are likely to rise in the aftermath of the earthquake, there should be a special support system to promote their survival and social resilience.

The effect on children has been significant. Four child-focused agencies, Plan International, Save the Children, United Nations Children's Fund, and World Vision International Nepal, are currently undertaking a children's consultation in the 14 most affected districts. Their preliminary findings from Focus Group discussions (FGDs) reveal several effects on children, ranging from concerns like shelter, education, food, hygiene, and access to drinking water, and other issues (unfair distribution, psychosocial support).

In 16 out of 24 FGDs, children groups identified shelter as the first priority issue in the current context and children in five FGDs said it was the second most important issue for them. Major problems relating to shelter listed by children are as follows:

- a. Houses have collapsed and they do not know when new ones will be built;
- b. Houses have developed cracks and they are unable to live inside them;

**TABLE 22.3: COPING MECHANISMS OF HOUSEHOLDS BY DISTRICT**

Coping mechanisms of HHs by district					
	Living with Relief Support	Living with Community Support	Living with debt	Other	Total
Kathmandu	4.00	2.00	7.00	4.00	17.00
	23.53	11.76	41.18	23.53	100.00
Lalitpur	3.00	8.00	5.00	0.00	16.00
	18.75	50.00	31.25	0.00	100.00
Bhaktapur	16.00	17.00	0.00	1.00	34.00
	47.06	50.00	0.00	2.94	100.00
Sindhupalchowk	63.00	4.00	29.00	10.00	106.00
	59.43	3.77	27.36	9.43	100.00
Sindhuli	3.00	1.00	15.00	3.00	22.00
	13.64	4.55	68.18	13.64	100.00
Gorkha	0.00	0.00	7.00	1.00	8.00
	0.00	0.00	87.50	12.50	100.00
<b>Total</b>	<b>89.00</b>	<b>32.00</b>	<b>63.00</b>	<b>19.00</b>	<b>203.00</b>
	<b>43.84</b>	<b>15.76</b>	<b>31.03</b>	<b>9.36</b>	<b>100.00</b>



- c. Their parents have no/not enough money to afford new houses;
- d. Parents are stressed due to lack of shelter and they are not able to pay attention to children's needs; and
- e. Sleeping under the tents is not comfortable.

Children in seven out of 24 FGDs stated that education is the first priority need for them, whereas children in 12 FGDs cited education as the second most important issue. They have lost the motivation and confidence to study as their learning habits have been disrupted. They fear that they might have forgotten what they have learned, which may make it difficult to pass their exams. The extent of damages and losses has been the highest in school education, with the subsector accounting for 88.8 percent of the total damages and losses faced by the entire education sector. The earthquakes and series of continuing aftershocks led to the complete closure of schools and colleges for 37 days (26 April–30 May) in the affected districts, forcing more than five million children and youth to stay out of educational institutions for a significant stretch at a time when the academic year had just started. The standard number of days on which school remains open annually is 220 days, with 190 days for teaching and learning. Therefore, actual physical damage to schools, compounded by the psychological trauma of students, may have a significant impact on all education related HD outcomes.

Among the most common concerns expressed by the children was that there is not enough food for the whole family and they have to depend on neighbours and relief handouts and, because of this, they do not get to eat on time. Hygiene and access to drinking water is another area that was prioritized by children. Out of 24 groups consulted, two groups prioritized it as the second most important problem for them. Issues listed by the children include the lack of toilets, littering of garbage, insufficient water supply, and contaminated water due to damage at the source. Due to the shortage of safe drinking water, children are forced to drink river water due to which they are falling prey to diarrhea.

## Channels of Longer-Term Impact on Poverty and Human Development

Impact on poverty and human development relates to the consequences of the effect in the short, medium and long term. The following channels are most likely to exert a strong influence on how poverty and HD unfolds in the wake of disasters.

### MIGRATION AND REMITTANCES

One of the most important drivers of poverty reduction has been remittances. The following chart provides the share of remittance receiving households, and the share of remittances in total income.<sup>89</sup>

The share of remittance in total income went up significantly between 2004 and 2011 across all income groups but especially in the upper ones. The share of households receiving remittances rose too, but not that sharply. Thus, households that receive remittances have become **increasingly more dependent** on them as their main source of income. If this is not sustained, the income levels of such households take a hit, affecting the poverty rate directly. This will indirectly impact the **growth rate** of the economy by reducing investment in human capital, lowering nutrition/health status and causing a general slowdown in consumer spending.

### LOSS OF PRODUCTIVE ASSETS

The main channel that exacerbates poverty is damage and loss to productive assets. On the one hand, damage or destruction of houses implies the loss of rental income for many households and, on the other, signifies higher rental costs for those households previously living in rented dwellings. Destruction of productive assets such as land, seeds, machineries and working tools implies a loss of wage income as does the drop in economic activities, namely services and tourism as seen in the aftermath of the earthquakes. According to the World Bank, the most likely scenario will be sandwiched between the extremes presented in the table and the earthquakes could end up pushing an additional 2.5-3.5 percent Nepalis below the poverty line. Between 50-70 percent of the total number pushed into poverty by the earthquakes will be from rural Central hills and mountains.

<sup>89</sup> 'Inclusive Economic Growth in Nepal' by Chandan Sapkota, Journal of Poverty Alleviation and International Development, 5(2)

**TABLE 22.4: POVERTY IMPACT UNDER THREE SCENARIOS**

	Baseline no. earthquake scenario 2015	Low impact		Medium impact		High impact	
		Housing and durable assets loss:50%		Housing and durable assets loss:70%		Housing and durable assets loss:100%	
		Annual income loss:35%		Annual income loss:45%		Annual income loss:50%	
		Growth rate in 2015/16:4.5%		Growth rate in 2015/16:4.5%		Growth rate in 2015/16:4%	
		Foreign remittance increase:15%		Foreign remittance increase:5%		Foreign remittance increase:0%	
	% Poor	% Poor	Δ# poor (in '000)	% Poor	Δ# poor (in '000)	% Poor	Δ# poor (in '000)
National	21.2	23.2	561	24	786	24.9	1038
Mountains	35.9	41.1	102	43.8	152	45.1	180
Urban Kathmandu	9.4	12.1	43	13	56	14.6	82
Urban Hills	7.3	7.8	6	7.8	6	7.8	6
Urban Tarai	17.8	18.3	11	18.3	11	18.4	14
Rural Eastern Hills	13	13.7	13	14.1	19	14.2	22
Rural Central Hills	25.8	36.6	280	41.2	395	45.1	500
Rural Western Hills	21.8	24.3	66	25.8	106	27.1	141
Rural Mid and Far Western Hills	32.8	33.9	27	33.9	27	34.1	32
Rural Eastern Tarai	17.9	18.1	7	18.1	7	18.4	17
Rural Central Tarai	19.3	19.3	0	19.3	0	19.8	22
Rural Western Tarai	18.6	18.6	0	18.6	0	19.2	10
Rural Mid and Far Western Tarai	26	26	6	26.3	6	26.6	11

Source: World Bank, 2015

#### HUMAN ASSETS AND ECONOMIC VULNERABILITY INDICES

There is a likely impact on the human asset and economic vulnerability indexes (HAI, EVI, respectively), two of the three criteria required for graduation from being a Least Developed Country and also closely connected to HD. The 17th session (March 23-27, 2015) of the Committee for Development Policy in UN-DESA, announced that for the first time Nepal has met the criteria for graduation, possibly by 2022. Nepal made it to the list mainly due to its remarkable progress in HAI and EVI. The composition of HAI used for the 2015 review is an equally weighted index of percentage of the population undernourished, mortality rate of children under five years of age, gross secondary school enrolment ratio, and adult literacy. For the next triennial, **maternal mortality rate will be added as an additional criterion.**

Thus, while all the pre-existing components will reflect the effect of the earthquakes, an additional channel has been created through which the impact of the earthquakes will have long-term implications for HAI as well as the outcome of the next triennial review scheduled for 2018. It could be useful to identify affected women at different stages of their pregnancies and ensure that they receive adequate care to give safe birth.

The earthquakes also have implications for the Economic Vulnerability Index (EVI). Nepal had achieved the benchmark level according to the March 2015 review. The EVI comprises two sub-indices, namely exposure and shock. The shock sub-index, in turn, includes three components, namely export instability, victims of natural disasters, and instability of agriculture. All three are likely to receive at least a temporary setback.







# 23. Macroeconomic Impact Assessment

## Summary

Over the past decade, Nepal has been performing reasonably well on the macroeconomic front. Growth averaged 4.1 percent (basic prices) between 2005 and 2014. Inflation remained in single digits for most of the decade, with the peg of the Nepalese rupee to the Indian rupee providing a stable nominal anchor. Fiscal balances remained sustainable owing to robust and sustained revenue growth and modest spending (particularly on capital outlays). Nepal's balances, both current account (CA) and reserves, remained equally healthy, owing to large and fast-growing remittance inflows that now amount to over a quarter of gross domestic product (GDP) and have allowed Nepal to finance its large trade deficit.

Following the successful election of the second Constituent Assembly, Nepal had begun gearing up for a higher trajectory of economic growth after decades of policy uncertainty. Over the past year, it made a transformative leap in the energy sector by signing a historic power trade agreement with India and contracts to develop mammoth hydro-electric plants that would put the country on a course to increase electricity generation ten-fold in a decade. The country was pursuing the next generation of economic reforms, enacting or revising several dozens of policies, acts and regulations. Nepal was also on a firm path to achieving many of the Millennium Development Goals by the end of this year, including the target of halving absolute poverty. For the first time in 2015, in the UN's triennial review, Nepal met the required criteria of graduating from its status as a Least Developed Country (LDC), possibly by 2022. Although the earthquakes have slowed down the momentum of progress on these fronts, this need not be irrecoverable over the next couple of years if immediate concerns are met. Most importantly, these are to restore the productive means of livelihood for millions of women and men in ag-

riculture, services and industry; ensure that the revenue base for the functioning of the state is not weakened; that there are macro-prudential preparations for the likely second-order consequences of the direct impacts on the economy; and that the Nepali people's resilience in the face of growing vulnerabilities is enhanced.

## GDP GROWTH

### Pre-earthquake

In recent years, growth has been driven mainly by the services sector and, to a lesser extent, agriculture, with performance in the former supported by remittance inflows that have fuelled consumption-led growth, and the latter determined by weather patterns. By contrast, industrial sector growth has remained lacklustre. In FY2014, overall growth at basic prices reached 5.1 percent,<sup>90</sup> reflecting: (i) a base effect after a disappointing performance in FY2013 (3.8 percent), and (ii) positive developments in agriculture and services (Figure 23.1). Prior to the earthquakes, the economy was projected to grow at 4.6 percent in FY2015, with the slight deceleration relative to FY2014 on account of lower growth in agricultural output as a result of delayed monsoon.

### Post-earthquake

The earthquakes have further sharpened the rate of decelerated growth from the pre-earthquake growth estimate of 4.6 percent. Post-disaster preliminary estimates show that the impact of the earthquakes is expected to wipe off over 1.5 percentage points off GDP growth rate. The exodus of people from Kathmandu Valley<sup>91</sup> immediately after the disaster, which is the main consumption centre; general population shifting to saving mode as compared to earlier conspicuous consumption; loss of income from all three sectors (agriculture, industry and service sectors); low absorption capacity of public expenditure; mora-

<sup>90</sup> At market prices, GDP growth in FY2014 was 5.4 percent and 4.1 percent in FY2013. Pre-earthquake GDP growth at market prices was projected at 5 percent, which was revised down to 3.4 percent after the earthquakes.

<sup>91</sup> An estimated 1.2 million people have moved to safer areas and/or to rebuild their houses in affected areas immediately after the earthquakes.

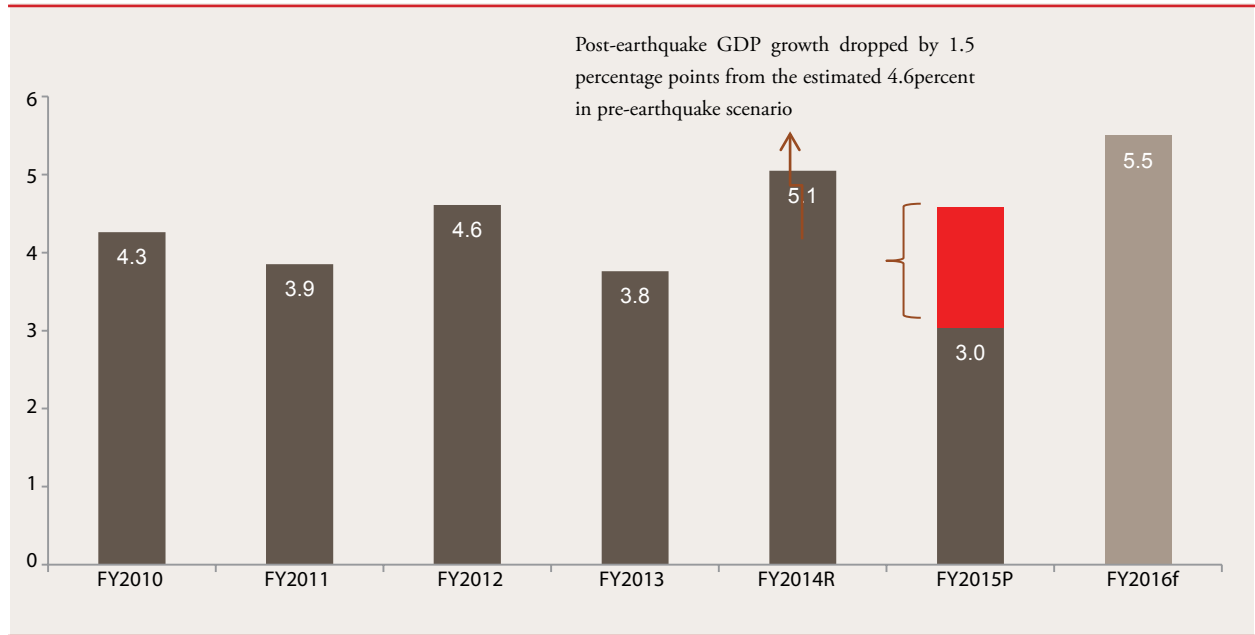


**TABLE 23.1: MACROECONOMIC INDICATORS<sup>92</sup>**

	FY2014 (actual)	FY2015 (pre-quake)	(FY2015 post-quake revised estimate)	FY2016 (projected)
<b>Output and prices</b>				
GDP (constant, basic price, NPR million)	669,980 (US\$6836.53)	700,667 (US\$7113.37)	690,349 (US\$7008.62)	728,318 (US\$7283.18)
GDP growth rate (percent) (basic prices)	5.05	4.58	3.04	5.50
GDP (current, basic prices, NPR million)	1,736,022 (US\$17714.51)	1,924,705 (US\$19540.15)	1,893,994 (US\$19228.37)	
GDP (current market prices, NPR million)	1,941,624 (US\$19812.49)	2,161,175 (US\$21940.86)	2,124,650 (US\$21570.05)	2,422,101 (US\$24221.01)
CPI inflation (percent)	9.1	8.0	7.5	8.5
<b>Fiscal indicators</b>				
Total revenue (NPR million)	356,840 (US\$3641.22)	422,900 (US\$4293.40)	390,000 (US\$3959.39)	460,810 (US\$4608.10)
Tax revenue (NPR million)	311,800 (US\$3181.63)	374,710 (US\$3804.16)	349,000 (US\$3542.15)	412,310 (US\$4123.10)
Non tax revenue (NPR million)	45,040 (US\$459.59)	48,190 (US\$489.23)	41,000 (US\$416.24)	48,500 (US\$485)
Expenditures (NPR million)	434,420 (US\$443.06)	618,000 (US\$6274.11)	494,000 (US\$5015.23)	840,000 (US\$8400)
<b>Money and credit</b>				
Broad money (NPR million)	1,565,970 (US\$15979.29)	1,815,755 (US\$18434.06)	1,816,520 (US\$18441.82)	2,143,490 (US\$21434.90)
Growth rate (percent)	19.1	16.0	16.0	18.0
Private sector credit (NPR million)	1,150,825 (US\$11743.11)	1,349,100 (US\$13696.45)	1,335,120 (US\$13554.52)	1,588,790 (US\$15887.90)
Growth rate (percent)	18.3	18.0	16.0	19.0
<b>External sector</b>				
Exports (million NPR)	100,960 (US\$1030.20)		94,900 (US\$963.45)	95,850 (US\$958.50)
Growth rate (percent)	17.4		(6.0)	1.0
Imports (NPR million)	696,370 (US\$7105.82)		752,710 (US\$7641.73)	889,960 (US\$8899.60)
Growth rate (percent)	27.2		8.1	18.2
Grants and loans (NPR million)	69,650 (US\$710.71)		62,860 (US\$638.17)	108,730 (US\$1087.30)
Growth rate (percent)	45.5		(9.7)	73.0
Remittances (NPR million)	543,300 (US\$554.39)		589,470 (US\$5984.47)	627,790 (US\$6277.90)
Growth rate (percent)	25.0		8.5	6.5
<b>Balance of Payments (NPR million)</b>	<b>127,130 (US\$1297.24)</b>		<b>71,380 (US\$724.67)</b>	<b>35,260 (US\$352.60)</b>

<sup>92</sup> Exchange rate used in this section is as follows: US\$1=NPR98 for FY2014; US\$1= NPR98.47 for FY2015 and US\$1=NPR100 for FY2016

**FIGURE 23.1: GDP GROWTH (BASIC PRICES)**



Source: CBS;

Note 1: R (Revised); P (Projected); f (forecast)

torium by the government on building construction; and dearth of a skilled workforce available for reconstruction and rehabilitation activities for the remaining part of the fiscal year are few identified channels that will contribute to lower GDP growth during the remaining fiscal year. The services sector contributes the most to GDP growth (Figure 23.2). Furthermore, standard national accounts do not yet value the size of the household ‘care economy’, traditionally largely upheld by women in Nepal. However, women’s role in the economy is increasing over the years – the share of women’s paid employment in the non-agricultural sector has more than doubled, from just under 19.9 percent in 2009 to 44.8 percent in 2011. Amidst growing migration of men of working age, the share of women’s paid and unpaid work is only likely to grow in the aftermath of the earthquakes.

**AGRICULTURE**

**Pre-earthquake**

The agriculture sector accounts for about one-third of GDP and is an important driver of

**Economic Impacts of the Reconstruction (Preliminary Findings)**

Preliminary projections of the ‘general equilibrium’ effects of reconstruction using the National Planning Commission’s Computable General Equilibrium (CGE) model for Nepal<sup>93</sup> shows that reconstruction will not merely be about building infrastructure, but will also alter the structure of the economy. Real Gross National Income (GNI) will increase because of international transfers; real GDP increases because of the ‘multiplier’ effect of the additional income being spent in the country. There will be reallocation of resources, especially into construction, inducing a transfer of the factors of production away from other sectors by raising their wage and rent. Consequently, the cost of production in other sectors, especially tradables, will rise, possibly hurting export competitiveness. However, modelling results indicate that the private sector will acquire additional capital stock during reconstruction which can help sustain modest growth beyond this phase.

<sup>93</sup> The Computable General Equilibrium (CGE) model under development at the National Planning Commission (NPC) is titled General Equilibrium Model for Nepal and the World (GEMNW).

economic growth. The timing and adequacy of monsoon rains and agricultural inputs, including fertilizers, determine agricultural output. Its growth averaged 3 percent in the last five years. In the first half of FY2015, agricultural output was affected by the delayed as well as subnormal (winter) monsoon and flooding in various parts of the country. Paddy production contracted by 5.1 percent compared to 2014 and wheat output faced a similar fate. Maize output was reduced by 6 percent, which further dampened the already poor performance of the agriculture sector. As a result, agriculture growth was expected to be reduced to 2.2 percent in FY2015, compared to 2.9 percent in FY2014.

**Post-earthquake**

The agriculture sector, especially livestock, has taken a direct hit. Several factors had already brought down the agriculture sector’s performance, but it is the loss of livestock that has further lowered overall growth in the sector after the earthquakes. Livestock accounts for over 23 percent of value-added in agriculture. The loss of over 17,000 cattle and about 40,000 smaller, domesticated animals has resulted in the revision

of the projected growth in agriculture from 2.2 percent to 1.9 percent this year. The estimated gross value added (GVA)<sup>94</sup> losses in the agriculture sector in the final quarter of this fiscal year are NPR2334.45 million (US\$23.7 million). Damages in this sector have affected at least one million households, those managed by elderly people and women suffering the most. Additionally, women who produce 60 percent of the crops and manage 75 percent of the livestock will be the hardest hit.

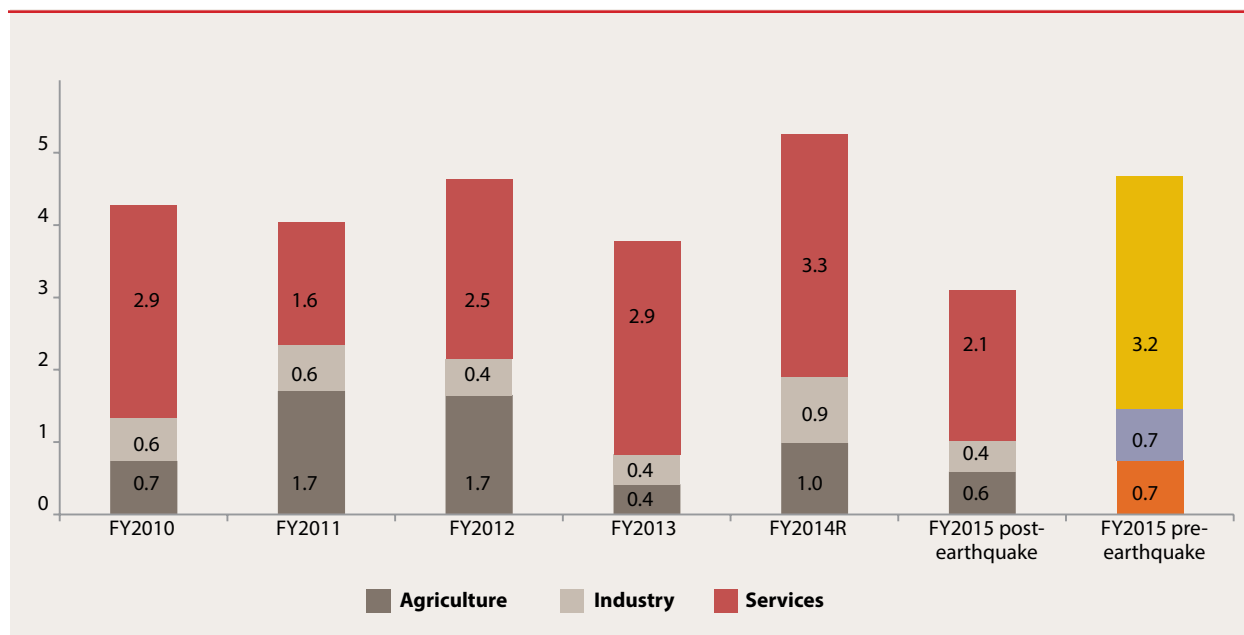
With the El Niño shadow over South Asia, destroyed cultivatable land and displaced rural workforce, slow replacement rate of livestock and no other subsectors (within the agriculture sector) that can quickly fill the loss in the short run, contribution from the agriculture sector is expected to be below its potential going into FY2016.

**INDUSTRY**

**Pre-earthquake**

Industrial sector growth rate in FY2014 had signalled hope of this sector’s rebound and contribution to the economy. Performance of their-

**FIGURE 23.2: CONTRIBUTIONS TO GDP GROWTH (BASIC PRICES)**



Source: CBS

<sup>94</sup> Gross output is the total value of all goods and services produced during the accountancy period (at basic prices). Intermediate consumption is the total value of goods and services consumed as inputs by production processes (at purchasers’ prices). Gross value added (GVA) is the difference between gross output and intermediate consumption. Finally, GDP is equal to GVA, plus taxes, minus subsidies.

dustry sector – which accounts for about 15.2 percent of GDP – has been lackluster due to the persistent, binding supply-side constraints. However, in FY2014, industrial sector growth rate was 6.2 percent and much of this encouraging upswing was channelled from three sub-sectors – mining and quarry (growth rate of 5.3 percent), manufacturing (growth rate of 6.3 percent), and construction (growth rate of 7.1 percent). Improving investment climate and political stability, investments in hydro power starting to translate into expanded construction activities and growing consumption helped increase manufacturing output.

### Post-earthquake

Industrial sector recovery has been halted. The earthquakes have shaken industrial sector output, which is expected to grow by only 2.6 percent in the remaining fiscal year. The estimated GVA losses (in the last quarter of FY2015) are NPR6195.65 million (US\$62.9 million) – of which manufacturing sector GVA losses are NPR2649.65 million (US\$26.9 million), and of the construction subsector NPR3142.15 million (US\$31.9 million).

Although no overall heavy damage to the country's manufacturing base was reported, the sudden leave of absence by workers going home to affected districts, contraction in consumption and general move of population to saving mode from earlier conspicuous consumption, disproportionately high production during the fourth quarter and its cessation leading to income loss were factors that have led to the slowdown in the manufacturing sector. In addition, many manufacturing units, other than those producing Corrugated Galvanized Iron (CGI) sheets and steel rods, have reported under-utilization of capacity. Moreover, in the 14 most-affected districts, a large share of micro enterprises are households which that suffered significant damage or have collapsed completely.

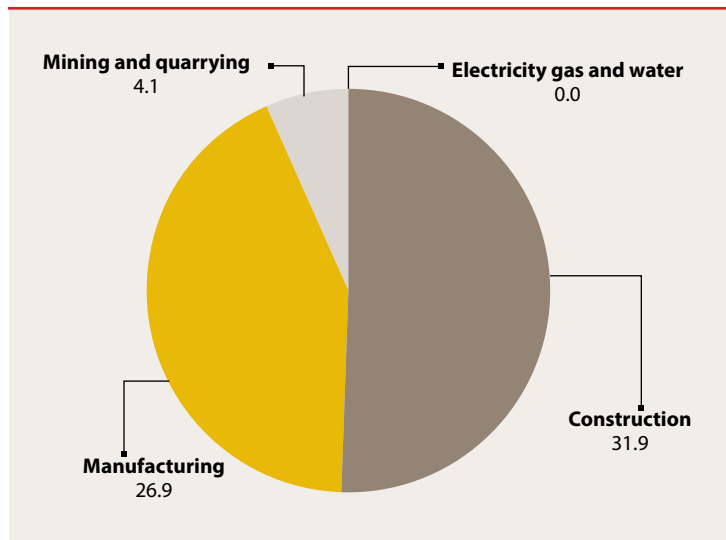
In the **construction subsector**, the government's moratorium on housing construction, till further notice, contributed to the subsector's contraction. Construction had started to pick up in FY2014 after two consecutive years of weak performance. Renewed financial sector health, together with strengthened supervi-

sion by the NRB, boosted residential lending and higher levels of public capital expenditure, thereby contributing to the recovery in infrastructure construction. However, in the immediate aftermath of the earthquakes, private construction has slowed down drastically. Though large public programmes at the districts are unaffected by the earthquake, overall construction is expected to slow down. The cessation of construction activities in 14 districts has lowered this sector's growth rate to 3.6 percent from the projected estimate of 5.9 percent growth (pre-earthquake). Compared to the growth rate of 7.1 percent achieved in FY2014, the sector's deceleration is significant. In the following year (FY2016), however, labour demand for demolition, clearing of debris, and reconstruction of destroyed and damaged dwellings and other physical infrastructure will grow. This will increase demand for and earnings of skilled and unskilled labour in ancillary industries such as manufacturing and transport. Recovery also represents a short-term opportunity to kick-start and restore rural livelihoods as well as promote women's economic empowerment.

The **electricity subsector** will face a significant challenge in the medium term, though there has been no notable drop in production of power in the short term. Nearly 115 MW of hydro power facilities have sustained damage but increased generation from undamaged power plants assisted in filling the gap. All transmission facilities, including 42 substations and 57 transmission lines, are in operation with little disruption of services. About 800 kilometres of distribution lines at different voltage levels and 365 transformers of different capacity (from 15 to 300 kVA) have been damaged and are out of service. Losses are estimated to be more than NPR2955 million (US\$30 million) in power sales revenues for independent power producers (IPPs) and about NPR95.55 million (US\$0.97 million) for the government in royalty payments by Nepal Electricity Authority (NEA). More importantly, increase in load shedding is almost certain as a result of significant delays in the completion of power projects, because approximately 1,000 MW of hydro power projects under construction owned by IPPs and NEA have been partially damaged.



**FIGURE 23.3: ESTIMATED GROSS VALUE ADDED LOSS IN INDUSTRY SECTOR (US\$ MILLION)**



Source: CBS

**SERVICES**

**Pre-earthquake**

Growth rides on service sector performance. The service sector’s growth has contributed to overall performance of the economy and has averaged 5.3 percent per annum (FY2010-2014). The anticipated service sector growth rate in FY2015 was 6 percent. Remittances-backed consumption demand is the main driver of services growth. Wholesale and retail trade; hotels and restaurants; transport, storage and communication; public administration and defence; education; health and social work; and other community, social and personal activities were all projected to grow by over 5 percent in FY2015.

**Post-earthquake**

Weakened service sector performance will drag down overall GDP growth. The disruptions caused by the earthquakes have been the most severe on service activities. Overall, services growth is estimated to decline by 2.5 percentage points to 3.9 percent in FY2015 (compared

to 6.3 percent in FY2014). Losses in three sub-sectors (wholesale and retail; real estate, renting and business activities; and transport, storage and communications) account for 83 percent of service sector losses. The total GVA losses are estimated to be NPR22753.5 million (US\$231 million) for the rest of FY2015.

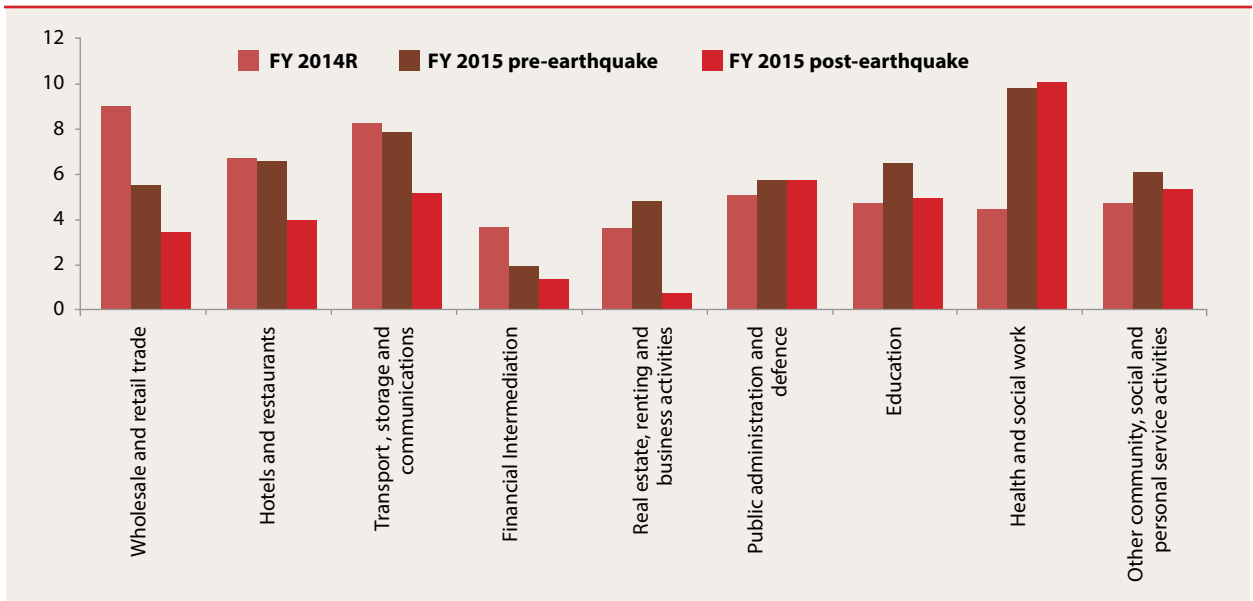
**Wholesale and retail subsector** drop is the largest in the past five years. The earthquakes have shaved off 2.2 percentage points of the anticipated growth rate (of 5.6 percent). This is largely due to the sharp drop in retail activities in the major demand centres, decrease in agricultural production and a slowdown in imports. Total production losses of NPR51909.5 million (US\$527 million) did not enter the market, the margins of which are the net losses to the subsector. The total estimated GVA losses are NPR5791.8 million (US\$58.8 million) for the final quarter of FY2015.

The **real estate subsector** took the largest hit. Real estate, renting and business activities are expected to see the steepest decline after the earthquakes. With massive destruction of owner-occupied dwellings,<sup>95</sup> worth over NPR295.5 billion (US\$3 billion), flow arising from this sector has been particularly hard hit. Its growth is expected to drop by 4.1 percentage points to 0.8 percent, largely due to substantially lower land and rent related transactions (including buying, selling, renting and operation of self-owned or leased real estate; and renting of machinery, equipment and personal and household goods) arising from the large-scale damage to land and property. The total GVA losses are about one-third of service sector losses, or NPR 7062.45 million (US\$71.7 million).

Transport disruptions further slow the service sector’s performance. Transport, storage and communication activities are estimated to decrease by 3.1 percentage points to 5.2 percent due to

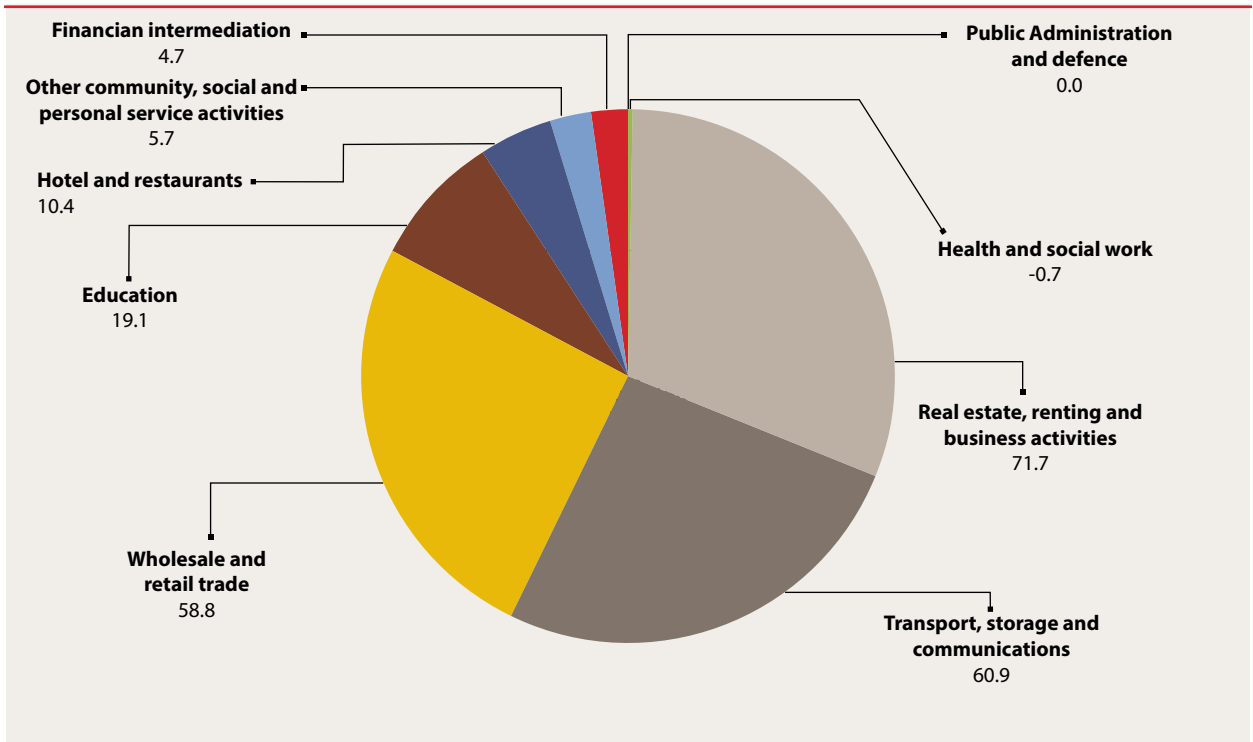
<sup>95</sup> The System of National Accounts (SNA) 1993 defines services of owner-occupied dwellings as ‘own household unincorporated enterprises that produce housing services for their own consumption.’ These are included within the production boundary of the SNA.

**FIGURE 23.4: SERVICES SUBSECTORAL GROWTH**



Source: CBS

**FIGURE 23.5: ESTIMATED GROSS VALUE ADDED LOSS IN SERVICES SECTOR (US\$ MILLION)**



Source: CBS

slowdown in land and air transport. Mechanized as well as non-mechanized transport activities slowed down drastically due to the exodus of drivers and passengers from the main demand centres, including Kathmandu Valley. The frequency of air transport, both domestic and foreign, is also reduced. The estimated GVA losses are NPR5998.65 million (US\$60.9 million).

The **hotel and restaurant subsector** is expected to rebound partially by the next tourist season. Hotel and restaurant business growth is projected to decline by 2.8 percentage points to 4 percent following the earthquakes as tourist arrivals have drastically reduced, domestic tourism has receded, and some hotels and restaurants have reported partial or full shut down of operations due to physical damage. With relief personnel temporarily filling empty hotel rooms, the impact on the subsector has somewhat lessened.<sup>96</sup> However, given that the tourism sector has sustained significant physical damages in the affected districts, it is expected to suffer major economic losses over the next two to three years. It is also important to note that the overall impact of the earthquakes on the tourism sector goes beyond the 14 affected districts and has affected well-known tourism destinations like Chitwan and Pokhara. Other nations which have experienced a similar disaster, have generally taken several years to recover fully with regards to tourist arrivals. As a result, in the medium term, the tourism sector is expected to suffer losses of about NPR59100 million (US\$600 million).

Losses in the education subsector are more psychological than financial, but damages are substantial. Most children are out of school and with the monsoon, the disruption to schooling and its impact on development is expected to be far-reaching. Disruptions to educational services provided by government, corporations and non-profit institutions, and physical damage to their assets will likely lower education subsector growth by 1.2 percentage points to 5 percent in FY2015. The estimated GVA losses are NPR1881.35 million (US\$19.1 million).<sup>97</sup> However, the total damages and losses beyond

FY2015 in the education subsector is estimated to be more than NPR30830.5 million (US\$313 million). As the public sector accounts for 80 percent of these damages and losses, it will certainly put significant fiscal pressure on the government in the medium term.

Financial intermediation loss is lower than expected for now, though its full impact will unfold over time. The disruptions to banking and insurance transactions in the affected districts will likely lower financial intermediation growth by 2.3 percentage points to 1.4 percent in FY2015.<sup>98</sup> The operational disturbances in financial infrastructure were short-lived in the earthquake-affected areas. However, the portfolios of micro-finance institutions (MFIs) and cooperatives are likely to be most severely impacted as low income people in rural areas have lost lives and livelihoods. Many borrowers are likely to face a Catch-22 situation: they have lost livelihoods and their income stream has been disrupted; they require loans to rebuild livelihoods; but their lack of stable source of income may be grounds for credit providers not to extend loans. Additionally, the damages and economic disruption could deteriorate the asset quality of the loan portfolios of banks and financial institutions (BFIs) through: (i) damage or disruption to otherwise viable businesses, especially medium, small and micro enterprises (MSMEs), which may need to restructure their debts and will need additional finance to repair damages; (ii) damage to uninsured real estate collateral (under-insurance is widespread and weak administration is leading to claims being denied); and (iii) contagion to BFIs from losses in the microfinance sector. Therefore, the likely losses are expected to be much higher, in the range of NPR25610 million (US\$260 million), in the medium term.

#### PER CAPITA INCOME

Per capita GDP decreased by NPR2319 (US\$23) compared to the no-earthquake scenario (in which case per capita income would have been NPR77311 (US\$785)). Accordingly, real per capita income increased by 3.6 percent.<sup>99</sup>

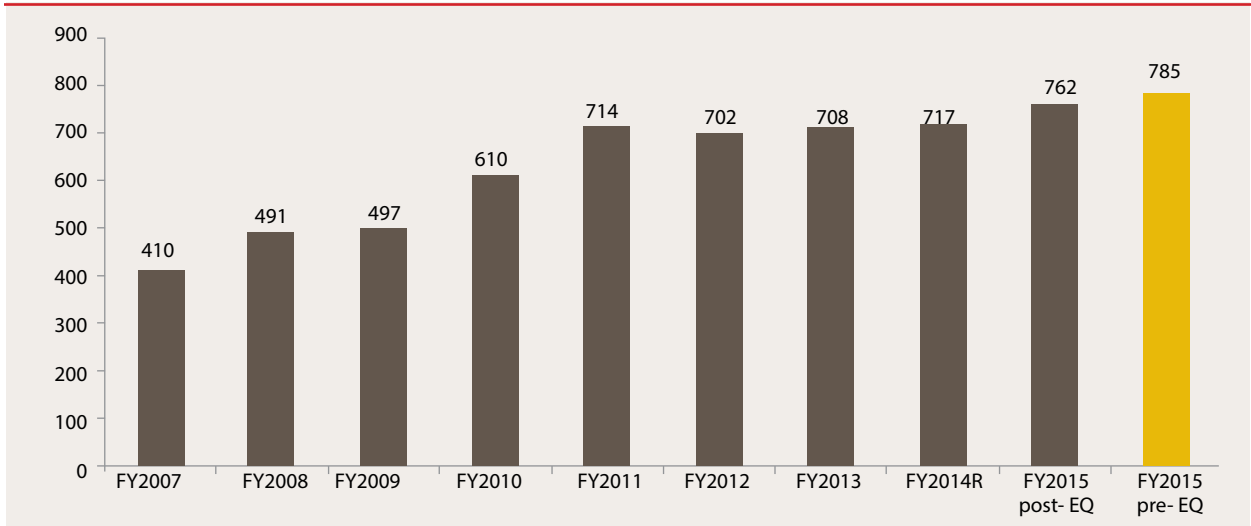
<sup>96</sup> The estimated GVA loss is US\$10.4 million for the final quarter of FY2015.

<sup>97</sup> This also factors in the agreement reached between the government and private schools to charge only half a month's fee.

<sup>98</sup> The estimated GVA losses are US\$4.7 million.

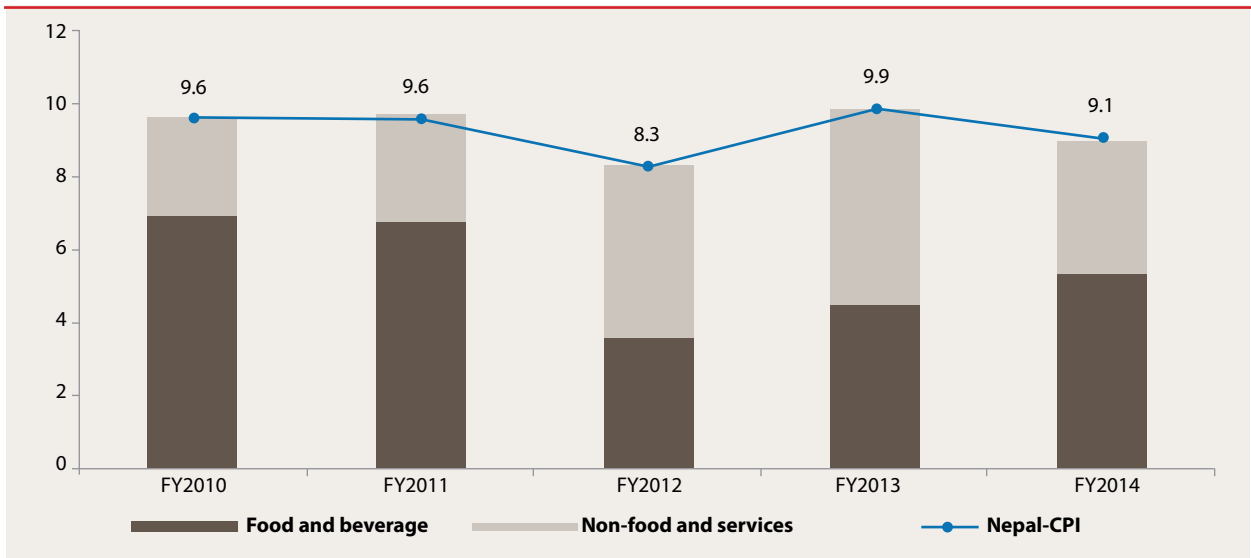
<sup>99</sup> Growth rate of real per capita income in local currency unit

**FIGURE 23.6: NOMINAL PER CAPITA GDP (US\$)**



Source: CBS

**FIGURE 23.7: CONTRIBUTIONS TO INFLATION (PERCENTAGE POINTS)**



Source: NRB

**INFLATION**

**Pre-earthquake**

Inflation was slowing down significantly in FY2015 after several years of persistent high inflation. Overall inflation (year-on-year average) declined to 9.1 percent in FY2014 from 9.9 percent the year before, driven mostly by food prices, which rose by 11.6 percent, and the evolution of prices in India. In the first nine months of FY2015 (pre-earthquake), average inflation had slowed to 7.2 percent (year-on-year).

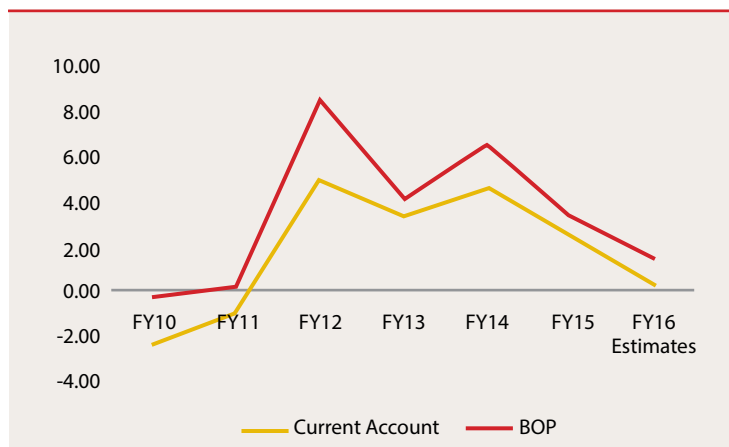
The price moderation, despite being at elevated levels, is mainly due to substantially lower non-food inflation aided by lower fuel prices, but a modest increase in food prices.

**Post-earthquake**

Inflation is on the rise after the earthquakes as a result of supply-side constraints and anti-competitive behaviour. Food inflation is expected to be in double digits. Low agricultural harvest as well as losses caused by the earthquakes, supply disruptions and anti-competitive practices in



**FIGURE 23.8: CURRENT ACCOUNT BALANCE (SHARE OF GDP)**



the market will exert added pressures on overall inflation, resulting in inflation hovering around 7.5 percent in FY2015 (post-earthquake).

In the medium term as well, these factors along with an expansionary budget, wage pressures due to shortage of workers, a temporary burst of aggregate demand arising from cash transfers and reconstruction activities, and supply-side bottlenecks will likely keep inflation at elevated levels. Food inflation is likely to be in the double-digits due to upward price pressures on legumes, cereal grains, fruits and milk products, among others. Non-food inflation will also see upward price pressures, especially those coming from housing and utilities, construction materials, furnishings and household equipment.

**EXTERNAL SECTOR**

**Pre-earthquake**

Despite a large and growing trade imbalance, the current account (CA) remained in surplus and significant foreign exchange reserves had accumulated, owing predominantly to robust growth of remittances. In FY2014, the balance of payments (BOP) surplus reached NPR128.05 billion (US\$1.3 billion) (6.6 percent of GDP), growing at 65.1 percent from FY2013, while the CA was positive by NPR 90127.5 million (US\$915 million) (4.7 percent of GDP). This healthy position was overwhelmingly due to remittance growth. Total transfers (including remittances) reached a record NPR630.4 billion (US\$6.4 billion)

(equivalent to 32.7 percent of GDP) and almost on a par with the trade deficit of NPR600.85 billion (US\$6.1 billion) (equivalent to 30.9 percent of GDP). As a result, gross official reserves grew by 23.6 percent in FY2014 to reach NPR679.65 billion (US\$6.9 billion), enough to cover some 8.2 months of imports of goods and services.

For FY2015, before the earthquakes, Nepal was expected to maintain a sizeable CA surplus (but reduced, compared to FY2014) due to lower remittance growth (through official channels). This was partially compensated by lower world prices for oil (the largest import item). This was reflected in the first nine months of FY2015 when CA balance was NPR48659 million (US\$494 million), significantly lower than FY2014 when the CA balance was NPR107.8 billion (US\$1.1 billion) during the same period.

**Post-earthquake**

Current account surplus will decrease, but is expected to remain positive in the short term. As a result of the earthquakes, export-based firms have either halted production or are partially operational. Furthermore, domestic consumption of exportable construction items has increased (partly also due to temporary export restriction policy imposed after the earthquakes). The net impact will likely be lower export growth (even negative growth if supply disruptions further intensify) in FY2015. Meanwhile, import growth will likely accelerate as demand for machinery parts, agricultural goods, medicines and construction materials picks up. Consequently, the trade deficit is likely to widen further. However, increased inflow of remittances and grants are expected to continue in FY2015. As a result, CA surplus will decrease in FY2015 but is expected to remain positive at about NPR46886 million (US\$476 million) and a BOP surplus of about NPR70230.5 million (US\$713 million). Foreign exchange reserves will likely continue to grow and be enough to cover over seven months of imports.

In the medium term, both CA and BOP are expected to decline significantly compared to previous years. There will likely be a net increase in the number of overseas migrant workers,<sup>100</sup> resulting in increased inflow of remittances. Also,

<sup>100</sup> The scope and pace of rehabilitation and reconstruction will also influence the rate of out-migration.

foreign aid is expected to continue to increase for reconstruction activities. Nevertheless, there also exists a possibility of CA balance being negative if the rate of increase of trade deficit is high on account of increased import of construction materials and if the rate of increase of net transfers is low in the medium term. Should such a situation arise, it is expected to be manageable.

## MONETARY SECTOR

### Pre-earthquake

Monetary policy continued to be expansionary to support economic activity and financial sector stability. Broad money (M2) supply increased by 19.1 percent in FY2014 (up from 16.4 percent in FY2013), resulting in very low interest rates. The Nepal Rastra Bank (NRB) maintained a relatively loose monetary policy and minimal sterilization of remittance inflows to stimulate private sector lending while also allowing banks to rebuild balance sheet strength by keeping interest rates low. In the nine months of FY2015 (before the earthquakes), money supply (M2) growth stood at 16.1 percent (year-on-year), reflecting a decline in growth of net foreign assets (NFA) on the back of weaker remittances and lower foreign grants receipts.

In the last few years, high deposit growth coupled with slower credit off-take kept the cost of borrowing low, which was starting to change from FY2015. The weighted average Treasury-bill (T-bill) (91 days) and interbank rates for FY2014 were 0.13 percent and 0.22 percent respectively. Likewise, the average base rate of commercial banks stood at 8.36 percent. This trend was partly reversed in the first nine months of FY2015 (before the earthquakes), with credit to the private sector from BFIs increasing by 19.8 percent in mid-April 2015. This outpaced deposits (deposits at BFIs expanded by 16.5 percent), resulting in a significant decrease of excess liquidity in the system.

### Post-earthquake

After the earthquakes, broad money is expected to increase by 16 percent in FY2015 (year-on-year). The deposit rate is expected to increase significantly, partly also because money in

households has been now been parked in the commercial banks for safety reasons. Domestic credit is expected to slow down significantly in the short term. Without clarity on the balance sheets of banks and increased risk after the earthquakes, banks will be reluctant to lend in the short term.

## FISCAL SECTOR

### Pre-earthquake

While domestic revenue mobilization has continued to perform exceptionally well over the years, structural bottlenecks to spending, particularly capital budget, have been a problem. Though public spending picked up significantly in FY2014, it remained low (particularly investment) compared to both needs and the space afforded by healthy fiscal balances. Nepal registered a budget surplus in FY2013 (0.7 percent of GDP) and marginal deficit in FY2014 (-0.1 percent of GDP), reflecting, among other things, continued robust revenue growth but a persistent shortcoming in capital budget execution. A similar trend was observed in FY2015 prior to the earthquakes – the budget was under-executed. Domestic revenue mobilization on the other hand has continued to perform well. The government managed to meet the ambitious targets it had set for itself, with total revenue growth of 19.8 percent in FY2014 and 21.1 percent in FY2013. Total revenue as a share of GDP reached 18.4 percent in FY2014 (from 14.7 percent four years ago). Before the disaster, domestic revenue mobilization in FY2015 (despite the trimester targets missed) was expected to reach NPR416.66 billion (US\$4.23 billion),<sup>101</sup> with overall revenue growth reaching 19.3 percent.

### Post-earthquake

The combination of a decline in tax revenues and an increase in spending will put pressure on the fiscal balance in the medium term. Public revenues have taken a direct hit in the aftermath of the disaster. It is now increasingly likely that the target for revenue collection of NPR416.66 billion (US\$4.23 billion) in the current fiscal year will not be met. With only NPR384.15 billion (US\$3.90 billion) expected to be raised by the end of FY2015, there will be a shortfall of about 8 percent (approximately NPR29550

<sup>101</sup> Netting out NPR 18.5 billion of cash balance of FY2014

million (US\$300 million)). Of the five major sources, customs and deemed 'non-tax' revenues have seen the largest drop in collections after the earthquakes. This is because of, among other factors, reduced imports, including luxurious items such as motorized vehicles, slowdown in tourism and banking, and customs exemptions on relief materials. This shortfall is expected to be met by external and domestic borrowing. However, this will potentially not yet put added pressure on fiscal balance in FY2015 because the disruptions to normal functioning of government services have led to expenditure shortfall as well. Only NPR492.5 billion (US\$5 billion) out of the expenditure target of NPR608.73 billion (US\$6.18 billion) is expected to be spent by the end of FY2015.<sup>102</sup> The balance will be carried forward to the next fiscal year for increased spending.

Due to the huge damages and losses inflicted by the earthquakes,<sup>103</sup> fiscal pressure will start to increase from FY2016. A lower base for domestic revenue is set for FY2016 (NPR472.8 billion (US\$4.80 billion)) against a projection of NPR504.32 billion (US\$5.12 billion) prior to the earthquakes. Preliminary estimates of the immediate needs recovery is NPR659.95 billion (US\$6.7 billion), which will put pressure to increase unanticipated post-disaster spending. For example, housing subsidy alone is expected to increase government spending by anywhere between NPR98.5 to 147.75 billion (US\$1 to 1.5 billion). As a result, FY2016 budget is estimated to reach as high as NPR827.4 billion (US\$8.40 billion). To fill the resource gap, the government may have to resort to higher domestic borrowing. To ease the fiscal balance pressure, the government is requesting development partners to mobilize increased support, in addition to pledges already received. Fortunately, external borrowing is not likely to put Nepal at risk of debt distress given the already low levels of external debt, which creates enough fiscal space for financing recovery efforts. Revenue mobilization could also be bolstered by further efficiency-enhancing administrative reforms, strict monitoring of tax evasion and by bringing more people inside the tax bracket.

#### WAY FORWARD

The foregoing analysis suggests an economy that is struggling with the challenge of triggering sustained growth, yet was supported by a reasonably comfortable fiscal space and BOP – the former a result of low expenditures and the latter a windfall from inward remittances. With the need for rehabilitation and reconstruction, the challenge ahead is to garner resources from within and abroad in a manner that does not strain macro-prudential norms and discipline in internal and external borrowing. Going forward, there are five issues deserving policy attention.

First, economic sectors that have borne the brunt of income losses need a package of support aimed at early recovery. From tourism and agriculture to the financial sector, industry and commerce, post-disaster needs assessments suggest that losses are expected to persist well into next year. The government stands ready to respond with policy instruments that have not been frequently tried earlier, such as bailout funds to prevent contagion in the financial sector and business recovery centres to jump-start small enterprises.

Second, with a search for new revenue instruments and firmer tax effort, fiscal space can be widened. Options include: (i) widening the tax base without increasing rates, but imposing a temporary reconstruction levy, (ii) encouraging voluntary compliance, (iii) reducing tax exemptions, (iv) enforcing electronic billing, (v) reforming customs valuation, (vi) prioritizing high net worth individuals, and (vii) building capacity to bring emerging areas such as e-commerce and capital gains into the tax net. However, it was the quality, pace and pattern of expenditure that was a bigger concern over the past decade, with over 10 percent of annual budget being unspent on average. There is a growing tendency to augment unproductive recurrent expenditures in lieu of capital investments with larger payoffs, especially in physical infrastructure. To ramp up spending aimed at post-earthquake reconstruction, Nepal now needs a binding institutional commitment to instill confidence in a system built around ef-

<sup>102</sup> This will be 80 percent of planned outlay

<sup>103</sup> Preliminary estimates put total damages and losses at about US\$7 billion

efficiency, transparency and accountability. An Extra-ordinary Mechanism (EOM) that is informed by international best practice, but is grounded in past Nepali successes, will be necessary. Successes include the rebuilding after the 1988 earthquake, the reconstruction of Myanglung Bazaar in Tehrathum after the fire of 2002, and the integration of Maoist combatants after the 2006 peace process. Under the oversight of elected representatives in government and parliament, as well as development partners and civil society, an EOM staffed by professionals who can exercise legal authority, from procurement to land acquisition, embedded in several acts will be required to execute reconstruction.

Third, there are macroeconomic vulnerabilities that will need to be monitored closely. With the surge in import of construction materials, and reconstruction attracting resources away from the tradable (export) sector, the trade deficit will widen further. If the flow of remittances is tepid as a result of unforeseen shocks, BOP could spiral out of control. Similarly, controlling inflation will require vigilance on the part of regulatory institutions. Calls to exempt reconstruction-related imports from customs and value-added taxes at the border could also dampen revenue collection.

Fourth, the management of public expectations with regard to the scale and intensity of 'new' construction has to be deft. The discourse in the country already conflates recovery needs with ambitious projects of national significance not directly related to the earthquakes. While a national campaign of new building and renewal can use post-earthquake recovery as a point of departure, it would be useful not to mix the two at early stages of recovery to encourage prioritization and economic use of scarce resources.

Fifth, the recently secured consensus among the largest political parties to promulgate a new constitution and to hold elections for local government as early as possible adds optimism to

efforts aimed at restoring the trajectory of higher economic growth. A push towards economic reforms has to continue so that the investment climate is friendlier. Nepal also needs to tap unconventional assets at its disposal, such as the growing financial and technical clout of the diaspora, the spirit of volunteerism of its youth and new sources of philanthropy.

## Assessment Methodology

This chapter was led by the NPC on and was written based on the inputs and data provided by the CBS, NRB and MoF from the Government side. On the Development partners side, it was led by the WB and ADB and the inputs were provided by the UNDP, DFID and EU. Loss and damage figures from the sector assessment was used for the macro-analysis.

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ANNEX I:

# PDNA Sector Teams and Contributors

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# Abbreviations and Acronyms

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ACA	Annapurna Conservation Area
ACORAB	Association of Community Radio Broadcasters
ADS	Agriculture Development Strategy
AEPC	Alternative Energy Promotion Center
AIMS	Agency-Managed Irrigation Schemes
APF	Armed Police Force
ARI	Acute Respiratory Infection
ART	Antiretroviral Therapy
BBB	Build Back Better
BCPs	Business Continuity Plans
BFI	Banks and Financial institutions
BMS	Breast Milk Substitute
BoP	Balance of Payment
BRC	Business Recovery Centres
BTS	base transceiver stations
CAAN	Civil Aviation Authority of Nepal
CAC	Citizen Awareness Centre
CBDRM	Community Based Disaster Risk Management
CBOs	Community Based Organizations
CBS	Central Bureau of Statistics
CCA	Climate change adaptation
CCG	Core Coordination Group
CDD/KYC	Customer Due Diligence/ Know Your Customer
CDO	Chief District Officer
CEF	Change in Economic Flows
CF/CFUG	Community Forestry/ Community Forestry User Group
CFLG	Child-Friendly Local Governance
CFS	Child-Friendly Schools
CGI	Corrugated Galvanized Iron
CIP	Community Irrigation Project
CLA	Central Level Agencies
CLC	Community Learning Center
CLTS	Community Led Total Sanitation
CMAM	Community Management of Acute Malnutrition
CMIASP	Community Managed Irrigated Agriculture Sector Project
CNDRC	Central Natural Disaster Relief Committee
CNI	Chamber of Nepalese Industries
COs	Community Organizations
CSD	Central Securities Depository
CSO	Civil Society Organization
CTVET	Council for Technical and Vocational Education and Training
CWC	Cable & Wireless Communications
DADO	District Agriculture Development Office
DaLA	Damage and Loss Assessment
DCGF	Deposit and Credit Guarantee Fund
DRCN	District Road Core Network
DDC	District Development Committee
DDMC	District Disaster Management Committee
DDRC	District Disaster Response Committee
DEO	District Education Office
DEOC	District Emergency Operation Centre
DFRS	Department of Forest Research and Survey

DHM	Department of Hydrology and Meteorology
DLSA	District Level Support Agency
DLSO	District Livestock Service Office
DMG	Department of Mines and Geology
DNPWC	Department of National Parks and Wildlife Conservation
DoA	Department of Agriculture
DoA	Department of Archaeology
DADO	District Agriculture Development Office
DFSCC	District Forestry Sector Coordination Committee
DFO	District Forest Office
DLSO	District Livestock Service Office
DoE	Department of Environment
DOE	Department on Education
DOED	Department of Electricity Development
DoEnv	Department of Environment
DoF	Department of Forest
DoFE	Department of Foreign Employment
DoHS	Department of Health Services
DoI	Department of Industries
DoI	Department of Irrigation
DoLIDAR	Department of Local Infrastructure Development and Agriculture Roads
DoLS	Department of Livestock Services
DoR	Department of Roads
DOTS	directly observed treatment, short-course
DoWIDP	Department of Water Induced Disaster Prevention
DP-Net	Disaster Preparedness Network
DPR	Department of Plant Resources
DRCN	District Road Core Network
DRRMCC	Post Disaster Recovery and Reconstruction Management Coordination Committee
DRRT	Disaster Response and Rescue Teams
DSCWM	Department of Soil Conservation and Watershed Management
DTMP	District Transport Master Plan
DTO	District Technical Office
DUDBC	Department of Urban Development and Building Construction
DUV	Direct Use Value
DWASHCC	District WASH Coordinating Committee
DWSS	Department of Water Supply and Sewerage
EBA	Ecosystem-Based Adaptation
ECD	Early Childhood Development
ECHO	European Commission Humanitarian Aid and Civil Protection
EFA	Education For All
EFLG	Environment Friendly Local Governance
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIIP	Employment Intensive Investment Programmes
EMIS	Education Management Information System
EMIS	Environment Management Information Systems
ETC	Education Training Center
EU	European Union
EVENT	Enhanced Vocational Education and Training
EVI	Economic Vulnerability Index
EWS	Early Warning Systems
FAO	Food and Agriculture Organization of the United Nations
FCHVs	Female Community Health Volunteers
FDI	Foreign Direct Investment
FECOFUN	Federation of Community Forestry Users Nepal
FFS	Farmer Field Schools
FHHHs	female-headed households
FINCO	Financial and Multi-Purpose Co-operatives
FINGO	Financial Intermediary NGO



FIRST	Finance Institutional Reforms and Strengthening Initiative
FMIS	Farmer-Managed Irrigation Schemes
EMP	Environmental Management Plans
FMT	Foreign Medical Team
FNBI	Federation of Nepalese Brick Industries
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
FNCSI	Federation of Nepal Cottage and Small Industries
FSP	Flexible Schooling Programme
GAP	Good Agriculture Practices
GARD	Getting Airports Ready For Disasters
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GGA	Good Governance Act
GHG	greenhouse gas
GIS/RS	Geographical Information System/Remote Sensing
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLOF	Glacial Lake Outburst Floods
GoN	Government of Nepal
GOs	Government Organizations
GRB	Gender Responsive Budgeting
GVP	Good Veterinary Practices
Ha	Hectare
HAI	Human Asset Index
HAN	Hotel Association of Nepal
HCW	health-care waste
HD	Human Development
HDI	Human Development Index
HEOC	Health Emergency Operation Centre
HFMC	Health Facility Management Committee
HLNFSSC	High Level National Nutrition and Food Security Steering Committee
HMIS	Health Management Information System
HOPE	Hospital Preparedness for Emergencies
HSE	Health, safety, and environment
ICH	Intangible Cultural Heritage
ICIMOD	International Centre for Integrated Mountain Development
ICS	Improved Cooking Stove
ICT	Information and Communications Technology
IDDs	Irrigation Development Divisions
IDP	Internally Displaced Persons
IEC	Information, Education, and Communication
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
ILO	International Labour Organization
INSARAG	International Search and Rescue Advisory Group
IOM	International Organization for Migration
IPFC	Integrated Planning and Formulation Committee
IPM	Integrated Pest Management
IPP	Independent Power Producers
IPPN	Independent Power Producers' Association
IRA	Initial Rapid Assessment
ISF	Irrigation Service Fee
ISPS	Institutional solar PV system
IUCN	The World Conservation Union
IUV	Indirect Use Value
IWRM	integrated water resource management
IWRMP	Irrigation and Water Resource Management Project
IYCF	Infant and Young Child Feeding
JICA	Japan International Cooperation Agency
JMIS	Jointly-Managed Irrigation Schemes
JMP	Joint Monitoring Programme

KfW	Kreditanstalt für Wiederaufbau
KOICA	Korea International Cooperation Agency
KUKL	Kathmandu Upatyaka Khanepani Limited
KUTMP	Kathmandu Urban Transport Master Plan
KV	Kathmandu Valley
KVDA	Kathmandu Valley Development Authority
KVWSMB	Kathmandu Valley Water Supply Management Board
LAPA	Local Adaptation Plan of Action
LBRMMOG	Local Body Resource Mobilisation and Management Operation Guidelines
LDO	Local Development Officer
LF	Leasehold Forestry
LFS	Labour Force Survey
LFUG	Leasehold Forest User Groups
LFUG	Local Forestry User Groups
LGBTI	Lesbian, Gay, Bisexual, Transgender/Transsexual and Intersex
LGCDP	Local Governance and Community Development Programme
LHF	leasehold forests
LIB	Limited International Bidding
LLL	Lifelong Learning
LRN	Local Roads Network
LMIS	Logistic Management Information System
LSGA	Local Self-Governance Act
LT	Local Transport
LT	long term
MAPs	Medicinal and Aromatic Plants
MCM	Mass Casualty Management
MDG	Millennium Development Goals
MFDBs	Microfinance Development Banks
MFI	Micro-finance Institution
MHP	Micro hydropower projects
MICS	Multiple Indicator Cluster Survey
MIP	Medium Irrigation Project
MIS	Management Information System
MIS	Municipal Information System
MISP	Minimum Initial Service Package
MIYCN	Maternal Infant and Young Child Nutrition
MMI	Modified Mercalli Intensity
MNC	municipalities
MNP	Multiple Micronutrient Powder
MoAD	Ministry of Agricultural Development
MoCAC	Ministry of Civil Aviation and Culture
MoCS	Ministry of Commerce and Supplies
MoCTA	Ministry of Culture, Tourism & Civil Aviation
MoD	Ministry of Defense
MoE	Ministry of Education
MoEn	Ministry of Energy
MoEST	Ministry of Science, Technology and Environment
MoF	Ministry of Finance
MoFALD	Ministry of Federal Affairs and Local Development
MoFSC	Ministry of Forest and Soil Conservation
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoI	Ministry of Industry
MoIC	Ministry of Information and Communications
MoLE	Ministry of Labour and Employment
Molrr	Ministry of Irrigation
MoPIT	Ministry of Physical Infrastructure and Transport
MoSTE	Ministry of Science, Technology and Environment
MoUD	Ministry of Urban Development
MoWCSA	Ministry of Women, Children and Social Welfare

MPI	Multi-Dimensional Poverty Index
MPIT	Ministry of Physical Infrastructure and Transport
MRE	Mountain Risk Engineering
MRT	Mandatory Rules of Thumb
MSFP	Multi Stakeholder Forestry Programme
MSMEs	Medium, Small and Micro Enterprises
MSNP	Multi-Sector Nutrition Plan
MT	medium term
NA	Nepalese Army
NAPA	National Adaptation Programmes of Action
NARC	Nepal Agriculture Research Council
NATO	Nepal Association of Tour Operators
NATTA	Nepal Association of Tour and Travel Agents
NBA	Nepal Bar Association
NBSAP	National Biodiversity Strategy and Action Plan
NCB	National Competitive Bidding
NDHS	Nepal Demographic and Health Survey
NDRF	National Disaster Response Framework
NEA	Nepal Electricity Authority
NEC	Nepal Engineers' Council
Ne-GIF	Nepal e-Government Interoperability Framework
NekSap	Nepal Food Security Monitoring System
NEOC	National Emergency Operation Centre
NEPSE	Nepal Stock Exchange
NFE	Non-Formal Education
NFRI	non-food relief items
NGOs	Non-Governmental Organizations
NHRC	National Human Rights Commission
NIDMC	National Identification Management Center
NLSS	National Living Standards Survey
NMA	Nepal Mountaineering Association
NMDP	Nepal Market Development Programme
NMIP	National Management Information Project
NPC	National Planning Commission
NPHC	National Population and Housing Census
NPL	Non- Performing Loans
NPR	Nepalese Rupees
NRB	Nepal Rastra Bank
NRCS	Nepal Red Cross Society
NRRC	Nepal Risk Reduction Consortium
NSC	National Seismological Centre
NRCS	Nepal Red Cross Society
NSDRM	National Strategy for Disaster Risk Management
NSET	National Society for Earthquake Technology-Nepal
NSIC	Nepal Standard Industrial Classification
NTA	Nepal Telecommunications Authority
NTB	Nepal Tourism Board
NTC	Nepal Telecommunications Authority
NTFP/NWFPs	Non-Timber Forest Products/Non-Wood Forest Products
NTNC	Nepal Trust for Nature and Conservation
NTSP	National Tourism Strategy Plan
NWSC	Nepal Water Supply Corporation
O&M	Operation and Maintenance
ODF	Open Defecation Free
ODR	Owner-Driven Reconstruction
OPMCM	Office of Prime Minister and Council of Ministers
OPGW	optical-fiber ground wire
OSP	Open Schooling Programme
OTPs	Outpatient Treatment Programmes
PA	Protected Areas

PAF	Poverty Alleviation Fund, Nepal
PES	Payment of Environmental Services
PGA	Peak ground acceleration
PGCIL	Power Grid Corporation of India Ltd
PHCC	Primary Health Care Centers
PLHIV	People Living with HIV
PLWDs	People Living With Disabilities
PMUs	Project Management Units
PoE	Panel of Experts
PPA	Production Per Annum
PPA	Public Procurement Act
PPC	Pre-Primary Classes
PPM	Part Per Million
PRSP	Poverty Reduction Strategy Paper
PTA	Parent-Teacher Association
PUF	Poly Urethane Foam
PVPS	Photo Voltaic Pump Set
PWD	Person With Disability
RC	Reinforced Concrete
RC	Resource Centre
RCC	Reinforced Cement Concrete
RCIW	Rural Community Infrastructure Works
RED	Regional Education Directorate
RET	Renewable Energy Target
RFPDC	Radio Frequency Policy Determination Committee
RoLHR	Rule of Law and Human Rights Project
RPP	Readiness Preparation Proposals
RSLUP	Risk Sensitive Land Use Planning
RTDF	Rural Telecommunications Development Fund
RTGS	Real Time Gross Settlement
RTI	Right to Information
RWSSFDB	Rural Water Supply and Sanitation Fund Development Board
SACCOs	Savings and Cooperatives
SAE	Small Area Estimation
SAM	Severe Acute Malnutrition
SAR	Search and Rescue
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SDMP	Strategic Development Master Plan
SDP	Sector Development Plan
SDP	Skills Development Project
SEA	Strategic Environment Assessment
SEBON	Securities Board of Nepal
SEIU	Sector Efficiency Improvement Unit
SGBV	Sexual and Gender Based Violence
SHS	Solar Home System
SM	Social Mobilizers
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SMC	School Management Committees
SME	Small and Medium Enterprises
SMEs	Small and Medium-Sized Enterprises
SNP	Sagarmatha National Park
SOP	School Outreach Programme
SPIP	Reviving springs and providing access to solar powered irrigation pumps
SRN	Strategic Roads Network
SSDP	School Sector Development Plan
SSHS	Small Solar Home System
SSRP	School Sector Reform Programme
ST	short term
SWOT	Strength-Weakness-Opportunity-Threat



SWS	Single Window Service
TA	Technical Assistance
TAAN	Trekking Agencies' Association of Nepal
TBSU	Trail Bridge Support Unit
TIA	Tribhuvan International Airport
TLC	Temporary Learning Center
TLM	Teaching/Learning Materials
TSLC	Technical School Leaving Certificate
TURGAN	Tour Guide Association of Nepal
TUCDES	Tribhuvan University Central Department of Environmental Science
TUTH	Tribhuvan University Teaching Hospital
TVET	Technical and Vocational Education and Training
TYIP	Three Years Interim Plan
UC	Users Committees
UGC	University Grants Commission
UN	United Nations
UNCDF	United Nations Capital Development Fund
UN-DESA	United Nations Department of Economic and Social Affairs
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Fund for Population Activities
UN-Habitat	United Nations Human Settlements Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
VAT	Value Added Tax
VCA	Vulnerability and Capacity Assessment
VDC	Village Development Committee
VOC	Vehicle Operations Cost
VRCN	Village Road Core Network
VSBK	Vertical Shaft Brick Kiln
WASH	Water, Sanitation and Hygiene
WB	World Bank
WCF	Ward Citizen Forums
WCF	Women in ward citizen forums
WDO	Women Development Organizations
WDR	World Development Report
WFP	World Food Programme
WHO	World Health Organization
WLL	Wireless Local Loop
WRPPF	Water Resource Project Preparation Facility
WSP	Water and Sanitation Program
WSST	Water Supply and Sanitation Technician
WSUC	Water and Sanitation Users Committees
WTTC	World Travel & Tourism Council
WUAs	Water Users' Associations



PDNA CORE PARTNERS

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