Challenges for reconstruction after $M_w$7.8 Gorkha earthquake: a study on a devastated area of Nepal

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ABSTRACT

The Gorkha earthquake on April 25, 2015 had significantly affected the livelihood of people and the overall economy in Nepal. The earthquake had caused damage to about half a million private and public buildings, apart from damage to other infrastructures including schools, hospitals, roads, hydropower, irrigation canals, etc. The earthquake had affected the lives of 8 million people. With significant numbers of actors and stakeholders involved in the reconstruction process, no significant relief has reached the ground or is observable even after 3 years of the disaster. The government has formed National Reconstruction Authority (NRA) as the focal authority for the reconstruction process which is leading the reconstruction process with line agencies and other stakeholders. The longitudinal study was carried out through semi-structured interviews with the engineers working under NRA, local people and social mobilizer, group discussions, and field observation from June 2015 to August 2016 focusing on challenges for timely and quality reconstruction. The research also reviews the experiences from past events in similar social and political condition. This study concludes that the situation was the result of larger institutional gaps as the absence of local government, lack of coordination, bureaucratic hurdles and political transition, weak governance and cross-cutting issues as accessibility, manpower shortage, knowledge gap and other socio-cultural aspects. Authors supplement that the good governance and strategic incorporation of social and cultural aspects of reconstructions along with the technical cross-cutting issues like skilled labour, resources availability and construction knowledge could help to expedite the reconstruction process.

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1. Introduction

The Gorkha earthquake of moment magnitude $M_w$ 7.8 occurred at 6:11 a.m. UTC on April 25, 2015, with the epicentre 77 km northwest of Kathmandu (Chiaro et al. 2015; Goda et al. 2015). As of December 30, 2016, more than 465 aftershocks with a magnitude above 4 had been observed (KC et al. 2017). These seismic events in the central Himalaya were the strongest after the 1934 earthquake that was located northeast of Kathmandu (Sharma et al. 2017a).

The 2015 Gorkha earthquake is one of most devastating disasters in the modern history of Nepal, which is why there is no comprehensive study on reconstruction after disasters in modern Nepal, which integrates the necessary information to deal with challenges and opportunities of reconstructions (Sharma and KC 2017; Adhikari et al. 2018). Some researchers after 2001 Gujarat and 2005 Kashmir earthquake had mainly focused on post-disaster mental health interventions, disaster relief problems and management inconsistencies, and healthcare challenges in disasters (Zhang et al. 2012; Doocy et al. 2013). However, most of these studies have rarely used a qualitative approach to understand the experiences and perceptions of disaster survivors. Thus, there is still a significant gap in the field of reconstruction. The study is complicated in the methodical and interactive process which needs a more comprehensive understanding of the long-term recovery experiences of people involved. It is essential that academics, governments and humanitarian agencies learn from previous applications of this process in a similar area to not only implement a programme that reduces the current vulnerability but also to establish a legacy of disaster risk reduction. The current study, therefore, investigates the challenges of reconstruction after the earthquake in rural areas of Nepal and different aspects and actors involved in the process.

This paper examines the challenges of reconstruction after 2015 Gorkha earthquake. Field research involved visual surveys, questionnaires, group discussions and review of published news, reports and opinions, etc. This research highlighted a number of issues that would affect the reconstruction process in term of speed and quality. The issues established through this paper are ones that need to be recognized by academics, governments and implementation agencies, and considered in the implementation of post-disaster reconstruction (PDR) programme in the future especially in developing countries like Nepal.

2. Scale of devastation

On April 25, 2015, Nepal was struck by a 7.8-magnitude earthquake, followed by a 7.3-magnitude earthquake on May 12, 2015, killing in total nearly 9000 people and injuring 22,400 (Sharma et al. 2016, 2017b). About 800,000 houses were damaged or destroyed (Sharma et al. 2017c). Out of 75 districts, 31 were deemed ‘most affected’, and out of that number, 14 districts were ‘severely affected’ (Figure 1). Figure 2 shows the typical flattened town and villages during the earthquake. These 14 districts have an estimated population of 2.8 million, out of which 1.1 million (40%) are children. The Government-led Post Disaster Needs Assessment (PDNA) estimates that Nepal’s financial losses from the earthquake are US$7.06 billion, which is 36% of the
country’s gross domestic product (GDP) as of 2014\(^1\) (Table 1). Different government and non-government sources refer to the estimated amount of USD $7 billion required for the whole reconstruction process, with the major focus of almost 25% required on the housing sector (Tables 2 and 3).

Destruction is widespread; residential and government buildings, heritage sites, schools and health facilities, rural roads, bridges, water supply systems, agricultural land, trekking routes and hydropower plants were all hit. The most severely affected districts account for 30% of the country’s cottage industries – a key engine of the economy. The heavily affected sectors are housing, which sustained about 50% of the destruction and subsequent decline in output, followed by tourism at 11%, whereas environment, education, finance and agricultural sectors each suffered 4%–5% of the total disaster effects (PDNA 2015).
### Table 1. Summary of damages and loss due to 2015 Gorkha earthquake (PDNA 2015).

| Sectors                        | Disaster effects (NPR million) | Distribution of disaster effects (NPR million) | Losses in personal income (NPR million) |
|--------------------------------|--------------------------------|-----------------------------------------------|------------------------------------------|
|                                | Damages | Losses | Total | Private | Public |                                      |
| Social sectors                 | 355,028 | 53,597 | 408,625 | 363,248 | 45,377 |                                      |
| Housing and human settlement   | 303,632 | 46,908 | 350,540 | 350,540 |        |                                      |
| Health                         | 6422    | 1122   | 7544   | 1394    | 6150   |                                      |
| Education                      | 28,064  | 3254   | 31,318 | 2365    | 28,953 |                                      |
| Cultural heritage              | 16,910  | 2313   | 19,223 | 8948    | 10,274 |                                      |
| Productive sectors             | 58,074  | 120,046| 178,121| 158,079 | 20,043 | 17,124                                 |
| Agriculture                    | 16,405  | 11,962 | 28,366 | 25,813  | 2,553  | 4,603                                  |
| Irrigation                     | 383     | –      | 383    | –       | 383    | –                                      |
| Commerce                       | 9015    | 7938   | 16,953 | 16,953  |        | 2667                                   |
| Industry                       | 8394    | 10,877 | 19,271 | 19,271  |        | 3654                                   |
| Tourism                        | 18,863  | 62,379 | 81,242 | 75,105  | 6137   | 6200                                   |
| Finance                        | 5015    | 26,890 | 31,905 | 20,937  | 10,969 | –                                      |
| Infrastructure sectors         | 52,460  | 14,323 | 66,783 | 17,281  | 49,502 | –                                      |
| Electricity                    | 17,807  | 3435   | 21,242 | 15,569  | 5673   | –                                      |
| Communications                 | 3610    | 5085   | 8695   | 1712    | 6983   | –                                      |
| Community Infrastructures      | 3349    | –      | 3349   | –       | 3349   | –                                      |
| Transport                      | 17,188  | 4930   | 22,118 | 22,118  |        | –                                      |
| Water and sanitation           | 10,506  | 873    | 11,379 | –       | 11,379 | –                                      |
| Cross-cutting issues           | 51,872  | 1061   | 52,933 | 1755    | 51,178 | –                                      |
| Governance                     | 18,757  | –      | 18,757 | –       | 18,757 | –                                      |
| Disaster risk reduction        | 155     | –      | 155    | –       | 155    | –                                      |
| Environment and forestry       | 32,960  | 1061   | 34,021 | 1755    | 32,267 | –                                      |
| Total                          | 517,434 | 189,027| 706,461| 540,362 | 166,100| 17,124                                 |
| Total (US $ million)           | $5174   | $1890  | $7065  | $5404   | $1661  | $171                                   |

### Table 2. Summary of total needs for reconstruction (PDNA 2015).

| Sector                          | Total needs (NPR million) | Total needs (US$ million) |
|---------------------------------|---------------------------|---------------------------|
| Social sectors                  | 407,747.00                | 4077.00                   |
| Housing                         | 327,762.00                | 3277.62                   |
| Health                          | 14,690.00                 | 146.90                    |
| Nutrition                       | 5036.00                   | 50.36                     |
| Education                       | 39,706.00                 | 397.06                    |
| Cultural Heritage               | 20,553.00                 | 205.53                    |
| Productive Sectors              | 115,618.00                | 1156.18                   |
| Agriculture                     | 15,561.00                 | 155.61                    |
| Irrigation                      | 467.00                    | 4.67                      |
| Commerce                        | 20,051.00                 | 200.51                    |
| Industry                        | 7357.00                   | 73.57                     |
| Tourism                         | 38,710.00                 | 387.10                    |
| Finance                         | 33,472.00                 | 334.72                    |
| Infrastructure sectors          | 74,266.00                 | 742.66                    |
| Electricity                     | 18,586.00                 | 185.86                    |
| Communications                  | 4939.00                   | 49.39                     |
| Community infrastructures       | 4450.00                   | 44.50                     |
| Transport                       | 28,185.00                 | 281.85                    |
| Water and sanitation            | 18,106.00                 | 181.06                    |
| Cross-cutting issues            | 71,873.00                 | 718.73                    |
| Governance                      | 18,442.00                 | 184.00                    |
| Disaster risk reduction         | 8204.00                   | 82.00                     |
| Environment and forestry        | 25,197.00                 | 252.00                    |
| Employment and livelihoods     | 12,547.00                 | 125.00                    |
| Social protection               | 6398.00                   | 64.00                     |
| Gender and social inclusion     | 1086.00                   | 11.00                     |
| Total                           | 669,505.00                | 6,695.00                  |
Damage of this scale would be devastating for any country; evidently that Nepal is limited in financial resources to support such a massive recovery programme with its GDP per capita about US$700, one of the lowest in the world (World Bank 2016).

3. Institutional bodies

Right after the earthquake in rescue and recovery process, till the date of reconstruction, one of the most widely discussed topics in Nepal’s reconstruction process has been a strong institutional body. In the aftermath of many large-scale disasters around the world, setting up an independent agency to manage a multi-sector recovery and reconstruction programme has been a standard practice, which Nepal also stepped into. Apart from the existing national setup of government, Government of Nepal (GoN) formed National Reconstruction Authority (NRA) as the major coordinating authority, along with other policies to ease the reconstruction process were also endorsed. NRA being the pivotal agency, local governments and other stakeholders like NGOs, INGOs and civic society were pertinent foundation in the process.

3.1. National Reconstruction Authority

The GoN had set up the key coordinating body NRA under the act of ‘National Reconstruction Act, 2072’ and with guiding principles set out in ‘National Reconstruction and Restoration policy, 2072’. The government has formed NRA to oversee all post-earthquake reconstruction works in the country which put forward an ordinance before the international conference on Nepal’s reconstruction in June 2015 to attract funding commitments from donors. Nearly, 9 months after the earthquakes in 2015, the parliament of Nepal passed the NRA bill and finally began official reconstruction efforts. So far, the NRA, which is managing US$4.1 billion worth of international donations, has promised US$3000 to each family that needs new housing. In addition, it will provide loans ranging from US$3000 to US$25,000 to finance the construction. Apart from these promises, there are still many details to figure out in terms of effective management of resources, earthquake resilient construction and a resolution to conflicts with ethnic minority groups, which NRA has not figured out yet.

One critical aspect of NRA’s formation has been its administrative efficiency and its political buttress. Changing of NRA’s CEO as per political desire is attributed to the transitional politics of government forming. Even in the desperate days of reconstruction, NRA welcomed its new CEO on October 23, 2017, after the resignation of earlier CEO who was himself appointed in January 2017 a second time. This makes the present CEO the fourth in the row of fewer than 3 years after the earthquake.
is quite obvious that the newly formed government shall appoint the new CEO in very soon time as per their political agenda. The blame game and excuses have reached the peak from either side of NRA and other governmental line agencies which is resulting in the ineffective and inefficient result of reconstruction.

The NRA now has clear policy instruments for steering reconstruction and resettlement efforts. The Reconstruction and Resettlement Policy 2072 BS (2016 AD) is the foundational document that guides all NRA activities. These policies and guidelines have clarified the roles and responsibilities of different institutions involved in reconstruction including resettlement, and livelihood support to victims. The council of ministers has approved NRA rules and guidelines for the following interventions: (1) housing grant distribution, (2) environmental impact assessment (EIA), (3) land acquisition, (4) public procurement, (5) reconstruction regulation, (6) land registration and (7) working with non-governmental organizations.

The NRA has already finalized the guidelines for distributing the grants, managing human resources, reconstruction fund, and training and capacity building of masons. It also began providing budget authorizations to different ministries for reconstruction-related interventions. It is estimated that about US$6.7 billion is needed for the successful post-earthquake recovery and reconstruction in Nepal that will be managed by a shared modality among development partners, INGOs/NGOs, community and the GoN. According to the existing institutional framework, NRA is the leading autonomous body for the reconstruction which needs to be accompanied by other development line agencies like Department of Road (DOR), Department of Irrigation (DOI), Department of Water Supply and Sanitation (DWSS) and so on. With different thematic sections in a different hierarchy, NRA is a comprehensive body for the whole reconstruction process with devolution of authority in different level of project implementation units (PIUs) like central-level PIU (CL-PIU), regional-level PIU and district-level PIU. Since major effort is done from top-down approach, the institutional setup of ground level is missing in the reconstruction act and policy. This is one of the important aspects of the NRA policy, which basically neglects the importance of bottom up approach in reconstruction process. Such top-down approach of NRA’s policy intervention has resulted in various challenges related with reconstruction which are elaborated in further chapters.

### 3.2. Local government

One of the major challenges faced in the reconstruction process of Nepal was the absence of elected local government. For almost two decades, bureaucrats were leading the role of local-level development works and all other development agendas in consensus of local parties. The recent local election of 753 local governments was held on May 14, June 28 and 18 September, 2017 in series of phases, after the last local election of 1997. Lack of local government in local level was reflected in the major pre-disaster and post-disaster event, where it took months to reach the affected region and still no acceptable data is settled. In lack of local government, centre-level government has to directly intervene in the community level which has not been effective till date where reconstruction practices area still carried out with the leading
role of elected local government. In the absence of accountable governing body in local level, weak governance was realized in term of relief distribution, integrated information and more importantly decision-making moments, where it took months to resolve single hurdle which could have been resolved in less than a week time.

3.3. Other stakeholders

Apart from the major stakeholders like Government’s NRA and local government, the role of civic society, development partners and private sectors is crucial, especially regarding the rehabilitation process. Civic society is important actor for delivery of social services and implementation of other development programmes, as a complement to government action (Mercer 2002). Social leaders, political leaders, teachers of the villages, influential persons in the village, religious leaders and elders are considered as important actors under civic society (Gupta 2014). They are imperative share of stakeholders as they are more informed about the situation and play catalytic role in carrying out the project in more lucid manner. Development partners in the form of I/NGOs, academic sectors, research organizations are an important aspect of the reconstruction as they are equipped with high-quality resources and abundant financial resources. One of the important strategies of reconstruction involves the aspect of livelihood and upgrading the lifestyle of people after reconstruction. After the destructive earthquake, people did not only lose their houses but also lost their occupation. Private sectors or the business society are important part of the reconstruction process which brings investment in the process. Establishment of big agriculture park, animal husbandry, fish farm or small-scale industry needs to be initiated by the business sector. Identification and integration of such actors and stakeholders is a crucial decision to be made, which was largely evaded in the reconstruction process of Nepal. Such actors of different sectors could be formed in a network creating more productive and dynamic platform for reconstruction.

4. International experiences for PDR

PDR and rehabilitation is a complex process that involves the interaction of social, technological and economic factors. It is quite obvious that in countries like Nepal with weak governance, reconstruction efforts may be hampered through institutional bureaucracy, corruption, inadequate coordination, inexperience of construction management and pressures from government and humanitarian agencies (Barenstein 2012; Ophiyandri et al. 2013). As the post-disaster is often characterized by many issues such as inaccessibility, inadequate financial and human resources, logistical issues, harsh social environment (Davidson et al. 2007; Ophiyandri et al. 2013), PDR works in developing countries deal with uncertainties (Hayles 2010; Sun and Xu 2011) and complexity (Bello 2006; Boano and García 2011). Roosli et al. (2012) studied PDR work from past disasters and concluded that reconstruction should be defined, planned and implemented in stages. Chang et al. (2010) pointed out that PDR can lead to further vulnerabilities, if it is not well planned and executed. In case of reconstruction after 2004 Tsunami in
Sri Lanka, lack of reconstruction framework in institution and legislation, policy and reliable data affecting housing targets and reconstruction plans has led to systemic confusion and, ultimately, reconstruction delays (Grewal 2006; Ratnasooriya 2007). Top-down relocation plan and construction of contractor-driven mass housing without social consultation have resulted in numerous abandoned houses in Bhuj, Gujarat (Figure 3). Lack of interface between community and the reconstruction authority, inaccessibility, lack of awareness, manpower shortage, knowledge gap and social-cultural issues were pointed out as a key challenge of reconstruction in Pakistan after 2005 Kashmir earthquake (Mumtaz et al. 2008).

Lack of coordination and commitment and policy and institutional framework had resulted in conflict among the different stakeholder and led to duplication of works and the inefficient utilization of funds (Nazara and Resosudarmo 2007; Soelaksono 2009) after 2004 Sumatra earthquake and tsunami. Studies of post-disaster construction work after 2003 Bam earthquake, Iran (Gharaati and Davidson 2008) and 2004 Tsunami, Sri Lanka (Shaw and Ahmed 2010) concluded that inadequate funding and public participation are the key challenges in delaying the reconstruction works and resuming the normal life. Extent of the destruction, weak and dysfunctional government institution, complex urban landscape, lack of security, large number aid actors involved and large military presence have been highlighted as the challenges of Haiti reconstruction (Kwok 2016).

5. Research methodology

The research team intended to explore the challenges of reconstruction from the perspective of different actors involving in reconstruction and/or familiar with reconstruction in Nepal after 2015 Gorkha earthquake. The study was conducted using qualitative content analysis method in longitudinal survey.
5.1. Participants

Purposeful sampling based on the research question was used. Basically, the study was conducted in five districts (Kathmandu, Dhading, Nuwakot, Sindhupalchowk, and Dolakha) out of most devastated districts during 2015 Gorkha. As such, the interviewees included local social workers, local party leaders and earthquake victims, engineer and social mobilizer working in reconstruction, and professors and experts. In all, 100 social workers, local party leaders and earthquake victims; 30 engineers, 30 social mobilized and 10 professors and experts were selected for this study as shown in Table 3. Participants also were selected based on the following inclusion criteria:

1. Willingness and readiness to participate in the study
2. Ability to provide information on the present status of reconstruction without biasness
3. Involvement in reconstruction as an engineer, social workers
4. Familiar with the disaster scenario in Nepal, NRA policy, and reconstruction (this criterion was especially for professors and experts)

5.2. Data collection

Information and data were collected through semi-structured interviews, focus group discussions (Figure 4) and field notes, with no previous assumption (hypothesis), from January 2016 to August 2016. The semi-structured interviews began with general questions as shown in Table 4, gradually progressing to more specific ones. This kind of interview is appropriate because it permits flexibility and depth for qualitative research. Each interview of the participants started with a broad question such as ‘could you explain your experiences regarding reconstruction after the earthquake?’ Probing was performed according to the reflections of each participant concerning their perception about reconstruction and their needs; opportunity and challenges of reconstruction; role of governmental and non-governmental organization working in reconstruction.

In addition to the interviews, few group discussions were conducted in focused group discussion manner with the community respondents. The group was identified during the interviews, based on their interest, knowledge and common views of the response and reconstruction in their locality. The group discussions were interactive in nature and helped to gather multiple perspectives and issues concerning reconstruction in the local area.

Author also reviewed literature and documents covering academic and practitioner studies on challenges of reconstruction after earthquake in developing countries such as 2001 Gujarat earthquake, 2005 Kashmir earthquake, 2003 Bam earthquake and 2010 Haiti earthquake, which have very similar building typologies, economic, political, geographical and geological conditions with Nepal. Secondary data were collected from reports, action plans and reflection papers of governmental entities, non-governmental organizations, private sector businesses and the online news. Newspaper articles and field report authored by journalist and experts were reviewed to make some opinion for this research.
5.3. Data management and analysis

Data analysis was based on qualitative content analysis principles and inspired by grounded theory. The primary data were obtained through interviews which were transcribed and studied carefully. During the analysis of data from the initial interviews, open coding helped to identify the different factors highlighted during the interview and group discussion. Identified critical factors were marked with appropriate labels on the transcribed text. Then, critical factors were discussed within the research team and appropriate themes were extracted. The findings and interpretations of this study were reviewed and compared with the available reports from organization working in reconstruction, news on local and national newspaper and

Figure 4. Interaction and information sharing with local people.

Table 4. Typical open-ended questions.

| a. For engineer and social workers |  |
|-----------------------------------|--|
| 1. Could you explain your experiences regarding reconstruction after the earthquake? |  |
| 2. Why did it take more than 1 year to identify the earthquake victims? |  |
| 3. Why only few thousand families have received the grant from the government? |  |
| 4. Why only few thousand houses have been reconstructed so far? |  |
| 5. Why local people are reluctant to reconstruct their houses? |  |
| 6. What do you want from government and local people to speed up the reconstruction process in your area? |  |
| 7. Why NRA has not decided about relocation of the village located in vulnerable area? |  |
| 8. What are the biggest challenges to the reconstruction in your working area? |  |
| b. For local social workers, political leader and earthquake victims |  |
| 1. Could you explain your experiences regarding reconstruction after the earthquake? |  |
| 2. Have you got any support from government after the earthquake? |  |
| 3. Why have you not started to build your home yet? |  |
| 4. What do you want from NRA to reconstruct your house as soon as possible? |  |
| 5. Do you know how safe is your place? Do you want to move from here to safer place? |  |
| 6. Do you know about earthquake-resistant house? |  |
| 7. What are the problems you have been faced since the earthquake? |  |
| a. Professor and experts |  |
| 1. Could you explain your experiences regarding reconstruction after the earthquake? |  |
| 2. What are the biggest challenges of reconstruction after earthquake? |  |
| 3. How can NRA/government accelerate the reconstruction? |  |

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international experience in the countries having same socio-economic condition. Credibility was established through field notes and memo writing, prolonged engagement with the participants, the participants’ revisions using member check and peer check.

It is important to note that interviews elicit both facts and subjective opinion and that these individual accounts, like all interpretations of reality, may be partial and biased. This issue was addressed by careful choice of informant, by interviewing at least 20 people in each place, by asking probing questions, and by verification through observation, crosschecking between informants, and conducting a comprehensive review of published sources, literatures from the past earthquake having similar building typologies and socio-economic condition.

5.4. Ethical considerations

Informed consent was obtained through explaining the aim and process of the research orally and in writing. The participants then signed informed consent or gave a verbal consent to participating in the study. Information was confidential and participants’ identities were made anonymous for use in this article. Participants had the right to withdraw at each stage of the research.

6. Results

It is crucial for Nepal government to investigate the issues and challenges and find a concrete solution to overcome the complexity and uncertainties of PDR, so as to meet the target of build back better by 2020. As the challenges of reconstruction are interlinked with different sectors and dimension, it is important to categorize into more common scope of studies. Apart from the basic conception of dumping blame to political misfortune, there are further bureaucratic as well as socio-cultural hindrances in reconstruction. This section is intended to present the outcomes of the study and discuss in brief the challenges and influencing factors for PDR in Nepal.

Of 170 participants of the study, including local social workers, political leader and earthquake victims, engineers and social mobilized working in reconstruction and the qualified professor and experts with relevant scientific expertise, 35 were women and the mean age of all participants was 38 years. The literacy level ranged from illiterate to doctorate qualification. Quotations mentioned in this article are all translated from Nepali into English. Author tried to maintain the accuracy of translations as much as accurate with the help of English language expert.

The summary of the response to the questionnaires is presented in Table 5. Local people indicated that manpower shortage; negligence of local culture; poverty, inequality, and unemployment; lack of public awareness; loss of livelihood are the top five critical challenges for reconstruction. Albeit difficult geographical terrain and other cross-cutting technical issues were widely pointed out by the local people from remote area. Engineers working in the reconstruction highlighted manpower shortage as one of the most challenges factor in reconstruction, followed by lack of local government; poverty, inequality, and unemployment; lack of public awareness; people
The conclusions of the interviews and discussion with Social mobilizers working in reconstruction correlate well with the Engineers. Professors and experts had different perceptive regarding the challenges of reconstruction in Nepal than the Engineers and Social workers. Professor and experts indicated that Techno-legal regime, knowledge gap and building construction, lack of public awareness, manpower shortage, lack of comprehensive/integrated information system and lack of experience are the few most challenging factors need to be overcome to speed up the reconstruction.

This study identified 23 factors based interviews, group discuss, literature reviews and secondary data from reports, action plans, and reflection papers of the organization involving in disaster management and reconstruction, opinions, newspapers, etc. These identified twenty three factors are divided into three broad groups: institutional setup: actors and stakeholders; governance, society and policy and cross-cutting technical issues. Identified critical factors are explained in detail in the following sections.

7. Challenges in reconstruction

7.1. Institutional setup: actors and stakeholders

After the 2015 April earthquake, the biggest disasters in Nepal’s modern era, Nepal’s weak institutional framework for disaster management has been clearly proven to be ineffective and inefficient. Although Hyogo Framework for Action (2005–2015) has proved to be catalyst in forming policies regarding disaster risk management (DRM), Nepal’s Disaster Risk Reduction strategy has not integrated well in the institutional setup: actors and stakeholders; governance, society and policy and cross-cutting technical issues. Identified critical factors are explained in detail in the following sections.
charter. In 1982, the Natural Disaster Relief Act (also known as the Natural Calamities Act) was ratified, leading to the establishment of Central, Regional, District and Local Level Natural Disaster Relief Committees, as well as a system for allocating relief funds (MoHA 1982). The Act also sets out clear organizational responsibilities, giving the Ministry of Home Affairs responsibility for the formulation of national policies and their implementation; preparedness and mitigation activities; immediate rescue and relief work; data collection and dissemination; and the distribution of disaster relief funds (Pradhan 2007). Recently in 2009, National Strategy for Disaster Risk Management (NSDRM) has been approved by MoHA, which basically stratifies the level of institutions into central level (National Disaster Management Authority), sub-national (high-level management committee), district level (authority chaired by chief district officer) and local level (local disaster management committees in Village development committees (VDCs) level) (Jones et al. 2014). Although these different levels have been identified in the strategy paper, no significant implementation has been observed for pre-disaster preparedness, ignoring Nepal’s high susceptibility to floods, landslides, glacial lake outburst floods and earthquake. Impact of such institutional inefficiency and limitation of different actors and stakeholders in reconstruction process is elaborated below.

7.1.1. Absence of local government

Although GoN has set up powerful reconstruction authority to act regarding the PDR, the absence of local government (in early phase of reconstruction), lack of coordination amongst different actors and lack of specific set of guidelines in post-disaster condition has weakened the institutional setup of reconstruction process. Inefficiency of local governmental organizations with bureaucratic set of institutions has left the NRA and central government alone with the responsibility of restoration and reconstruction, causing problems to speed up the reconstruction. In addition, the absence of an elected local government in early phase of reconstruction has led to top-down approach of governance resulting in its own accountability deficit. After a disaster, local government needs to perform different set of tasks very quickly, and many of these must be performed simultaneously, with proper approved ‘Standard Operation Procedures’. But there were no such effective mechanisms for delivering the project and ensuring participation of communities in decision-making in local level. An engineer working in the remote area says, In the absence of local bodies, we are unable to provide basic service to local people for reconstruction. Even we do not have proper office to stay and work in the village.

Very recently, local government election has been conducted and all the local governments are equipped with the elected stakeholders. One of the major problems that has not been considered or revised in this changing scenario of local governance is that the local governments are not given pivotal role in this process. Rather the role of local government is limited as of moderator as it was earlier conceived in the time of bureaucracy-led local bodies. Such guidelines resulting in lack of devolution of authority in local level has lengthened the process along with the inefficiency in resolving local problems.
7.1.2. Coordination and commitments

Developing effective coordination within the NRA, between the NRA, local governments, and line agencies as well as between the NRA and other development organizations has been a continuing challenge in the process. The three key structures within the NRA itself are the Executive Agency, the Advisory Board and the Supervisory Board. ‘The question of how these three bodies can interact efficiently and effectively is the major issue since the establishment of NRA’, one high-level official in the interview voiced. Disaster response was reflected on its ‘unpreparedness’, where there were long delays, bottlenecks and a waste of relief assistance provided generously by people in all parts of the country. The engagement of many institutional actors – several ministries, I/NGO, districts, municipalities and VDCs – particularly in the reconstruction process, meant huge coordination difficulties.

Apart from that, the lack of information in the pre-disaster scenario has been reflected in the response and relief mechanism of the earthquake which is later carried out till post-reconstruction. In a focused group discussion with engineers and local officials, one engineer marked that, ... unfortunately, since the government lacked a detailed statistical system the grant distribution for housing were intensified, and unfortunately some of the people who are claiming residing here in the village are not the permanent residents of the village; we do not have any detailed statistical data about them...

7.1.3. Uncontrolled I/NGO

Development partners in terms of donor agencies have greatly contributed in the reconstruction process. But ineffectiveness of the provision of humanitarian aid into reconstruction after Nepal earthquake is that much of the money did not directly reach victim, where much (more than 75% of the total budget) of it went on salaries, accommodation and transport for the NGO workers themselves. However, even if the funding reached to ground, they are usually temporary or not what the affected population actually needed, but guided by the partners’ development agenda. NGOs are constantly in competition with one another over both financial and human resources. Taking reference of Haitian’s failure of reconstruction process where despite the billion dollars’ expenditure by international agencies, more than 85,000 Haitians are living in tents (Kwok 2016), many observers are sceptical about the role of I/NGOs. Nepal Red Cross Society has already spent US$25 Million in earthquake devastated districts. However, noticeable results in reconstruction of physical structures and livelihoods of the victims have not seen yet. Nepal Red Cross Society is just an example; hundreds of similar I/NGOs are working on devastated area and spending billions of dollars. Most INGOs have failed to live up to commitments they made after the earthquake. INGOs have been sharply criticized for failing to deliver effective humanitarian aid after the earthquake in Nepal as well. In addition, single window policy of NRA on NGO’s involvement has controlled unnecessary flow of money but it has equally discouraged some genuine donors with its bureaucratic hassles. Unnecessary control of NGOs involvement in shelter has dispirited some genuine NGOs who already have networks of local groups, which could be effectively used in resourceful reconstruction process. One of the expert working in disaster reduction...
Many INGOs are focusing on the areas having good access of road and other facilities such as bank, internet, hotel etc., which often ignores the larger section of marginalized group hindering the basic objectives of reconstruction. Coordination amongst NGOs, INGOs and local government bodies in reconstruction process have been the major issues, especially while in duplication and omission of resource distribution. Government capacity will never be built or improved if donors continue to bypass local institutions in favour of NGOs. They also believe that channelling funds through NGOs helps fight corruption and foster accountability.

Although assistance from outside of the community is often welcome and sometimes necessary as a ‘catalyst’ for successful reconstruction, it must not take on a lead role. Foreign aid can expedite development but cannot in ad of itself develop poor nation. The same applies to reconstruction. Reconstruction is a very specialized work, needs large number of technical manpower and expert. No I/NGOs in Nepal have or can manage such number of technical manpower as most of these I/NGOs have been working on awareness and social issues.

### 7.1.4. Political transition

Undoubtedly, Nepal is suffering from weak governance and corruption because of a decade long political transition. Various international agencies have reported that the nation has turned into fragile country with one of the lowest per capita income and Human Development Index (HDI) rank of 157 out of 187, with high level of poverty, social inequality and high corruption level with rank of 27th in overall failed state index. Political instability, nepotism, clientelism and lack of accountability prevail in the society, and corruption is perceived to be a major concern (Jones et al. 2014). As previous reconstruction experiences in developing countries like Nepal also have indicated, the politicization of the process has always been the main obstacle to the provision of timely, effective and sustainable solutions. This is largely because the PDR process relies on *ad hoc* laws and is led by regional and district government structures. Moreover, because of political and social reasons, a kind of distrust is built between the government and people, donor and the government.

### 7.1.5. Bureaucratic burdens and egoism

On the other instance, we have seen inefficiency of NRA in its own institutional setup as well because of its bureaucratic egoism and political interventions. A completion of a supply chain or service depends upon the authorities and institutions responsible for the service provider. Nepal has been struggling in this case because of the insatiable politics and immoral practices of bureaucracy (KC 2015). The second CEO of NRA had not been able to build an effective team yet as many bureaucrats have refused to join the NRA and work under the CEO. Although the newly elected CEO has enjoyed warm welcome from government, path is clear without hindrances. The government erred in not prioritizing adequate staffing of NRA. Post-quake reconstruction works have been largely affected due to a lack of staffers in the authority. It has taken months for officers to be seconded, and many have openly defied the government’s instructions. There is also distrust that the NRA is being used as recruiting ground for the faithful, including those who are active members of intra-party...
professional’ departments and allied NGOs. Bureaucracy has been trying to deal with the situation in a regular bureaucratic manner. As a solution of bureaucratic burdens and egoism, one of the Professors from Tribhuvan University says If NRA cannot get enough manpower from existing bureaucratic system, they should have authority to hire the required temporary manpower including both administrative and technical. Otherwise, NRA cannot complete the reconstruction process within given time frame.

7.1.6. Vested interests and corruption
With the scale of reconstruction to conduct and amount of budget involved in the process, reconstruction projects are prone to fall prey to fraud and corruption resulting in huge losses of project funding (Hidayat and Egbu 2010; Wardak et al. 2012). One finds difficulty in pointing single project in Nepal that has been completed with design time and budget. Prolongation of the process and its limited control mechanisms allowed both local and national politicians to use it for personal gain. Kuntoro Mangkusubroto, the head of the reconstruction of Aceh in Indonesia after the 2004 tsunami, presciently warned when he visited Nepal on 2015 that the three enemies of reconstruction were politics, bureaucracy and corruption, where Nepal seems to be unwittingly falling into these exact traps.

7.1.7. Domestic shortfalls and incapacities
Although the disaster severely affected only about one-fifth of the 75 districts, the degree of devastation is so massive that it is beyond Nepal’s financial capacity to cope with destruction when it comes to speedy reconstruction. Estimated reconstruction requirement – NRs 666 billion – is a big slice of GDP pie. Divergence among political parties in understanding the earthquake-induced humanitarian concern has turned state mechanism weaker in ensuring international assistance. For example, after the army said it is unable to demolish multi-storied decrepit buildings due to lack of instruments at their disposal, there had been a governmental call for international community to provide for such equipment, but to no avail so far. One can imagine the limitation of resources and technical capacities in the process where similar inefficiencies were also reflected in livelihood and reconstruction steps.

7.1.8. Phony commitments
Maintaining and consolidating socio-economic order through reconstruction efforts is just as grave as addressing the ongoing crises of the earthquake. Failing to do so will simply provide more rooms for the undemocratic players to stealthily penetrate into political sphere. During the initial stage, local inhabitants witnessed the arrival of large-scale support from both the government and non-governmental organizations. For reconstruction drive to gain momentum, it is imperative that the government pays due attention to address its shortcomings, ensure convergence among stakeholders over foreign assistance, keep its commitments and ensure others fulfil their commitments too. Unrealistically high community expectations were generated by the various statements and pledges from government leaders, opposite political parties, NGOs, donors and others. Local communities now expect not only to have their
houses rebuilt and their livelihoods restored but also to participate in reconstruction activities. It is hoped that expectations can be managed by focusing on reasonable targets although the NRA’s operational approach does not yet provide any frameworks.

The country has already got its fourth Prime Minister after the 2015 Gorkha Nepal earthquake, after recent election. All the Prime Ministers after the earthquake had publically committed to leave no stone unturned to transparently regulate relief and reconstruction. A new formula – nawa-nirman (reconstruction) has entered into as political jargon. However, their commitments to nawa-nirman (reconstruction) are bogus as they spend their entire time for power centric political purposes in the name of constitution writing. The ambitious plans for reconstruction and rehabilitation have created high expectations.

### 7.2. Governance

In an article for the Guardian, UN head to Nepal Robert Piper wrote, ‘after five years of working on this in Nepal, I have come to recognize that addressing Nepal’s vulnerability to natural hazards is first a governance problem’ (Piper 2013). Hyper-centralization of the reconstruction process at the governmental level weakens the reconstruction process, whereas experience demonstrates that local authorities make more effective, socially sensitive and accountable decision-makers (Davidson et al. 2007). In the broader term of disaster risk reduction in context of Nepal, non-governmental partners are playing pivotal role in setting out priorities and affecting the national goal as per the organization’s target. While ‘sticks and carrots’ are clearly quite significant in the DRR process, it is difficult to locate centres of power or identify who is leading the process, as a degree of circularity seems to be in operation.

Many donor and multilateral agencies laboured the point that DRR and the consortium were ‘government led’ to convey a sense of ownership. Donors claim that they ‘fund the gaps’ or ‘respond to government requests’ and that the ‘government leads’ but at the same time they shape government priorities (Jones et al. 2014).

There is nothing called ideal governance in practice but combining different literatures and advocacy of good governance or ideal governance, it is rational to realize European Union’s (2009) indicators like openness, participation, responsibility, effectiveness and coherence. Some of the indicators added by UN-HABITAT like sustainability, subsidiary, equity, accountability, civic engagement, citizenship and security are broader concept in conventional understanding which are believed to be ‘interdependent and mutually reinforcing’ (UN HABITAT 2011). In the reconstruction process of Nepal, governance needs to be critically analysed with the aspect of govern-ability and govern-mentality.

#### 7.2.1. NRA spending

Nepal has a long record of struggling to meet government expenditure targets even without the additional post-disaster pressures, for instance; it managed to spend only three-quarters of the capital expenditure budget for roads, dams and other infrastructures in 2015/2016. As at September 2016, spending by the NRA has lagged well behind budget. The inability of the NRA to achieve its reconstruction target is
reflected in the planned budget for NRA operations. The NRA has spent about 21 billion rupees for reconstruction so far against the budgetary allocation of 91 billion rupees for the 2015–2016 fiscal year, the bulk of which reflected underspending in the areas of housing, infrastructure and land use coordination. One widely mentioned reason for spending delays was said to be the Nepal government’s commitment to careful details and accurate household damage survey in affected district. As committed to donor agencies, NRA has finished the survey of household in affected districts except districts in Kathmandu Valley damaged by earthquake for the second time. This explanation, however, was not well-received at the local level. What the locals perceived is that they have not received the things that were promised to them by the NRA. People still living in barracks feel that they should by now have been able to move into permanent housing, and farmers feel that their operations should, by this stage, have returned to normal. Second, this continuing under expenditure naturally begs the question of whether the NRA will be able to execute planned budgets into the future. A German MP, Dagmar Wöhrl visited Nepal in March 2016, pointed out that ‘spending merely 13 percent of foreign support is not simply enough.’

7.2.2. Lack of experience

Another headache troubling the reconstruction team lies in the lack of reconstruction experiences or preparedness. Although Nepal is a country accompanying many natural disasters, and even though the NRA team is claiming that the reconstruction process is the task, full of passion and commitment, lacking of reconstruction planning experiences is an obvious weakness. In reconstruction planning work, many planners were confounded at what to do and the first plans were just like ordinary plans, ignoring or at least not fully considered the special aspects of reconstruction. Until the catastrophe of the 2015 Gorkha Nepal earthquake, there has been no special legislation on counter-natural disaster response system in the past. It is obviously a failure of the disaster response system. For another instance, more than 1500 engineers and architects have been employed by the government and deployed in disaster-affected districts and VDCs. But the task of the engineers is not well defined which completely aids to the loss of resources.

Even after 1 year NRA and other stakeholders seem to face several minor technical hitches hindering the long-term process due to lack of experience (Ozerdem and Rufini 2013), such as follows:

A difficult choice between ‘temporary’, ‘transitional’ and ‘long-term’ solutions. Where ‘temporary’ often becomes ‘5 years-long’, whereas ‘transitional’ essentially implies a permanent modification
No guidelines and policy to decide relocation or resettlement
An inappropriate choice between rebuilding ‘where and as it was before’ or ‘build back better’
Decisions on the extent and the objective of the reconstruction process, ignoring social-economic aspect (livelihood) for sustainable reconstruction
A difficult choice between retrofitting or reconstruction of heritage structures and no clear decision on mode of retrofitting/reconstruction of the heritage structure. Decisions about whether to maintain local traditional housing or to promote new technologies. Strategies linking potential new settlements to historical ones, which have to be undertaken in response to their specific needs and bearing in mind their possible effects. No action plan to promote public’s participation at various stages of the reconstruction process. No idea about the number of engineer, Mason and social mobilizer required to complete the reconstruction with in time frame and no plan to train thousands of engineers and masons required for housing reconstruction. Continuing education programmes for the practicing engineer and introducing earthquake engineering courses into university are the out of the scope of the reconstruction.

Characteristics of weak governance are reflected widely on the bureaucratic system of Nepal. Nepal’s tangled bureaucracy is also frustrating and discouraging donors and different actors involved, fearing their donations may not be used effectively. Nepal has already received over US$4 billion in pledged donations towards the estimated US$6.6 billion reconstruction cost, which indicates that the problem facing Nepal is not a lack of funds, rather inefficiency and governmental bureaucracy.

7.2.3. Techno-legal regime
The most crucial factor in reducing a community’s risk from an earthquake is the adoption and enforcement of up-to-date building codes and land use planning. To survive and remain resilient, communities must strengthen their core infrastructure and critical facilities so that these can withstand an earthquake or other disaster and continue to provide essential services. The GoN has decided to implement the Nepal building code in Kathmandu Valley in 2002. However, nearly 90% of homes in Kathmandu have not received the ‘construction conclusion’ certificate, only because their homes do not meet building codes of Nepal. Sharma et al. (2016) also concluded that a majority of the damaged buildings were not designed or constructed properly in accordance with national building codes of Nepal. One of the Professors from Institute of Engineering says, *There does not exist an effective building monitoring and site enforcement mechanism for implementing and enforcing the building code - even in the Kathmandu Valley and municipalities, let alone in the rural ones.*

Land use planning after a mega earthquake can be an instrumental to reduce future seismic risk (Sharma, 2016; Sharma and Deng 2017; Subedi et al. 2016). It should be a significant part of the reconstruction. Reconstruction in large scale without land use planning will not be sustainable and long-lasting. NRA has still got to work to ensure that those places are safe and resilient to future disaster risks while talking about reconstruction. The government has formulated a land use policy but the haphazard construction and development works have put a big question over its effective implementation.
7.2.4. People and public participation

Often while planning or doing engineering works, most of the technical jargons overshadow the real demand of people affected. It is often ignored or forgotten that the affected people are centre of this whole reconstruction process. Especially when the institutional setup of NRA is a broadly elaborated based on the concept of a top-down approach. The reconstruction framework, which basically eludes the importance of participation and integration of cultural and social assets in reconstruction process,\(^\text{19}\) is doomed to fail. In most of the reconstruction process, cognitive mapping and social integration of planning have proved to be very efficient. Ignoring on the local-level integration of governance and politicization of the process through national, regional, and local structures have troubled the reconstruction in many ways. However, it is important to consider this challenge also from a different perspective as for local actors to participate effectively in PDR environments; they need to be aware and equipped with certain capacities and resources, which will enhance their understanding for further years in DRM.

Be it the typology of houses they require or settlement pattern they seek to live in; be it the technological intervention they can adopt in construction process or construction material they are more familiar with; it is very important to plan as per the ground root reflection. In another way, these are not only the challenges for reconstruction but offer plenty of opportunities to rebuild back with capitalizing the cultural and social asset of people in disaster resilience. Jigyasu (2002) and Marahatta (2013) have explicitly focused on capitalization of community-based knowledge and their implication in pre-disaster and PDR process.

7.2.5. Poverty, inequality, and unemployment

Existing social problems such as poverty, inequality and unemployment before earthquake have increased the vulnerability of people and hindered people’s interest to accelerate the reconstruction, especially to build a seismic-resistant residential building. Preliminary estimates suggest that an additional 3% of the population has been pushed into poverty as a direct result of the earthquakes.\(^\text{20}\) They do not have access to or cannot afford modern materials such as cement and steel to build earthquake-resistant building. Furthermore, the cost is exacerbated by transport costs. People who have physical, social and personal vulnerabilities has suffered the most and are finding it difficult to get back to normal life. Dalits, single women, children and people with disabilities are among the greatly disadvantaged group. Improper and unequal distribution of resources is another key factor hindering inclusive reconstruction. In many cases, improper management has resulted in wastage of resources leading to more difficulties among the survivors. One of the landless local participants said Our house was flattened by the earthquake and since then we have been living in this tents. We have not received any support and cannot claim the grant to reconstruct our houses because we do not have land ownership certificate. We are landless, but we are also victims. It seems that special attention needs to be provided in terms of additional government support for landless and people under poverty line, which supports their livelihood as well.
7.2.6. Lack of public awareness
Lack of public awareness is another factor causing problems for people at disaster time and even during the reconstruction after earthquake. Lack of advanced knowledge and skills to respond and recover from a disaster and current level of education of public made them unable to play an active role in the reconstruction process. Although the area is highly seismically active, the frequency of large earthquake is very low. That is the reason for a severe lack of awareness at all levels of society. A participant noted the issue as ... before the earthquake, government agency with the support of I/NGOs organized mason training for earthquake resistant house construction and earthquake drill (Drop, Cover and Hold On). It was kind of fake training and was not organized seriously. It seemed it was organized just to spend the budget. Most of the people even were not aware of it and those who participated were only observers, which brings the seriousness of the issue where such trainings were not targeted to increase in resiliency rather a task carried out of the annual programmes of some institutions. Even after 1 year of the earthquake, public awareness regarding is the earthquake-resistant building construction is very poor. Communicating of earthquake-resistant designs is highly recommended so households can build back safer.

7.2.7. Negligence of local culture
The GoN has proposed more than 17 different building models for residential housing to be constructed as a reconstruction after the earthquake through different platforms. Out of 800,000 collapsed houses, more than 80% houses were traditional houses built up with mud mortar in rural setting. The government has proposed only two fundamental models: one is stone masonry with mud mortar and the second is brick masonry with mud mortar. Those houses are really small in size, even not enough for a nuclear family, ignoring the livelihood directly related with livestock. These model houses do not represent the house of any caste or cultural group of people. Rest of 15 models are either stone or brick masonry in cement mortar with reinforced bar. The government has not proposed yet the model for cattle shade (barn) which is equally important as houses in term of the livelihood of the people living in the village. The inability to consider the local cultural need has led to other problems in reconstruction.

A participant put his anger in our discussion that they have special problems with houses: We need large rural houses. They have provided model of the small civic houses. These houses might be enough for nuclear family and people who live in urban areas but are not suitable for village. The houses have not enough bedrooms and very small kitchen. No space to store the agricultural products like rice, wheat, corn etc. No design for barn is provided…. Negligence of special requirements in rural houses was one of the main aspects of reconstruction that led to dissatisfaction and uncertainty in people’s lives. A couple of houses designed in the centre do not meet the needs of people in earthquake-stricken areas.

7.2.8. Lack of comprehensive information system
Comprehensive planning is an integrated approach for bringing different planning that is done within a town from different actors. In the simplest example, it keeps
everything in order beforehand and in future (KC, 2015). One of the obstacles impeding the process of rehabilitation is the lack of comprehensive information about the demographics of the people and the number of households of each district. The lack of this information was significantly noted during the rescue and distribution of relief material and fund. Immediately after the disaster, a preliminary assessment often referred as rapid assessment or situation assessment was conducted to obtain an early but full assessment of the geographical extent of damage, the number, categories, location and circumstances of the disaster-affected population took months to acknowledge, even those statics are not widely accepted. According to NRA officials, many organizations did not conduct or did not use EIAs nor did they consider long-term spatial, urban or regional planning in their settlement and shelter programme where failing to conduct proper assessments in new sites could increase exposure to other hazards. Due to lack of statistical system, some people residing as a temporary resident could not get any relief materials and fund. They will be deprived of the special fund or loan provided by the government to build earthquake-resistant house and many other privileges for earthquake victims. NRA is still struggling to distribute the first instalment of grants, one and a half years after the devastating quakes and detailed damage assessment of Kathmandu Valley are yet to be completed.

Importance of integrated information system has been often ignored in the planning milieu of Nepal. Be it the reconstruction process or the development plans to be prepared of any rural or urban areas, it is very hard to comprehend the co-ordination amongst different ministerial departments. Reflection of such isolation in planning and missing of information is clearly observed in the delay of reconstruction, which is often the consequence of larger bureaucratic tangle.

### 7.3. Cross-cutting technical issues

#### 7.3.1. Accessibility

The earthquake area is spread over 10,000 km$^2$ and is mostly in very rugged, high altitude, that is remote and with low accessibility. In some cases, it takes over 1 day by road to travel from one end of the affected district to the other. To reach many of the villages at high altitude (higher than 5000 m from mean sea level), it takes another day from the nearest road. Many of the areas are totally cut-off during monsoon due to high flow in the river. Harsh weather in the winter makes the outdoor activities very challenging in winter in the north part of Gorkha, Dhading, Rasuwa and Dolakha districts. The terrain makes transporting construction materials an impossible task in most of the area.\(^{22}\)

#### 7.3.2. Manpower shortage

About 2.2 million Nepalese youths are working in foreign countries (excluding India) as migrant workers. It was predicted that the reconstruction effort would require some 10,000 skilled manpower that included engineers, foremen, masons and carpenters – and another 40,000 semiskilled/unskilled workers.\(^ {23}\) Developing manpower on this scale is in itself a mammoth task. National Planning Commission’s damage and needs assessment in 2015 estimated that only 20% of the needs of human resources
could be met within Nepal’s existing resources. Unfortunately, NRA has not proposed a rigid plan to train such a huge number of manpower required to accelerate the reconstruction. Many people can build their houses without financial support from the government and also are willing to build the house as soon as possible but are facing lack of manpower and do not know how to construct earthquake-resistant building. One of the local businessmen says ….I am not waiting for government’s grant to build my house. I have been looking for an engineer and trained mason to build by the house. Even I am ready to pay higher to trained mason. We have less than 5 trained masons in the village but we have to construct more than 300 houses. Engineers from government appear once in a month. … … ….. Since earthquake government and NGOs have trained thousands of masons and carpenter required for reconstruction but reluctance of such manpower to work in difficult terrain or farther distance has not resolved the crisis.

7.3.3. Knowledge gap and building construction

The construction workforce, in general, lacked knowledge of earthquake-resistant technology because it has never been considered as an integral part of general engineering education in Nepal. Moreover, construction artisans in the area are not formally trained. Their skills are passed down from generation to generation, or learned from other masters. Of course, a small number of craftsmen who have worked in the Gulf States or in urban areas have a better experience in steel fixing, concrete, etc. Without formal training, newer techniques for use with modern materials are not being introduced to craftsmen and technicians.

The building construction mechanism is mostly vernacular, non-formal, incremental in nature and dictated by the local availability of construction materials. The engineering community does not know much about these construction types. The local building practices differ greatly with changes in the availability of materials, culture and economic status of the building owner. Thus, it is neither possible to strictly standardize everything, nor would it be appropriate. Furthermore, the academic institutions appear to be more apathetic towards both non-engineered materials and traditional technologies which is quite an injustice to cultural inheritance of vernacular technology.

7.3.4. Loss of livelihood

Hundreds of thousands of people in Nepal depend on agriculture to make a living and lost the main source of their livelihoods during the devastating earthquakes and their aftershocks. Without an income from crop cultivation and animal farming, people’s ability to feed their families has been hampered. Various organizations and government entities have distributed shelter kits, cooking kits and grain bags to farming household’s right after the disaster as a relief, enabling them to salvage stocks of food and to safely store rice, maize and other types of crops.24

No attention has been primarily paid to livelihoods such as agriculture, husbandry, employment and other social issues by government and I/NGOs. An assistant professor at Institute of Engineering presses that ...the government has done its best to reconstruct the houses and this has not been completed yet and most of the houses are
incomplete, but unfortunately very little attention has been primarily paid to livelihood, health, and social issues ... ... . This has led to an intensification of social uncertainty and confusion in the earthquake affected area. As indicated in PDRF, around 270 million US dollar is estimated for a rehabilitation project in sectors like agriculture, livestock and irrigation. Without effective rehabilitation programme, people are forced to sell their cattle at low prices after the earthquake because they do not have adequate barns and shelters necessary to take care of their livestock. Yet, most of the people are not able to make the loss up after 18 months because they could not afford the higher prices for cattle and food. Moreover, immediately after the earthquake, people received the foods and clothing from government and donor so, people seem to be reluctant to cultivate the agricultural product.

7.3.5. Rehabilitation and retrofitting

Many existing structures including residential buildings located in the devastated area survived the 2015 Gorkha earthquake but are inadequate based on current seismic design codes. Massive demolition and replacement of these vulnerable buildings are neither affordable nor feasible due to historical, cultural, social and economic constraints. One of the local leaders says about half of the RCC building in my village have suffered no damage to moderate damage. We do not know whether our houses can be strengthened or upgraded. We do not know we will get a grant for maintenance or not? Retrofitting is a very relevant technique to restore as well as strengthen the existing undamaged buildings which are otherwise weak against earthquake likely to occur in future. Although there is both financial and technical support for new construction and NRA has already purposed some model buildings for new construction, there is no support or guidance for retrofit of a large number of partially damaged houses. It is also important to build confidence among the local community in the effectiveness of earthquake-resistant technology, with a special focus on retrofitting at minimum additional cost. The retrofitting programme cannot be neglected because carrying on such programme is essential for all economic, political and social reasons.

7.3.6. Ethnicity and Caste

Concerns related to the ethnicity and caste groups were largely ignored in the reconstruction process as a whole which was reflected in the inefficient implementation of reconstruction and revival of livelihood. The existing social or power structure amongst the affected group, especially in a rural setting has put the great impact in differences on reconstruction. The ethnic group which specialized in construction sector seems to have reconstructed their house earlier than the group which would completely depend on daily wages for livelihood in service delivery sector or others. The existing social structure also determined the power access in the context, which resulted in the discriminatory distribution of reconstruction relief or subsidies in some terms of timely or moral support.

Social bondage amongst the affected group was ignored in terms of distribution of money where the reconstruction sum was distributed to individual households. Such distribution mechanism was allotted in phase-wise construction of the houses but the amount was not sufficient enough for some ethnic group to start with as with their
larger family size and lost livelihood. In some interviews, affected people with low-income group expressed their agony and pain towards people close to the power centre. ‘Only higher class people have the information when the relief is coming and they can manipulate the resources’, as quoted by a woman of a lower caste who is living in a structure made of bamboo, tarpaulins and iron sheets and is deprived of the relief resources because of lacking documents of land or house ownership.

7.3.7. Poor housing scheme

Another concern relates to a government scheme recently set up to house the poor and homeless. The scheme works under the same philosophy as the owner-driven reconstruction (ODR) approach where funds are released for the completion of certain elements of work. When asked why the owners had not included these features, the respondents stated that the money reserved by the government was not enough and it did not allow them to even consider some earthquake-resistant features (ERF). It was also stated that a government engineer undertook checks just to ensure that construction works were being undertaken and not to check the inclusion of ERF or the quality of construction. It is underfunded and is subsequently allowing families to live in buildings that are very vulnerable in the event of another earthquake. It is of much concern that the government have developed and introduced a scheme based on the ODR approach that shows total neglect for the beneficiary involved. One of the experts suggests for an effective technical knowledge transfer process to reduce long-term vulnerability, the government needs to include appropriate frameworks that provide earthquake resistant housing for the poor.

8. Discussion

With the critical analysis of the above-mentioned aspects which have greatly deaccelerated the pace of reconstruction, it is important that we regroup our analysis. Reconstruction of broken down structure and retrofitting of the weak structure of physical infrastructures are the major sectors of reconstruction but the most imperative factor: rehabilitation which is directly linked with the social and economic livelihood of people should not be forgotten. After almost couple of years of reconstruction, there does not seem any pragmatic plans that can address the larger group. We must not forget the exorbitant price that we have to pay in terms of economy and social agony, with the delayed reconstruction process. Starting with the institutional setup and identification of actors in this paper, we would like to focus our light on effective institutions and good governance. The absence of local government, hindrance in accessibility and need of integrated information system are considered as critical resources for reconstruction in the period of rescue, recovery and rehabilitation. The inefficiency of involving public in this reconstruction process has been the major flaws identified in different case scenarios. Top-down planning approach has largely failed to address the ground root level demand of people in terms of reconstruction typology/technology and livelihood aspects. Apart from some bureaucratic hassles and irregularities involved in the planning process and implementation, there have been some basic technical shortcomings to address the
reconstruction process. The road to reconstruction cannot be addressed through single panacea rather it is cumulative approach followed by the different actors. When we try to figure out the root problem of all those issues, most of these converge to the political instability. Obviously, we will fall short in explaining the political and bureaucratic instability, but we cannot miss to acknowledge it. Components for effective reconstruction in context of Nepal are presented in Figure 5.

9. Concluding remarks

A qualitative study was conducted to identify the major challenges of reconstruction after the 2015 Gorkha earthquake which has been hindering the pace of reconstruction. With different interactions and analysis of the status quo, authors are convinced with the persistent conception of politics and weak governance structure as the roots of the problem.

It is quite understandable in the period of political transition, different institutions and systems are not in order of good performance, especially in case of countries like Nepal which is struggling with a stable ruling system for seven decades and more. Wide ranges of issues observed during the study such as NRA’s Spending, coordination, and commitments gaps amongst stakeholders, lack of public awareness incapacity of I/NGO and lack of local participation and ownership were amongst few which could have been handled tactfully with effective NRA’s policy. Local government and governance, socio-economic status of people with poverty, inequality, discrimination and unemployment and lack of comprehensive information were rooted in the decade-long stagnation period of the nation. Some issues also featured some cross-cutting topics like difficult topography, domestic shortfalls and incapacities, perception on international assistance, phony political commitments, poor housing scheme, manpower shortage, lack of experience, negligence of local culture,
manpower shortage, knowledge gap in building construction technology and materials, loss of livelihood, no plan for retrofitting and rehabilitation. Bureaucratic burdens, vested interests and corruption, and concentration on the distribution of subsidy for the house and overlooking of rehabilitation are incorporated in different topics of issues. The research has specified that reconstruction is inherently complex and therefore acquires a high level of political and bureaucratic willingness, and project management approaches to bring about higher levels of successful implementations.

Reconstruction after a disaster has always been the response of social, cultural and political situation at that moment. From the experiences around the world, it is noted that challenges related to reconstructions are broader in characters and tangled in its social fabrics. It is also learned that such challenges are not only wider in context rather can be arguably summarized in few topics like governance, technical inefficiency and socio-political situation. In the context of Nepal’s reconstruction, political instability seems to have led the problem with changing NRA leadership and inept local government, but such ineffectiveness in reconstruction is the result of larger contexts.

Understanding of reconstruction as a core technical process and urgency of handing over leadership of NRA towards engineers and relying on a larger number of engineers for reconstruction has underestimated the need for social and economic restoration. In rarest context, sociologists and economists have brought the framework of reconstruction, which is seen in inefficient spending of NRA and lack of effective implementation in plans as forwarded by agencies. Random allocation of relief amount for individual households with changing political agenda was a major failure of NRA which could have been resolved with some strong leadership in NRA with well worked out strategic planning for financial distribution.

Apart from the strategic reinforcement required in the reconstruction process of Nepal, there need to be some cross-cutting issues that could be handled with target strategy and result in the more effective comprehensive reconstruction process. Reconstruction of almost a million houses should also be considered as a renewal of the new era in building construction where more resilient and productive community is expected in future. The government needs to carefully look after the landless and marginalized group including women, single women, senior citizens, people of low-income group and low caste group so that the large group of people is not left behind in the bureaucratic hurdles. It is to be considered that the reconstruction is also to be expanded in the economic revival of the nation as a whole.

A mechanism to livelihood recovery must be developed, which considers the broader impacts of natural disasters including earthquake, landslides, floods, etc., by developing a strong mechanism for community engagement. It is also important to enhance the participation of local authorities in reconstruction where it is must to use post-earthquake reconstruction as an opportunity to strengthen economic activity and to develop sustainable livelihoods in the village. Ensure policy coordination among governmental agencies, donors and I/NGO in determining priority sectors and planning skill development initiatives. Cooperation between local government offices and the NRA should be improved to adjust impractical policies, two-way
channels for information sharing on policies and challenges relating to implementation need to be formalized. National building code should be site-specific and implementation shall be immediately started throughout the country. Provision of strengthening older structures should be developed and implemented immediately.

Improvement in the labour market linkages between the construction workforce and reconstruction effort is the milestone need of the government which should include skill development strategy and livelihood improvement projects incorporating greater investment in training centres for workers in construction-related trades, such as masonry, plumbing, and electrical work and connecting these newly trained workers with opportunities in reconstruction. It is also required to facilitate recruitment of skilled construction workers by individual homeowners to rebuild houses and ensure policy coordination among government ministries and donors in determining priority sectors and planning skill development initiatives.

Finally, the most crucial need of the moment is to enhance the participation of local authorities in developing and executing local economic development strategies and reconstruction process. Especially in terms of the reconstruction process, there is a need for improving the cooperation between local government offices and the NRA, and to adjust impractical policies, two-way channels for information sharing on policies and challenges relating to implementation need to be formalized and significant authority needs to be devolved to local government.

The effective institution, good governance, integrated and comprehensive information, public participation along with short-term and long-term strategies to tackle with technical issues are some crucial factors for timely and quality reconstruction in context of Nepal.

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