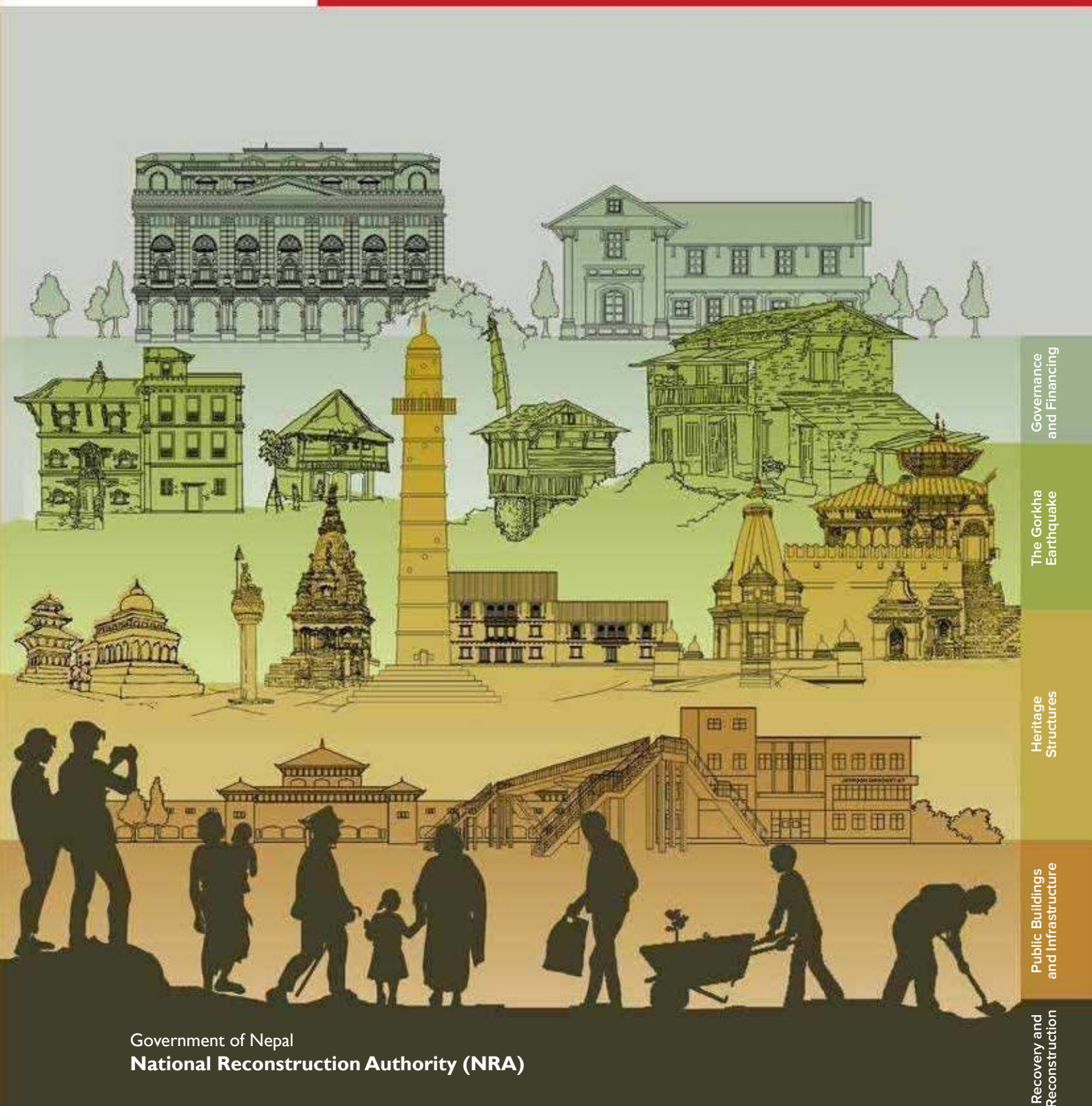




GOVERNMENT OF NEPAL
NATIONAL RECONSTRUCTION AUTHORITY

The Institutional Memory of Nepal's Earthquake Recovery and Reconstruction

COMPENDIUM DOCUMENT: PART B



Government of Nepal
National Reconstruction Authority (NRA)

Governance
and Financing

The Gorkha
Earthquake

Heritage
Structures

Public Buildings
and Infrastructure

Recovery and
Reconstruction

The Institutional Memory of Nepal's

Earthquake Recovery and Reconstruction

COMPENDIUM DOCUMENT: PART B



Government of Nepal
National Reconstruction Authority (NRA)

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The Prime Minister

MESSAGE



This report on post-earthquake recovery and reconstruction reflects the commitments and actions of the Government of Nepal and Nepali people to build back better after the Gorkha earthquake of 2015. Despite changes of governments and the challenges that these have created, the National Reconstruction Authority (NRA) has successfully prepared a record of progress, achievements – and challenges it overcame – for our neighbors and countries around the world. We hope that this will be helpful, should they encounter a fate similar to the one that we had experienced. Now, six years after the 2015 earthquake, damaged homes have been rebuilt, ruined settlements have been transformed into vibrant communities, and shattered infrastructure have been restored and rebuilt to more resilient standards. The livelihoods of earthquake-affected families are now returning to pre-earthquake rhythms.

It is important to note that Nepal's recovery and reconstruction was accomplished with the aid of a broad national consensus. Every political party and people from all walks of life participated in the reconstruction process. Everyone joined hands to support the affected communities. Above all, Nepal also demonstrated its strong commitment to the fundamental reconstruction principles of Building Back Better.

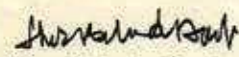
I acknowledge the NRA's leadership and dedication throughout the long reconstruction process, which is now nearing successful conclusion. Various government officials and local governments played highly constructive roles in the process. I also acknowledge the contribution of our multilateral, bilateral, civil society and private sector partner organizations for their generous support. They consistently focused on the needs of the affected people the results of which are there for all to see. The ultimate credit goes to all earthquake-affected individuals and communities for the many ways in which they rose from the rubble with such determination to rebuild their homes, their communities, our shared cultural heritage and public infrastructure.

Our overwhelming success in reconstruction has bestowed upon us the additional responsibility of working further – and together – to build a more resilient society. We have much work to do to strengthen and retrofit our existing housing stock and to construct new, disaster-resilient houses. Our existing infrastructure must be retrofitted and our new infrastructure build in accordance with disaster-resilient principles. Last but not least, all of our federal, provincial and local government bodies must work on disaster preparedness and disaster mitigation to be ready to immediately mobilize for post-disaster rescue & relief operations and for prompt and effective post-disaster reconstruction and recovery. The overarching objective is to minimize destruction, save lives and property, protect the most vulnerable, reconstruct damaged infrastructure as swiftly as possible – and, at every step, do everything possible to strengthen the resilience of our nation and fellow citizens to face future disaster events.

Finally, I would like to reassure my fellow citizens and the international community of the Government of Nepal's strong commitment to the Sendai Framework for Disaster Risk Reduction. We will further intensify our engagement internationally, while acting locally to maximize the social wellbeing of all Nepali people.

Jay Nepal.

29 Nov. 2021


Sher Bahadur Deuba



National Reconstruction Authority



FOREWORD

I am pleased to share this document, which synthesizes the National Reconstruction Authority's experiences in recovery and reconstruction after the Gorkha earthquake of 25 April 2015. The National Reconstruction Authority (NRA) began its reconstruction immediately after it was established. It was a period of major political changes in the country and the resultant challenges were enormous. Frequent change of national governments, the fragility, even absence, of local governments, the fears that many Nepalis still experienced after years of conflict and of course, the agony and losses suffered as a direct result of the earthquake, all had combined to create tremendous moral and psychological pressures on the NRA to deliver.

Strategizing reconstruction began with the preparation of the Post Disaster Needs Assessment (PDNA). Thereafter, donors and partner organizations joined hands under the Government of Nepal's (GoN) leadership to organize the International Conference on Nepal's Reconstruction (ICNR) – 2015. The NRA further refined the PDNA after building greater understanding of the ground realities in terms of destruction and loss, and led the multi-stakeholder preparation of the Post Disaster Recovery Framework (PDRF). Using the PDNA and PDRF as reference documents, NRA formulated annual plans for carrying out an extensive array of reconstruction and recovery interventions.

The NRA's trajectory followed the normal project implementation curve: slow at the initial stages, as preliminary technical studies and assessments were required to underpin reconstruction operations, and subsequently accelerated the pace of activities as the recovery progressed. The reconstruction of more than 800,000 private houses, more than 900 heritage structures, 415 government buildings, 7,583 school buildings, 1,164 health facilities, 731 security related buildings, 764 kilometers of road, 120 integrated settlements (68 completed), 12,337 houses for landless people, and the relocation of 4,720 households are major accomplishments by any standard. We attained a significant milestone in employment generation as well, with the creation of over one million jobs with about 50 million work days for engineers and other construction workers including masons, carpenters and artisans. A substantial number of the employment opportunities went to women.

Putting together reconstruction resources of US\$ 7 billion was not an easy task. NRA's maintenance of operational transparency and its ability to gain the trust of many stakeholders played a significant role in making this possible. Through the Development Assistance Coordination and Facilitation Committee, the NRA kept all members of the donor community regularly informed of both progress and challenges. We also ensured close coordination with sectoral line agencies for effective implementation.

There was always one concern at the NRA during reconstruction: How to internalize the lessons learnt from its engagement across the government system? NRA has been working with the Ministry of Urban Development (MoUD) in retrofitting the existing housing stock and implementing the National Building Code nationwide. More importantly, our engagement with the recently-established National Disaster Risk Reduction and Management Authority (NDRRMA) to ensure that the achievements will contribute towards increased disaster resilience, has started bearing fruit. The GoN's announcement to prepare the Nepal Disaster Response Framework 2021-2030 along with the resilience goals and targets is a major milestone in that direction. The strengthening of the local government systems was also extremely crucial during post-earthquake reconstruction. It is now for the NDRRMA to take forward the gains and continue building disaster preparedness and post-disaster reconstruction capacities at the local level. The preliminary initiatives undertaken in the post-Gorkha earthquake recovery operations have to be nurtured, expanded and internalized during the post-NRA period.

I would like to thank everyone who contributed to the preparation of this important document, in particular the ICNR Secretariat, thematic teams, national and international experts. I strongly believe that both national and international stakeholders will benefit from your efforts for years to come.

Sushil Gyawali
Chief Executive Officer
National Reconstruction Authority



National Reconstruction Authority



ACKNOWLEDGEMENTS

It is our pleasure to have Rt. Hon. Sher Bahadur Deuba as Prime Minister and Chairman of the NRA Steering Committee. We wish him a successful tenure and hope that we will be able to comprehensively conclude the NRA's operations under his guidance.

The NRA has been documenting the lessons learnt during the reconstruction in various documents. This one adds to the list. Hundreds of officials, experts and other individuals have been involved in the preparation of this document. Five thematic committees were formed for drafting the thematic chapters under the overall guidance of the Chairman of the ICNR Organizing Committee and NRA CEO Mr. Sushil Gyawali. The heritage chapter was coordinated by Steering Committee Member Mr. Kishore Thapa. Similarly, the thematic areas of governance, housing, public buildings & infrastructure, and livelihoods were coordinated by NRA Executive Committee Members Mr. Dhruva Prasad Sharma, Dr. Chandra Bahadur Shrestha, Dr. Hariram Parajuli and Dr. Bishnu Bhandari, respectively. All others involved in preparing the document have been named in the list of contributors.

Based on the thematic consultations, national sectoral experts mentioned in the list of contributors drafted the thematic chapters. I would like to, particularly, acknowledge the contributions of Mr. Pratap Pathak for governance; Mr. Surya Narayan Shrestha & Mr. Ranjan Dhungel for housing; Mr. Bishnu Raj Karki & Mr. Purushottam Dangol for heritage; Mr. Ranjan Dhungel for public buildings and infrastructure, and Dr. Bishnu Bhandari for livelihoods.

I also acknowledge the commitment, drive, and efficiency of the ICNR Secretariat led by Dr. Chandra Bahadur Shrestha, NRA Executive Committee Member. Mr. Manohar Ghimire, Under Secretary, contributed as Member Secretary of the Secretariat. Ms. Sulochana Nepali, Mr. Janardan Nepal and Mr. Sandeep Gurung facilitated the works of the Secretariat. Mr. Chandan Rana Magar and Mr. Bhuvan Adhikari worked on the layout-design, including sketches on the cover and title pages.

The document was greatly enhanced with the contribution of the international team of experts, which was coordinated by Dr. Chandra Bahadur Shrestha, Executive Committee Member. Other international experts were: Dr. Nigel Fisher – governance, livelihoods and general editing; Dr. Jennifer Duyne Barenstein – housing; Mr. Vivek Rawal – housing; Dr. Rohit Jigyasu – heritage; Prof. Dr. Rajesh Dhakal – public buildings and infrastructure & housing; and Mr. Manohar Ghimire, Member Secretary of the ICNR Secretariat. I, on behalf of the NRA, would like to express my thanks to all for their contributions.

The NRA is also grateful to all the agencies who supported the preparation of this document. We are grateful for the support provided by the World Bank, European Union, United Nations Development Programme (UNDP), and the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), Italy. The Multi Donor Trust Fund (MDTF) established by the World Bank, and the governments of USA, Canada, Switzerland and UK have supported the publication of this document. We are immensely grateful for the contributions of the Central Level Project Implementation Units (Building, GMaLI & Education), Department of Archaeology (DoA), local governments, development partners and many other national and international partner organizations.

We hope that this document will be beneficial to all for effective disaster management in the coming days.

Sushil Chandra Tiwari
Secretary
National Reconstruction Authority



National Reconstruction Authority



ABOUT THIS PUBLICATION

The National Reconstruction Authority (NRA) has documented learnt lessons in reconstruction through scientific papers, the NRA corporate paper on institutional memory and through institutional and open route publications. This publication comprises of NRA's institutional memory and record of recovery and reconstruction in the years following the 25 April 2015 Gorkha earthquake.

The ICNR Secretariat formed five thematic committees: governance, housing, heritage, public building & infrastructure and livelihood as approved by the Organizing Committee. Each of these committees drafted a thematic paper based on the given table of contents. Each of the thematic papers were developed through an iterative process and including reviews by international experts.

One webinar was organized during 27-29 November 2020 to obtain feedback from all stakeholders, where the thematic papers were discussed and commented by both national and international experts. The documents were further refined based on the feedback. The NRA observed the sixth Earthquake Memorial Day (25th April, 2021) where the institutional memory was presented and discussed, which lead to another round of revisions.

The chapter on governance and financial framework has concluded that a reconstruction authority would require undisputed, overall authority in post-disaster reconstruction, including administrative and financial authority. Similarly, the analysis of the housing chapter has concluded that NRA's owner-driven approach was appropriate and led to significant success in the reconstruction of private houses. It has also suggested that Nepal needs to pay additional attention to urban housing and retrofitting of existing houses that fall short of disaster resilience standards. Another suggestion is the need for nationwide enforcement of building codes and relocation of vulnerable settlements.

Similarly, the heritage chapter has pointed to the need for enhancing Nepal's overall capacity in conserving heritage monuments and settlements. It calls for increased focus on producing human resources skilled in conservation and preservation of both tangible and intangible heritage. Incentives for attracting youths to the heritage sector, and clarity of demarcation of ownership of heritage monuments and sites have been pointed out as crucial steps required for efficient conservation.

The analysis in the public buildings and infrastructure chapter has concluded that implementation through user committees was a very appropriate strategy. Secondly, it has pointed to the urgent need to strengthen historical palaces, government buildings, schools and hospitals through retrofitting as most of them are still vulnerable to earthquakes. Further, the employment opportunities created through reconstruction were instrumental in rebuilding, and ensuring livelihoods of the affected people. Some direct livelihood interventions yielded mixed results, especially those that were short-term. The socio-economic recovery and socio-economic impact of overall reconstruction and recovery efforts have been documented separately, and hence, not included in this document.

NRA has devised an exit strategy which was, to some extent, affected by the Covid-19 pandemic. We have completed the smooth handing over of some remaining reconstruction works to concerned ministries and departments, and are working together with NDRRMA for addressing long-term disaster management tasks.

We hope this document will serve as useful reference material for policy makers, implementing agencies, academicians, researchers and people interested in reconstruction both in Nepal and abroad.

Dr. Chandra Bahadur Shrestha
Member, NRA Executive Committee
Convener - ICNR

Executive Committee

Mr. Sushil Gyewali	Chief Executive Officer
Mr. Shishir Kumar Dhungana	Member, Secretary, OPMCM
Mr. Dhruba Prasad Sharma	Member
Dr. Chandra Bahadur Shrestha	Member
Dr. Bishnu Bahadur Bhandari	Member
Dr. Hariram Parajuli	Member
Mr. Sushil Chandra Tiwari	Member Secretary and Secretary, NRA

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Abbreviations

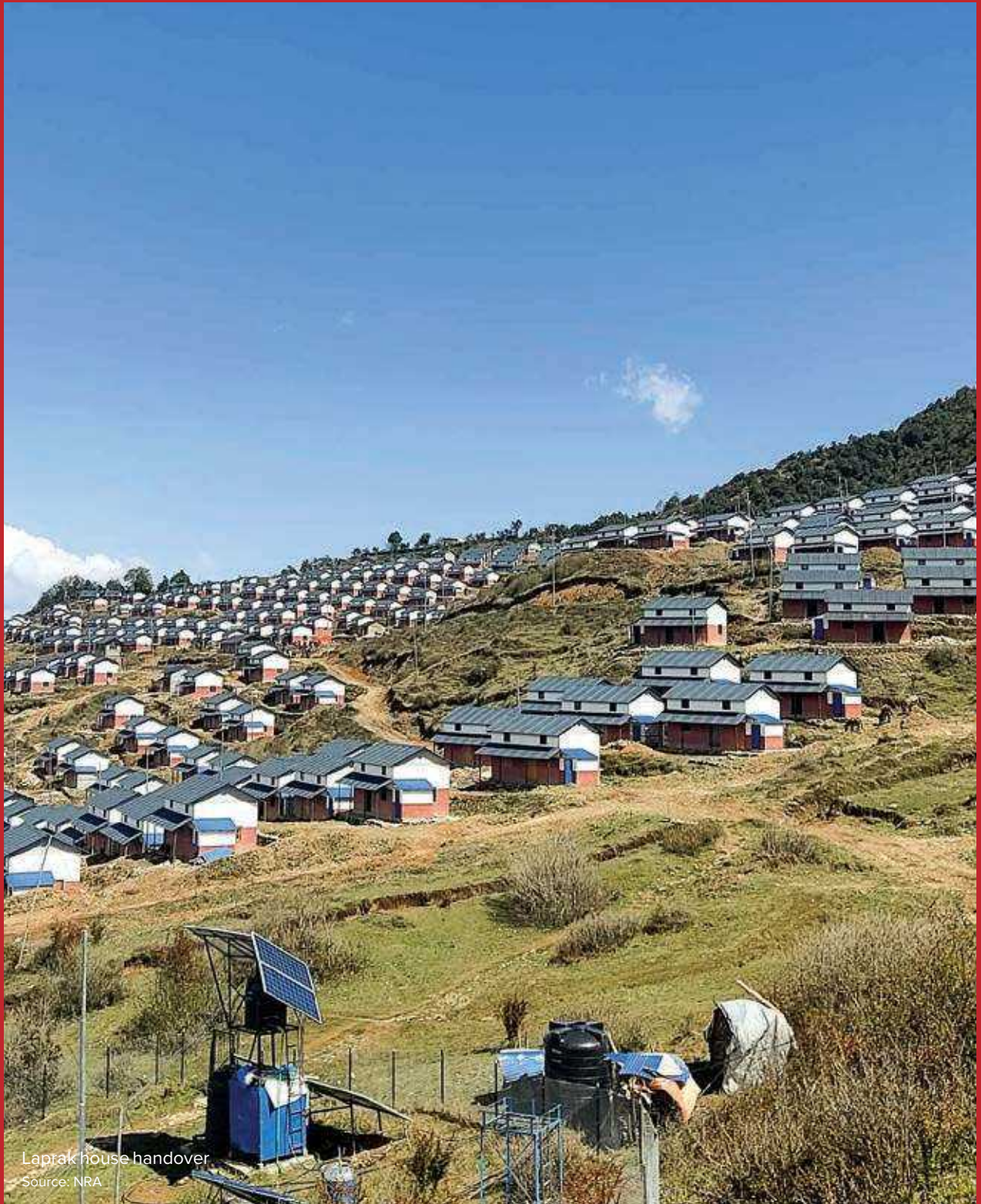
ADB	Asian Development Bank
AIN	Association of International Nongovernmental Organizations in Nepal
BCRAC	Building Code Revision Advisory Committee
BMC	Brick Masonry in Cement
BMM	Brick in Mud Mortar
CAPI	Computer Assisted Personal Interview
CBOs	Community-Based Organizations
CBS	Central Bureau of Statistics
CDO	Chief District Officer
CEO	Chief Executive officer
CG	Choudhary Group
CGI	Corrugated Iron Sheets
CLPIU	Central Project Implementation Unit
CRC	Community Reconstruction Committees
CRS	Catholic Relief Services
CSO	Civil Society Organizations
CTEVT	Council of Technical Education and Vocational Training
CTTF	Centre Technical Taskforce of Centre Bureau of Statistic
DACFC	Development Assistance Coordination and Facilitation Committee
DoA	Department of Archaeology
DAO	District Administration Office
DCC	District Coordination Committees
DDA	Detail Damage Assessment
DDMC	District Disaster Management Committee
DDRC	District Disaster Risk Committee
DIFID	Department of International Development
DLPIU	District Level Project Implementation Unit
DMG	Department of Mining and Geology
DoE	Department of Education
DOLI	Department of Local Infrastructures
DOLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DoR	Department of Roads
DPR	Detail Project Report
DRCN	District Road Core Network
DRRM	Disaster Risk Reduction and Management
DRSP	Disaster Resilience of Schools Project
DSCWM	Department of Soil Conservation and Watershed Management
DUDBC	Department of Urban Development and Building Construction

DWIDP	Department of Water Induced Disaster Management
DWSS	Department of Water Supply and Sewerage
EC	Executive Committee
ECED	Early Childhood Education and Development
EEAP	Earthquake Emergency Assistance Project
EHDC	Earthquake Housing Damage Characteristics
EHRP	Earthquake Housing Recovery Program
EEAP	Earthquake Emergency Assistance Project
EIRR	Economic Internal Rate of Return
ESRP	Emergency School Reconstruction Project
EU	European Union
EXIM Bank	Export-Import Bank of India
FY	Fiscal Year
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit / German Corporation for International Cooperation GmbH
GLOFs	Glacial Lake Outburst Floods
GMALI	Grant management and Local Infrastructure
GoI	Government of India
GoN	Government of Nepal (GoN)
HCBS	Hollow Concrete Block
HRHRS	Household Registration for Housing Reconstruction Survey
HRIS	Human Resource Information Management System
HRRP	Housing Reconstruction and Recovery Platform
ID	Identification Document
IDA	International Development Association
IEE	Initial Environmental Examination
IFRC	International Federation of Red Cross
INGO	International Non-Government organization
IT	Information Technology
JFPR	Japan Fund for Poverty Reduction
JICA	Japan International Cooperation Agency
KOICA	Korean International Cooperation Agency
KVDA	Kathmandu Valley Development Authority
LMGS	Land Management and Geological Studies Section
LRN	Local Road Network
M&E	Monitoring and Evaluation
MDTF	Multi-Donor Trust Fund
MoE	Ministry of Education
MOFA	Ministry of Foreign Affairs
MOFAGA	Ministry of Federal Affairs and General Administration
MoFALD	Ministry of Federal Affairs and Local Development
MOHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population

MoUD	Ministry of Urban Development
NBC	Nepal National Building Code
NEA	Nepal Electricity Authority
NFN	NGO Federation of Nepal
NGO	Non-Government Organization
NNBC	Nepal National Building Code
NPC	National Planning Commission
NPR	Nepali Rupees
NRA	National Reconstruction Authority
NRCS	Nepal Red Cross Society
NSET	National Society for Earthquake Technology
ODR	Owner Driven Reconstruction
PA	Participation Agreement
PBI	Public Buildings and Infrastructures
PCU	Project Coordination Unit
PDNA	Post Disaster Need Assessment
PDRF	Post Disaster Recovery Framework
PIU	Project Implementation Unit
PMC	Programme Management Consultancy
POs	Partner Organizations
PRC	People's Republic of China
RC	Reinforced Concrete
RCC	Reinforcement Cement Concrete
SEANep	Structural Engineers' Association Nepal
SDC	Swiss Agency for Development and Cooperation
SFD	Saudi Fund for Development
SMC	Stone in Cement
SMM	Stone in Mud Mortar
SOP	Standard Operating Procedure
STA	Socio-Technical Assistance
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training
TWG	Technical Working Group
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Education Fund
UNOPS	United Nations Office for Project Services
USAID	United State Agency for International Development
VDC	Village Development Committees
VRCN	Village Road Core Network
WASH	Water Sanitation and Hygiene
WB	World Bank

CHAPTER I

INTRODUCTION



Laptrak house handover
Source: NRA



Integrated settlement, Dolakha
Source: NRA

CHAPTER 1

INTRODUCTION

1.1 Background

On 25 April 2015 a massive –7.8 (Mw) – earthquake, one of the worst earthquakes in 80 years, shook about a third of country including the capital Kathmandu. The epicenter was near Barpak village of Gorkha district is the northwest of Kathmandu. The Post Disaster Needs Assessment (PDNA) had estimated a loss of about US \$ 7 billion, in addition to 8,790 lives that were lost and 22,300 people who were injured. Seventeen days after the main shock, there was a strong after-shock on May 12, 2015 that caused more damages. In all there were over 500 aftershocks. On May 19, 2021, there was an aftershock of 5.8 (Mw) with the epicentre located west of Gorkha, in Lamjung district. Major meta-data of the April 2015 Gorkha Earthquake is presented in Table 1.

TABLE 1: MAJOR METADATA OF 2015 GORKHA, NEPAL EARTHQUAKE

Parameter	Description	Damage Estimates	Unit
Date of occurrence	25 April 2015	Fully damaged houses	498,852 Nos
Time	UTC 06:11:25; NST: 11:56:25	Partially damaged houses	256,697 Nos
Magnitude	7.8 (Mw)	Health facilities	1197 Nos
Epicentre	Barpak, Gorkha	Schools	7553 Nos
Depth	8.2 km	Public buildings	415 Nos
Death	8,790	Security buildings	216 Nos
Injuries	22,300	Heritage monuments	920 Nos
Affected districts	32	Roads	964 Km
Affected population	8 million	Road bridges	14 Nos
Disaster effect	US \$ 7.065	Water supply	1500 Schemes
		Gumbas	1320 Nos
		Settlements to be relocated	299 Nos

Source: NRA

1.2 Achievements

The National Reconstruction Authority (NRA) has almost completed the reconstruction and recovery tasks. The Table 2 shows the major accomplishments until the end of Ashadh 2078 (15 July 2021).

TABLE 2: MAJOR ACHIEVEMENTS

Outputs	Target	Achievement (units)	%	Outputs	Target	Achievement (units)	%
Private housing	829667	759,710	91.57	Schools	7583	6647	87.66
Resettled households	4720	3385	71.72	Health buildings	1164	751	64.52
Landless households	12757	12337	96.71	Govt. buildings	415	388	93.72
Integrated settlement	128	68	53.13	Heritage	920	589	64.02
				Road	764	657 km	85.99

Source: NRA Annual report 2077/78

1.3 About this report

The purpose of preparing and publishing the institutional memory is to record the reconstruction achievements and the processes involved, which are expected to be useful for future generations of this country and for the rest of the world.

There are two parts of the Institutional Memory of Nepal's Reconstruction and Recovery documentation. Part A is the summary version and Part B discusses the issues in detail. This is Part B of the institutional memory documentation. It deals with five thematic areas: Governance and financial framework, housing reconstruction, reconstruction of heritage structures, reconstruction of public buildings and infrastructure, and socio-economic recovery after the Gorkha earthquake. The exit strategy of the NRA is provided in the final chapter.

The second chapter deals with the governance and the financial framework, including governance structures, organizational structure and financial requirements and sources. Similarly, chapter 3 describes the magnitude of destruction, reconstruction processes, issues and outputs in housing reconstruction. Chapter 4 explains the reconstruction of heritage structures, including world heritage sites, temples, monasteries, Rana palaces and ponds. Chapter 5 presents the learnings in the public building and infrastructure sector, including schools, hospitals, government buildings, roads, water supply and sanitation. The buildings of security forces are also included. Finally, chapter 6 deals with socio-economic recovery and livelihood, highlights the social and economic losses and the recovery. The chapter also deals with the recovery efforts of both the government and non-government sides.

1.4 Process and methodology

Under the overall guidance of the ICNR Steering Committee and Organization Committee, NRA formed five thematic groups including relevant individuals. These groups identified the issues and coordinated information collection from various sources. Based on the information collected, the sectoral experts drafted the report which involved a number of integration processes. Each sectoral report was presented to national and international audiences at the National Symposium (24 - 27 Aug. 2020). The thematic papers were then reviewed by an international team of experts. The entire process was coordinated by the ICNR Secretariat. The summarized version of the institutional memory was presented at the Sixth Earthquake Memorial Day feedback from which helped in finalizing the report.

1.5 Limitations

The entire government system of providing services is output oriented. The process recording is not emphasized enough even though it is vital for extracting learning elements. Further, the high turnover of government officers affected proper recording of firsthand knowledge. In addition, the report process began only in early 2020 when most of the non-governmental organisations (NGOs) had wrapped up their operations. All learnings documented were triangulated and corroborated, which enhances the robustness of the analyses. In addition, as the preparation of the institutional memory document took more than one and half years and different chapters were analyzed at different points of time, there is also some discrepancy in data. Though the Secretariat had updated many data later, it was logistically complicated to update all data in the report.



Public Hearing at Melamchi, Sindhupalchok
Source: NRA

CHAPTER 2

GOVERNANCE AND FINANCIAL FRAMEWORK



Source: NRA



20th Steering Committee Meeting
Source: NRA

GOVERNANCE AND FINANCIAL FRAMEWORK

2.1 Background and introduction

2.1.1 Gorkha Earthquake 2072: A Synopsis

Nepal suffered a large number of lives and property on 25 April of 2015, when the devastating 7.8 Mw earthquake struck Nepal. The subsequent aftershocks, including one on 12 May 2015, of magnitude 7.3 Mw in Dolakha district near the border with China, resulted in additional loss of life and property.

The Post-Disaster Needs Assessment (PDNA) prepared by the Government of Nepal in August 2015 estimated that the lives of eight million people, almost one-third of the population of Nepal, were affected by the earthquakes of 25 April and 12 May 2015 and the subsequent aftershocks and over half a million homes were badly damaged or destroyed, primarily in the rural areas.

It is now five years since the Gorkha earthquake that took thousands of lives, destroyed livelihoods, destroyed and damaged many houses, buildings, public infrastructure, and cultural heritage sites and monuments, many of them thousands of years old. During these five years, the government has supported nearly one million survivors with emergency response, relief and rescue, recovery and reconstruction. It was the largest owner-driven post-disaster housing reconstruction program the world has ever witnessed.

This initiative, overseen by the Government of Nepal, was led by the NRA, established in December 2015. The effort was supported by several donors and development partners, as well as by civil society organisations, and international and national NGOs. This combined effort supported the country efforts to recover from the terrible losses it had incurred. Damages and losses affected almost half of the country in terms of geography; the impact of the disaster was estimated to have been about two percent of Nepal's GDP.

The PDRF guidelines

Recovery vision

“Well-planned, Resilient Settlements and a Prosperous Society”

Strategic objectives

- n Restore and improve disaster resilient housing, government buildings and cultural heritage, in rural areas and the cities,
- n Strengthen the capacity of people and communities to reduce their risk and vulnerability and to enhance social cohesion,
- n Restore and improve access to services and improve environmental resilience,
- n Develop and restore economic opportunities and livelihoods and re-establish productive sectors, and
- n Strengthen capacity and effectiveness of the state to respond to the people's needs and to effectively recover from future disasters.

The scale of destruction was massive. Over 8000 lives were lost and over 800,000 private houses were destroyed or badly damaged. Much public infrastructure, including health facilities, schools, roads, law enforcement office buildings and government offices, was damaged or destroyed. Thirty-two of Nepal's 77 districts (40%) were affected, 14 districts were affected very severely. Many people were displaced and

lost their homes, food, and livelihoods and were forced to live in tents, or in very poor conditions in temporary huts and shelters. Lack of food, water, sanitation, and shelter was a problem in the year immediately following the earthquake. Though rescue and relief operations started immediately after the 25 April 2015 earthquake, aftershocks (including a large one in May) were frequent and compounded the difficulties faced in the operations.

The Government of Nepal immediately mobilised all possible means - agencies, equipment, technical and material resources - for rescue and relief. Affected people were provided shelter in tents, public buildings, or open spaces, and were supplied with relief materials as per the government's capacity and

Losses from the earthquake

1. Affected: 32 districts
2. Affected: 8 million people
3. Loss of lives: 8,790 persons
4. Wounded: 22,300 persons
5. Private houses damaged/destroyed: 866,207 (November 2021)
6. Government buildings: 2,656 destroyed and 3622 damaged
7. Schools destroyed/ damaged: 7,583; Classrooms: 49,681
8. Health posts destroyed/ damaged: 1,164
9. Cultural Heritage sites destroyed/ damaged: 920
10. Financial loss: NPR 706 billion (US \$ 7.06 billion).

Post Disaster Need Assessment (PDNA)

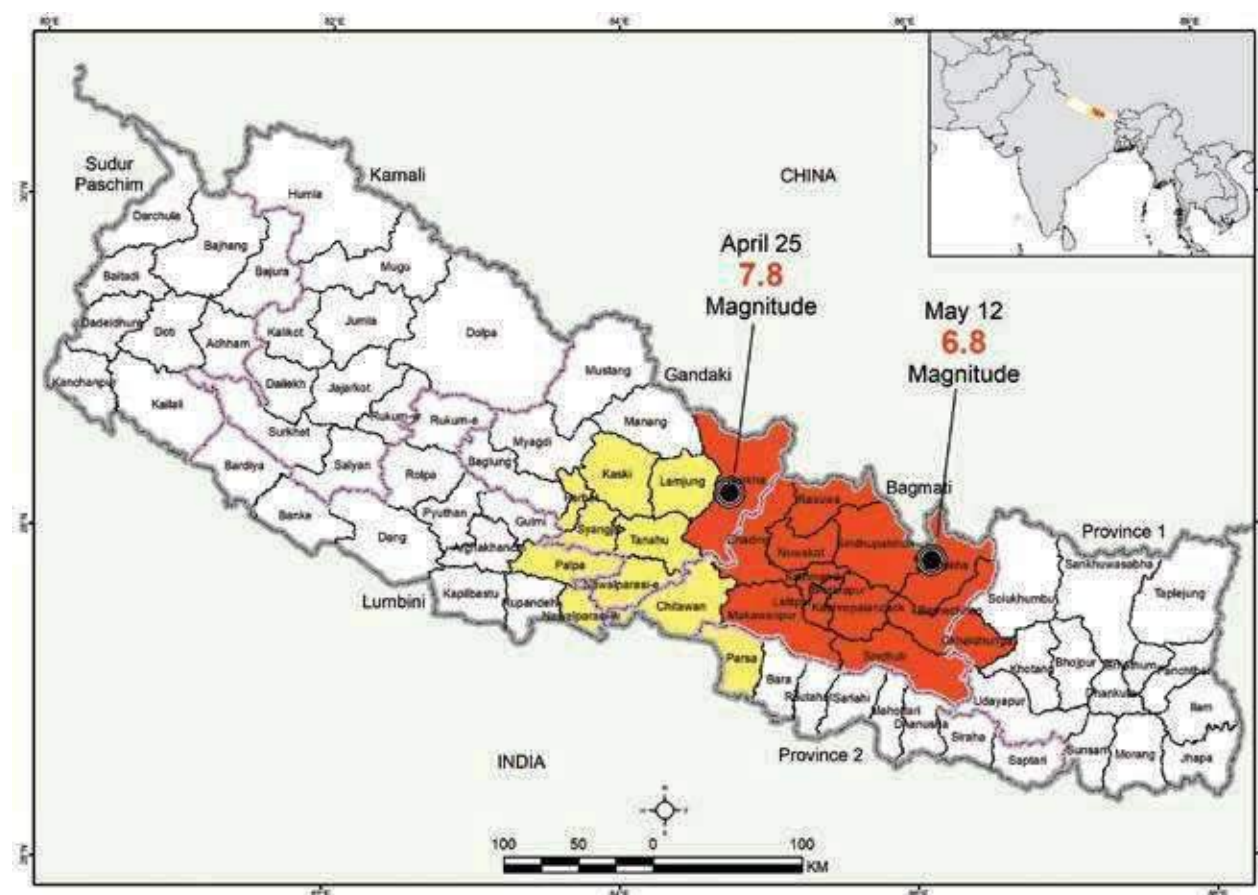
1. Nepal carried out a Post Disaster Need Assessment (PDNA) immediately after the earthquake; the main objective was to assess and estimate the losses inflicted by the earthquake and to prepare a recovery strategy.
2. The first response of the Government of Nepal after the earthquake was to rescue and provide relief to earthquake-affected people. The PDNA exercises were carried out simultaneously.
3. Nepal's development partners/ international donors extended support to the Government for providing humanitarian aid, and extended and mobilised financial and material resources, technical support and expert services.
4. The National Planning Commission (NPC) had been designated by the government to lead the PDNA. Representatives from line ministries, civil society, private sector, and development partners were mobilized to undertake a comprehensive assessment of damage and losses caused by the earthquake. The assessment was completed within a month.
5. More than 250 national and international experts were mobilized. 23 thematic areas were assessed in four sectors: i) Social, ii) Productive, iii) Infrastructure, iv) Cross-cutting issues. The PDNA had estimated that losses and damages worth about 7 billion USD. The private sector's losses represented nearly two-thirds of the total.
6. Thirty-one (subsequently revised to 32) districts were affected. These districts were categorised in terms of three levels of earthquake damage.
7. The National Reconstruction Authority (NRA) was established as the agency that would lead and steer the recovery and reconstruction on the basis of the PDNA.

Sources: Government of Nepal, Nepal Disaster Risk Reduction Portal (<http://drrportal.gov.np>).

community access. The rescue and relief effort had faced some initial problems owing to the lack of experience of effective coordination among some agencies, and the inability to identify proper means of support. However, within a very short time period of time, the government succeeded in mobilising resources for rescue and relief in an integrated manner. These efforts led to many lives being saved, locating and recovery of the deceased, and establishment and management of temporary shelters, while relief materials including food, water and medicine were sourced and distributed. The government had managed to keep the country in good order, with a focus on returning to normalcy as-early-as possible.

The earthquake-affected districts and epicenter of the 2015 Gorkha earthquake and its aftershocks' location are shown in Figure 1.

FIGURE 1: EARTHQUAKE AFFECTED DISTRICTS



Sources: Edited map from <https://reliefweb.int/map/nepal/nepal-april-2015-earthquake-estimated-affected-areas-25th-april-2015>

The Post-Disaster Recovery Framework (PDRF) prepared under the leadership of NRA, in consultation with national and international stakeholders, provided a strategic platform with a prioritised and structured framework for planned, systematic, coordinated and collaborative execution of recovery and reconstruction work. The PDRF's strategic recovery objectives were based on an integrated perspective encompassing the governance structure, policy management capacity, institutional provisions, execution system, financing mechanism, financial management system, monitoring, review and evaluation mechanisms, together with a collaboration and partnership framework. As an integral component of the recovery framework, a specialized system of sector-specific plans came into effect, incorporating priorities and projections of financial resource requirements for recovery and reconstruction interventions.

2.1.2 The immediate post-earthquake phase

The 25 April and 12 May 2015 earthquakes caused a level of devastation that had not been experienced by Nepal in 80 years. There were no comprehensive records on how Nepal had responded to the 8.0 Mw earthquake of 1934, and subsequent significant disaster events. Nevertheless, Nepal was able to mobilize all levels of society and international partners to rapidly launch extensive emergency relief operations. The PDNA provided the basis for holding the 25 June 2015 International Conference on Nepal's Reconstruction (ICNR), that had resulted in pledges of US \$4.1 billion for recovery.

However, reconstruction had to wait. Political turmoil surrounding negotiations on Nepal's new Constitution (promulgated on 20 September 2015), was accompanied by protests in the Terai and the subsequent disruption of supplies that had devastating humanitarian and economic effects across the country. The NRA was formed in August but was dissolved for failure to get the legislation approved in parliament. A new Government was elected in October 2015.

The NRA was constituted again on 25 December 2015. Its first six months were challenging: the Executive Committee had to launch reconstruction while also creating and staffing the new institution from a scratch. Despite this, and within a few months of its creation and before the first anniversary of the earthquake, the NRA obtained approval of the Council of Ministers on the guidelines for housing grant distribution; environmental impact assessment; land acquisition and land registration; public procurement; reconstruction regulation; land registration; and working with non-governmental organisations. In May 2016, the NRA published a Post-Disaster Recovery Framework (PDRF), detailing reconstruction priorities within and across sectors, for 2016-2020 period.

Given a number of logistical, security and other challenges with housing damage surveys undertaken in 2015, the Central Bureau of Statistics, conducted the detailed damage assessment survey in three phases – first, for 11 most affected districts; second, for 3 Kathmandu valley districts; and third, for remaining 17 (later on, 18) less affected districts.

While the mandate of the NRA as provided in the Reconstruction Act (GoN, 2072) was multi-pronged, the scale of devastation of private housing and the consequent large-scale displacement of Nepalis

First Lessons First:

- a. Preparedness for disaster recovery cannot wait for disasters to happen.
- b. Hazard mapping, disaster risk assessment and context-relevant disaster preparedness have to be an intrinsic part of planning for sustainable development.
- c. Development standards, codes and practices have to accommodate the requirements of national resilience to disaster impacts.
- d. A permanent disaster management authority should be endowed with the necessary powers, authorities and capacities to lead and coordinate disaster preparedness, response, recovery and reconstruction operations, following any and all kinds of disasters.
- e. Advance whole-of-government consensus on the mandate, authorities and procedures of the authority is a prerequisite.
- f. Advance development is required of survey protocols and of special systems specifically designed for management of financing, procurement, human resources, information management, monitoring and evaluation in disaster management and during post-disaster reconstruction – with the support of international development partners.
- g. Planning for specific post-disaster recovery and reconstruction operations must begin during the immediate rescue and relief phase.
- h. Regular communication with the media and public on the necessity for proper planning of reconstruction – and on the progress of the planning phase - will assist in managing expectations.

forced to live in temporary and improvised shelters, had created an increased public demand for starting reconstruction of private housing that had eclipsed all other reconstruction priorities. The first household/owner participation agreements with the NRA were signed in June 2016 and distribution of the first tranche of housing grants to beneficiaries began shortly after that.

Housing reconstruction became the central pillar of the reconstruction operation owing to the need and also the increasing public demand. Two monsoon seasons went by after the April and May 2015 earthquakes before significant reconstruction initiatives got underway. Beyond the challenges in the political landscape, the new NRA faced numerous stresses, as it sought to simultaneously develop its governance bodies, its structure, staffing, systems and stakeholder coordination arrangements, complete the PDRF and initiate reconstruction in housing and other sectors, in the face of ever rising expectations at both the political and popular levels.

The NRA learnt early that engaging international development partners in the design and development of special procedures, protocols and systems for timely and effective disaster management and recovery operations, was important. It was essential that the international partners supported the national authority to develop the control systems that gave them (the partners) confidence in the capacity of the entity. This was also important for the NRA because unless it developed financial management, procurement, human resource and information management systems that meet national requirements that were acceptable to international partners; and unless the systems and procedures facilitated the accountabilities of international partners to their authorities, it was likely that the partners would develop their own control systems and spend resources, which otherwise, could have been spent on strengthening the national system.

2.1.3 First lessons learned

Nepal's natural disaster risks, its vulnerability and exposure to natural hazards are well-known. The need for disaster preparedness is therefore paramount. In this context, there are important lessons to be learned for future disaster recovery operations from the delay in creating the NRA and starting in the first 8 months after the 2015 earthquakes. It is now clear that having a national authority formed immediately and mitigating the impacts of any contextual challenges beyond the immediate disaster effects, such as those experienced in 2015, are important first lessons in disaster management.

2.1.4 National and international commitment for reconstruction

Since the earthquakes had affected the economy and socio-cultural system of Nepal, reconstruction became the critical issue for ensuring governance, involving the business sector, civil society, and in terms of social development and protection of those that were most affected. The scale of the challenge united people from all walks of life in support of the post-disaster recovery effort. This national will and collective capacity was duly reflected in the NRA's actions.

The international community had provided a wide range of support for rescue, relief, recovery and reconstruction. The solidarity was articulated in commitments of significant financial support pledged during the international conference organised by the Ministry of Finance (MOF) immediately after the earthquake. The main development partners who attended were the Asian Development Bank, China, Department for International Development (DFID), the European Union, India, Japan International Cooperation Agency (JICA), the United Nations (UN) organizations, United States Agency for International Aid (USAID) and the World Bank. Much of the international assistance committed was in the form of grants, loans, and technical assistance. Commitments made before the establishment of the NRA were signed by the Ministry of Finance and respective donor agencies. Some donors worked together with NRA, i.e., through the establishment of joint project monitoring units by channelling the funds through

national budgetary system; some provided support in the areas of technical assistance and capacity development; others provided conditional funds as support. Some donors had direct interventions but in collaboration and coordination with the NRA.

An institutionalised coordination platform was formed, where the NRA, key national stakeholders, donors and development partners involved in post-earthquake reconstruction met periodically - usually on a 6-monthly basis. This platform, chaired by the CEO of the NRA, was the 'Development Assistance Coordination and Facilitation Committee (DACFC)', which provided an invaluable means for the NRA to coordinate collaborative reconstruction and recovery operations.

2.1.5 Objectives, methodology and limitations

This chapter explores the NRA governance and financial systems that guided its mission, and had the following objectives:

1. To analyse NRA governance and financial frameworks, policy provisions and strategies, institutional arrangements, systems and methods of operation, human resources and financial management.
2. To identify issues and challenges encountered in NRA's governance and financial frameworks.
3. To explore opportune ways for the orderly disengagement of the NRA and for the preparation of the exit strategy, and
4. To prioritise future perspectives and options for ensuring the sustainability and institutional integration of disaster management and reconstruction within Nepal's federal structure.

A detailed review of relevant documents on governance and financial frameworks of the NRA were carried out for this assessment. NRA officials were also interviewed at length to fully capture their experiences and observations.

2.1.6 Reconstruction ordinance, and initial efforts to establish the NRA

The Gorkha earthquake of 2015 marked a watershed moment for Nepal, both in terms of immediate response as well as the promulgation of the special legal framework in the form of "Ordinance related to the Reconstruction of Earthquake-affected Structures, 2015". The ordinance to establish the NRA was failed to present to parliament on time and hence, could not secure parliament's approval.

2.1.7 Establishment of the NRA

The NRA was established in December 2015 as per Article 3 of the "Act Related to the Reconstruction of Earthquake-Affected Structures, 2015" enacted by the parliament to establish the Authority as a statutory agency with special jurisdiction, responsibility and delivery structures. The main purpose of establishing of the NRA was "to promptly complete the reconstruction work of the structures damaged by the devastating earthquake of 25 April 2015 and the subsequent aftershocks, in a sustainable, resilient and planned manner to promote the national interest and provide social justice by making resettlement and translocation of the persons and families displaced by the earthquake" (GoN, 2072).

2.1.8 The objectives of the NRA

1. To reconstruct, retrofit and restore partially- and completely-damaged residential, community and government buildings and heritage sites, to make them disaster-resistant using local technologies as needed.
2. To reconstruct (restore) damaged cities and ancient villages to their original form, while improving the resilience of the structures.

3. To build resilience among people and communities at risk in the earthquake-affected districts.
4. To develop new opportunities by revitalising the productive sector for economic opportunities and livelihoods.
5. To study and research the science of earthquakes, their impact including damages and effects, and post-earthquake recovery, including reconstruction, resettlement, rehabilitation and disaster risk reduction.
6. To resettle the affected communities by identifying appropriate sites.
7. To build resilience among people and communities at risk in the earthquake-affected districts.

The Act also listed the following functions of the NRA:

- a. Policy management
- b. Legislation and enforcement
- c. Development planning and programming with execution
- d. Institutional management
- e. Resource mobilisation
- f. Regulation, standard setting and compliance building
- g. Advise and recommend
- h. Coordination and harmonisation
- i. Collaboration and partnership building, and
- j. Research and development.

2.1.9 Hybrid nature of the NRA

The Reconstruction Act established the NRA as a special entity with a limited lifespan. In terms of mandate and operational authority, it was somewhere between a ministry (the CEO has the rank of minister) and a (semi-) autonomous body, like the National Electricity Authority (NEA) or the Nepal Investment Board. But the NRA CEO did not have the kind of autonomous authority that the Managing Director of the NEA does, for example. In the NRA, the CEO was not a government official and could not sign financial agreements without approval by the Ministry of Finance. The NRA Secretary, who is accountable to the Chief Secretary, was the head of the NRA administration, not the CEO. This situation created difficulties particularly in terms of decision-making and the execution of decisions – difficulties that could have been avoided if the NRA – the CEO - had had more institutional autonomy.

As the status of the NRA did not also fit within the established government bureaucracy, transfer to the NRA was not necessarily viewed by government employees as a career-enhancing move. The lack of proper succession planning, or of a system of predictable career development, remained demotivating for personnel and had some impact on the overall performance of the NRA. High turnover rates of personnel and frequent transfers of senior staff also affected team-building efforts. To further complicate matters, officials in core NRA positions remained under the legal control of their parent government ministry, rather than the CEO of the NRA. This added complications to performance appraisal and decisions related to human resource management and deployment (Pathak, P.K., 2020).

The hybrid political/ bureaucratic model of the NRA brought with it some unnecessary difficulties. The NEA model of a (semi-) autonomous entity would appear to be a potential alternative for a future reconstruction agency, with the requisite systems, human and financial resources and authorities. This should form the basis for a whole-of-government commitment to, and consensus on, the agency's mandate and functional modalities, including its mandate and ability to control and manage reconstructions funds. Such clarity can also help to ensure greater institutional stability of both the leadership and officials.

2.1.10 Lessons learned

- n Establish a future disaster management/ reconstruction authority with a clear status and autonomy, establishing the authority of the CEO over the entity, its decision-making processes, finances and personnel.
- n Ensure that the status of the authority facilitates succession planning, career development of government employees, with clear roles and responsibilities of personnel and experts recruited from outside the government bureaucracy.

2.2 Governance system, organisation and management

2.2.1 Governance principles and guiding framework

The policy framework and proposed structure of the NRA provided the Office of the Prime Minister and Council of Ministers (OPMCM) as the nodal ministry which gave the NRA authority that it would not have had if the nodal ministry had been a line ministry. Likewise, having the Prime Minister as chair of key oversight bodies also reinforced the stature of the NRA, as did membership that included ministers and the leadership of the opposition.

2.2.2 Key governance principles

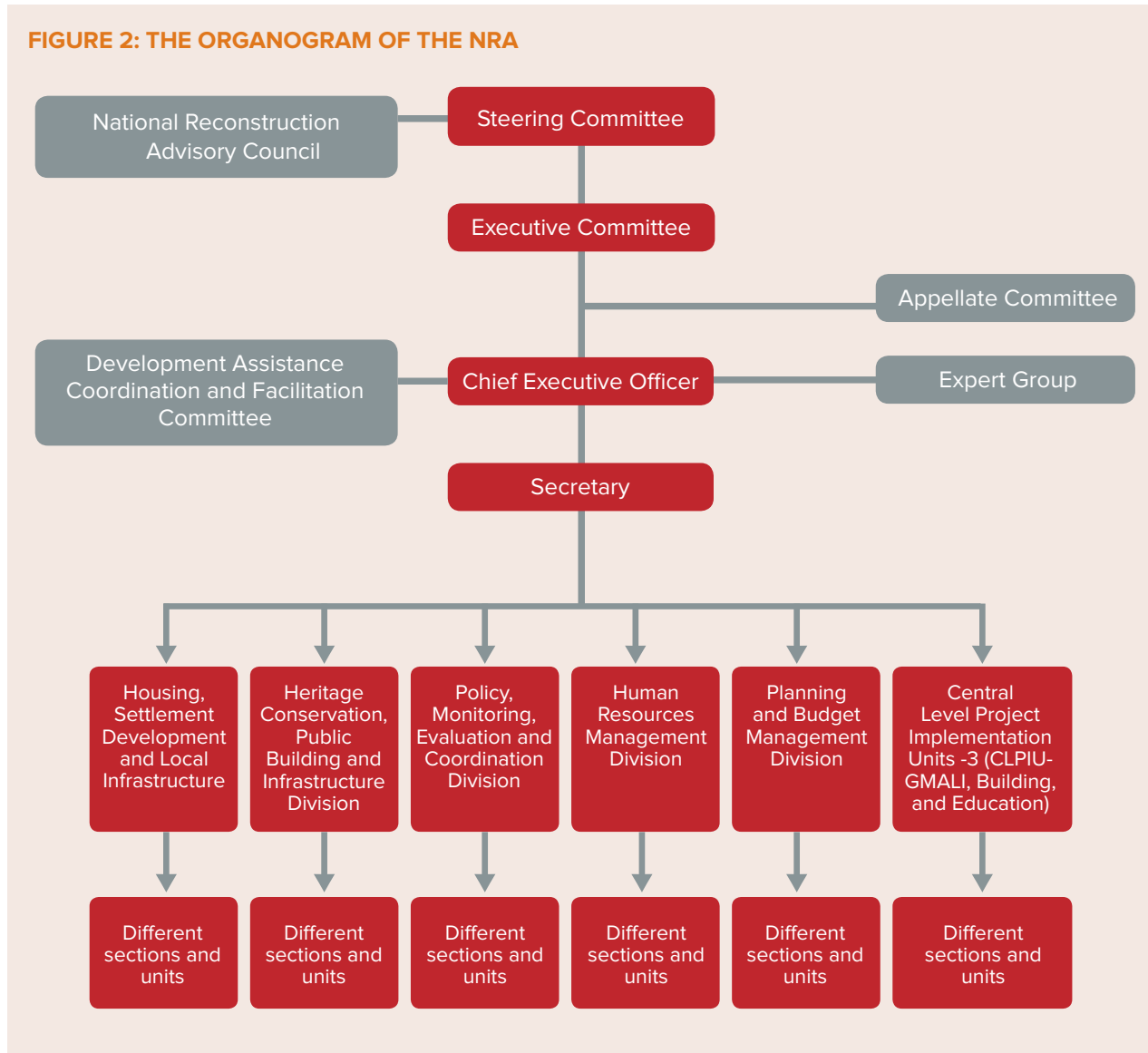
- a. Owner-driven reconstruction: build on the leadership, participation and commitment of the NRA with a nationally and internationally enabled system.
- b. Build back better principle for executing structural design improvements to achieve efficiency and effectiveness in the reconstruction process.
- c. Legitimacy: Justified scope of work, the broader public mission of service, legal mandate and responsibility, and accountable and transparent delivery mechanism.
- d. Participatory approach to policymaking, planning and execution of NRA's jurisdiction and responsibilities, with meaningful engagement of actors, collective ownership, shared responsibility and accountability.
- e. Socio-economic recovery and sustainable livelihoods of the affected population.
- f. Collaboration and partnerships with stakeholders at all levels of governance; between the beneficiaries and the government; between government, civil society organisations and the private sector for successful and sustainable reconstruction.
- g. Gender and Social Inclusion (GESI): Reconstruction provisions led by the NRA recognised that the structural, historic and cultural discrimination and subjugation of women and girls, senior citizens, marginalised and vulnerable populations were likely to be further exacerbated following the earthquake. Thus, measures were taken to address specific issues through a wide array of collaborative reconstruction interventions.
- h. Human rights and rights-based approach to assure property and human security rights of the citizens affected by the earthquake, and
- i. Sustainability in post-earthquake reconstruction, through adoption of scientific principles of planning and seismic-resistant construction, community-level education and capacity development for safe construction, maintenance of cultural and religious continuities in earthquake-affected heritage settings, adoption of a longer-term programme approach to align reconstruction with the sustainable development goals and with the objective of reinforcing disaster-resilience of Nepali society.

2.2.3 Governing structures of NRA

The governance structure of the NRA comprised of the following bodies, operating from national to municipal levels:

Structure	Key Responsibility
National Reconstruction Advisory Council	Advise and guide on matters of policy making, planning and governance/ institutional strengthening
Steering Committee	Steering the realization of policy management, planning, directing and controlling responsibilities, including Approving the policy, plan and program Directing the Executive Committee on matters for making the recovery and reconstruction planned, systematic and effective Approving the resource mobilization framework and budget, and Approving the organizational structure and management system.
Executive Committee	Exercising the authority and assuming the legal and developmental responsibilities of the NRA for the effective performance
Chief Executive Officer	Leading, executing and administering the organization and management operations of the NRA
Development Assistance Coordination and Facilitation Committee	Coordinating and facilitating the mobilization, utilization, and coordinating and facilitating international technical and financial cooperation
Appellate Committee	Delivering appellate justice
Expert Group	Providing theme/ subject-specific policy level, managerial and technical inputs to the Executive Committee and the CEO
District Coordination Committee	Coordinating, harmonizing, supervising and facilitating for effective program execution and service delivery at the district level
District Reconstruction and Facilitation Committee	Coordinating, handling of grievances, recommending effective execution measures for district level reconstruction activities
Local (Municipal) Reconstruction Coordination Committee (LRCC)	Coordinating, handling of grievances, recommending effective execution measures for local-level reconstruction activities

FIGURE 2: THE ORGANOGRAM OF THE NRA



2.2.4 Strategic framework

The work of the NRA was situated within a strategic framework that laid out the long-term road map for a nationally-owned and led effort that was designed to achieve the vision, mission, goals and objectives set for post-earthquake reconstruction. The strategic framework was guided by some fundamental questions: Where are we? What do we want to achieve? How do we get there? The NRA was guided by a number of mission-critical strategic directives:

- National Reconstruction and Rehabilitation Policy, 2015
- Post-Disaster Needs Assessment, 2015
- Post-Disaster Recovery Framework (2016-2020)
- Environmental and Social Management Framework
- Communication and Outreach Strategy (2017-2020)

As previously stated, the NRA had to not only ensure the delivery of a complex range of reconstruction operations, but to simultaneously build the systems that would underpin its ability to attain results. Thus, the NRA had to develop necessary institutional arrangements, planning and programming systems, resource management mechanisms, standard operating procedures, implementation mechanisms,

monitoring and evaluation procedures, systems for management of collaborations and partnerships and mechanisms to ensure accountability.

2.2.5 Legal framework

In addition to the Act related to Reconstruction of Earthquake-affected Structures, 2015, the Government of Nepal had formulated and put into force the “Rules related to Reconstruction of Earthquake-affected Structures 2015”. Based on this the NRA created an extensive series of guidelines and procedural frameworks – technical, financial and administrative – to ensure the effective implementation of the strategic and legal obligations¹. These guidelines were incorporated within the following instruments.

The key procedural instruments of NRA for reconstruction management

1. Housing reconstruction programme, 2072 (2015)
2. Earthquake-damaged private houses reconstruction grant allocation procedures, 2072 (2015)
3. Environmental impact assessment procedures related to the reconstruction of earthquake-affected structures, 2072 (2015)
4. Land acquisition procedures for the reconstruction of earthquake-affected structures, 2072 (2015)
5. Public procurement procedures for the reconstruction of earthquake-affected structures, 2072 (2015)
6. Integrated procedures related to the interest grant on concessional loan, 2075 (2018)
7. Integrated procedures for the distribution of earthquake-affected private house reconstruction grant
8. Land registration procedures in the name of earthquake-affected person, 2072 (2015)
9. Non-government organisation operation procedures for reconstruction and rehabilitation, 2072 (2015)
10. Timber supply and management guidelines for earthquake-affected persons, 2072 (2015)
11. Reconstruction community committee guidelines, 2073 (2016)
12. Training and management guidelines, 2073 (2016)
13. Procedures for relocation and rehabilitation of the vulnerable settlements, 2073 (2016)
14. Forest-related procedures, 2072 (2015)
15. National Reconstruction Authority appeal procedures, 2073 (2016)
16. Beneficiary selection for reconstruction of earthquake-damaged private house grant standards
17. Operational procedures for earthquake-affected vulnerable beneficiary identification, 2074 (2017)
18. School reconstruction procedures, 2073 (2016)
19. Reconstruction-related grievance management procedures, 2074 (2017)
20. Land purchase standards for earthquake-affected persons, 2074 (2017)
21. Procedures related to integrated settlement development, 2075 (2018)
22. Procedures for conservation, restoration and reconstruction of earthquake-affected Gumba/ Bihar/ Stupas, 2075 (2018)
23. Operating procedures for the survey and re-examination of left-out cases, 2075 (2018)
24. Procedures for providing grants to private houses reconstructed prior to the deployment of technicians, 2076 (2019)
25. Procedures for the reconstruction of single ownership or multiple ownership private houses in heritage sites, 2076 (2019)

¹ USAID supported development of 14 national policy documents that were critical to operationalizing the reconstruction program.

2.2.6 National Reconstruction Advisory Council

As the apex body of NRA, the National Reconstruction Advisory Council (NRAC) was a multi-agency body chaired by the Prime Minister, entrusted with the authority to advise the Steering Committee on the formulation of reconstruction policies, strategies and plans and on the reconstruction governance system. The Council included main opposition leader of the parliament as the Vice-Chair and the ministers, members of parliament, security agency chiefs and civil society representatives, among others were the members. The NRAC met at least once every six months. Its meetings generally preceded those of the Steering Committee, to enable the committee to incorporate advice from the council as required. Most of the advice provided related to major reconstruction policies and strategies, as well as to provisions for strengthening the institutional framework for reconstruction programmes. The Council was briefed regularly on the progress of reconstruction and on the design of future program. Representation in the Council from the political, social, professional, technical and bureaucratic domains helped NRA to finetune its activities and gain the confidence of different spheres of society.

The Advisory Council was designed to be inclusive of political parties, parliamentarians, government and technical experts. Its large size was important for its inclusiveness, but that came with additional challenges in terms of providing consistent, practical advice to the CEO.

2.2.7 Steering Committee

The Steering Committee chaired by the Prime Minister was smaller and more functional. It met regularly and its deliberations and decisions were assisted the NRA leadership in reconstruction operations. The Committee was the highest governing body of the NRA with a mandate to guide policy and give policy directives, oversee strategic planning and programming, budget and approaches for resource mobilisation, monitor and supervise reconstruction

programs and organisational structure and management for enhancing effectiveness. It also oversaw all reconstruction activities, including coordination and collaboration with stakeholders and development partners. Finally, the Committee directed the Executive Committee to ensure that reconstruction planning was systematic and effective.

The opposition leader in the parliament was the vice-chair of the Steering Committee. The Committee comprised of two designated ministers, the Vice-Chairperson of the National Planning Commission, the CEO of NRA and the Chief Secretary of the Government of Nepal. The Committee also included technical experts nominated by the government, while the Secretary of NRA was the Member-Secretary.

Since the Committee was chaired by the Prime Minister, its decisions were binding on the NRA and the line ministries. By August 25, 2021, the committee had met 20 times and had taken decisions on a range of major policies and programs. The Monitoring and Evaluation Division of NRA was responsible for monitoring and preparing progress reports and tracking implementation of the Committee's decisions. These reports were regularly tabled at Committee meetings.

Governing Structure of NRA

1. National Reconstruction Advisory Council
2. Steering Committee
3. Executive Committee
4. Appellate Committee
5. Development Assistance Coordination and Facilitation Committee (DACFC)
6. District Coordination Committee (DCC)
7. District Reconstruction Facilitation Committee (DRFC)
8. Local Reconstruction Coordination Committee (LRCC)
9. Reconstruction Community Committee (RCC)

2.2.8 Executive Committee

The Executive Committee (EC) of the NRA formed under the Reconstruction Act to exercise executive authority – legal, regulative and developmental and as delegated by the Steering Committee – both over institutional performance as well as for overseeing and monitoring execution of the reconstruction plan and programs. The Executive Committee was chaired by the NRA CEO, while its members were the Secretary of the Office of the Prime Minister and Council of Ministers, and four full-time subject-specific technical experts nominated by the government. The Secretary of NRA served as the Member-Secretary of this Committee. The Committee had met 147 times by the end of November 2021. Implementation of its many decisions fell on the NRA bureaucracy, headed by the Secretary. All decisions of the committee were minuted and progress was tracked and reflected in the NRA's annual and trimester reports.

Expert Group

An expert group was mandated to support and advise the CEO and Executive Committee in strengthening policy-making capability, improving technical and managerial capacity and enhancing the performance of the NRA in its reconstruction operations. However, NRA was unable to make the most of the experience of the Group. Given the number of directive and consultative bodies associated with the NRA, a more productive route might have been to eliminate the Expert Group per se and link relevant experts more closely to the Executive Committee, for augmenting the breadth and depth of the Executive Committee's expertise, as needed.

Development Assistance Coordination and Facilitation Committee

To ensure transparency and cohesion in cooperation with development partners, principal collaborating government departments, civil society and private sector stakeholders, the NRA constituted the Development Assistance Coordination and Facilitation Committee (DACFC), to facilitate, coordinate and monitor all development cooperation for reconstruction. With the CEO as chair, the DACFC comprised of 11 formal members representing development partners, civil society and government agencies. In addition, a much larger number of stakeholders were regularly invited to attend meetings of the DACFC in an informal capacity. It was sometimes found to be challenging to review with sufficient depth the many significant matters related to development cooperation for reconstruction. However, on balance, the Committee proved to be a valuable platform for frank and open exchanges between government and its partners on progress, priorities, emerging challenges and mid-course corrections required in reconstruction.

2.2.9 Appellate Committee

The Appellate Committee was mandated by the Reconstruction Act to hear and review the decisions made by the NRA at different levels. The Committee provided a platform for hearing complaints from any party on decisions or orders made by the NRA in the performance and exercise of its functions, duties and powers.

The Committee is equivalent to a tribunal, with legal powers to provide verdicts, like those of the High Court. Chaired by a High Court judge, the Committee included expert members of the NRA, as well as two members nominated by the government: one with a legal background and the other with relevant technical background. The committee will remain in existence for a period of one year after the completion and closure of the NRA to ensure that all final beneficiary and other grievances are addressed. This is a unique mechanism with a watchdog function and on several occasions, it overruled some decisions taken by the NRA.

Most of the cases that this Committee had considered at the time of writing this report comprised complaints from potential beneficiaries who had not been included in the housing reconstruction program and had become ineligible to receive reconstruction grants, or from beneficiaries who thought that their concerns had not been sufficiently addressed by the NRA. As of November 2021, the Committee had received over 55,000 complaints, where 13,585 were register and 11,901 were handled. The Committee also met periodically with beneficiaries and concerned authorities in the field to orient them on how to correctly make complaints. This outreach was useful to filter out complaints that do not need to be made at the federal level, while ensuring that relevant complaints reached the committee for consideration.

2.2.10 District and Local-level Participatory Structures

Reconstruction District Coordination Committee (RDCC)

The Act related to Reconstruction of Earthquake-affected structures made a provision for constituting coordination committees in all 32 earthquake-affected districts, each under the leadership of the Member of the federal parliament of the concerned district on a rotational basis, and with the representation of district-level political and bureaucratic authorities. The principal responsibilities of these committees were to coordinate, monitor and appraise activities carried out by the NRA (and its implementation agencies); to report any irregularities and perform other prescribed functions.

District Reconstruction Facilitation Committee (DRFC)

Due to the challenges of federal parliamentarians to be available regularly at district for DCC meeting, the NRA constituted another overarching committee, the District Reconstruction Facilitation Committee (DRFC) in each of the 32 affected districts, to coordinate private housing reconstruction activities, handling of grievances, addressing policy and implementation-related issues and maintaining consistency among district-level reconstruction actors. These committees were headed by the Chief of the DCC, elected by municipal representatives. The DLPIU, Grant Management and Local Infrastructure (GMALI), provided secretariat support to the DRFC in each district. The DRFCs were delegated with the authorities of RDCCs to perform in the absence of the meetings of RDCCs. The DRFCs were then reporting to RDCCs at their meetings.

Local-level coordination and facilitation structures

With the institutionalization of local-level governing bodies, resulted in creation of another important governance layer as an integral part of the NRA's subnational architecture, with frontline responsibility for delivering reconstruction services to beneficiaries. The Local (Municipal) Reconstruction Coordination Committee (LRCC) were been constituted in each of the 282 affected municipalities and rural municipalities. The committee headed by the Mayor/Chairperson, includes local-level elected representatives, civil society organisations and government agencies. The committees have functioned realively well, although they were contrained by limited financial resources, technical know-how, availability of technical human resources and weak mechanisms for handling beneficiary grievances. Finally, Ward Committees were also constituted by the NRA to hear grievances and to address coordination responsibilities for the housing reconstruction program. Each Ward Committee comprised of the Ward Chairperson, an NRA Engineer and the Ward Secretary. The NRA institutional approach to reconstruction operations changed in line with the roll out of federalization for increasing local autonomy and to harmonise program management, coordination, delivery systems and grievance handling mechanisms with local needs and requirements.

2.2.11 Transparency and accountability mechanisms

Transparency and accountability mechanisms were integral in the NRA governance framework. The purpose was to ensure that reconstruction functions, including resource management, were undertaken transparently and responsively, and also to ensure that partner agencies, beneficiaries and other stakeholders could engage with the NRA to pursue the shared reconstruction objectives. At the centre of these mechanisms, the NRA institutionalised its public information delivery system, shepherded by the spokesperson and information officer and in line with the provisions of the Right to Information Act.

The NRA developed a range of legal, developmental, technical and managerial measures to underpin accountability to government, the public, beneficiaries and other stakeholders for achieving desired reconstruction results. These measures helped to ensure accountability and responsiveness to beneficiaries and stakeholders for effective service delivery and grievance management.

The NRA was obliged to submit its periodic and annual performance reports to the National Reconstruction Advisory Council, to the Office of the Prime Minister and Council of Ministers, and to the Parliament for official purposes, as well as to the public for scrutiny by citizens. NRA accountability processes at national and local levels included the following:

- a. Periodic and annual performance benchmarking and service quality indicators for recovery and reconstruction works; an internal performance monitoring mechanism, auditing (social, public and financial) of financial performance; participatory mechanisms, involving experts and stakeholders in policy and decision-making processes; civic engagement through information sharing and communication regarding the efficiency and effectiveness of NRA's interventions.

Review of NRA's performance (November 2021)

The NRA had last held a Steering Committee meeting on August 25, 2021, to review the post-earthquake reconstruction work carried out in the fiscal year 2077/78 (2020/21) and held discussions on the progress, problems and the learning during the period.

As of November, 2021, a total 829,667 beneficiaries had signed the agreement for the government grant of Rs. 300,000 (\$3000) to rebuild their houses out of which 828,763 had received the first tranche Rs. 50,000 (\$500). A total of 750,859 beneficiaries had received the second tranche of Rs. 150,000 (\$1500) while 740,341 had received the third and final tranche of Rs. 100,000 (\$1000). During the period, 759,710 beneficiaries began reconstruction and 615,924 beneficiaries completed construction.

Similarly, 47,827 beneficiaries had been identified to receive the government grant of Rs. 100,000 (\$1000) to reinforce their houses. Of them, 35,027 beneficiaries had received the first tranche. Also, 2035 received the second tranche.

In the last fiscal year, the NRA had completed the hearings and cleared all the grievances registered at the Authority through various offices. Altogether, 634,973 grievances had been cleared.

The completed construction work during the period were 6647 schools and education institutions, 751 health facilities, 589 heritage structures, 384 government buildings and 216 buildings of the security sector.

The NRA had made a significant progress in the construction of Dharahara and Ranipokhari that it had implemented directly. Construction of Ranipokhari has been completed, including the Balgopaleswar temple. The construction of Dharahara tower had also been completed.

Last but not the least, the retrofitting and electrification of Singha Durbar in the eastern, northern and southern facades have been completed; whereas, 55 percent of retrofitting works on the western façade had been completed.

- b. Support to local-level devolved structures to facilitate participation, access to information, encouragement of community inputs in program implementation, participatory monitoring systems, collaboration with community-based organisations and inclusion of vulnerable groups.
- c. Establishment of coordination mechanisms among national government agencies responsible for reconstruction management; of a transparent system for mobilization of funds; a performance reporting system; a joint mechanism for monitoring and sharing of results; and maintaining transparency in information-sharing.

The NRA developed its web-based application software, the Project Management Information System (PMIS), to facilitate evidence-based monitoring of, and reporting on, project performance and to assist the NRA, CLPIUs and DLPIUs to strengthen information management and maintain reconstruction records. The NRA also developed a Management Information System (MIS), together with a manual with description of the system functions and capabilities, contingencies and alternate modes of operation, and step-by-step procedures for system access and use. The MIS is an integrated data management system covering planning, data acquisition, data analysis, data use and data updating. Images and graphics were used, wherever possible, to illustrate steps in the use of the software for assessment of any reconstruction event or activity, and to assist in the use of mobile applications, and in the administration manual and the manual for CLPIUs.

2.2.12 Communication management

A good management information system does not automatically strengthen communication without a robust communication strategy. NRA prepared a communication strategy to facilitate public interaction and response through information, education and communication measures, supported by an interactive and dynamic website. The combination of an accessible management information system, the recording of performance, the publication of periodic and annual reports and publication of program and financial progress, for public information were features of NRA's transparency and accountability system.

As an important instrument for ensuring transparency and management of the relationship with stakeholders, the communication strategy contributed significantly to the process of post-disaster reconstruction, facilitated recovery and contributed to reducing the potential for setbacks and misunderstandings. The task of rebuilding homes and communities is complex and challenging with many potential pitfalls. In post-disaster situations, the status quo shifts constantly, a challenge that makes strategic communication a crucial element in response and reconstruction.

NRA understood early the importance of good and regular communication, although the Communication and Outreach Strategy 2017-2020 took some time to develop. NRA's strategic approach evolved over time, from one of primarily communicating information outward, to establishing a two-way communication, especially with beneficiaries and their communities, using multiple channels. The process helped to build trust with beneficiaries and stakeholders, reinforcing meaningful participation in reconstruction initiatives and creating a common understanding of the dynamics of reconstruction management.

Direct participation of beneficiaries in decisions affecting them is crucial in all aspects of reconstruction and particularly in owner-driven private housing reconstruction. The reconstruction projects financed and supported by several development partners emphasised such participation and helped to influence NRA's thinking in this regard.

The deployment of social mobilisers to communities was another important element of the communication and outreach strategy. Unlike engineers deployed from outside a geographical area, social mobilisers

were familiar with the local social and economic fabric and knew more about issues in the minds of the disaster-affected population. It took time – perhaps too long – to take this deployment to scale. Experience has shown that civil society partners, including non-governmental organisations, can play a useful role in managing and deploying such community-oriented human resources and in supporting municipalities in their outreach to affected populations.

The NRA had a well-endowed communication unit that met on a regular basis for discussions with stakeholders. Regular assessment was undertaken of the information needs of various audiences and of the impact of the content of various communications channels and media employed. The communication plan, the 2015 Earthquake Reconstruction web portal and tools were designed to interface with the NRA's Project Monitoring Information System (PMIS).

2.2.13 e-Governance

NRA's e-governance facilitated program effectiveness and service delivery. It helped to advance both transparency and accountability among affected populations, as well as to wider stakeholders, within and outside the government. It provided beneficiaries and stakeholders with access to reconstruction information and stimulated active consultation, interaction and feedback, as well as the incorporation of suggestions for improvements into reconstruction programming (Pathak, P.K., 2020). The two main objectives of NRA's e-governance efforts were:

- a. To provide beneficiaries and stakeholders with access to information and knowledge about the systems, structures and process of reconstruction delivery.
- b. To make possible the active participation of citizens in information exchanges, as beneficiaries and stakeholders, by
 - i. Informing and representing the beneficiaries.
 - ii. Advocating to and sensitising beneficiaries and stakeholders.
 - iii. Encouraging the participation of beneficiaries and stakeholders.
 - iv. Facilitating social interactions and consultations, and
 - v. Acknowledging development feedback, comments and suggestions to strengthen reconstruction outcomes.

2.2.14 Grievance management

The "Reconstruction-related Grievance Management Procedure" of the NRA served as a robust mechanism for citizens and stakeholders with a safe channel to raise grievances without fear of negative repercussions, and that facilitated the resolution of grievances lodged following rigorous assessment of each case. The procedure was accessible, just and highly effective and contributed to building trust and harmony between the NRA management, citizens and stakeholders. As of July 4, 2021, the NRA had examined all recorded grievances related to housing reconstruction. Altogether, 6,34,973 grievances were reviewed and cleared.

2.2.15 Organisational structure of the NRA

The NRA was a multi-disciplinary government agency with core competencies in engineering and in technical and management disciplines related to post-earthquake recovery and reconstruction. Its structure was a hybrid of bureaucratic, project matrix, expert-based and networked units with regular divisions functionally linked project implementation units. It was also supported by a combination of specialised thematic sub-committees. The NRA structure reached down to the district level with further linkages up to local-level coordination bodies.

The organisational structure of NRA experienced a continuous change with the movement of personnel within the organisation, changes in policy and practice, the impact of electoral reforms and processes, new stakeholders and partners, restructuring of ministries, and adaptations to try to remain state of art and fit for purpose, within a complex and changing context.

Some of the NRA structures were as defined and elaborated in the Reconstruction Act, while others were adopted by the NRA Steering Committee. The organisational structure of NRA was created according to government norms and rules. The rank and number of positions, together with NRA's units were approved by the Government of Nepal upon recommendation by agencies, including the Ministry of General Administration (MOGA), (now the Ministry of Federal Affairs and General Administration, MoFAGA) and the Ministry of Finance (MOF). The NRA was entitled to review and adapt its organisational structure, within the limit of the number of staff allocated. However, a lack of clarity in the Act about the roles and responsibilities of NRA's Executive Members in this regard had prevented any such decisions from being taken.

A. NRA central office

As the apex executive and administrative body of the NRA, the central office was established to guide, control, supervise, coordinate, monitor and evaluate the performance of the organisation. It represented the NRA at national and international levels and networked with functionaries to ensure the level of inter-unit integration required to achieve reconstruction goals. The central office was composed of the executive, regulative and administrative, programme delivery, human resource, resource management and quality assurance systems. This network of systems was headed by the CEO, with expert support provided by Executive Members, administrative management support provided by the Secretary, programme delivery support assured by the functional divisions (line and staff), with central level project implementation units positioned in different ministries and associated with the NRA at the central level.

B. The Chief Executive Officer

The CEO as the executive head of NRA exercises executive powers required to carry out its functions and discharge its responsibilities. Specifically, the responsibilities of the CEO were:

- a. To carry out – and ensure full compliance with – the decisions of the NRAC, Steering Committee and Executive Committee.
- b. To exercise the executive powers of the NRA on its behalf, by discharging the strategic, legal, developmental, administrative and collaborative responsibilities of different operational units.
- c. To supervise and monitor employee performance, motivate and boost the morale of employees to optimise effective delivery.
- d. To prepare and submit the NRA's reform plans and reconstruction programs required for the NRA to function effectively.
- e. To coordinate and collaborate with concerned agencies and stakeholders to ensure the effective functioning of the NRA and achievement of reconstruction goals.

The CEO was supported by the Executive Committee Members, Thematic Sub-Committees, Secretary, Joint Secretaries and Under Secretaries along with the staff for efficiently discharging the responsibilities of the office. The Government of Nepal appointed the CEO.

C. Divisions and sections

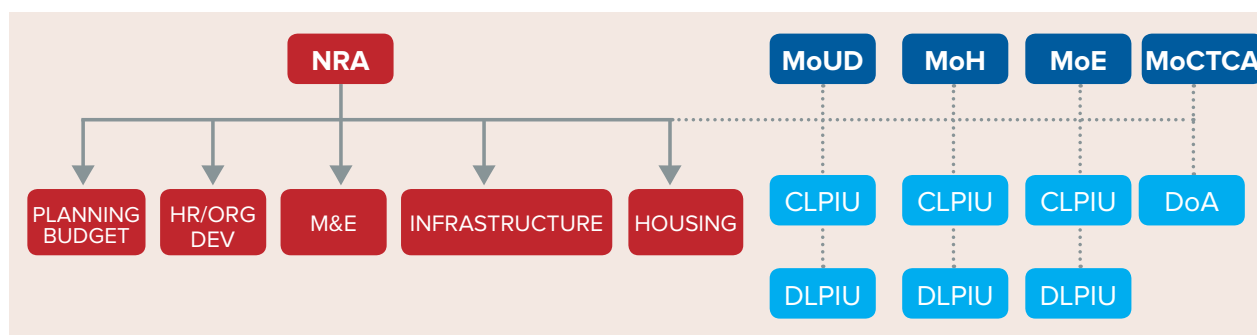
As approved by the Steering Committee, the responsible divisions and sections/ units of the central office of the NRA, under the direction of the Secretary, were structured as follows:

Divisions	Sections/Units
Policy, Monitoring, Coordination and Social Development Division	Policy and Monitoring Section Information Management and Communication Section Social Development and Grievance Management Section Income Generation Promotion, GESI Section
Cultural Heritage Preservation, Public Buildings and Infrastructure Division	Public Buildings Section Cultural Heritage Preservation Section Physical Infrastructure Section
Housing, Settlement Development and Local Infrastructure Division	Housing Section Settlement Development and Local Infrastructure Section Land Management and Geological Study Section
Human Resources Management Division	Legal Section Personnel Administration Section Financial Administration Section
Planning and Budget Management Division	Planning Section Development Assistance Coordination Section NGO Coordination Section

The NRA was divided into five divisions, headed by Joint Secretaries; three were from the administrative service and two were from technical (engineering) services. The Planning and Budget Management Division, Human Resources Management Division and Policy, Monitoring, Coordination and Social Development Division were headed by Joint Secretaries of the administrative service. The Cultural Heritage Preservation, Public Buildings and Infrastructure Division, as well as the Housing, Settlement Development and Local Infrastructure Division, were headed by technical Joint Secretaries. All divisions were divided into specialised sections, headed by Under Secretaries of the concerned service.

D. Programme delivery structures

Effective programme delivery was the core requirement of NRA's functional capabilities in order to deliver the desired reconstruction results. It was essential to define the characteristics of well-performing structures intended to deliver reconstruction results, namely: the required delivery competencies, clear terms of reference and role profiles, performance indicators for measuring outputs, program/ project-based monitoring and review mechanisms and space for innovation and creativity. The following figure explains the institutional arrangement of the NRA.



The extended NRA structure institutionalized a system comprising of centralised and direct programme execution by the central office itself, the specialised Central Level Project Implementation Units (CLPIUs); and District Level Project Implementation Units (DLPIUs).

Central Level Project Implementation Units (CLPIUs): Initially, the main implementation modality the NRA adopted was to create project implementation units within relevant sectoral line agencies or organisations. It had decided that reconstruction projects should be implemented under the joint responsibility of NRA and the relevant line ministries, with NRA playing providing oversight, facilitation and coordination (including monitoring and supervision), while line ministries took responsibility for implementation. The CLPIUs were created for this purpose and the responsibility was designated to relevant line ministries to supervise and control administrative matters, including the allocation of human resources, whilst the NRA designed the overall project management system. However, over time it was realised that the joint responsibility between the NRA and line ministries was neither practical nor effective. The allegiance of the CLPIUs continued remained with their respective line ministries and they struggled with the hybrid oversight system. Eventually, the NRA brought the main CLPIUs into the Authority's organizational structure.

2.2.16 Implementation arrangements and modality

An effective implementation arrangement results from the creation of an enabling environment, functional execution mechanisms, effective coordination, collaboration and partnerships; effective monitoring and evaluation; and motivation and morale of human resources. With this in mind, the NRA created a web of implementation arrangements to meet administrative and managerial requirements for facilitating effective implementation of policies and strategies, legal frameworks, guidelines and standard operating procedures related to recovery and reconstruction. These arrangements served as key instruments for translating reconstruction goals and targets into measurable outputs and clear results. The NRA was successful in managing effective implementation arrangement by creating the following:

An enabling environment for implementation

1. High-level political support and commitment
2. Advocacy and sensitisation through information, education and communication
3. Compliance building
4. Stakeholder management

Competent execution mechanisms

1. Strategic plan, action plan and implementation plan
2. Directives, rules of procedures and operating guidelines
3. Programme and budget system
4. Coordination and collaboration/ partnerships
5. Human resource management
6. Motivation and morale

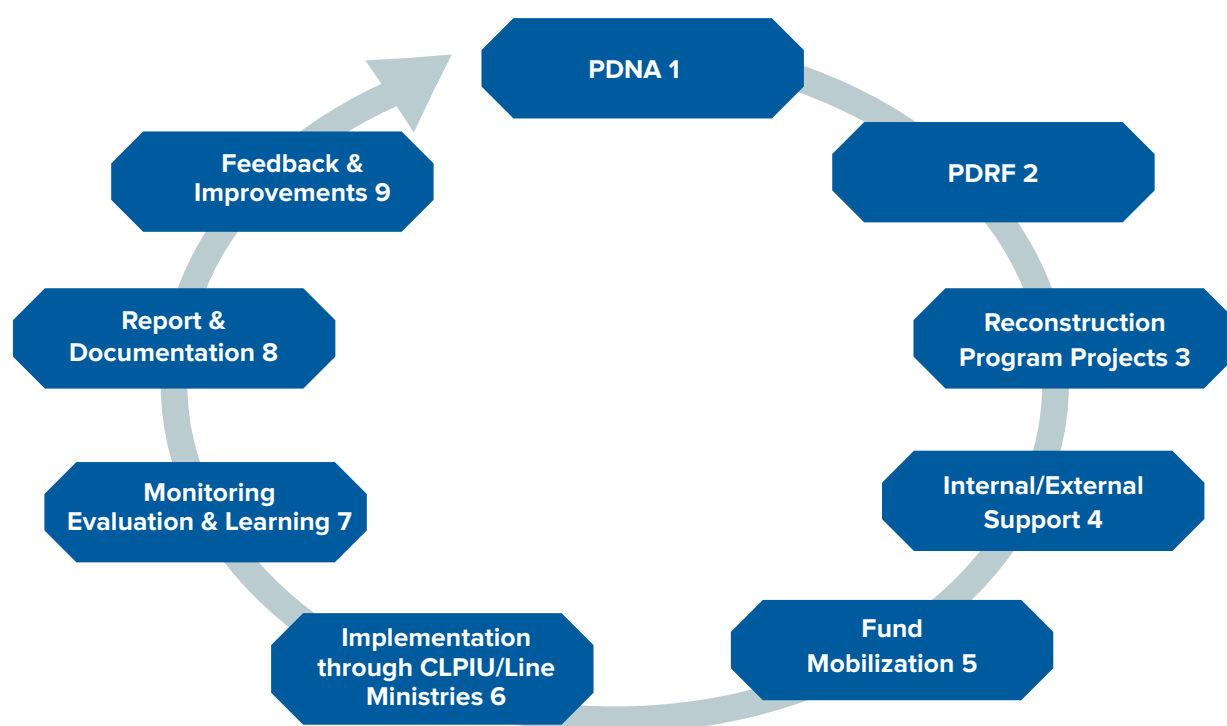
A monitoring and evaluation framework

1. Action plan for monitoring and evaluation
2. Dedicated agency for monitoring and evaluation
3. Results matrix and performance management system
4. Project/ program management information system
5. Supervision
6. Periodic and annual reviews

7. Programme evaluation and reviews
8. Problem solving mechanism
9. Independent and third-party evaluation, and
10. Continuous improvement measures.

A unique and practical implementation modality was adopted for the recovery and reconstruction after the Gorkha Earthquake 2015, in line with the purpose of creating the NRA as a special purpose vehicle and a one-window agency for all recovery and reconstruction initiatives. It was the first time a dedicated body was created to take on a challenge. It was granted substantial authority as an autonomous government organisation, led by the prime minister, with all major ministries involved in the process. It was entrusted to develop and adopt reconstruction programs and projects, mobilize funds within the framework of the existing government regulations, acquire and allocate human resources as required, set up organisational structures, and collaborate directly with all levels of government and non-governmental organisations, including the corporate sector.

FIGURE 3: THE POST-2015 EARTHQUAKE RECONSTRUCTION PROGRAM CYCLE.



After developing the PDNA and PDRF, the NRA developed a specific project management cycle that foresaw decentralisation and devolution of reconstruction functions, initially to the district level and subsequently to the local governments at the municipal level. It directed and coordinated development of the reconstruction program and projects according to both need and demand and sought and obtained both internal and international support for its work. With the help of external partners, NRA identified sources of financial and technical assistance and channelled resources to implementation units. It was constantly engaged in coordination, monitoring, evaluation and learning to identify gaps and for developing the means to address the problems, through program and policy reviews and adjustments. It also documented all reconstruction-related activities in an information repository for institutional memory. The documents captured progress, processes, structural and programmatic data, reports, including associated procedures for handling of grievances and managing feedback. It has also recorded lessons learnt and best practices.

NRA implemented many reconstruction activities through CLPIUs, line ministries – and donor-funded project implementation units. One example, was the PIU located at the NRA that was funded by the World Bank-financed Earthquake Housing Reconstruction Project (EHRP). The NRA also engaged directly in some projects valued at over NRs. 1 billion (US \$ 10 million). Some of the directly implemented projects were the reconstruction of Dharahara, Ranipokhari and Singhadurbar, the central government secretariat.

NRA respected and encouraged community participation, especially in community resettlement and relocation activities. If more than 10 beneficiaries formed a group and desired to relocate the settlement, the NRA assisted them in land acquisition and for building basic infrastructure like roads, electrification and drinking water and sanitation facilities. It regarded vulnerable groups as another distinct category of beneficiaries who were entitled to receive additional cash and technical support to rebuild houses. It mobilized and encouraged communities and NGOs to assist such beneficiaries, including orphans, single women, disabled and senior citizens, and people from other marginalized groups. NRA provided additional cash grants to beneficiaries from vulnerable settlements, vulnerable groups, landless and people residing on government, public or community land. The community-managed projects have shown that direct involvement and control by local organisations was very effective for ensuring successful project completion. This was particularly in the restoration and conservation of cultural heritage and monument/s.

2.2.17 Coordination and partnerships

The NRA had prudent mechanisms for coordination and partnerships in conformity with the collaborative governance framework to bring together the capacities and resources of two or more legally independent agencies, beneficiaries and other stakeholders to produce synergistic value addition in policy management, law enforcement, program execution, delivery of reconstruction products and services, grievance management, quality assurance through review and monitoring, and continuous improvements.

The collaborative framework was arranged for ensuring better coordination and partnerships as a formal, consensus-oriented and deliberative processes aimed at achieving efficiency, accountability and collective ownership. Such mechanisms were based on the memoranda of understanding (MOUs), programme execution Participation Agreements, information sharing and networking, competitive use of knowledge/ skills and resources; ensuring cost-effectiveness in resource use, mutual sharing of accountability, joint review mechanisms, and so on. The collaborative mechanisms were guided by NRA's policy to pool competencies of the NRA and the government agencies, local governments, civil society organizations and the business community.

2.2.18 Working with other government departments

The establishment of a functional structure and working procedures for the NRA took considerable time and effort. Like the earthquake, the creation of the NRA was also something that had not been anticipated. The existing emergency powers of the Ministry of Home Affairs and the Ministry of Defence/ armed forces extended only as far as emergency rescue and relief operations after disaster events. Nepal had no prior experience of creating a time-bound special purpose agency for reconstruction.

Government-wide consensus is required for the creation and development of a seamless disaster reconstruction agency with wide-ranging powers. Mandating legal authority is one thing but achieving agreement on this at all levels and in all departments of government is another. Not unsurprisingly the creation of the NRA was not welcomed by all in government. Lack of an inclusive prior consultation

and consensus-building process on the remit of the NRA in the government apparatus had made it a challenge for some departments to accept the authority of the new agency, especially where it crossed boundaries established for “normal”, non-disaster times.

In the months before the creation of the NRA, line ministries were faced with the obligation of taking on reconstruction tasks in addition to regular development priorities, but with the same manpower and resources. In addition, given that on average the development budget expenditure rates of line ministries were averaging well below 40 percent, it was not reasonable to expect that line ministries could successfully assume the added responsibilities. Faced with the need for massive mobilization required for reconstruction, the government had taken the correct decision to create a distinct entity, the NRA.

Early in its existence, the NRA decided that if ministries were already undertaking specified technical reconstruction tasks, they should continue to do so, with NRA performing an oversight and coordination role. For example, the Central Bureau of Statistics continued to design survey protocols and conduct surveys. The NRA also negotiated operational agreements that left some CLPIUs – health and education, for instance - with substantial autonomy, while others, such as the MOUD and MOFALD CLPIUs and their district-level DLPIUs, remained under the respective line ministries and worked in close coordination with the NRA.

Over time, coordination and implementation challenges – ranging from difficulties in monitoring or verifying progress to delays in recruitment of human resources, or in mobilization of engineers in rural areas, for example, or in procurement of essential equipment – led the NRA to reconsider the arrangements. This became a matter of priority when the roll-out of the new federal structure required establishment of new mechanisms at the sub-national level. As a result, the NRA absorbed the CLPIUs to optimise coordination and management. Even under the revised arrangements, the parent ministries, with their technical expertise, continued to play an important role to provide guidance and oversight. The NRA had a direct oversight role but in essence reconstruction had become a joint responsibility, where all ministries were expected to own it. The reconstruction endeavour was so large that it could not be carried out successfully by the NRA alone without support from partners and stakeholders. The government line

List of partners of the NRA

1. Government Ministries and Agencies

- a. Office of the Prime Minister and Council of Ministers (OPMCM)
- b. National Planning Commission
- c. Ministry of Finance
- d. Ministry of Home Affairs
- e. Ministry of Urban Development
- f. Ministry of Education
- g. Ministry of Health and Population
- h. Ministry of Federal Affairs and General Administration
- i. Department of Archaeology
- j. Department of Urban Development & Building Construction (DUDBC)

2. Major development partners

- a. World Bank
- b. Asian Development Bank
- c. India
- d. China
- e. DFID
- f. USAID
- g. United Nations Agencies
- h. European Union Delegation to Nepal (EUD)
- i. JICA
- j. SDC

3. Local-level governments and agencies

- a. Municipalities/ rural municipalities and related line agencies
- b. District Administrative Office (DAO)
- c. District Coordination Committee (DCC)

ministries and agencies like the National Planning Commission, the Ministry of Finance, the Ministry of Federal Affairs and General Administration, the Ministry of Urban Development, the Ministry of Education, Science and Technology, the Ministry of Health and Population, and the Office of the Prime Minister and Council of Ministers, and several development partners had supported various aspects of recovery and reconstruction. These agencies assisted the preparation of the PDNA and PDRF, organised donor meetings to fill the funding gap, provided technical support to the NRA, implemented recovery, reconstruction and livelihood projects, supported community engagement initiatives and beneficiary management, including development of databases and the operation of management information systems.

Looking to the future, the NRA decided to work together with the newly-established National Disaster Risk Reduction and Management Authority (NDRRMA), the Department of Survey and the Department of Mines and Geology (DMG) to identify possible disaster risks and to support the design of a future-oriented work plan based on a comprehensive Multi-Hazard Risk Assessment. To realise this collaborative effort, a high-level consultative and strategic planning meeting was conducted to discuss and establish the modalities of collaboration and partnership.

Partnerships with local governments worked particularly well as the newly elected local governments were the legitimate representative bodies and were close to the communities and affected people. Municipalities and their ward offices were (and still are) the most accessible places where affected people could receive support, register grievances, interact with representatives and receive updates and information about the reconstruction process.

The local elections had been held about two years after the earthquake, and the engagement of local governments was important in the earthquake response. In 2018, NRA developed a memorandum of understanding (MOU) with all 282 affected municipalities/ rural municipalities to devolve authority, functions, responsibilities and resources for streamlining of the reconstruction process. Regrettably, the MoUs did not facilitate the process as intended, given the financial and human resource limitations of the new local governments. Overtime, however, many began to play stronger and increasingly active roles in coordinating local endeavours, handling local issues, grant management and managing technical assistance provided by engineers deployed to local jurisdictions.

Apart from partnerships, inter-agency relationships also contributed to the effective implementation of the reconstruction program. The Reconstruction Act gave the NRA the authority to work with government and non-government agencies. It formulated joint programs, facilitated inter-agency coordination, resources mobilization, and prepared policies and guidelines for collaboration. These helped in developing close and active working relationships with NGOs even though there still were a number of relationship issues that remained. One issue was the question of the extent to which the NRA was in the driving seat, or whether or not the size of donor contributions gave the latter undue influence, either in the selection of reconstruction priorities or in the establishment of parallel donor systems for tracking and monitoring financing and program activities. The NRA maintained effective relationships with collaborating agencies and external partners and convinced donors to support the development of its nationally owned financial tracking and management information systems. This was important because it is essential that donors assist the strengthening of national systems and standards rather than set up own parallel control mechanisms.

Collaboration with local government: At the time of the earthquake, local governments were overseen by civil servants and it was difficult to hold them accountable and responsible to the affected populations given their limited financial and human resources. However, after the local government elections in 2018,

the NRA established cooperation networks with the new local administrations and began decentralizing certain responsibilities mainly in the area of private housing. However, given the lack of experience and technical knowledge, local representatives were not able to advance the reconstruction process as the NRA had expected. Capacity building of local government officials on reconstruction and disaster management therefore became a priority.

The NRA attempted to engage and support local authorities signing MOUs with all 282 local governments, under which they were to take ownership of and exercise authority over reconstruction functions. The intention of the NRA was to backstop municipalities by providing technical support, however, a combination of factors impeded the roll out of this initiative: the scale and scope of the disaster, the limited capacity of local authorities, their limited awareness of the scope and purpose of the MOUs, and the initial difficulties in designing support systems to meet the different needs of local authorities and the types of challenges they faced. The NRA had faced significant difficulties in providing the range of support needed, while it also lacked the authority to transfer funds to the local levels without involving the Ministry of Finance.

Nonetheless, the local governments gradually began to assume reconstruction responsibilities, mobilise technical staff, handle grievances, bridge communication gaps between the NRA and beneficiaries and represent the interests and concerns of beneficiaries. By 2021 many local governments were handling reconstruction activities, including building local reconstruction databases and risk assessments.

They will continue to exercise these responsibilities after the NRA completes its tenure. However, provision of continuous orientations to enable them to fully understand the scope of their authority, and continued assistance for disaster management and planning (both financial and technical) from federal authorities will be essential for the municipalities to successfully execute their functions. This would require clear and frequent communication between the centre and the local authorities.

Collaborations with government line agencies: At the outset, many ministries and government departments questioned the value and relevance of establishing a new agency to oversee the earthquake reconstruction program. To exacerbate the matter, staff seconded to the NRA retained their formal bureaucratic links to the ministries from where they had been seconded and there were very few permanent positions in the NRA. Further, a new organisational culture was required for the new hybrid Authority, while its financial management experience was limited, especially at the outset. All these issues were the reasons for tasking existing agencies, rather than the new one, with the reconstruction process. However, the NRA gradually built up its staffing strength, issued an extensive series of reconstruction guidelines and procedural instruments,² worked with stakeholders to prepare the PDRF and established working arrangements that enabled many line ministries and departments to retain responsibility for reconstruction, but under the oversight and overall coordination of the NRA. The establishment of the NRA under the Office of the Prime Minister and Council of Ministers (OPMCM) had helped it to reinforce and strengthen its position.

The reconstruction law required all government agencies be to adopt the reconstruction guidelines, norms and policies established by the NRA. The creation of the National Reconstruction Advisory Council and the Steering Committee, both chaired by the Prime Minister, consolidated the legitimacy of the Authority, while assuring line ministries representation in the governance bodies. The establishment of cooperation procedures, for example, the framework on the relationship between the NRA and

² See Section A.2.5 Legal Framework, above, for a complete list.

technical CLPIUs clarified the chain of command. The process of establishing the inter-entity procedures took time, while some relationships, for example, between the NRA and Ministry of Finance, remained challenging. The lesson from the experience is clear: legal provisions on the mandate and autonomy of any future disaster management agency needs to be clearly established, understood and accepted by all government agencies, and such an agency needs to be endowed, from the start, with the resources required – human and financial – for executing its responsibilities.

Coordination at all levels: The NRA had established well-functioning coordination mechanisms but it must be recognised that entrenched donor practices, combined with their doubts about the effectiveness of NRA oversight mechanisms, led several international partners to establish parallel monitoring mechanisms and to directly fund projects administered by the private sector or NGOs. This complicated the coordination of reconstruction operations. As previously stated, there is no alternative to all parties to be working in tandem to ensure that in future post-disaster reconstruction operations, oversight and control processes are both nationally owned and also gain the confidence of external partners. The establishment of the DACFC to coordinate international support in consultation with development partners, provided a platform for the NRA to review reconstruction progress with stakeholders, to mitigate stakeholder concerns and align the perspectives and goals. This still left room for the NRA leadership to develop direct and flexible relationships with individual partners.

At a higher level, the Advisory Council of NRA, chaired by the Prime Minister and with wide representation, ensured that coordination and consultation took into account a wide range of interests and perspectives. The creation of District Coordination Committees and District Reconstruction Facilitation Committees and similar local coordination bodies at the municipal and ward levels, established a network of platforms where political representatives, government officials, civil society and I/NGOs could engage to reach a shared understanding of local reconstruction priorities, progress and challenges.

Collaboration with development partners: Nepal's reconstruction program mobilised a large number of development partners. Almost all donors had established collaborative arrangements with the NRA in all thematic areas of reconstruction. Some coordination challenges have been cited above (see: Coordination at all levels). Several key development partners (World Bank, Asian Development Bank, EU, USAID, JICA, India, China, UNDP and to an extent the SDC) worked closely with the NRA. Some of them provided technical assistance directly embedded within the NRA, such as the Project Implementation Unit supported by the World Bank in the housing reconstruction sector, the European Union-funded Nepal EU Action for Recovery and Reconstruction (NEARR) governance support facility and the UNDP's Human Resource Facility. Other donors also collaborated closely with the NRA to establish financial and human resource management frameworks, management information systems and a range of other reconstruction management and coordination procedures. This extensive cooperation helped the NRA in attaining its goals.

Until the end of FY 2077/ 78 (2020/21), the total amount invested in reconstruction and rehabilitation programs and projects was more than NRs. 470 billion where the contribution from partner organizations was NRs. 190 billion, nearly 41 percent. The detailed contribution is given in Table 3. However, the Table 3 does not include off budget support. For example, the UK's Foreign Commonwealth Development Office (FCDO) and U.S. Agency for International Development (USAID) had provided significant support

that has not been recorded in the NRA's database. Similarly, People Republic of China's contribution was significantly higher than the amount mentioned below.

TABLE 3: SUPPORT FROM DEVELOPMENT PARTNERS (AS AGREEMENT WITH MOF)

Amount in NPR, 00000

Development Partner	Pledged	Agreement	% (agreement)
ADB	600,000,000	322,564,797	53.76
Australia	4,635,300	0	0.00
Austria	1,200,000	0	0.00
Bangladesh	502,815	0	0.00
Canada	10,500,000	0	0.00
China	766,927,000	766,927,000	100.00
EU	117,484,500	194,290,233	165.38
Finland	2,237,800	1,118,900	50.00
Germany	33,567,000	34,000,000	101.29
IMF	50,000,000	50,000,000	100.00
India	1,400,000,000	1,078,820,849	77.06
Japan	260,000,000	360,377,747	138.61
Netherlands	26,000,000	0	0.00
Norway	15,965,500	5561671.796	34.84
Pakistan	1,000,000	0	0.00
South Korea	10,000,000	8,400,000	84.00
Saudi Fund	30,000,000	29163542	97.21
Srilanka	2,500,000	0	0.00
Sweden	10,000,000	0	0.00
Switzerland	25,000,000	0	0.00
Turkey	2,000,000	0	0.00
UN	110,000,000	165,500,000	150.45
USA	130,000,000	170,196,536	130.92
WB	500,000,000	698,970,853	139.79
Grand total	4,109,519,915	3,885,892,129	94.56

Source: MoF/GoN

2.2.19 Key issues and lessons learned

The main lessons learned in establishing governance and coordination mechanisms for a complex range of reconstruction operations can be summarised as follows:

- n Design governance bodies of a size, composition and nimbleness necessary to provide the requisite oversight and guidance to a disaster management/ post-disaster reconstruction authority.
- n Learn from NRA experience concerning incorporation of expertise from outside Government in executive functions at the post-disaster reconstruction authority.
- n Ensure the prompt formation of a representative, consultative body for coordination between Government, development partners and other stakeholders.
- n Complete a process of prior consultations with all government departments to ensure whole-of-government clarity, consensus on and commitment to the reconstruction entity's mandate and authority.

- n Ensure that all departments are clear about their roles in the reconstruction process, as well as their relationship with and obligations to the oversight authority.
- n Ensure that subsequent changes in relationships and responsibilities are transparently discussed, clearly understood and agreed upon.
- n Ensure the early development and implementation of a communication strategy and engagement protocols, centred on strong community outreach. Clear and frequent two-way communication is essential between the reconstruction authority and stakeholders, especially affected people (beneficiaries) and their communities. Such communication also serves to keep stakeholders informed of plans, progress, issues, innovative technologies and approaches.
- n Ensure direct participation of beneficiaries in decisions that affect them.
- n Ensure use of communication channels most frequently used by affected people and deploy community social mobilisers to facilitate information exchange and support, and
- n Ensure that the reconstruction authority creates an e-governance framework to enhance transparency and mutual accountability between government decision-makers, stakeholders and beneficiaries.

2.3 Human resource system

Human resource management at the NRA involved a meticulous planning to assess the requirements; a management study to establish parameters for effective performance; compliance with the provisions of the civil service law and the Reconstruction Act; the creation of a Human Resource Management Division; and the development of measures for enhancing the knowledge, skills and competencies of personnel.

2.3.1 Human resource planning

NRA's human resource planning comprised of:

- a. Formulation of a comprehensive human resource plan.
- b. Annual planning, programming and budgeting exercises.
- c. A human resource information management system.
- d. Organisation and management reforms.
- e. A human resource development plan and program, and
- f. Agreements with the international development partners for program execution.
- g. Collaboration and participation agreements with partner organizations for technical and human resource support, and
- h. Program and project performance monitoring exercises.

HUMAN RESOURCES PROFILE OF NRA

SN	Agency	Number (staff)
1	NRA	151
2	CLPIU-GMALI	409
3	CLPIU-Building	3,250
4	CLPIU-Education	415
TOTAL		4,225

The NRA was both a policy management and technical delivery agency that required policy and engineering professionals, reconstruction management specialists and technical support staff. The personnel and technical demands on the NRA were enormous:

- a) A large number of technicians, including engineers and sub-engineers were required to assist and implement the reconstruction program in 32 districts.
- b) Over 800,000 houses and numerous public and community buildings, such as schools, health facilities, cultural heritage sites and local infrastructure had to be reconstructed with adequately managed and trained technical personnel.
- c) The NRA was required to deploy engineers in all municipalities, even at the ward level. An initial assessment had shown that some 4,000 engineers were initially required for technical assessments and reconstruction.

- d) Agreements were reached with national, bilateral and international partners for deployment and management of additional human resources, with a range of technical specialisations, to specified districts, but operating within NRA-established guidelines.

2.3.2 Performance management

The NRA prepared a performance management system to ensure the high performance of its staff, experts and support staff. The system comprised the following mechanisms:

- a. Each division, section and project / program unit were required to prepare an annual performance plan identifying key result area, performance indicators, performance monitoring and reporting system and measures required for performance improvement.
- b. Each staff member was required to prepare and submit through the supervisor an annual performance report delineating key tasks undertaken, results achieved, gaps in performance and the reasons, remedial efforts to address performance-related problems, and steps for improving performance.
- c. The CEO, Executive Members, Secretary and Division Chiefs were responsible for carrying out systematic performance reviews, providing feedback, counselling and designing and implementing performance development measures.
- d. A performance agreement system was instituted at all levels of the NRA – between the CEO and the Secretary, between the Secretary and Division Chiefs and between the Secretary and the CLPIU chiefs, that included:
 - i. The goals of the department, program or project.
 - ii. Key result areas and timeframe for achieving results.
 - iii. Performance appraisal and monitoring system.
 - iv. Associated reward and sanctions.
- e. A performance-based incentive system was introduced to evaluate, recognize and encourage high-quality work performance. The system was administered through standard operating procedures approved by the Governing Body, and
- f. The NRA instituted a system for assessing training needs and capacity development for all levels of personnel, based on its Guidelines for the Conduct and Management of Training, 2073 (2016).

2.3.3 Sources and types of human resources

The NRA was a public agency including professional executives from outside the civil service, civil servants appointed by the government, and experts and professionals hired on contract for specific tasks. It had incorporated a number of human resource positions:

- a. Permanent positions as per the organisational structure of the NRA and approved by the Steering Committee, the Executive Committee, and approved by the Government of Nepal.
- b. Sanctioned temporary positions required for support services.
- c. Sanctioned time-bound positions required to execute a specific project or program, and
- d. Expert or professional positions required for specific assignments, on the basis of agreements with the development partners.

Bringing together a diverse range of human resources and contract arrangements was not within the standard experience of a government agency and took some time to develop. This experience provides lessons on how to create and work with a heterogenous team and was possible because of careful analysis and articulation of human resource requirements.

2.3.4 Human resource facility

The NRA created a human resource facility to plan for and secure the expert services required. The facility prepared a roster of experts and professionals and determined criteria for selection and hiring.

2.3.5 Human resource information management system

The NRA institutionalized and operated a dedicated Human Resource Management Information System (HRMIS), to facilitate transparency and consistency in decision-making and management of human resources, performance and capacity development.

2.3.6 Key issues and lessons learned

The NRA had made extensive efforts to create a human resource framework and management system appropriate to its needs. It required to formulate a human resource policy, strategy and management system, which it had done to lead the extensive and complex post-earthquake recovery operations.

Past experience and institutional guidelines were of limited use. Innovation and improvisation were required to ensure performance and accountability within this novel institutional approach. The lack of clarity about the NRA's status within the government apparatus created uncertainties among personnel, which was clarified following consultations.

The frequency of transfer at senior levels in the NRA created uncertainties. The lack of systematic succession planning, or of a system for predictable career development, also contributed to uncertainty among personnel and resulted in challenges in team building and performance.

The fundamental principle of unity in command and direction in an institution was breached in two key areas, among others: officials deployed from other government departments and ministries remained under the legal control of the ministries they were deputed from, rather than of the CEO of NRA; secondly, the CEO did not have direct authority of the structure and administrative divisions. This power rested in the NRA Secretary and it complicated performance appraisal and decision-making on human resource management. The strain between the CEO and Secretary were evident in the turnover of secretary-level staff.

A non-traditional entity charged with powers to lead disaster management and post-disaster recovery must have a clear place in the government system for incentivising careers of public servants. The provisions for including expertise from outside the government must also be fair and transparent. Finally, the head of the organization must be accorded executive authority and responsibility including both the administrative apparatus and financial management.

E. Summarizing lessons: creating the NRA while simultaneously delivering on its mandate

The Reconstruction Act accorded the NRA wide and considerable powers at the policy, planning, budgeting and operational levels, to oversee, coordinate, conduct, facilitate and monitor reconstruction. Its mandate and functions covered all sectors and included authority to assure technical damage assessment, acquire land, relocate and resettle people, establish standards for inter-sectoral capacity building and human resource development, provide financial resources and assure effective use.

It was a broad mandate that was necessary to ensure that the NRA could exercise the authority required to unite a wide array of disparate actors in government, the private sector, civil society and

the international community in a coherent reconstruction effort. However, the NRA faced a number of challenges in exercising its mandate. Most challenging was leading substantive reconstruction efforts while simultaneously building up the organization from a scratch.

The scale of the reconstruction challenge facing Nepal and the NRA as lead agency, was unprecedented. The NRA had to focus considerable attention on establishing itself, recruiting personnel, and developing organisational model and systems, even as pressure on it to show progress in reconstruction was extreme. Recruitment of personnel from the administrative bureaucracy meant onboarding staff with little experience of disaster management or of working at an emergency pace outside the bureaucratic norms.

While starting reconstruction, the NRA was also simultaneously building itself, initially with very few personnel – new departments, new functions, new policies, new operating guidelines. In the absence of special human resource management provisions for accelerated recruitment, incentives, deployment and secondment, many civil servants were not keen to transfer to an organisation that had a five-years tenure or did not see the move as one that would support career advancement. In the PDRF the NRA had this to say about its mandate; “NRA is committed to ensure that recovery and reconstruction are carried out in an inclusive and transparent manner and that interventions integrate risk reduction, so as to withstand the impact of future disasters”. However, given the lack of a disaster risk-informed development planning tradition in government, even though there were competent staffs at all levels they had no experience of disaster management and reconstruction, or of accelerated systems and provisions for hiring, procurement, financial approvals, etc.

Standard bureaucratic systems tend to be slow and cumbersome, ill-suited to the rapid action required in disaster management and reconstruction. One reason for this, is expectation of compliance with government rules and regulations that leads to a culture of caution among bureaucrats, particularly in the human resource and procurement domains, where the potential of intervention by the Commission for the Investigation of Abuse of Authority (CIAA) can be a powerful deterrent for action.

This can discourage strong, decisive and rapid actions required of bureaucrats in a disaster recovery situation, where lost time could mean lost lives and reduced well-being of citizens. The NRA therefore spent several years in establishing systems and procedures necessary for efficient reconstruction operations³ while it was also rolling out operations to meet the public's reconstruction expectations. This required consultations and joint planning with other government departments and with national and international partners, each with their own perspectives on what systems should look like – especially financial management, procurement and management information systems.

One of the main difficulties arising from NRA's challenging institutional build-up phase was its limited capacity to exercise its mandated financial responsibilities. A resulting lack of agreement with the Ministry of Finance on NRA's functions and capabilities to manage reconstruction financing, especially with regard to the operation of a Reconstruction Fund as established by the Act (GoN, 2072), meant that NRA was not able to attain the level of financial authority provided for in the Act.

In addition, it rapidly became apparent that a number of development partners would not provide financing to the treasury directly but would prefer various levels of shared or direct oversight of on-

³ As summarised in Section A.2.5. Legal Framework, above

budget resources they had contributed or would finance third-party international agencies and third parties off-budget. It took the NRA considerable time to establish monitoring requirements, especially for off-budget projects and to negotiate the terms of institutional agreements with NGOs (especially INGOs) that would authorize them to function.

Disaster recovery fund management is at the heart of a reconstruction agency's mandate. The agency must have the authority to manage and disburse funds, as well as the capacities and mechanisms to assure accountability. The NRA had to follow lengthy, impractical and process-driven procurement procedures, guidelines and legal provisions. This experience pointed to the need for specialized procurement procedures for disaster management, response and recovery. Therefore, these have to be established before disasters and be applicable not only to the disaster management or reconstruction agency, but also other government entities at central and sub-national levels – even non-governmental agencies (Bhandari & Hodder, March 2019).

It took some time for the NRA to develop a functioning management information system (MIS), assisted by development partners' advice and investment of human, technical and financial resources. The system was accessible to external actors, payment processes were as required, as was the process of inspection-verification-payment through the District Treasury Controller Office (DTCO) to beneficiaries. The system remained largely paper-based. Accelerated digitisation would have made the system more user-friendly and speed up decision-making.

The establishment of sufficiently nimble systems and procedures for ensuring efficient, effective and timely reconstruction operations was laborious. This experience points to the need for pre-disaster delineation of the special procedures required for emergency management, disaster response and recovery, and for training of personnel for these functions. It is too late to build systems during the reconstruction phase, which is when the limited time available should be devoted to achieving results.

Development of a management information system does not automatically create the framework for monitoring and evaluation, unless it is specifically designed for reconstruction contexts. One element that was missing in the monitoring of reconstruction operations was a disaster resilience lens (Bhandari & Hodder, March 2019). The second factor inhibiting comprehensive monitoring and evaluation of results was inadequate coordination and information-sharing as reconstruction operations advanced towards completion. This especially applied to partner entities – NGOs included – that ended reconstruction operations without submitting completion reports. In such situations, it was difficult for the NRA to know what activities had been completed, by which organization and where.

2.3.7 Lessons learned

The major lessons derived by the NRA in the governance and financial management thematic areas are:

- n Design appropriate systems, procedures and protocols, beyond standard bureaucratic operating procedures in advance to facilitate rapid, effective and efficient disaster management and reconstruction operations, backed by clear authority of the reconstruction entity to employ these special procedures, especially in financial management.
- n Institute disaster risk-informed development planning and simulation exercises as a means of developing a cadre of professionals for disaster preparedness, response and recovery.
- n Ensure advance agreement with development partners and INGOs on systems for monitoring of both on- and off-budget financing and on templates for institutional agreements.
- n Ensure the incorporation, within monitoring frameworks, of a disaster resilience lens, and
- n Ensure commitment of all partners to submit project completion reports.

2.4 Financial governance

2.4.1 Principles of reconstruction financing

Certain principles prevail in reconstruction financing:

- a. Policy-based resource management to respond to the strategic framework for achieving the set goals and objectives.
- b. Strategic planning of financing to ensure the link between the strategic goals, priority and resource management.
- c. Resource management based on robust situation analysis, mapping and results framework.
- d. Resource needs prioritised with a robust, evidence-based investment plan.
- e. Maximization of existing resources, to ensure efficiency and productivity.
- f. Strengthened resource governance to ensure accountability and transparency.
- g. Building consensus and collaboration for resource management decisions.
- h. Diversification of funding sources and streams.
- i. Ensuring accountability for results through financial performance management and results-based monitoring.
- j. Management of fiduciary and financial risks.
- k. Ensuring the sustainability and continuity of funding, and
- l. Provisioning and encouraging external scrutiny by the beneficiaries and stakeholders.

The financing of reconstruction requires goal-oriented financial autonomy, speed in response and action, flexibility in financial management, harmonised systems and procedures (that take into account both on-budget and off-budget channels), participation of multiple actors and collaborative financial execution with a system to assure multiple accountabilities.

Finance and accounting procedures need to be adapted to the requirements of emergency and reconstruction requirements. Fast-track processing for activities related to emergency projects is essential. For instance, budget reallocations between different expense heads within Government's Line Ministry Budget Information System (LMBIS) for the NRA were required to go through regular procedures, which took almost 2-3 months to obtain approvals. Emergency projects cannot be treated as business as usual and should be facilitated by flexibility with regard to government procedures.

2.4.2 Financing policy and strategy

In endeavoring to reflect these principles, the key features of the financing system developed by the NRA included:

- a. Strategic planning for financing reconstruction and guiding resource utilization, based on the PDNA damage and needs assessment, and on the program priorities and guidelines established in the PDRF.
- b. Policy-based programming and budgeting, integrated with the national budgetary system.
- c. Coordinated fundraising efforts.
- d. A reconstruction fund with multiple sourcing, efficiency and uniformity assurance, transparency and accountability.
- e. Fund flow mechanism.
- f. Results-based expenditure management, financial management information system and expenditure tracking system.
- g. Coordinated execution of project financing.

- h. Application of government's internal financial controls for managing financial risks.
- i. Financial accountability through pre-auditing of expenditure decisions and statutory auditing, and
- j. Public reporting of resource use and results achieved.

Over time, taking into account the critical differences between the requirements of standard government financial mechanisms and those needed for financial management of post-earthquake reconstruction, the NRA developed systems and processes designed to be compatible with both requirements. At different times, these were reservations expressed by the Ministry of Finance and by certain donor partners. To repeat an observation made repeatedly in this document with regard to institutional preparedness, it is essential to establish, in advance, rigorous financial management frameworks and systems for a disaster management/ post-disaster reconstruction authority – and to have these agreed and accepted by all parties, before authority would be required to exercise the rules during disaster events.

The mechanism for the management and use of financial resources of the NRA was based on:

- a. PDNA estimation of damages, losses and financial needs,
- b. PDRF delineation of reconstruction projects, objectives and financial requirements,
- c. Domestic resources allocated from the national budget with adjustments,
- d. Committed donor funds, and
- e. Capacity to use the funds for achieving results.

Nepal had applied a mix of several resourcing approaches in reconstruction. These included:

- a. Government-driven resourcing approach:** post-earthquake reconstruction resource availability driven mainly by government sources.
- b. Owner-driven approach:** house/ asset owners were responsible for rebuilding their own houses through self-maintenance, with limited external financial, technical and material assistance.
- c. Community-driven resourcing approach:** individuals, community organizations and voluntary institutions engaged in fund collection and contribution for reconstruction resourcing.
- d. Market-driven approach:** banks and financial institutions and cooperatives investing for reconstruction works, and
- e. Donor-driven resourcing approach:** donors playing a determining role in resourcing and financing reconstruction efforts.

The effectiveness of the owner-driven approach in private house reconstruction was demonstrated in terms of quality compliance, timely outputs and impacts on the quality of life of the earthquake-affected population.

The financial mechanisms of the NRA were based on the Public Expenditure and Financial Accountability Framework (PEFA) characterised by:

- a. Policy-based financial management
- b. Predictability and control in resource utilization
- c. Credibility of budgeting the resources
- d. Comprehensiveness and transparency
- e. Accounting, recording and reporting
- f. Management of fiduciary risks, and
- g. Public accountability through external scrutiny and audit.

2.4.3 Reconstruction Fund

The Reconstruction Act made provision for constituting a dedicated funding mechanism to finance

reconstruction. Thus, Reconstruction Fund was intended to manifest the financial autonomy conferred to the NRA by the Act. The operating modality of the fund was to have been determined by the Executive Committee of the NRA. The fund was to be resourced from the following sources:

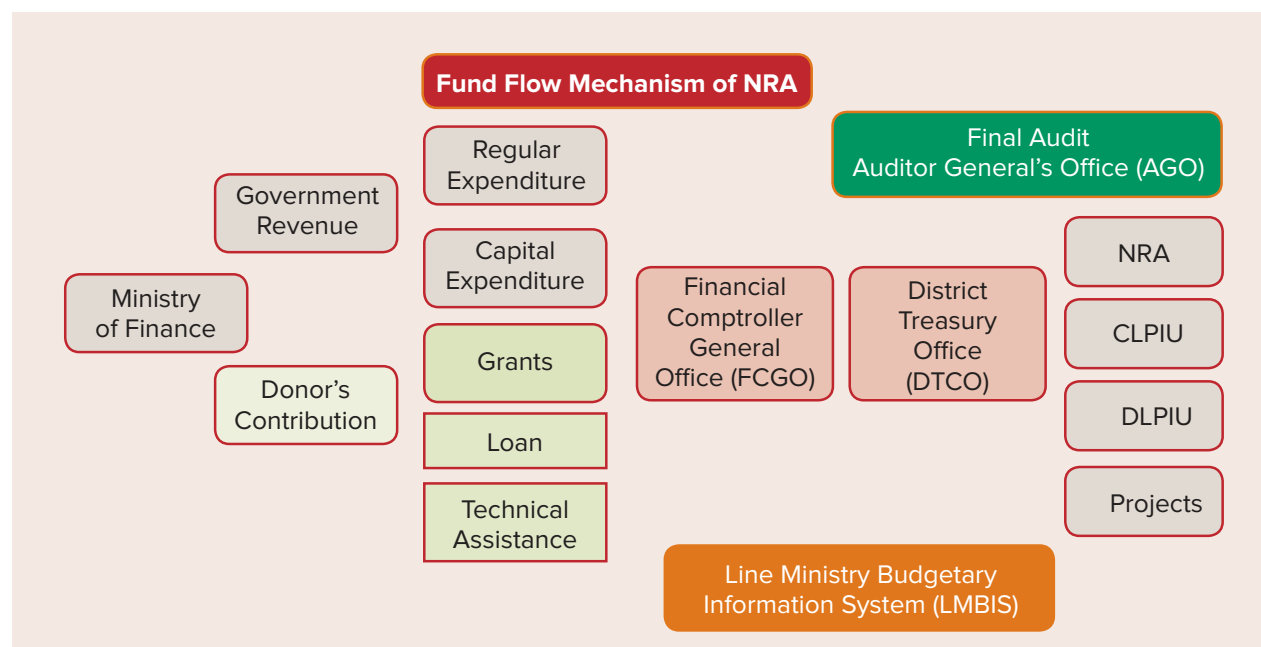
- Government of Nepal.
- Prime Minister's Relief Fund.
- Organisations, institutions or individual contributors.
- Grant assistance in cash or kind or fund for the programme from foreign individuals, governments, or international organisations, and
- Any other source.

Prior approval from the Ministry of Finance, in coordination with the Ministry of Foreign Affairs was to be obtained before grant assistance, in cash or kind or fund, could be received from foreign individuals, governments, or international organisations. As a dedicated fund mechanism, the fund was only to be used for reconstruction-related works. According to the provision in the law, the NRA was to have been required to prepare and submit an annual report to the Government of Nepal on the use and activities carried out using the fund.

However, the fund never came into operation and standard government practice for authorisation and management of public finances prevailed. The Ministry of Finance remained unconvinced that an autonomous entity had either the capacity or systems to manage the fund throughout the NRA's tenure. This suggests that financial systems and management capacities of a future Authority such as the NRA must be established in advance in agreement with all concerned parties, particularly the Ministry of Finance.

A. Fund flow mechanism

The Steering Committee of the NRA was the supreme authority for approving budgets to fund reconstruction programs and projects.



In the fund flow system shown above, the Executive Committee of the NRA prepared the annual reconstruction program and budget. Following the approval by the Steering Committee, proposals were forwarded to the National Planning Commission and the Ministry of Finance. In the case of reconstruction, after the budget was approved by parliament, it was disbursed through the Financial Comptroller

General's Office (FCGO), and the District Treasury Control's Office (DTCO). The DTCO disbursed the budget to NRA Central Office, CLPIUs, DLPIUs and projects. All budgetary information was handled by the Ministry of Finance, through the Line Ministry Budget Information System (LMBIS) software portal. The NRA was one of the agencies listed in the system.

2.4.4 Budget management system

The NRA adopted its own budget management system, guided by policy-based budgeting and results-based budget management and established within the framework of the guidelines of the National Planning Commission and the Ministry of Finance to ensure effectiveness in resource generation, allocation and use through medium-term and annual programs of reconstruction.

Forecasting of capital and recurrent expenditures was identified using the "management by objectives" principle. The system of budget prioritization used for resourcing reconstruction was based on a number of guiding factors: reconstruction policy, feasibility of programme/ project, implementation capacity, comparative contribution to recovery and reconstruction, beneficiary participation and competitive results.

NRA budget formulation combined both the top-down and bottom-up approaches and was designed to achieve synergy between needs and resource requirements identified in federal level and provincial plans and local level programs, qualified by an assessment of capacities to manage and deliver on expenditures at various levels of the government system. The NRA also used budgetary benchmarks and a costing framework in the allocation of program-based budgetary resources.

Problems in budget execution, appropriate solutions and required improvements were identified through a system of periodic and annual reviews, assessed against progress in the attainment of reconstruction goals and objectives. The tables below summarize expenditure on reconstruction by the NRA. They show that substantial progress in financing was achieved in the third fiscal year after the earthquake, which was because the initial years were invested for developing the governance system and mechanisms.

TABLE 4: SECTOR-WISE FINANCIAL PLAN OF THE NRA (ON BUDGET)

Sector-wise	Total need	Expenditure upto 2077/78	Budget of 2078/79 (as per LMBIS)	Additional budget required in fiscal year 2078/79	Remaining need (Proposed amount for fiscal year 2079/80 and 2080/81)
Private housing grant	2315537	2223279	11681	80577	0
Integrated settlement, settlement protection, settlement relocation	14620	10474	4146	0	0
School and university buildings reconstructed	1101652	737226	132209	13383	218834
Reconstruction of health facilities	156391	25351	59806	39780	31454
Government buildings and security related buildings	409310	290231	38580	0	80499
Cultural heritage, Gumba, urban heritage	500268	240180	78642	31446	150000
Road, drinking water and local structures	169849	163550	3799	2500	0
Irrigation, landslide, agriculture, livelihood	17531	17531	0	0	0
Earthquake memorial park construction and handover	1256	63	1193	0	0
EHRP (PMU)-NRA	12939	7482	5457	0	0
Total	4699353	3715367	335513	167686	480787

SOURCE-WISE FINANCIAL PLAN (ON BUDGET)

Source-wise	Source-wise allocation	Expenditure upto 2077/78	Budget of 2078/79 (as per LMBIS)	Additional budget required in fiscal year 2078/79	Remaining need (Proposed amount for fiscal year 2079/80 and 2080/81)
IDA	625339	549809	27195		48335
IDA/DPC	2096	2096			0
ADB	349216	275858	69285		4073
China	5337	5337			0
ADB/PBL	15975	15975			0
Japan – K R 2	3300	50	2200		1050
Japan - JICA	246360	230355	14445		1560
JFPR	5971	5971			0
GoN	2791646	2337260	114049	167686	172651
India	242585	125497	74079		43009
India – Axion bank	278184	50060	25324		202800
EU	85272	85272			0
WB – Trust Fund	13200	9862	2560		778
Saudi fund	34872	21965	6376		6531
Total	4699353	3715367	335513	167686	480787

Source: NRA Annual Report 2077/78

2.4.5 Channelling of grants and loans through the banking system

The NRA channeled all grants to beneficiaries through the banking system to minimise fiduciary and financial risks. All cash tranches provided to beneficiaries were deposited in bank accounts of the recipients. This ensured transparency in the process eliminating the possibility of corruption.

It was not easy to decide on and implement this mechanism, however. A large number of beneficiaries did not have bank accounts and were required to open accounts. Access to banks was another problem, given the low presence, even absence, of bank branches of in a number of rural and remote areas. Further, some of the recipients of the grants were illiterate and unfamiliar with the banking system and even the banks saw banking with NRA beneficiaries as high risk and even a liability. These factors caused significant delays in the establishing the mechanism, which required government to provide guarantees. The NRA requested the central bank (Nepal Rastra Bank) and other commercial banks to open branches throughout the earthquake-affected districts and municipalities to make it easy for beneficiaries' access to banks and open accounts to receive housing grants.

The NRA had expedited the process for beneficiaries to open zero balance accounts which helped to take banking services to most areas without banks. This resulted in many beneficiaries in developing banking (saving) habits, and in general, cash received them was not misused. A few beneficiaries did face problems after opening accounts, while cash deposits and flows from the banking headquarters was delayed. The banks were also reluctant to exclusively serve beneficiaries. Finally, there were also a small number of cases where the instructions of the central bank were not fully followed.

Overtime, disbursements through banks functioned at an acceptable level of efficiency. The banks provided a monetary mechanism to support the reconstruction endeavour, which also led to more sustainable economic activities and money management habits among the beneficiaries.

The system did not, of course, address the problem that the cost of housing reconstruction that often exceeded the grants disbursed, forcing poor households to seek loans from local money lending sources who charged higher interest for additional loans, pushing some beneficiaries deeper into debt. The lesson that can be drawn from the experience is to have alternative means for providing additional loans at concessionary or no-interest rates to beneficiaries that could be forced to borrow to build houses.

2.4.6 Financial accountability

The NRA's financial management system was fully in compliance with the public finance laws of Nepal. The Secretary of the NRA was designated as the Authority's Chief Accountable Officer, responsible for assuring financial discipline. The Secretary was authorised to operate all accounts of the NRA, in accordance with established laws and procedures.

Financial accountability of the NRA required it to be responsible for all financial transactions, including appropriate use of funds, obligation to comply with the rules and procedures and responsibility for the effective fund management. Financial accountability was delivered through statutory auditing of compliance and performance, undertaken by the Office of the Auditor General on an annual basis. The NRA established a good record of preparing financial statements with the required information to facilitate completion of statutory auditing in a timely manner.

A. Internal financial controls

The NRA was subject to full compliance with the financial management laws of Nepal. The internal financial control system required the NRA to:

- a. ensure efficiency and effectiveness in financial deliberations,
- b. ensure accuracy and reliability of financial information,
- c. ensure full compliance with all financial, regulatory and operational requirements, and
- d. make efforts to manage the risk of fraud, illegality and inefficiency.

The government's internal audit system is a part of financial controls that is overseen by the Office of the Comptroller General and its offices. The process requires review of financial statements to ensure fair transactions, disclosures and compliance with prescribed requirements.

B. Financial reporting

In compliance with existing public financial law, the NRA had to prepare timely reports on financial performance and provide other financial information as required. Financial reporting required preparation of monthly, trimester and annual financial statements. Periodic program implementation progress reports on the status of budget execution were prepared monthly; periodic reports were prepared every four months. The review of financial performance was an integral component of the agency's periodic and annual progress review. In addition, the Ministry of Finance oversaw a bi-monthly budget progress review.

The NRA operated a Financial Management Information System (FMIS) to facilitate and support the financial reporting. This FMIS was used to record financial transactions and the impacts and to support the preparation of financial statements. It facilitated the verification of the completeness and accuracy of financial data, assisted in the completion of the audit process, contributed to reducing opportunities for fraud and overall, contributed substantively to mitigating financial risks.

NRA did not develop a particular and dedicated risk management system. Instead, it used compliance to procedural guidelines in all of the activities related to reconstruction as means to prevent and reduce risk-generating situations.

2.4.7 Key issues

Several issues were identified in the course of the review of financial governance, but three merit a re-emphasis:

The first understanding that emerged was that finance and accounting procedures needed to be altered as required to meet situational requirements. Emergency projects need fast-track processing as they cannot be subject to the delays encountered while following standard procedures and should be facilitated by flexibility in government procedures.

The second issue was the failure of the Reconstruction Fund to materialise, given Ministry of Finance mistrust of NRA financial management capabilities and of its capacity for financial autonomy. Avoiding a similar situation in future demands a rigorous analysis of shortcomings, but also of measures that need to be instituted in future so that similar entities are able to realise their mandated autonomy in the exercise of its fiduciary responsibilities and fund management.

The third issue was that of dependency on donor contributions. This weakened national ownership in decision-making and priority setting, discouraged donors and partners from relying on national management and control systems and stimulated direct contracting by donors of their own implementing agents. Nepal's reliance on external financing has declined considerably in recent decades, but it remains significant.

Although donors subscribe to the Paris Principles for aid effectiveness, they can still do more to support development of national oversight systems that can strengthen governance and accountability. This would also reduce the need for them to establish parallel control systems, compliance with which demand considerable time and energy of national authorities.

There were also issues related to accountability, transparency and high administrative costs and the alignment with national interests and goals – of mainly I/NGO's – subcontracted by donors for project implementation.

2.5 Political transition and federalism

2.5.1 Political transition and its implications

In the past few decades, Nepal has undergone a momentous political transition – from a multi-party democracy of 1990 to the Maoist movement (1995 to 2006), from the interim political settlement (2006 to 2015), and from a constitutional monarchy to republic in 2008. The unitary system of government changed to the federal republic in 2015 and the elections of local government, and provincial and federal parliaments were held in 2017. The political and constitutional changes had numerous policy implications and consequences, for governance structures, legal frameworks, the public management system and government-citizen relations. The Constitution of Nepal 2015 transformed the country from a unitary to a federal system, with three levels of government: federal, provincial and local.

The mega-earthquake of 2015 occurred before the new constitution was promulgated, after which the NRA came into existence. The period immediately after the earthquake and leading to the promulgation was one of political uncertainty, while the enormous of reconstruction lay ahead. The period also

witnessed wide debates on the concept, structure and terms of reference of an Authority to manage reconstruction, and on the appointment of the chief executive.

Local government elections were held after the promulgation of the new constitution. The country had established three tiers of government including the federal government, seven provincial governments, and 753 local-level governments, and 77 District-level Coordination Committees. Two elections – local, and provincial and federal – were held within one year. The transition to a federal system required holding these elections and also putting in place new governments with new mandates, legal instruments, logistics and budgetary systems.

The election of local representatives led to a major shift in local governance, which prior to this was overseen by government employees. This also required new policies, laws, regulations, systems and personnel. The newly-elected local level people's representatives began taking on reconstruction responsibilities as allocated by the NRA. However, provincial governments were (and still are) not able to be fully engaged in the reconstruction functions, even though the NRA had conducted provincial level consultative workshops and developed action plans to implement reconstruction based on the outcome of the workshops. The NRA also formed District Level Reconstruction Facilitation Committees led by elected leaders of the DCCs in earthquake-affected districts to accelerate reconstruction.

2.5.2 Impact of federalism on reconstruction

The Constitution transformed Nepal into a federal democratic republic, which was a major shift from traditional, centralised governance to federated governance. Power-sharing among different layers of government is constitutionally guaranteed. In restructuring the governance system, the Constitution created a three-tier government system, with distinct mandates and jurisdictions of federal, provincial, and local governments. The Constitution has provisions for the following:

- n **Political federalisation:** with powerful political institutions like the parliament and parliamentary committees, election system and the policy-making structures at the federal, provincial and local-levels.
- n **Economic and fiscal federalisation:** with the power accorded to provincial and local levels to formulate and enforce economic development policies, development management, programming and budgeting systems, generation and mobilisation of revenues.
- n **Legislative federalisation:** with the power devolved to provincial and local levels to formulate laws and enforcement mechanisms, with judicial powers.

2.5.3 Executive and administrative federalisation

The Constitution has provisions on the responsibilities of each level of government, with 22 exclusive functions assigned to local governments, including management of local services, local development projects and programs, basic and secondary education, basic health and sanitation and local economic development. The Government of Nepal has clarified the concurrent authority of each level of government and unbundled the following functional responsibilities in accordance with the provisions in the Constitution:

- a. **Federal level:** federal policy and law-making, determining quality and standards, research and development, coordination, monitoring and evaluation (M&E), international relations and capacity development, large scale projects execution.
- b. **Provincial level:** provincial policy and law-making, regulating quality and enforcement of standards, management of public services, infrastructure development, disaster management, coordination, monitoring and evaluation at the provincial level, capacity development, security management.

- c. Local level:** local level policy and programs related to disaster management, local level infrastructures, basic service delivery and service management for citizens, local level development programs, protection and basic security of citizens, coordination, monitoring and evaluation at the local level, mobilisation of community-based organisations and citizen security.

The federalisation of the country, particularly the new authorities at the provincial and local levels affected reconstruction work substantially in terms of changes required to account for new policies, laws, government structures, administrative systems and the new political and administrative culture. The executive, legislative, fiscal and administrative power structure changed significantly. To respond to the changes, NRA had to amend the reconstruction policy and strategy, responsibility and accountability systems, programming and budgeting systems, program execution mechanisms, coordination and facilitation systems, and mobilisation of resources and personnel. The major shift was the transformation of reconstruction from a centralized approach to a federalized one, putting the local government at the centre. For this the NRA required to prepare a localization strategy to reflect the restructuring of the government system and for effective implementation of reconstruction works at the local level.

2.5.4 Local institution building and capacity development

The federalisation of the governance system entrusted local level governance institutions with authority to make policies, enact laws, design enforcement mechanisms and service delivery, including construction of local infrastructure and post-earthquake reconstruction. The changes required the NRA to adopt and find ways for enhancing capacity of local institutions for continuation of reconstruction works, which required a dedicated and visible local institutional framework and local capacity for earthquake response. NRA implemented a localization strategy to carry out reconstruction but did not undertake a capacity assessment of local-level institutions with respect to their ability to plan and engage in reconstruction management.

Capacity assessment of the local government was required for planning and strategically strengthening local institutions in disaster management for leading preparedness, response and reconstruction responsibilities. For capacity development the NRA focussed on setting up capable disaster management institutions, developing competent human resources, improving systems for preparedness, response and reconstruction; collaborations, documentation and information systems and effective delivery of services. Doing all of the above proved to be impossible as many local bodies had limited resources, including capacity. Therefore, familiarizing and orienting local leaders and officials on reconstruction management remained a high priority of the NRA, even as it approached the final months of its tenure.

Despite the challenges, the NRA was able to complete training of more than 1,800 elected local representatives and officials of 283 local governments in 32 earthquake-affected districts on “Resilient Reconstruction and Resilient Development”. This was a crucial step towards transferring knowledge to local governments and building of long-term resilience. It was also a necessary step for facilitating the smooth exit of the NRA⁴. The objectives of the training included:

- n Orienting local level officials and elected representatives on policies, strategies, guidelines and standards related to disaster resilience.
- n Enhancing knowledge of local government representatives for mainstreaming disaster resilience into planning, implementation and management of development programs, and
- n Institutionalizing reconstruction and resilient development planning.

⁴ The initiative was financed by the World Bank through the Earthquake Housing Reconstruction Project (EHRP).

The planned transfer of physical and soft records through a reconstruction portal is also part of the local government integration initiative, which is integral to the NRA's exit strategy. After the training, the NRA introduced a number of capacity-building activities, including slope stabilization training for the local level and provincial government engineers in 32 earthquake-affected districts.

2.5.5 Key federalisation issues: decentralisation and devolution

Political and administrative complexities limited the ability of the NRA to capitalise on the opportunities offered by the political transition for reinforcing reconstruction management capabilities at the local level. By mid-2021, provincial responsibility for reconstruction policy management had still not been clarified, while there was also a lack of clarity between provincial and local governments on the responsibilities for reconstruction.

The Reconstruction Act required the formation of District Coordination Committees in all 32 earthquake-affected districts, under the leadership of a federal member of parliament from the district, on a rotational basis, and including district authorities. The DCCs were expected to monitor and coordinate reconstruction activities of the NRA and its implementing agencies. A significant problem in convening the DCC meetings was the frequent absence of the federal parliamentarian, due to commitments in Kathmandu. In addition, the existence of other district coordination committees, chaired by the Chief District Officer, that had been formed by the NRA led to some initial confusions on the oversight responsibility, for example, that between the DLPIUs, between NRA and the Ministry of Home Affairs (Pathak, P.K., 2020).

After the establishment of the three-tiered system of governance as set out in the 2015 Constitution and the 2017/2018 local government elections, the NRA initiated the process of establishing cooperation agreements with municipalities as a basis for decentralizing reconstruction responsibilities, especially in private housing. This initiative sought to make local bodies more accountable for post-disaster reconstruction, especially to affected populations. But devolution of reconstruction responsibilities to municipalities presented its own set of challenges, arising from the lack of local experience, technical knowledge and resources - human, financial and material - at many municipalities. The NRA initiated capacity building activities with partner support but additional projects for training and capacity support at the municipal level will need to be continued.

The federalisation process required the NRA to initiate a series of changes in reconstruction policy and strategy, programme financing and execution modalities, coordination and accountability frameworks. The development of the NRA's localisation strategy was instrumental in transforming reconstruction from a centralised to a devolved (federalized) approach. This was a major task, not unlike that faced by the NRA in 2015-16, when it was leading reconstruction efforts while simultaneously building its own organisational structures and functions.

A major achievement of the NRA was the signing of memoranda of understanding (MOUs) with all 282 earthquake-affected municipalities, with the intent of enabling them to assume authority over reconstruction. However, the transfer of powers has been uneven, not only due to limited capacities and awareness of many municipalities but also owing to the difficulties faced by the NRA in obtaining authorization from the Ministry of Finance to transfer funds to the local levels. Despite challenges, the municipalities and their Local Reconstruction Facilitation Committees (LRFCs) were progressively assuming their responsibilities, onboarding personnel, handling grievances and facilitating communication between affected people and the NRA.

Lessons learned

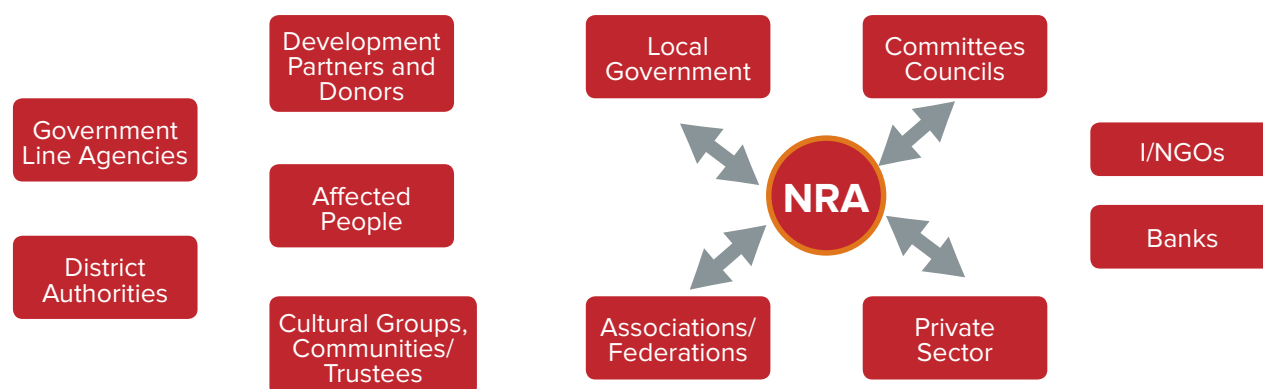
- n Clarify immediately, with precision and in advance, of the inevitability of future disaster events, and the respective roles and responsibilities of central and subnational coordination bodies and implementing agencies for disaster management and reconstruction.
- n Accord urgent priority to strengthening the capabilities of municipalities and to allocating resources required by municipalities for disaster management.

2.6 Mobilisation of civil society and the private sector

2.6.1 Mobilisation of I/NGOs and civil society organizations

The NRA had mobilised the non-profit sector in the reconstruction, in recognition of the significant role that such partners could play in delivering projects, cost-effectiveness, better social outcomes, transfer of knowledge and experience, and for ensuring sustainability of local initiatives. A collaborative partnership model was applied to work with civil society organisations (CSOs), through agreement on shared objectives, mutually agreed roles, responsibilities, accountability and optimization of results.

Along with donors and development partners, many I/NGOs and CSOs supported the recovery and reconstruction program in accordance with the plans and guidance of the NRA. Almost all INGOs working in Nepal were engaged in the reconstruction, most of them worked with national NGOs and community-based organizations (CBOs). Most of them began engagements after the earthquake, including rescue and relief operations. They were particularly effective in mobilizing communities, addressing problems of vulnerable groups, gender equality and social inclusion (GESI), resettlement and relocation. They also worked effectively in the area of cultural heritage and monuments and in supporting livelihood options and trainings on skill development. Their work at the grassroots level helped local communities directly, in coordination with local authorities. They were usually focused on specific areas or themes, followed on work progress, monitored programs and projects and served as mediators between the NRA and local communities, district-level agencies and beneficiaries.



In the beginning there was a significant problem of coordination between the NRA and I/NGOs, especially in identifying program activities, supporting affected people and providing relief materials. There were concerns about duplication, lack of quality and equitable distribution of services, and issues of professional integrity and work ethics. Quality of service was also an issue, particularly related to cash disbursement, material and technical support that was seen as being more supply-driven, rather than being based on the demands of communities. It was also observed that the support provided was sometimes inadequate. Coverage of the affected populations by NGOs was not evenly distributed or coordinated, and as result, assistance was concentrated in some areas while others were excluded.

The NRA confronted these problems and overtime the I/NGOs engaged with and contributed to the achievement of the reconstruction targets and priorities. Their main contributions to this partnership were social mobilization, community services, and delivery of additional support to vulnerable groups. Several I/NGOs were also engaged in rebuilding destroyed houses.

2.6.2 Mobilization of the private sector

The NRA worked with the private sector and communities in several aspects of reconstruction. The private sector was initially engaged in relief operations, mainly providing support and materials in the affected areas. Similarly, local communities were also mobilized in the affected areas during and immediately after the earthquake. Communities have since been engaged in supporting members to build private houses and public infrastructure, for social recovery and in the reconstruction of schools and health facilities.

Another major area of private sector engagement in reconstruction was facilitation of the supply of construction materials and labor for government projects. Many issues and concerns arose with regard to the supply of materials, their quality, appropriateness and the spiraling costs as demand increased, particularly in remote communities. There were shortages of local construction materials in some earthquake-affected districts from time to time, which had delayed reconstruction. The role of the private sector was essential, in supplying construction materials, especially to the remote areas where roads and road transportation either did not exist or was in a poor condition.

Much work remains to be done with the private sector in developing joint multi-hazard disaster risk analysis and reconstruction guidelines, in logistics and supply chain management, preparedness and prepositioning of materials, quality control and compliance with codes and standards for materials and construction, and in the application of cost controls when demand is high.

2.6.3 Community-based reconstruction management

One of the key approaches to reconstruction management adopted by the NRA to ensure local ownership and sustainability along with local resource and capacity mobilization, has been community-based reconstruction management. Many heritage sites and monuments – including world heritage sites – were either completely or partially damaged resulting in high financial costs and also losses in terms of socio-religious-cultural importance of these monuments. Numerous temples, monuments, heritage buildings, gumbas (monasteries) and historical sites were damaged. These culturally important assets, in many cases, belonged to local communities, trustees and festival management groups. The destruction of the tangible heritage by the earthquake threatened to lead to losses in the intangible heritage requiring the NRA to accord high priority on the renovation and rehabilitation of such sites.

There were extensive discussions on the approach, strategy, methods, and technologies suitable for rebuilding heritage monuments. What was evident throughout was that the reconstruction process would not work, nor be effective, without the participation of local communities and local owners of houses built in traditional styles in the heritage communities. The main concern of the NRA was to ensure, through community engagement, that social and cultural values were respected. This required a respectful approach to historical preservation by combining classical and suitable modern approaches to reconstruction.

There were some disputes (as is to be expected in a complex multi-stakeholder environment), but for the most part, the NRA was able to convince community members to adhere to common but contextually appropriate methods and use of technology for renovation, rehabilitation, reconstruction, protection and

preservation of the heritage sites. Together with the use of both modern and traditional approaches, the NRA had considered both global and local perspectives, including those of international institutions such as UNESCO.

It did become apparent, however, that training and certification of architects, civil and geotechnical engineers did not pay sufficient attention to culture and tradition with regard to construction materials, building designs and construction. These aspects need to be incorporated in training programs, and curricula of technical colleges and universities to ensure that Nepal can retain its distinctive communities, historic monuments, cultural and regional diversity in future disasters.

2.7 Key findings, learnings and conclusions

2.7.1 NRA governance

The 7.8 Mw earthquake of 2015 that struck Nepal was one of the worst disasters in the country. It had serious consequences for governance, including the political, economic, social and cultural systems of Nepal, in addition to the massive devastation caused on private houses and development infrastructure. The challenges faced also created many opportunities to learn from the experience, including from the management of the reconstruction and recovery process.

The lack of preparedness for response and weak disaster governance resilience of the society pointed to the need for more resilient disaster governance, in general, and earthquake response capacity and strengthened social resilience, in particular.

However, earthquake-affected homeowners did not wait for guidelines before they began rebuilding their houses. But this changed and progress was made in strengthening resilience in the course of the NRA-led reconstruction, which included building awareness of the importance of building earthquake-resilient houses. By the end of July 2020, 70 percent of 829,667 eligible beneficiaries had reconstructed earthquake-resilient houses and the remaining 30 percent were engaged in house construction.

Despite high political commitment to post-earthquake recovery and reconstruction, institutionalized reconstruction could not gain momentum for several months after the earthquake. This was due to delays in the formation of the dedicated national body to manage reconstruction and the political negotiations for enacting the required legislation for post-earthquake governance. Varied political interests had affected the process of forming the NRA. However, the timely completion of the PDNA

and the enactment of required laws made it possible to form the NRA as the special vehicle to lead post-earthquake recovery and reconstruction. This entity then created a common platform for planned

NEPAL'S RECONSTRUCTION IS COMMENDABLE, SAYS JAMAICAN MINISTER BARTLETT

The Jamaican Minister for Tourism Edmund Bartlett, who was in Nepal to participate in the inaugural ceremony of Visit Nepal Year 2020, visited various sites and heritage areas which were under reconstruction.

Minister Bartlett visited Dharahara, Kathmandu Durbar Square area, Durbar High School, Rani Pokhari and Mahadev temple of Tripureshwor and received information regarding their reconstruction.

During his observation visit, he expressed that the stronger and safer reconstruction is impressive and preservation of originality during reconstruction of heritage sites can have positive impact on tourists. Minister Bartlett expressed that the reconstruction work in Nepal had been commendable.

The Visit Nepal Year 2020 was inaugurated by President Vidhya Devi Bhandari in Dashrath Stadium. Ministers and State Ministers of Tourism from different countries had arrived for the event

reconstruction interventions, both for the government system and also for the wide range of committed development partners, civil society, the business community and the international development agencies.

The adoption of a post-earthquake governance architecture by the government reinforced the NRA's visibility and existence. It was a powerful institution and was capable of leading policy formulation, a collaborative governance system and institutional financing system and delivery modalities, designed to ensure effective execution, coordination, broad-based collaboration and partnerships. The NRA's positioning as a legitimate national agency, with the required autonomy and institutional arrangements, was required for optimizing coherence of interventions and to ensure recovery and reconstruction results met the high public expectations. The PDRF served as a strategic planning platform, with a prioritized and structured framework for the systematic, coordinated and collaborative implementation of an integrated recovery and reconstruction process.

The governance principles adopted by the NRA, including owner-driven reconstruction, build back better, gender and social inclusion and adaptation to federalisation underpinned the governance system's intent to achieve appropriate and socially relevant recovery. The accountability and transparency frameworks supported by e-governance, a public communication framework, an appeal process and the comprehensive grievance management procedures, among others, helped to ensure transparent, citizen-responsive post-earthquake reconstruction.

The NRA was a mix of executive professionalism and bureaucratic regulation, and was an institution that allowed bureaucratic-professional managerial trade-offs, with a project management structure and divisional and functional structures, and a network of cross-sectoral program implementation units. It was a relatively complex structure that did complicate executive decision-making and results-based deliberations.

In order to build a professionally competent human resource system, the NRA adopted a mix of executive, bureaucratic and expert systems for human resource management and in managing reconstruction performance. NRA's human resource capacity was supported by planning, the legal framework for civil service adaptation, and expert-based and outsourcing that provided the institution with a system of multiple autonomies in human resource deliberations. As a whole, the performance management system and human resource development approach adopted by the NRA assisted in ensuring competitive performance and accountability, as well as the results-based management.

The reconstruction financing system of the NRA was guided by a strategic financial management framework, with multiple streams of financing including government-driven, donor-driven, owner-driven, community-driven and financial market-driven approaches, which provided multiple options for reconstruction resource management. The use of banks to make grant transfers also helped towards developing a banking culture among beneficiaries while also contributing towards mitigating the potential financial risks.

The reconstruction fund institutionalized within the NRA system had the potential to provide space for the exercise of financial autonomy in resource use for program implementation and priority-setting. However, the limitations placed on operation of the fund by the Ministry of Finance, prevented from the fund being functional.

The specialised procurement system, supported by financial guidelines, did facilitate the autonomy of the NRA and its ability to manage both the quality of reconstruction programs and fiduciary risks. These were further assured by the public accountability framework of the government. However, as previously noted, a low appetite for risk limited the extent to which the NRA could take advantage of the specialised system.

Donor cooperation in reconstruction financing was characterised by a range of diverse approaches – policy-based, project and program-based, sector-wide approach, humanitarian assistance and support through I/NGOs grounded in the principles of alignment, harmonization and mutual accountability in the Development Cooperation Policy of the government. The Development Assistance Coordination and Facilitation Committee (DACFC) of the NRA provided a participatory structure for the coordinated mobilization of financial and technical contributions for reconstruction.

The fundamental changes in governance resulting from the prolonged political transition and changes in the constitutional system had multiple impacts on reconstruction governance. A shift from a unitary to the federal system of governance affected the strategies, structures, systems and institutional behaviour of the NRA.

Nepal's bureaucracy-led local governments were replaced by a representative-led local governance system and the centralized authority was devolved in accordance with the constitutional provisions. The devolution included economic and fiscal federalisation, executive federalisation, political federalisation, legislative federalisation and administrative federalisation. The collective impact of these changes required the NRA to undertake significant reforms in the institutional and decision-making frameworks for managing reconstruction while simultaneously assuring continued implementation of reconstruction programs and projects that were underway. The NRA was largely successful in managing the transition by harmonizing structures and functions to match the larger societal changes that were taking place in localization of the reconstruction effort.

2.7.2 Key reflections and learning

The devastating earthquake of 2015 captured the immediate attention of both national and international authorities who as a priority mobilized a massive humanitarian response, and a long-term investment in socioeconomic recovery thereafter.

The new constitutional provisions had led to a shift from the conventional welfare approach to a rights-based approach, which reinforced expectations of affected populations for the recovery and reconstruction response and the responsiveness of the NRA. The change not only focused on reconstruction governance arrangements but also demanded adoption by the government of a number of principles, such as social justice and inclusion, comprehensive accountability, efficient and effective performance and responsible delivery system, all of which underpinned need for a more collaborative and participatory governance system for reconstruction.

High-level political consensus and commitment was reflected in a determination to ensure the effectiveness of the reconstruction effort, grounded in trust-based government-citizen relationships and backed up by necessary legal and institutional provisions, and appropriate communication and coordination arrangements.

The NRA leadership and management made every effort required to be a high-performing, legitimate and autonomous agency, characterised by coherent programmatic strategies and functional financial and management systems. It gained strong support from the government and also substantive support from international development partners and a wide array of other stakeholders.

The owner-driven approach adopted by the NRA as the main principle guiding reconstruction, which also inspired its strategy. The NRA has institutionalized an extensive process of self-organised and self-sufficient construction by the affected population. This reflects the commitment of the NRA to supporting self-reliant, locally mobilized and sustainable community level reconstruction.

That said, the conditional cash grant system had its shortcomings, and was insufficient as a housing recovery financing strategy and in terms of effectiveness. A range of other complementary measures were needed to strengthen the effectiveness of the strategy for financing housing reconstruction and the affordability of homeowners. These included, for example, simplified procedures for obtaining grants; clear steps for accessing grant tranches and for compliance with building standards; simplified banking procedures for the poorest and most vulnerable; facilitated access to formal, subsidised credit services; control of construction costs, and comprehensive training of engineers in traditional and culturally-varied building design and construction materials.

A critical aspect of reconstruction financing was the considerable influence of the donor community in policy, decision-making, execution, monitoring and evaluation. This reflected the continuing prevalence of donor influence, in spite their stated commitment to the Paris Principles for aid effectiveness and recognition of the primacy of national ownership. In the absence of complete trust in national systems and procedures, the priority of donors should be to support the creation of strong national accountability systems, rather than to establish parallel systems. It must be said that certain donors were committed to national ownership in their support for development of the NRA's financial management, procurement, human resource management, MIS and project management systems, for example.

The bureaucratic nature of the NRA's system of reconstruction management had led to complexities and constraints, as reflected in a wide range of functions: decision-making, policy formulation and execution; management of human resources; ensuring teamwork and creation of a results culture; the stability of the senior management team; integrated performance management; and the exercise of administrative autonomy.

The political transition and the creation of new federal, provincial and local government structures through elections, transformed the governance framework that changed a unitary and centralized system to a federated one. Federalization introduced new mandates on all three tiers of government and that required the institutional reengineering of the reconstruction approach, based on a localized and harmonized system of response. Political stability is a necessary condition for effective functioning of institutions – a condition that has yet to be achieved.

The federal system of governance brought both challenges and opportunities for the NRA as it had to devise systems for working with all three tiers of government. The NRA managed the challenges posed by the new system with considerable success and integrated its functions with the dynamics of localization, as intended in the Constitution. However, the NRA struggled to function effectively, given the bureaucratic-managerial trade-offs that were required. It had also at times struggled to achieve performance effectiveness particularly at the local municipal government level.

Highly vulnerable groups, such as women, children, the elderly, differently-abled people and socially, culturally and economically marginalized populations, required to be provided equitable access to reconstruction services and benefits. Assuring this required effective provisioning and implementation, based on the principles of social justice and inclusion. A lack of proper assessments and documentation on these particular communities had an adverse impact on delivery of reconstruction services. There was also the need of meeting the distinct needs of women and girls, with the creation of social safety nets and provisions for their protection from gender-based violence. Assessment of the needs and vulnerabilities of such groups must become an integral part of mainstream development planning and programming. Without prior analyses, undertaken within the framework of a risk-informed development approach, it will remain difficult for post-disaster reconstruction and recovery to prioritize vulnerable populations.

Effective implementation of the reconstruction policy, strategy and decisions depends on the creation of an enabling environment. Such an environment must include a competent execution mechanism with competent human resources, effective coordination, monitoring and evaluation, meaningful collaboration and partnerships, encouragement of innovation and a motivating environment for all. The NRA made efforts to work to the best of its ability across the many dimensions of its work.

Reconstruction governance was a new practice introduced in Nepal after the earthquake, especially as regards the assumption of all responsibilities for recovery and reconstruction by one agency like the NRA. There was very limited experience, documentation or institutional memory of best practices on record, specifically related to impacts of, response to and recovery from past earthquakes. Thus, the NRA had to experiment, explore and establish its operation principles from the ground up.

The recording of NRA's reconstruction experience and the lessons learned can serve as a valuable source of knowledge and skills transfer, and also support both technological and academic research. A high-quality body of research, analysis and documentation is now available for sharing with stakeholders in Nepal and abroad. The institutionalization of mechanisms for documentation and information dissemination has not only formed a foundation for the desired NRA exit strategy, but also continue to facilitate the mainstreaming and integration of reconstruction lessons within Nepal's planning for sustainable development and national resilience, and for effectiveness in post-disaster situations in the future.

The NRA was not alone in the challenging and complex reconstruction undertaking. The whole nation was involved, directly or indirectly – including government agencies, development partners and donors, I/NGOs, the private sector, civil society organisations, local governments, people's representatives and citizens. The NRA's role was to lead, channelize and coordinate the efforts of all for reconstruction. The mixed experience, challenges faced, accomplishments, successes and failures, good and bad practices of the NRA provide the institutional memory that can underpin future initiatives of a similar kind.

2.7.3 Major challenges

The Gorkha earthquake of 2015 was one of most devastating disasters in the modern history of Nepal. It caused widespread destruction, huge loss of life and property, including public infrastructure, buildings and humanitarian facilities. The disaster also posed challenges to different aspects of national governance including the need to rebuild institutional capacities for response.

Reconstruction in response to earthquake is a cross-cutting issue of governance and development that requires mainstreaming across different tiers of government and across different sectors of society. The NRA, as it neared the completion of its term, undertook a comprehensive and rigorous effort to bring its experience, knowledge and skills, systems and response mechanisms into regular governance structures to ensure the continuity and sustainability of reconstruction, and absorption of lessons learned for disaster risk-informed development and disaster management planning.

The success of reconstruction in a federal system of government is determined by institution-building and capacity enhancement at the local level, with local ownership. Many local agencies remained overly influenced by political considerations, with insufficient experience of, or incentive to focus on the economic, social and managerial requirements of post-earthquake reconstruction. Weak community resilience and preparedness for earthquakes or other disaster events remains a fact of life and therefore increased proactivity is required from local governments for building disaster resilient communities.

Some major bottlenecks that limited institutional effectiveness in reconstruction included the lack of preparedness at political, institutional and administrative levels for dealing with a major disaster. The low level of government preparedness was a major reason for creating the NRA. But as it became evident over the years, creation of a special reconstruction body and measures was not enough not a panacea for reconstruction, given frequent changes of the leadership at the senior management level of the NRA, at related ministries and local government agencies. The absence of local government institutions immediately after the earthquake added challenges to disaster recovery.

Despite efforts to set up the institution of the NRA as a competent agency, bureaucratic influences and hurdles at federal, provincial and local levels hampered the professionalization of the reconstruction agency and its systems and processes. This challenge in institution-building for reconstruction has to be addressed across all levels of government.

International development partners contributed greatly to the reconstruction process by channeling resources through the government. They also funded I/NGO institutions directly. There was always a question of accountability and transparency in I/NGO fund management given, for example, the high administrative expenses. Excessive donor-dependence in sourcing finance for reconstruction by those agencies was also a challenging issue. This undermined continuity of funding and sustainability of their reconstruction engagements after the termination of PDRF and donor-supported funding agreements. It was also challenging, at times, to align specific I/NGO interests and perspectives with the national reconstruction goals and with the need for equitable coverage of services and support.

It is important to address the critical access barriers to reconstruction delivery to poor, vulnerable and marginalized communities. Such barriers are rooted in socio-cultural, economic and administrative impediments that need to be overcome in order to realize the goal of leaving no one behind, as articulated in the Sustainable Development Goals 2030 to which Nepal is committed.

2.7.4 Preparing for the future

It is clear from the NRA's experience that success in post-disaster reconstruction in the future will depend on national readiness to respond to challenges, seize opportunities, reinforce the strengths and optimize capacity – factors that together can result in strategic, institutional and programmatic effectiveness at all levels. After the NRA tenure ends, it would be essential to develop measures for sustained and sustainable application of lessons learned from reconstruction experience.

A broad-based and participatory strategic planning process is essential for several reasons: scanning the environment, exploring areas of effective intervention, setting priorities with supportive strategies, selecting measures for effective execution, building collaborative frameworks and developing platforms for cross-sectoral mainstreaming, localisation and capacity enhancement, all of which are required to make post-disaster reconstruction a logical extension of disaster risk-informed planning for sustainable development and national resilience.

The long-term impact and effectiveness of the NRA's experiences in reconstruction management will largely be determined by a successful localization strategy. This can be operationalized by carrying out an assessment of the current disaster response capacity of local governments for supporting the institutionalization of disaster management capacity and mainstreaming augmented reconstruction capacity into systems and behaviours for building stronger local institutions. This demands a wide array of enhanced skills and knowledge, at the political or bureaucratic levels, in human resource development and in financial risk management capacity. These measures combined can lay the foundation for ensuring professional performance and program delivery at the local level.

The NRA experience has shown that evidence-based reconstruction management requires proper documentation and information management mechanisms to support decision-making and project implementation. Towards the end of its tenure, the NRA moved strategically to prepare comprehensive documentation on its experiences in the post-earthquake reconstruction, an example of which is this document. The lessons it learnt, good practices and innovative ideas, and major achievements and challenges have been documented for wider learning. Mainstreaming and institutionalization of these lessons is a shared responsibility and should be a joint undertaking of all stakeholders.

Localization can be supported and reinforced by research and development support to local governments, with initial funding from the federal level. Assessment of the vulnerability of all major settlements to disasters, including earthquakes, need to be conducted for documenting disaster hazards and risks. This evidence can, in turn, help in building local government capacities for disaster preparedness, management, response and reconstruction.

The NRA evolved as an organization of excellent reputation, despite numerous challenges and constraints, and has created a solid foundation for future disaster response and recovery. A strong and well-resourced National Disaster Risk Reduction and Management Authority (NDRRMA), leading a common platform with the active participation of government, civil society, the business community, donor community and the independent experts, is required to ensure continuity after the completion of the tenure of the NRA. It needs to continue to build on NRA's substantive experience in the field of post-earthquake recovery and reconstruction, while planning for the future.

2.7.5 Conclusion

Despite several constraints, the NRA emerged with a strong performance and commitment in post-earthquake reconstruction management. It had begun from ground zero. After six years, it was able to proudly share its achievements in leading post-earthquake reconstruction in the normative, functional and operational domains laying the foundation for a reinforced culture of building earthquake-resilient structures. This is a significant achievement in a country that is highly vulnerable to earthquakes and to other natural disasters.

The transfer of knowledge, experience, best practices and lessons learned in reconstruction must now be mainstreamed and integrated in all sectors and levels of government. Development partners also have much to learn and apply from the experience in terms of their reconstruction strategies and approaches to partnerships, respecting the principles of aid effectiveness, localization, community participation and national ownership.

It is essential that the NDRRMA and other agencies that would be involved in continuing reconstruction responsibilities are supported to build the capacity necessary for the undertaking. The transition from the NRA to the next organization also needs to be well planned, phased, tracked and documented. The effort by the NRA to handover documentation of best practices, lessons learned and institutional memory is therefore expected to benefit stakeholders in government, civil society, the private sector, academia and others.

This can assist preparedness for agencies that would be involved in responding to future disaster events. Because the lives and livelihoods of the Nepali people are dependent on effective preparedness and response before and after disasters, both government institutions and the people must be made aware and prepared for facing future hazards. This approach can assist in reducing the risk of losses and also prepare duty bearers for effectively supporting reconstruction and recovery.

Effectiveness of reconstruction depends on sustainability of preparedness and response that can be attained through localization and strengthening of community-based institutions. This would require an urgent support strategy for capacity building at the local level. There is no alternative to strengthening the local governance system for future disaster preparedness and response. Developing self-reliant local governments and reducing donor dependency through effective localization and community mobilization can help in building a foundation for effective disaster management and response. To sum up, build back better needs to be internalized as a collective enterprise of all Nepalis.

2.7.6 Comprehensive mandate, delayed opportunities

The Reconstruction of Earthquake-Affected Structures Act, 2015 had defined the NRA's functions, duties and powers. The title of the law underscored its focus on reconstruction of physical structures, without mention of several important considerations that the NRA subsequently had to confront. A few examples:

- n There was no mention of the devolution that would be required in a new federal framework, although the new Constitution had come into effect before the Act was approved.
- n There was no reference to any definition or prioritization of vulnerable groups or of people living below the poverty line before April 2015.
- n There was no mention of the need to promote gender equity.
- n There was no mention of conservation or environmental protection.
- n The focus of a number of provisions was on the reconstruction of physical structures, mainly of private housing. This was not surprising, given the amount of damage suffered but the emphasis was later questioned as it diverted attention from other, less prominent reconstruction priorities. In 2017, the NRA acknowledged that its predominant focus on housing had overshadowed attention to broader community needs, for example livelihoods and employment regeneration.
- n The Act also authorized the demolition or removal of houses and other buildings, but made no reference to retrofitting, a key, cost-effective approach that was eventually implemented. It was taken on because of the economic and social benefits that had been observed elsewhere, for example in Bhuj, after the 2001 Gujarat earthquake. This had a direct adverse impact on vulnerable and marginalized populations, as many lived in stone/ mud mortar homes, which were amenable to retrofitting. An additional complication was that the training of most engineers in Nepal did not include instructions on the characteristics of load-bearing structures, such as the traditional and culturally-specific stone/mud mortar homes.

These, combined with public pressure to produce results in housing reconstruction, meant that the NRA had to play catch-up in adjusting policies and operations to accord necessary attention and channel resources to other important issues – such as vulnerable groups or environmental protection, and retrofitting of houses.

The 2015 PDNA had addressed the vulnerabilities of the population living below the poverty line (25.2 per cent in 2010-11) and estimated that a further 2.5 to 3.5 percent of the population (700,000 people) would be pushed into poverty by the impacts of the earthquake (NPC, 2015). This analysis was accounted by the text in the law. The PDRF (2016) had stated the intent to mainstream gender equity and social inclusion; and to provide specialized assistance to people with special needs and enhance the coping mechanism(s) of the most vulnerable. The PDRF also referred to the importance of building the resilience of people and communities at risk in the earthquake-affected districts (NRA, 2016). Likewise, in its section on Approaches for policy implementation, social inclusion, the PDRF said “NRA will develop solutions that benefit the poorest and ensure that interventions are tailored to meet their needs” (NRA, 2016).

That said, it did take some time for the NRA to focus on the needs of vulnerable groups. These included measures to provide additional cash grants and technical support to vulnerable groups (orphans, single women, disabled and senior citizens) for housing reconstruction, assistance to the landless acquire land; determining the rights of internally-displaced persons; and providing additional measures for relocation and rehabilitation of communities residing in highly vulnerable areas. However, the mapping of pre-earthquake poverty patterns, especially in the rural central hills and mountains, was not used as an indicator for direction of reconstruction assistance. The delays, however, did mean that Nepalis living in precarious and inadequate conditions before the earthquake represented a disproportionately high number of those still living in inadequate housing long into the reconstruction process (Displacement Solutions, April 2019).

The predominance of structural and technical skills and experience at the NRA, combined with the public demand for housing solutions, did lead to a lower initial prioritization of poverty, vulnerability and environmental protection in reconstruction, despite the PDNA observation that earthquake would disproportionately affect the poor. This highlights, once again, the importance of pre-disaster analysis and mapping of risks and hazards – particularly the situation of people below the poverty line and disadvantaged by other of vulnerabilities including discrimination – and including support mechanisms in the mandate of a disaster management and reconstruction authority. Provisions for recruiting personnel experienced in these domains at the entity is another consideration.

Lessons learned

- n Ensure that the mandate of a disaster management/ reconstruction authority is in line with federal governance parameters.
- n Specify the requirement to prioritize in the mandate, strategies and operations of the authority, social inclusion, gender equity and interventions specifically focused on addressing the needs of the poor, vulnerable and marginalized groups and on environmental protection.
- n Ensure recruitment of personnel with experience in applying strategies promoting gender equity, poverty reduction, environmental protection and for addressing the rights and needs of vulnerable and marginalised groups at the authority.
- n Ensure the inclusion of poverty and vulnerability analysis and of environmental protection in pre-disaster analysis, within the framework of disaster risk-informed development planning.

A. Sustainable development and disaster management

This section addresses an overarching requirement for successful post-disaster reconstruction operations in the future. This must begin with the incorporation of disaster management provisions and resilience-building measures in Nepal's development goals, plans and strategies. This is required to effectively execute disaster management, response and reconstruction for the benefit and well-being of citizens, including the most vulnerable. This would require incorporating hazard mapping, risk analysis and context analysis in development plans and strategies and updating in advance of disaster events relevant codes, standards, protocols and procedures for use in disaster management and reconstruction operations. These efforts can ensure contribution of the operations to the sustainable development goals and national resilience.

Such preparatory measures can assist Nepal towards starting to build a cadre of trained personnel – at national and sub-national levels – for crisis and disaster management, mainly in preparedness, hazard analysis, response and recovery.

It is not possible to develop national resilience without such measures. The lack of standards and guidelines for disaster risk-informed development planning had put the NRA under tremendous pressure during its early days, as it had to develop multiple guidelines on matters discussed above even as it was rolling out reconstruction operations. Nepal now has no shortage of laws, policies and strategic guidelines for undertaking multi-hazard risk-informed analysis for development planning, particularly for incorporating disaster management and preparedness in development plans.

For example, the Constitution of Nepal 2015 states that disaster risk management is a shared responsibility of all levels of government (“concurrent powers”) and has required the governments to have “advance warning, preparedness, rescue, relief and rehabilitation in order to mitigate risks from natural disasters”. Likewise, in the Preface to the 15th National Development Plan has said that “while implementing this plan, appropriate plans and programmes will be formulated and implemented to mitigate the adverse effects of the global COVID-19 pandemic and other epidemics and disasters on achieving the goals set by the plan and to recover the economy”.

Inadequate preparation for disaster response and weak response weakens societal resilience for withstanding and recovering from disasters. The situation in Nepal is not one caused by the lack of guidelines. Instead, it has resulted from lack of action, perhaps of will, to implement established and easily-accessible guidelines. The existence of local government authorities with responsibility for local disaster preparedness, management and reconstruction provides an opportunity, for the NDRRMA and the National Planning Commission to continue the efforts started by the NRA.

There is now opportunity for these two entities is to join forces to ensure that local authorities have the knowledge and capacity to comply with and implement provisions for incorporating disaster planning, preparedness and management in local development plans. This will be a significant contribution towards instituting more resilient disaster governance in general, and to disaster response capacity. Development partners need to support Nepal in this endeavour for developing mutually-acceptable strategies, systems and procedures for avoiding the huge investments that will otherwise have to be made after disasters.

Lessons learned

Nepal requires to make disaster risk-informed analysis - a standard part of development planning at all levels.

2.8 Exit strategy

The exit strategy refers to the NRA’s withdrawal from all responsibilities for reconstruction management and an assurance of a successor system/ agency for the continuation, mainstreaming and integration of interventions it had initiated. The goal of the exit strategy is to ensure the sustainability of impacts after the end of the NRA’s tenure. At the time of writing this report, the exit strategy foresaw three particular actions of the NRA in the final months.

2.8.1 Performance evaluation

As a critical aspect of the exit strategy, the performance of the NRA needs to be independently evaluated, employing performance indicators like the quantity of outputs achieved, quality of program delivery and cost-effectiveness, delivery system, timeliness and efficiency, and the social justice and inclusion perspectives. The scope of work of the evaluation may include the rationale and appropriateness of

the NRA's interventions, the accomplishment of the pre-determined mission, goals and objectives, achievement of results to the satisfaction of stakeholders; problems, challenges and efforts to resolve them, and recommendations for improvement. The framework of performance evaluation also needs to include the NRA's relevance, efficiency, key outputs, impact, effectiveness and contribution to long-term sustainability and resilience.

2.8.2 Preparation for disengagement and integration

A planned disengagement from the reconstruction responsibility involves willingly stepping aside while leaving behind a base to sustain interest, commitment and space reinvention and furthering processes for effective participation of potential agencies. From the NRA's perspective the disengagement means a smooth transfer of its responsibilities by integrating them into existing government systems (federal or provincial or local) for ensuring sustainability and continuity of policy implementation, delivery management and accountability for actions with respect to reconstruction management.

2.8.3 A plan for institutional transfer of responsibility

The exit strategy of the NRA comprises the processes by which the NRA intends to systematically phase out and transfer its functions, while ensuring that achievement of the reconstruction goals is not jeopardized. It also serves as a "sustainability strategy" as it involves planning to ensure sustainability of performance and impacts, even after the end of the timelines established for various interventions come to an end. This is intended to enable government and partners to manage the transition to associated long-term program implementation in selected areas for supporting sustainable development and national resilience.

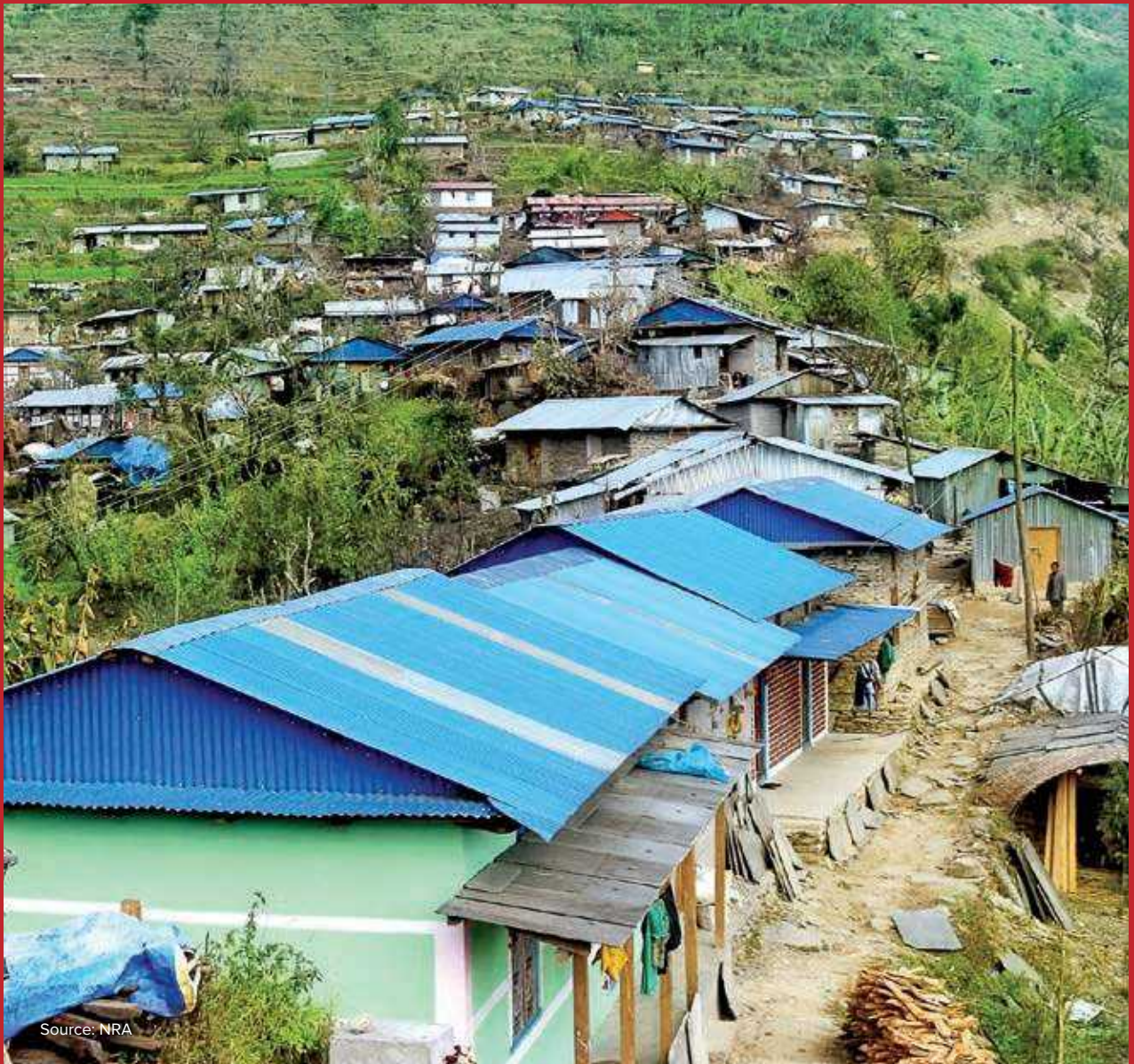
2.9 References

- Government of Nepal. Act No. 11 of 2015 (2072): An Act Made to Provide for Reconstruction of the Earthquake Affected Structures. An Act Made To Provide for Reconstruction of the Earthquake Affected-min 2019-05-05 10-01-04.pdf (dpnet.org.np)
- Government of Nepal. Act No. 11 of 2015 (2072): An Act Made to Provide for Reconstruction of the Earthquake Affected Structures. Preamble, p.1. An Act Made To Provide for Reconstruction of the Earthquake Affected-min 2019-05-05 10-01-04.pdf (dpnet.org.np)
- Pathak, P.K. (2020). Governance and Financial Frameworks of National Reconstruction Authority, pp.54-55. Kathmandu, Nepal. Unpublished paper prepared for NRA.
- Pathak, P.K. (2020). Governance and Financial Frameworks of National Reconstruction Authority, op cit p.34. Kathmandu, Nepal. Unpublished paper prepared for NRA.
- Dinanath Bhandari and Christopher Hodder. (March 2019). Learning from Nepal NRA to inform the National Disaster Risk Reduction and Management Authority, p.24. Oxford Policy Management (OPM) - Policy and Institutional Facility Working Paper, Oxford. NRA Lessons - FINAL Report 2019-09-29 10-39-08. pdf (dpnet.org.np)
- National Reconstruction Authority. (May 2016). Post-Disaster Recovery Framework 2016-2020, p.21. Kathmandu, Nepal. wQxngUUy2r160512083450.pdf (nra.gov.np)
- Government of Nepal. Act No. 11 of 2015 (2072): An Act Made to Provide for Reconstruction of the Earthquake Affected Structures. op cit, section 15. An Act Made To Provide for Reconstruction of the Earthquake Affected-min 2019-05-05 10-01-04.pdf (dpnet.org.np)

- Dinanath Bhandari and Christopher Hodder. (March 2019). Learning from Nepal NRA to inform the National Disaster Risk Reduction and Management Authority, op cit, p.25. Oxford Policy Management (OPM) - Policy and Institutional Facility Working Paper, Oxford. NRA Lessons - FINAL Report 2019-09-29 10-39-08.pdf (dpnet.org.np)
- Dinanath Bhandari and Christopher Hodder. (March 2019). Learning from Nepal NRA to inform the National Disaster Risk Reduction and Management Authority, op cit, p.25. Oxford Policy Management (OPM) - Policy and Institutional Facility Working Paper, Oxford. NRA Lessons - FINAL Report 2019-09-29 10-39-08.pdf (dpnet.org.np)
- Dinanath Bhandari and Christopher Hodder. (March 2019). Learning from Nepal NRA to inform the National Disaster Risk Reduction and Management Authority, op cit, p.25. Oxford Policy Management (OPM) - Policy and Institutional Facility Working Paper, Oxford. NRA Lessons - FINAL Report 2019-09-29 10-39-08.pdf (dpnet.org.np)
- Pathak, P.K. (2020). Governance and Financial Frameworks of National Reconstruction Authority, op cit pp. 25-26. Kathmandu, Nepal. Unpublished paper prepared for NRA.
- National Planning Commission. (2015). Post-Disaster Needs Assessment, Kathmandu, Nepal., p. XVI. Post-Disaster-Needs-Assessment-Report-2015_Executive_Summary_new.pdf (nepalconsulate.gov.np)
- National Reconstruction Authority. (May 2016). Post-Disaster Recovery Framework 2016-2020, p.12. Kathmandu, Nepal. wQxngUUy2r160512083450.pdf (nra.gov.np)
- National Reconstruction Authority. (May 2016). Post-Disaster Recovery Framework 2016-2020, op cit, p.13. Kathmandu, Nepal. wQxngUUy2r160512083450.pdf (nra.gov.np)
- National Reconstruction Authority. (May 2016). Post-Disaster Recovery Framework 2016-2020, op cit, p.13. Kathmandu, Nepal. wQxngUUy2r160512083450.pdf (nra.gov.np)
- Displacement Solutions (April 2019). Lessons Learned from Post-Earthquake Policy in Nepal - Guidance for further housing, land and property disaster and reconstruction law and policy reform. Nepal IDP and HLP Paper.pdf (reliefweb.int)

CHAPTER 3

HOUSING RECONSTRUCTION AFTER THE GORKHA EARTHQUAKE





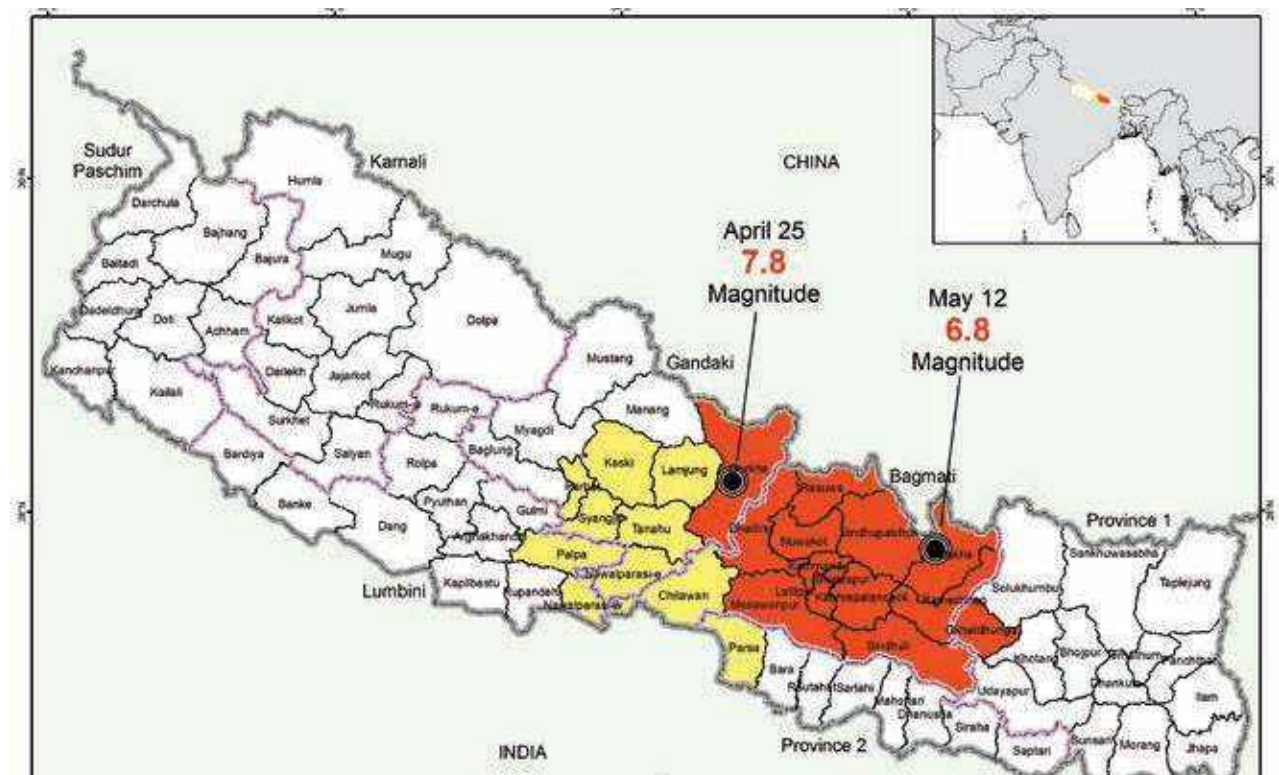
HOUSING RECONSTRUCTION AFTER THE GORKHA EARTHQUAKE

3.1 The Gorkha earthquake and its impact on housing

3.1.1 The context

Located in the mountainous region of South Asia, Nepal has a total area of 147,516 km² and a total population of approximately 29 million. The country is vulnerable to a multitude of natural hazards, such as landslides, earthquakes, floods, windstorms, hailstorms, fire, glacial lake outburst floods (GLOFs), avalanches and earthquakes. Nepal suffers an average of 900 disasters each year that cause losses of life property and also leave behind severe impacts on people's livelihoods (MoHA, 2009). Nepal has a long history of earthquakes, which may be considered the country's most prominent hazard. As many as ten major earthquakes have been recorded in Kathmandu in the past 750 years (Bilham et al. 1997). The destructive earthquake of 1934, and the more recent 1988 Udaypur earthquake were the most recent major earthquakes before the 2015 earthquake.

FIGURE 4: MAP OF NEPAL SHOWING EPICENTRE OF THE EARTHQUAKES OF APRIL 25, 2015 (MW 7.8) AND MAJOR AFTERSHOCK OF MAY 12, 2015 (MW 6.8)



Source: Edited map from <http://earthquake.graphnepal.com>

The Gorkha earthquake of 25 April 2015 had 7.8 magnitude on the Richter scale. Its epicenter was about 80 km northwest from Kathmandu, but the impact was felt across 57 of Nepal's 75 districts⁵. Subsequent aftershocks, including a major one with a magnitude of 6.8 on 12 May 2015, added to the damages caused by the first earthquake. Thirty-two districts were severely affected, mainly in the mountainous and hill regions including the very densely populated Kathmandu Valley. Figure 4 below shows the epicenter of Gorkha earthquake and the location of the aftershock of 12 May, and the earthquake-affected districts.

A total 8790 people lost their lives and 22,300 were injured. More than 75 percent of the casualties and injuries occurred in rural areas (NPC, 2015). A total of 829,667 (as of 4 July 2021) houses required reconstruction, of which over 600,000 were located in rural areas. Table 5 shows the casualties and injuries in the 14 most-affected districts.

TABLE 5: DEATH AND INJURIES IN 2015 GORKHA EARTHQUAKE

S. N	District	Death	Injury
1	Dolakha	180	661
2	Dhading	680	1218
3	Nuwakot	1112	1050
4	Sindhupalchowk	3570	1559
5	Gorkha	450	952
6	Kavre	330	1179
7	Ramechhap	42	134
8	Sindhuli	15	230
9	Rasuwa	681	771
10	Makwanpur	33	229
11	Okhaldhunga	20	61
12	Kathmandu	1233	7950
13	Lalitpur	185	3051
14	Bhaktapur	333	2101
Total of 14 Districts (most affected)		8,864	21,146
Other 18 Districts (Moderately affected)		115	1154
Grand Total		8,979	22,300

Source: PDNA

3.1.2 Housing before the earthquake

Nepal is a small mountainous country with a diverse population and a large diversity of languages, culture and religions. Cultural differences of the people living in various geographic regions are also reflected in the housing traditions. The housing situation comprises of different typologies of houses suited to the needs of different communities, occupations, geographic and climatic conditions and built using local skills, materials, and resources.

Housing typologies can be defined based on their design, building materials, construction techniques and structural systems. The photo 1 to 6 (below) are some examples of typical housing typologies that existed in the earthquake affected area. In Nepal, the predominant walling materials have been stone masonry with mud mortar, but one can also find other materials, such as adobe, rammed earth, or burnt brick masonry. Similarly, while thatch on wooden understructure may be the most common

⁵ After the 2015 Constitution was promulgated the district boundaries were adjusted to form a total of 77 districts.

roofing typology, one can also find slate stones, wooden shingles or clay tiles. The Government of Nepal (GoN) has a plan to replace the thatched roofs with corrugated iron sheets to reduce the risk of fire hazards (NUDS 2017). Similarly, recent years have witnessed an increased use of cement as mortar, burnt bricks or concrete blocks for masonry walls, reinforced cement concrete for the structural frame and roof slabs, or corrugated galvanized iron (CGI) sheets as roofing material. The housing and building practices present a rather complex situation with various new typologies being used alongside the wide range of vernacular housing typologies. These housing typologies reflect affordability issues and new aspirations, and pose a wide range of socioeconomic and environmental challenges.

The majority of the dwellings are planned and built by the homeowners themselves. This process includes mobilization and management of financial resources and the construction workforce, the development of a house plan, consultations with appropriate persons for design, quality supervision and arrangement of construction materials. In urban areas, for certain components of buildings, the homeowners engage engineers and local contractors, but the financial and technical management depends on the owner's decisions. Nepal's legal framework allows the owner driven construction of residential houses. The GoN formulated and approved the National Building Code in 1998, but implementation had remained insignificant until Gorkha earthquake as most of private buildings were built informally without adequate technical inputs and institutional monitoring. Not surprisingly, various studies have said that more than 60 percent of the existing building stock in Nepal is highly vulnerable to a multitude of disasters (https://www.preventionweb.net/files/16255_report2risksensitivelanduseplan.pdf).



Photo 1: Stone masonry in mud mortar, slate/ shingle roofs



Photo 2: Dry stone masonry houses



Photo 3: Golghar, sun dried brick masonry houses



Photo 4: Timber frame houses



Photo 5: Brick masonry with cement mortar and CGI sheet roofing



Photo 6: Reinforced concrete frame structure houses

Source: NSET

3.2 Assessing housing damage and identifying homeowners eligible for support

Immediately after 12 May 2015 aftershock, the GoN convened a series of meetings with local and international development partners to assess the damage and loss incurred and the recovery needs. Using the internationally well-established PDNA methodology and with the support of experts, the total damage and loss was assessed to be NRs. 706 billion (US\$ 7 billion) equivalents to about one third of Nepal's Gross Domestic Product (GDP) of the FY 2013-2014. The PDNA estimated the preliminary damage of houses as 498,852 completely collapsed and another 256,679 severely damaged. To identify each affected houseowner and the extent of damage to the house, the Central Bureau of Statistics (CBS) was commissioned to carry out a detailed damage assessment through a Household Registration for Housing Reconstruction Survey (HRHS).

This survey covered about one million households and was done in three different phases. The first two phases comprised of census surveys of 8,66,060 (865,337) households (8,76,520 houses) in 14 most affected districts including the municipal areas of the Kathmandu Valley. In the third phase, a verification survey of 176,428 houses was done in the remaining 17 districts (CBS, 2017). After state restructuring under the new Constitution, Nepal changed to a federal structure, where one among the 17 less affected districts was divided into two districts taking the number of these districts to 18. These surveys provided a detailed socio-economic database of earthquake affected households and also documented the damage of their houses had suffered. The following criteria were used to categorize the extent of damage to houses.

TABLE 6: DAMAGE CATEGORIZATION

Grade 1	Thin or hairline cracks in plaster on few walls. Falling of plaster in some or very little parts. Falling of loose stone and plasters from upper parts of buildings. May require aesthetic repairs only.
Grade 2	Cracks in many walls Falling of large portion of plaster in last bits over large area Damage to non-structural parts like chimney, projecting cornices. The load carrying capacity is not reduced appreciably.
Grade 3	Large and extensive cracks in most of the walls. Collapse of small portion non-load bearing walls. Detachment of roof tiles, failure of individual non-structural elements such as partition/ gable walls, delamination of stone/ adobe walls. Load carrying capacity of structure decreases and repair may be required
Grade 4	Large gaps in walls, walls collapsed, partial structural failure of floor/ roof, building in a dangerous state.
Grade 5	Total or near total collapse

The damage as defined in Table 6 of surveyed houses in 14 severely affected districts and the 17 moderately affected districts is summarized in Table 7.

TABLE 7: EXTENT OF HOUSING DAMAGE DISTRICT WISE

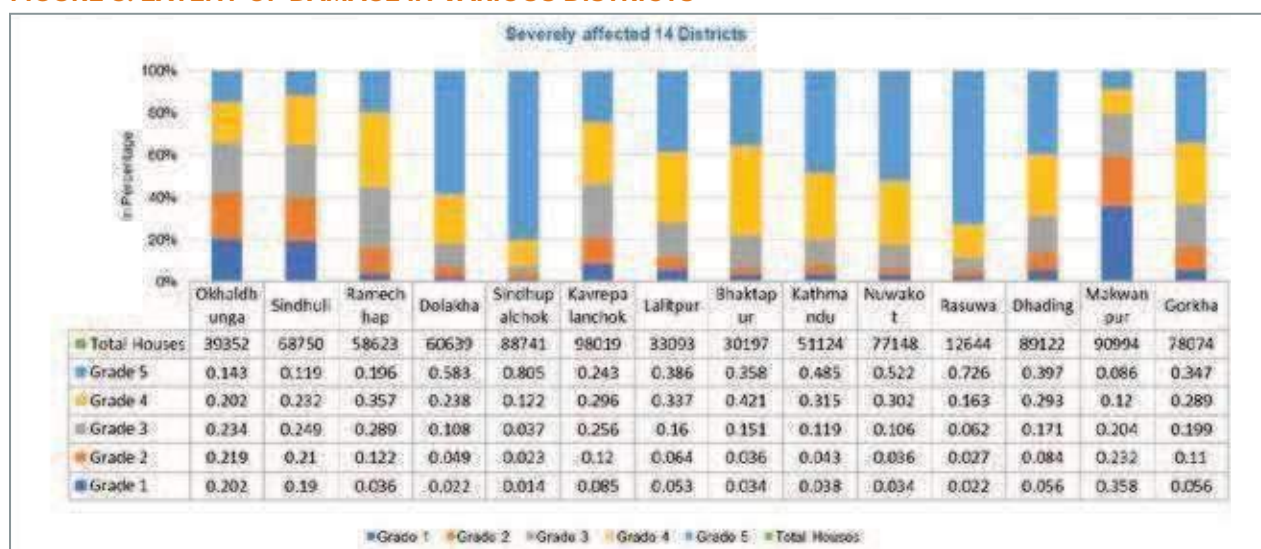
S.N.	District	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total
Severely affected 14 districts							
1	Okhaldhunga	7,961	8,605	9,220	7,946	5,620	39,352
2	Sindhuli	13,087	14,470	17,085	15,917	8,191	68,750
3	Ramechhap	2,116	7,156	16,951	20,910	11,490	58,623
4	Dolakha	1,353	2,993	6,520	14,409	35,364	60,639
5	Sindhupalchok	1,233	2,009	3,271	10,796	71,432	88,741
6	Kavrepalanchok	8,330	11,726	25,130	28,974	23,859	98,019
7	Lalitpur	1,746	2,125	5,282	11,152	12,788	33,093
8	Bhaktapur	1,022	1,083	4,560	12,720	10,812	30,197
9	Kathmandu	1,926	2,177	6,106	16,105	24,810	51,124
10	Nuwakot	2,615	2,745	8,209	23,284	40,295	77,148
11	Rasuwa	277	343	782	2,064	9,178	12,644
12	Dhading	4,952	7,526	15,218	26,080	35,346	89,122
13	Makwanpur	32,540	21,135	18,525	10,928	7,866	90,994
14	Gorkha	4,351	8,555	15,507	22,536	27,125	78,074
Sub Total of 14 districts		83,509	92,648	152,366	223,821	324,176	876,520

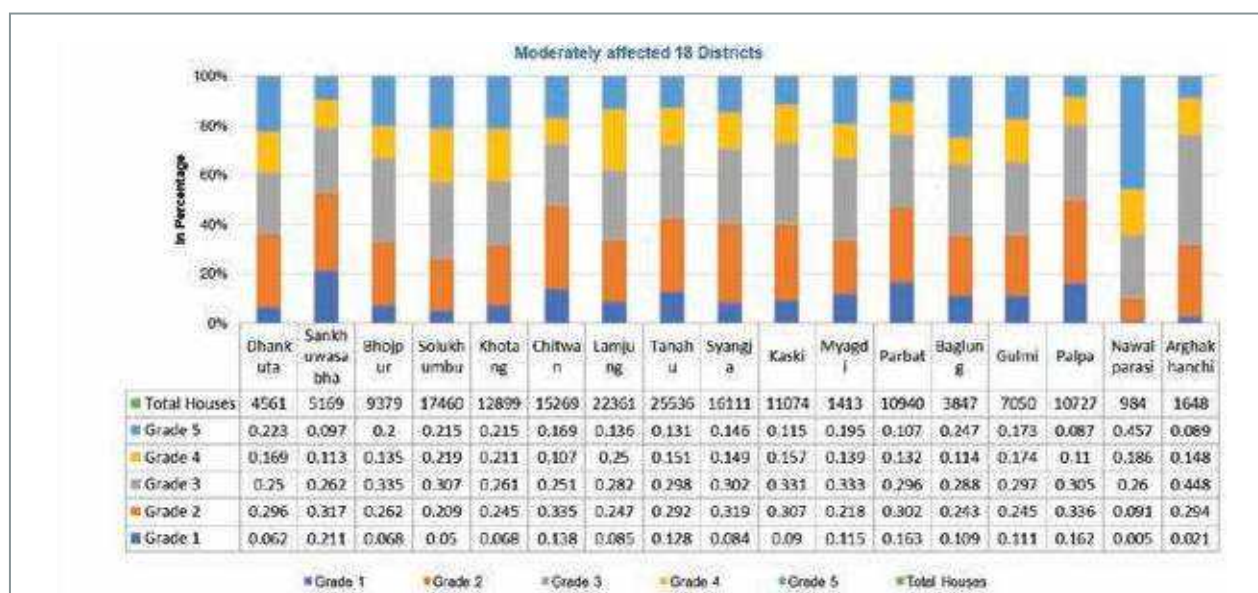
S.N.	District	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total
Moderately affected 18 districts							
1	Dhankuta	285	1,350	1,142	769	1,015	4,561
2	Sankhuwasabha	1,092	1,637	1,356	585	499	5,169
3	Bhojpur	638	2,457	3,143	1,268	1,873	9,379
4	Solukhumbu	867	3,644	5,361	3,826	3,762	17,460
5	Khotang	880	3,154	3,365	2,727	2,773	12,899
6	Chitwan	2,100	5,117	3,834	1,639	2,579	15,269
7	Lamjung	1,895	5,521	6,316	5,597	3,032	22,361
8	Tanahu	3,272	7,467	7,610	3,847	3,340	25,536
9	Syangja	1,358	5,143	4,860	2,396	2,354	16,111
10	Kaski	994	3,404	3,663	1,744	1,269	11,074
11	Myagdi	163	308	470	197	275	1,413
12	Parbat	1,786	3,309	3,233	1,444	1,168	10,940
13	Baglung	418	934	1,108	438	949	3,847
14	Gulmi	782	1,726	2,097	1,226	1,219	7,050
15	Palpa	1,739	3,608	3,267	1,184	929	10,727
16, 17	Nawalparasi (east), Nawalparasi (west)	5	90	256	183	450	984
18	Arghakhanchi	35	485	738	244	146	1,648
Sub Total of 18 districts		18,309	49,354	51,819	29,314	27,632	176,428

Source: Key Findings of Household Registration for Housing Reconstruction Survey in 14 and 18 Districts, CBS 2016

The detailed damage assessment showed that around 87 percent of the low strength masonry (mud mortar-based) buildings were severely damaged. Around 50 percent of timber buildings and those cement mortar-based were also severely damaged. However, much of the reinforced concrete (RC) buildings had withstood the earthquake – the proportion of severely damaged RC houses was 14.2 percent. In the 18 moderately affected districts, about 62 percent of the damaged houses were low strength buildings. Further, 38.4 percent of the surveyed houses that were based on cement mortar were also badly damaged and more than 90 percent of the RC buildings had sustained with only minor damages.

FIGURE 5: EXTENT OF DAMAGE IN VARIOUS DISTRICTS





Source: Key Findings of Household Registration for Housing Reconstruction Survey in 14 and 18 Districts, CBS 2016

The detailed housing damage assessment survey helped in attaining two objectives: i) identifying the extent of damage in each of the earthquake affected building, and ii) identifying the beneficiary for the housing grant assistance. House owners whose houses had extensive damage (damage grades 3 major, 4 and 5) or were beyond repair/retrofit solutions were considered eligible for a housing reconstruction grant. The owners whose houses could be retrofitted (damage grade 1, 2 and 3 minor) were considered eligible for retrofitting grant support. There were a few other criteria such as land ownership, ownership of other houses for living purpose, etc., which were also used to decide the eligibility of house owners for assistance from the NRA.

3.3 Debris management, emergency shelters and transitional housing

3.3.1 Demolition and debris management

Demolition of the damaged houses and debris management are site-specific issues that require specific ways of managing them. After the Gorkha earthquake, debris management was not a big challenge, since most of the damaged houses were in rural areas where the settlements are scattered and the plots where houses were built were larger. Further, since most of the houses were built with materials such as stone, mud, timber and CGI sheets they could be salvaged for reuse. However, demolition and debris management were a challenge in areas with dense settlements, mainly in urban and peri-urban areas. Debris management issues were faced at district headquarters like Charikot and Chautara. Khanal et. al. (2021). The average volume of debris generated from the rural houses in Gorkha and Sindupalchowk was about 20 to 25 cubic meters per household, of which about seven to 10 cubic meters was construction debris, including waste materials. This means that only a nominal volume of construction debris needed to be disposed. About 80 to 90 percent of debris from the damaged houses was reusable for reconstruction (Lauritzen, 1998). Compared to the rural masonry buildings, urban RCC frame structures produce relatively more debris management of which can be an issue, especially in the absence of policy guidance. However, the scale of the demolition and debris management was relatively minor, mainly because damage was concentrated in the rural areas.

Homeowners did most of the demolition and debris management, with limited knowledge of appropriate methods, and exposed themselves to high risk. As safety guidelines were not known or not properly followed leading to serious safety concerns of both the owners and workers. The government, with support from development partners, developed guidelines for house demolition and for stabilizing the damaged houses. The government mobilized the Nepal Army to demolish large and unsafe damaged structures. The village level local Disaster Response Committee and District Disaster Response Committees (DDRC) coordinated these efforts.

People shored up partially damaged houses to stabilize the buildings with the limited knowledge they had. There were some efforts by the development partners and the government to provide information on the appropriate techniques for supporting the damaged houses. Preparing plans to safely demolish badly damaged houses and managing the debris in advance can be effective for early recovery. There is also a need for capacity building on debris management and safe demolition techniques.



Photo 7: Supporting damaged houses.
(Source: kvptnepal.org)



Photo 8: Debris management
(Photo: Sandeep Gurung, 2015)



Photo 9: Owner-led demolition of house
(Photo: Sandeep Gurung, 2015)



Photo 10: Armed Police Force and Nepal Army personnel working on demolition and debris management
(Photo: Sandeep Gurung, 2015)

3.3.2 Emergency shelters

The Government of Nepal immediately mobilized the required resources to provide emergency relief. Households who lost their family members were provided NRs. 30,000 (US\$ 300) as relief. This support was used for meeting immediate emergency expenses including funeral costs. The fear of aftershocks and further damage had forced people leave their homes and many had put up temporary shelters.

National and district level government agencies focused on coordination with external and local stakeholders during the rescue and relief phases. Preliminary assessments and identification of immediate

needs by the government made this coordination effective. District and local governments also identified locations for temporarily sheltering survivors. Humanitarian agencies participated in the rescue and relief mission in coordination with the government and also highlighted the needs of the most vulnerable. The security forces were also mobilized in the immediate emergency phase to support the rescue and relief. The most critical role and responsibility was undertaken by the local communities themselves. As first responders, they took care of the families and relatives and immediately started building emergency shelters and transitional housing.

Different organizations put up a large number of tents to shelter people rendered homeless by the earthquake. Many of these community camps were far from peoples' own houses. People who preferred to live close to their original houses were assisted with temporary construction materials such as tarpaulins and other required items. According to a survey conducted by the Housing Reconstruction and Recovery Platform (HRRP), an NGO network, about 87 percent of emergency shelters were built by people using corrugated galvanised iron (CGI) sheets. About two percent households had used tarpaulin shelters. The emergency shelters were meant to be for short-term use but in many cases, they were used for more than four years.



Photo 11: Emergency shelter
(Source: UNICEF Nepal 2015, CS Karki)



Photo 12: Temporary emergency shelter constructed by a homeowner (December 2015)
(Source: NSET)



Photo 13: Emergency shelter near the damaged property
(Source: IsraAID)



Photo 14: Temporary shelter with plastic sheets
(Photo: Sandeep Gurung, 2015)

3.3.3 Transitional housing

The earthquake had occurred in April, a period of the year characterized by sweltering heat and that was followed by the rainy season, which typically begins in June. This was reason for the need of transitional shelters. Transitional housing was also important because that would provide adequate time for preparation for building permanent housing. Based on a preliminary damage assessment carried out immediately after the earthquake by the District Administration Offices with the involvement of local leaders and social activists, color-coded cards were distributed to the house owners; red cards were for fully damaged houses, yellow for partially damaged houses and green cards for houses that did not suffer critical damage and were still usable. Families with severely damaged houses (red cards) had received a support of NRs. 15,000 (US\$ 150) for building temporary shelters and people whose houses were partially damaged had received financial support of NRs. 3000 (US\$30) for immediate repairs. The grants were distributed through the village-level relief committees or partner organizations (NGOs/INGOs).

The Shelter Cluster co-led by the Department of Urban Development and Building Construction (DUDBC) and the International Federation of Red Cross and Red Crescent Societies (IFRC) was activated immediately after the earthquake with the aim of supporting the most vulnerable families to meet their needs for shelter and other basic necessities. In different phases small cash grants were provided for carrying out minor repairs and for the procurement of CGI sheets.

The Shelter Cluster and other agencies had suggested different transitional shelter solutions to the government. Distinctive design and demonstration events were held to propose appropriate designs for various terrains and climatic zones. This included models of transitional shelters solutions such as CGI sheet vaulted shelters, rammed earth buildings, Dui Naale houses (double bay buildings) and temporary shelter using bamboo (dhungre baans) that could be built within an hour. Similarly, prefabricated technology was also widely used where it was easy to transport materials. However, the prefabricated panels were more expensive compared to other locally available materials, and therefore, were used mainly to build public facilities like health posts and schools.

Various groups began distributing relief material immediately after the earthquake, which was later channeled through government channels to ensure equity, accountability and transparency in distribution. The stakeholders involved in supplying emergency relief also supported the transitional shelters. Under the GoN's leadership (MOFA, DUDBC, DAO and municipalities), other international organizations and relief agencies including the United Nations, the International Red Cross and Red Crescent movements and different non-government agencies such as ActionAid, Lumanti, CG Foundation, and NSET were involved in building such shelters.

Many households continued to live in emergency shelters like tents for an extended duration due to delays in transitional housing assistance. There were concerns regarding the size of temporary shelters, which in some cases were not habitable and unable to protect people from both the scorching heat and freezing cold. Water and sanitation (WASH) facilities also needed to be provided. Various NGOs coordinated by HRRP were mobilized for supporting winterization of tents and emergency shelters.

There were only a few guidelines available for building emergency shelters and transitional houses and the responsibilities, funding mechanism, were largely undefined. These issues were addressed to some extent after the enactment of the Disaster Risk Reduction and Management Act. In retrospect, what is clear is the need for having a greater understanding and capacity for providing temporary shelters in the early recovery phase after a disaster to ease the transition.



Photo 15: Transitional shelter supported by NGOs (2016)
(Source: CG Foundation)



Photo 16: Transitional shelter (2016)
(Source: CG)



Photo 17: Damaged area with transitional shelters (2016)
(Source: NSET)



Photo 18: Locally made temporary shelters
(Source: Temporary Shelter Report, HRRP)



Photo 19: Model bamboo transitional shelter
with necessary safety provisions
(Source: NSET, 2015)

3.4 Housing reconstruction: Principles, policies and implementation framework

3.4.1 Reconstruction principles

Reconstruction of houses was a critical need for rehabilitating people affected by the earthquake. The Government of Nepal laid down the principles, established institutional mechanisms, and strengthened partnerships through a broad consultative process for the purpose. This process was informed by international best practices. The government established a special reconstruction institution under the Reconstruction Act to lead recovery efforts and GoN's agreements with donors helped to further shape the new institutional arrangement.

The GoN laid down the objective of enabling affected people to reconstruct disaster resistant houses using earthquake safe technologies and materials. It advocated an owner-driven reconstruction approach that entailed providing owners of damaged houses financial and socio-technical support to give homeowners the leading role in rebuilding their houses. This approach built on the positive experience gained by other countries with owner-driven reconstruction after major disasters. Some examples were India, after the Gujarat earthquake of 2001, and Pakistan after the earthquake of 2005. It was an approach that was as being the most cost-effective, empowering and culturally sensitive (Duyne Barenstein 2004, Jha et al. 2010). The key principles of the owner-driven reconstruction approach were articulated in PDNA as follows:

1. Reconstruction should empower communities to take control of their recovery and be facilitated by the government and other partner agencies.
2. Reconstruction should apply “integrated safer settlement” principles where appropriate, involving the principles of holistic habitat development with an emphasis on basic services and community infrastructure.
3. Reconstruction should become a vehicle for building long-term community resilience.
4. Reconstruction should strengthen the local economy through processes supportive of the poor, marginalized and the informal sector. It should provide an opportunity for the poor to upgrade their overall living and economic conditions.
5. Reconstruction should ensure sustainable and environmentally conscious processes that keep in mind issues such as climate change, natural resource management and scientific risk assessments.
6. Reconstruction should be equitable and inclusive, with equal rights to land and property accorded to women, and
7. Reconstruction should be initiated through targeted strategies that address the specific needs of the diverse communities and settlements affected by the earthquakes.

Additional principles were identified during the reconstruction process and these included:

1. Uniform reconstruction support should be provided to affected house owners.
2. Reconstruction should be responsive to people’s needs and adaptive to realities on the ground.
3. Reconstruction support should ensure transparency, fairness and high level of satisfaction amongst the affected homeowners.
4. Reconstruction should promote indigenous construction technology and materials for accessible, affordable and culturally appropriate housing.
5. Reconstruction should be primarily in-situ, except where relocation is necessary due to vulnerability or loss of original location or as preferred by individual house owners.
6. Underpinning all of the above principles was principle of Build Back Better. In the housing sector, this was applied in a number of ways, including, for example, the following interventions:
 - i. development and enforcement of technical reconstruction guidelines and a robust inspection regime, tying compliance to the release of grant support;
 - ii. provision of socio-technical assistance throughout project implementation; and
 - iii. development and implementation of the Correction, Retrofitting and Exception Manual, to ensure the application of corrective actions to address major deviations from the safer reconstruction practices introduced by the NRA.

3.4.2 Policies for reconstruction grant assistance

The average construction cost of a rural house was estimated to be approximately NRs. 300,000 to 500,000 (USD 3000 to 5000), whereas in the urban areas of Kathmandu Valley, the cost was expected to range between NRs. 1 to 1.5 million (USD 10,000 to 15,000) at the minimum. The total number of houses that need to be built or retrofitted was over 800,000. The reconstruction of houses at a scale required financial resources and a program with a duration of 3-5 years to enable all affected households to rebuild disaster resilient houses.

The GoN decided to provide reconstruction assistance (financial, technical and social) to enable people to rebuild houses. It offered to provide a partial financial contribution to the reconstruction cost to all eligible homeowners identified after detailed damage assessment. To further support homeowners, the NRA also developed policy provisions for subsidised housing loans. These financial support policies were articulated in a number of documents and guidelines.

The grant initially announced was NRs. 200,000 (approx. USD 2000). However, upon realization that the amount would not be sufficient to rebuild safe and dignified dwellings and that reconstruction would excessively burden on affected households financially, and particularly the poor and vulnerable ones, the housing grant was later increased to NRs. 300,000 (approx. USD 3,000). The policy included a provision of providing NRs. 50,000 (USD 500) as top up grants for vulnerable households. The housing grants that were provided were based on the damage assessment survey carried out by the CBS.

The NRA prepared a standard operating procedure (SOP) for grant distribution. The distribution began with the signing of a Participaton Agreement by the local government and the eligible house owner. The Private Housing Reconstruction Grant Disbursement Guideline, 2073 guided the distribution of grants for private housing and had the provisions:

1. The NRA would provide housing grants for reconstruction in case of fully damaged houses and retrofitting grants, in case of the partially damaged houses.
2. Grants were to be provided in three instalments for ensuring reconstruction of earthquake resilient houses:
 - i. The first installment of NRs. 50,000 upon signing of participation agreement and enrolment of the beneficiary in the program.
 - ii. The second installment of NRs. 150,000 was provided upon completion of the construction up to plinth level and after confirmation of compliance with reconstruction guidelines by the inspection team.
 - iii. The final installment of NRs. 100,000 was provided upon completion of the construction up to the roof-band level after the inspecting team's confirmation of compliance with reconstruction guidelines.
3. All instalments were to be paid in the recipient's bank account to ensure transparency and eliminate malpractices. The eligible house owner had to open the bank account with his/her participation agreement and identity number for use by the District Treasury Controller's Office (DTCO) to deposit the grant following approval by the NRA's district offices (DLPIU Building and GMALI). No charges were levied on homeowners on the use of grants.

The CLPIU-GMALI prepared a list of eligible house owners based on the damage survey data after approval by the NRA's Executive Committee. The CLPIU- GMALI then sent the approved list of the homeowners to the districts and the local governments who then concluded the enrollment. The designated bank disbursed the first tranch of the grant upon receipt of the formal agreement between

the local government and the eligible houseowner. The first inspection was carried out by the technical team from the DLPIU-Building after the reconstruction had reached the plinth level. Similarly, if the house construction had complied with the minimum requirements set by the technical guidelines, the houseowners were recommended for the second tranche. The payment request from the DLPIU- Building was sent to DLPIU-GMALI that forwarded it to the DTCO along with the list of recipients. The DTCO, after matching and verifying the data with the LMBIS, issued a cheque to the concerned bank which then deposited the second tranche in the recipient's account. The payment from the banks was documented in the NRA's MIS system. The second inspection was carried out upon completion of construction up to the lintel level. The third tranche amount of 100,000 (US\$ 1000) was paid to the beneficiaries through the same process as application for the second tranche.

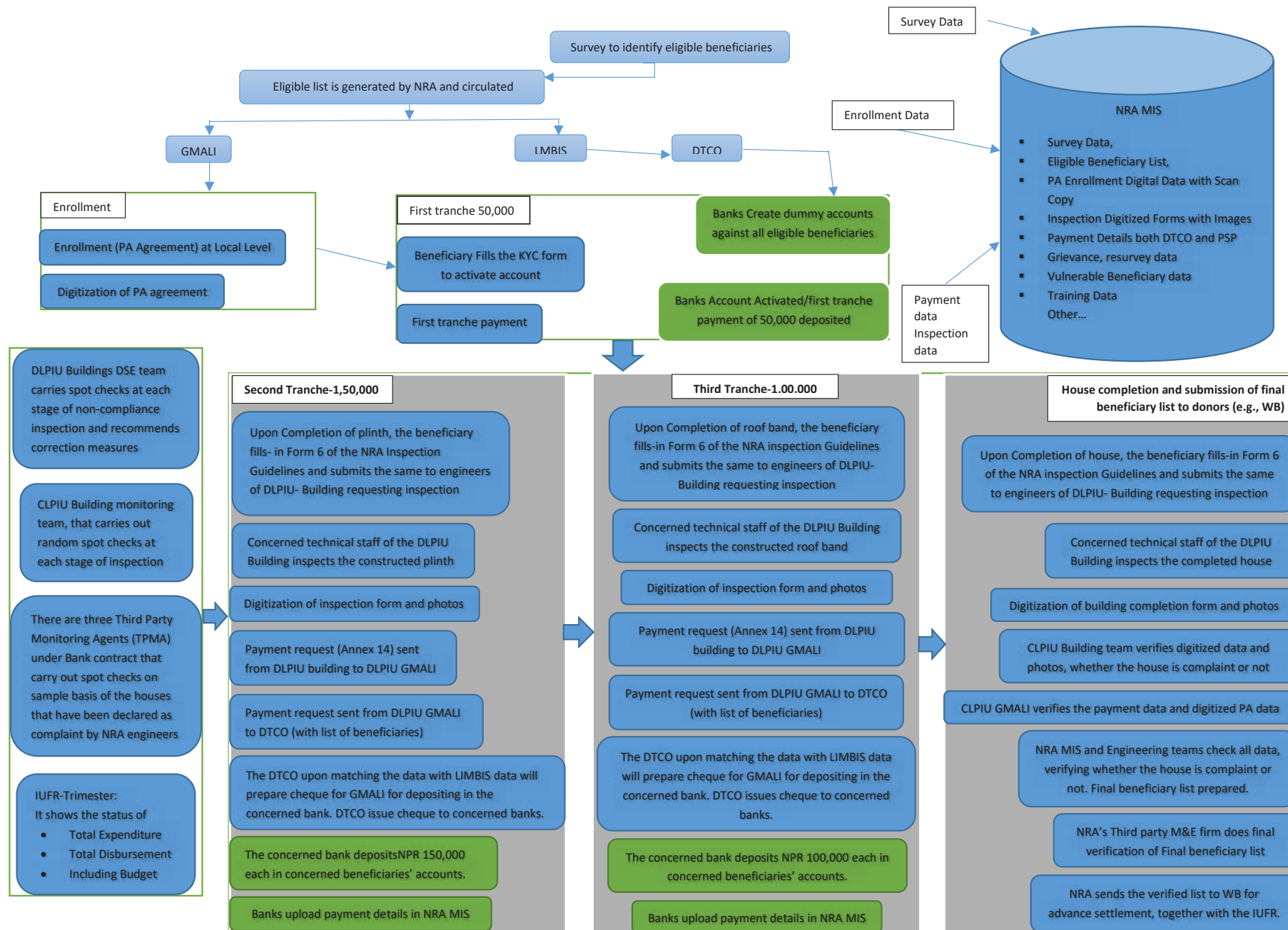
Final inspection of completed houses was carried out after installation of the roof and completion of construction. All inspections were guided by the Technical Inspection Guidelines 2016. This final inspection was mandatory for donor-supported housing reconstruction, such as that provided to the NRA through the World Bank-financed EHRP and related Multi-Donor Trust Fund grants, JICA and GoI's financial assistances. However, NRA adopted to make final inspection of all houses. It made provisions for all local governments to tie their services based on the completion of roof construction by the concerned house owner. Due to the lack of financial incentive to construct roofs, some house owners took longer time or did not contact the engineers for final inspection. Later on, NRA decentralized its authority of final inspection to be made through the building permit units of municipalities. Figure 6 shows the process of the grant administration and delivery.

As the housing grant assistance was not fully adequate to build a house, there was need for further support through affordable loans. The NRA issued the Guidelines for Earthquake Affected Households Reconstruction Loans, 2072 and the Nepal Rastra Bank directed commercial banks to provide earthquake-affected beneficiaries with NRs. 2.5 million inside Kathmandu Valley and NRs. 1.5 million of concessional loans (2% interest rate) and a payback period of five to 10 years. However, the Nepal Rastra Bank, withdrew this provision after about two years as the the guidelines contradicted with another provision of the central bank. As a result, less than 2000 houseowners benefited from the loan scheme.

The GoN had also introduced two other schemes in the "Guidelines for Community Collateral Loans, 2074"; and the "Guidelines for Concessional Loans, 2075 (revised)". Under the community collateral scheme, a loan of NRs. 300,000 (USD 3000) could be availed at zero interest for a period of three to five years. The policy when it was issued was seen as a major step towards increasing financial support for housing reconstruction, especially for economically vulnerable households, who were not able to top-up the government financial grant with owned resources. However, no bank operationalized the provision as they believed the investment was high risk. The scheme of concessional loans had been introduced after revising the provision of subsidy of five percent in the interest along with the GoN guarantee for loan recovery upto 75% amount. It had replaced an earlier loan scheme at the rate of two percent annual interest and community collateral loan at zero interest. Still, only a very few houseowners have been able to avail the benefit of this scheme. The reluctance of commercial banks remained a challenge to provide affordable loans to the houseowners who needed additional assistance.

Homeowners with partially damaged houses were eligible for retrofitting and were provided NRs. 100,000 (approx. USD 1,000) disbursed in two tranches as assistance. The first tranche of NRs. 50,000 (USD 500) was provided upon signing the participation agreement and the second and final tranche of another NRs. 50,000 upon completion of retrofitting and verification of compliance with technical norms. Towards the end of its mandate, the NRA had issued a provision for providing NRs. 50,000 for repair of damaged houses belonging to beneficiaries who did not intend to build new houses.

FIGURE 6: GRANT DISBURSEMENT PROCESS OF THE NRA



Source: NRA

In principle, any existing structure that was assessed as seismically deficient was a candidate for retrofitting, or a house/building did not have to be damaged in an earthquake in order to be considered for retrofitting. However, the post-earthquake program was limited to assisting repair and restoration only of a repairable damaged house, rather than enhancing the performance of all existing seismically deficient buildings. A broader, nationwide program will be needed for such an undertaking.

The Gorkha earthquake not only damaged houses but also triggered landslides and liquefaction that caused displacement of some communities. The policy entitled such homeowners to receive extra NRs. 200,000 (US \$ 2000) provided that they did not own safe land for building houses. Alternatively, they could also use government-provided safer land to build their house. In case, more than 10 house owners are interested to build their houses in integrated and planned settlement, they were entitled to collectively receive support for integrated settlements planned and built by the NRA. This policy provision also entitled the landless homeowners to access homestead land.

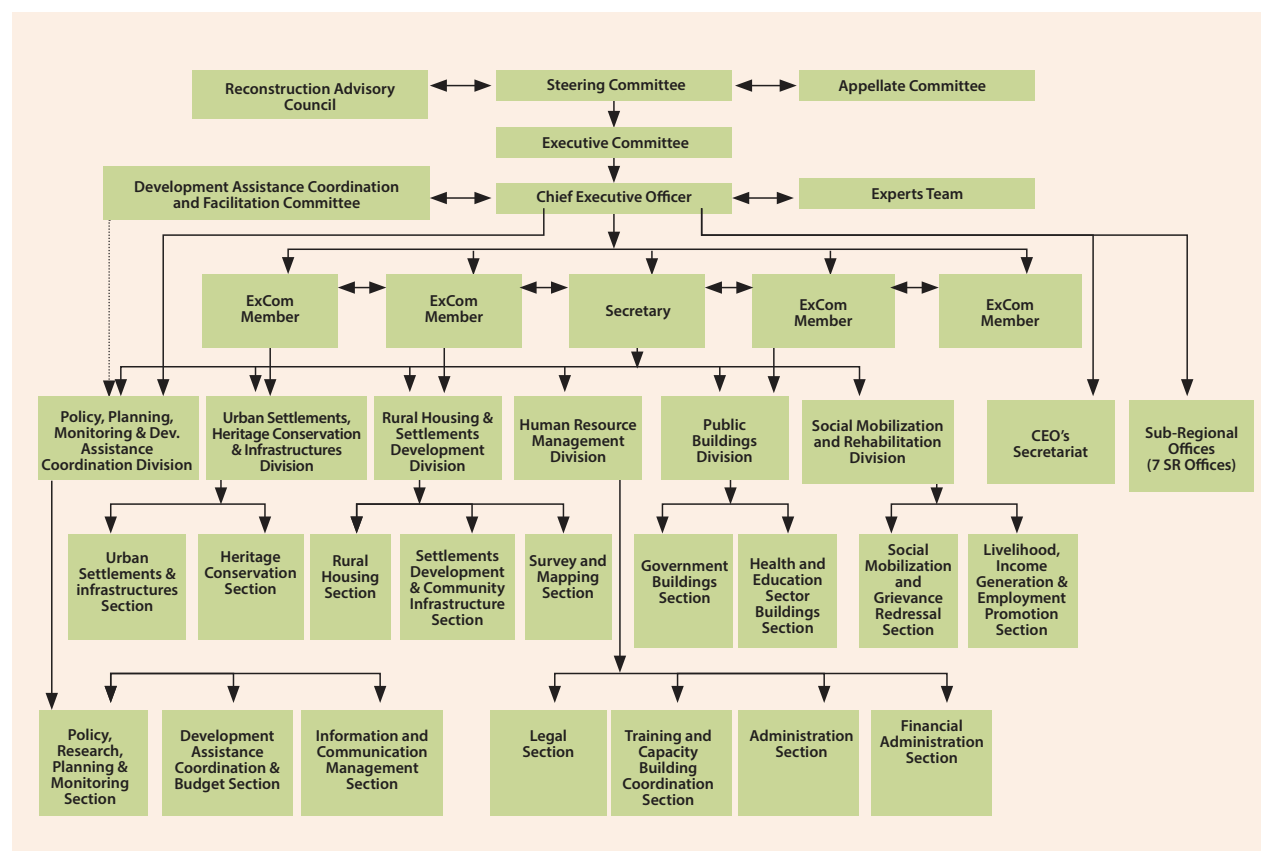
3.4.3 Institutional framework

Robust and coordinated institutional arrangements were devised to undertake housing recovery and reconstruction. Nepal adopted a mixed model entailing the mobilization of existing institutions in combination with the creation of a new institution in charge of leading and coordinating housing reconstruction.

The institutional arrangements devised at the beginning of the reconstruction process in December 2015 were modified in April 2018 based on the experiences gained over a period of almost two years. The revised framework was more robust and more directly linked with the NRA. An overview of the key institutions involved in reconstruction is given in Figures 7 and 8 below.

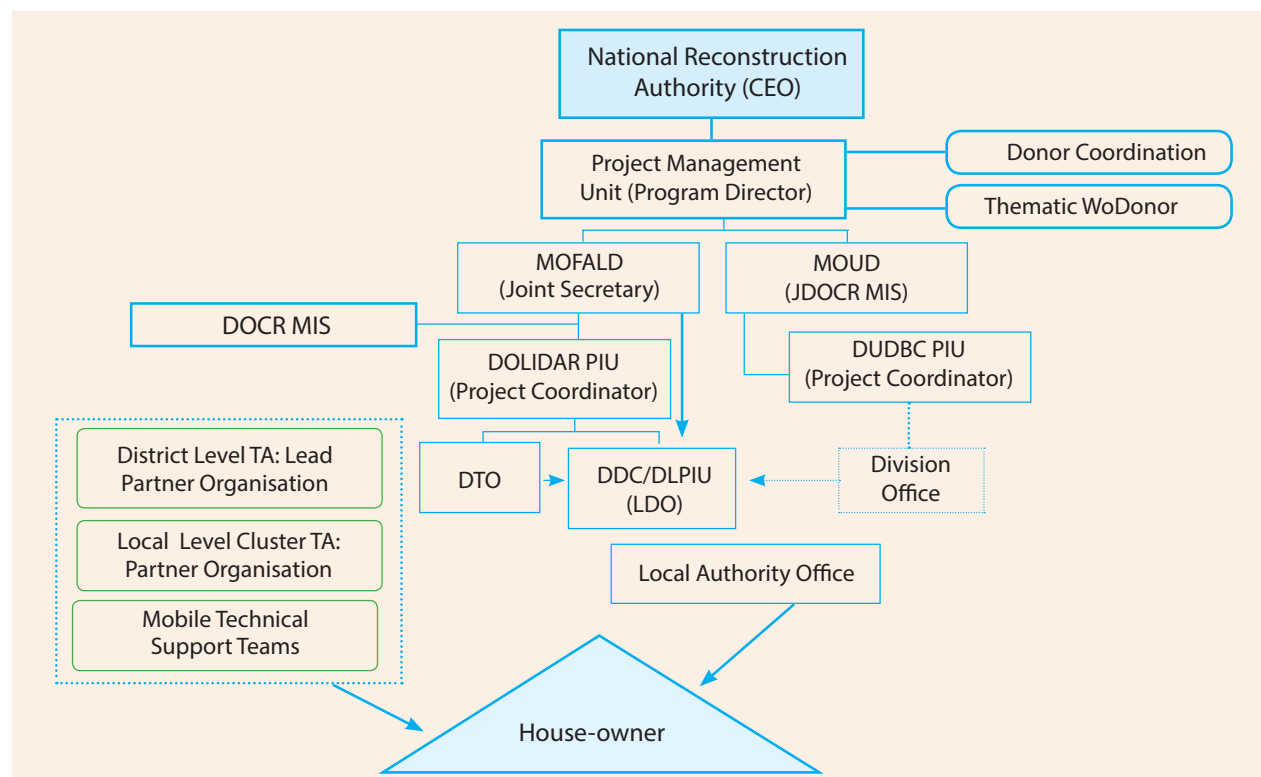
After enacting the Reconstruction Act, the GoN up the NRA in December 2015 with the responsibility to provide overall policy guidance, to develop an institutional framework, and to ensure coordination and oversight of housing reconstruction. A National Reconstruction Advisory Council (NRAC) was established to advise the Steering Committee on the formulation of reconstruction policies and plans. The Council, chaired by the prime minister, had members from all political parties, members of Parliament from earthquake affected districts, and five technical experts nominated by the GoN. The Steering Committee, chaired by the prime minister, consisted of two ministries, the NPC Vice-Chair, the NRA CEO, the Chief Secretary, three experts and the Secretary of the NRA as the member secretary. The Steering Committee (a) approved the Authority's organizational structure and budget, (b) approved policies and plans prepared by the Executive Committee, and (c) gave direction to improve the effectiveness of reconstruction. The Executive Committee, chaired by the NRA CEO, included one government representative, four Executive Committee members (technical experts nominated by the government), and the NRA Secretary as ex-officio member secretary. This was the organizational structure where the NRA provided leadership for implementing the housing reconstruction program facilitating and coordinating all stakeholders, including the GoN.

FIGURE 7: NRA ORGANIZATIONAL STRUCTURE AS PROPOSED IN THE PDRF



Source: PDRF

FIGURE 8: THE CONCEPTUAL INSTITUTIONAL FRAMEWORK OF RECONSTRUCTION DURING THE INITIAL STAGES OF THE NRA



Source: PDRF

A cascading structure of CLPIUs and DLPIUs were established for disbursing grant assistance and for providing technical support at the national and district levels, respectively. There were two CLPIUs: (a) CLPIU Building was responsible for establishing the technical standards and norms, to procure and manage the Partner Organizations, to develop and oversee the technical skills training and to provide technical oversight for the housing construction, and (b) CLPIU Grant Management and Local Infrastructure (GMALI) was responsible for providing housing reconstruction grants, including the operationalization, updating and use of household/ beneficiary information and other transactional data. It was also responsible for monitoring and evaluating the cash transfer system and to address relevant social and environmental issues. DLPIU Building and DLPIU GMALI extended their functions at the district level. The NRA also set up District Coordination Committees (DCC) to undertake coordination, monitoring and appraisal activities, to report any irregularities, and to perform other prescribed functions on its behalf. The DCC consisted of the members of parliament from the district (rotating every six months), the Chief District Officer and the Local Development Officer.

The NRA had also delegated a number of activities to the municipal level and also deployed engineers to support their capacity. At the local government level, the NRA had established an inspection and compliance system to reach out to each houseowner in the reconstruction program. Arrangements had been made to ensure that local authorities had at least one inspector (Engineer or Sub-engineer), who were responsible for: i) issuing building permits, ii) conducting inspections, and provide support to the documentation process for the release of reconstruction grant tranches, iii) ensuring compliance with environmental and social safeguard criteria, and iv) communicating the National Building Code and earthquake-resistant construction guidelines to houseowners. The inspector at the local level also reported to the DLPIU Building.

Another important institutional mechanism was the Appellate Committee to address complaints regarding a decision or order of the NRA. The Appellate Committee consisted of a judge from among sitting judges of the Appellate Court and two experts nominated by the government.

3.4.4 Mobilization of financial resources for housing reconstruction

The financial needs for recovery from the 2015 Gorkha earthquake of different sectors were assessed based on both the PDNA and PDRF. The estimated recovery cost was US\$ 9.377 billion (PDRF, NRA). About half of this amount was required for reconstruction of private housing. Table 4 lists the financial requirement estimates for different aspects of housing reconstruction and table 5 provides the sources of funding. The GoN provided about 67 percent of the total funds required and the remaining amount was mobilized from different donors. Of the total amount required for housing reconstruction, almost 95 percent was spent on rebuilding new houses and three percent was earmarked for retrofitting partially damaged houses. Other sectors, such as livelihoods, were allocated a small proportion of the overall recovery funds.

There was a need for pooling donor resources to support the GoN in its recovery program. For this, the World Bank facilitated the establishment of a Multi Donor Trust Fund (MDTF), with contributions from Government of Canada, Department of Foreign Affairs, Trade and Development; United States Agency for International Development; Swiss Agency for Development and Cooperation; and the United Kingdom Foreign, Commonwealth and Development Office. Of the USD 34.45 million in the MDTF, USD 15 million was transferred to the GoN treasury for direct implementation of recipient-executed activities. The remaining amount financed World Bank-executed activities for technical assistance, expanded hands-on implementation support and other enabling activities. (Note: JICA had provided its support directly.)

TABLE 7: ESTIMATED FINANCIAL NEEDS, ACTUAL EXPENDITURES AND REMAINING FUNDS FOR DIFFERENT HOUSING RECONSTRUCTION NEEDS (US\$ 000)

Aspects of housing reconstruction	Total number	Estimated needs/ available funds	Expenditure FY 075/076 BS (2018/19)	076/077 B.S. (2019/20)	Remaining fund
Private housing	810417	2494352	1729517	572461	192374
Seismic retrofitting	40000	79067	10667	138	68262
Land relocation	4056	8112	4378	3362	372
Land for landless	1500	3000	458	6566	-4024
Top-up support for vulnerable house owners	10000	5000	0	3355	1645
Urban settlements (NRs. 50,000 additional for each house at traditional settlement)	20000	10000	0	1500	8500
Administrative expenditure		20167	11390	5380	3397
Grand total		2619698	1756410	592762	270526

TABLE 8: BREAKDOWN OF FUNDING FROM GON AND DIFFERENT INTERNATIONAL DONORS (US\$ 000)

Source-wise	Source-wise allocation	Expenditure upto 2077/78	Budget of 2078/79 (as per LMBIS)	Additional budget required in fiscal year 2078/79	Remaining need (Proposed amount for fiscal year 2079/80 and 2080/81)
IDA	625339	549809	27195		48335
IDA/DPC	2096	2096			0
ADB	349216	275858	69285		4073
China	5337	5337			0
ADB/PBL	15975	15975			0
Japan – K R 2	3300	50	2200		1050
Japan - JICA	246360	230355	14445		1560
JFPR	5971	5971			0
GoN	2791646	2337260	114049	167686	172651
India	242585	125497	74079		43009
India – Axion bank	278184	50060	25324		202800
EU	85272	85272			0
WB – Trust Fund	13200	9862	2560		778
Saudi fund	34872	21965	6376		6531
Total	4699353	3715367	335513	167686	480787

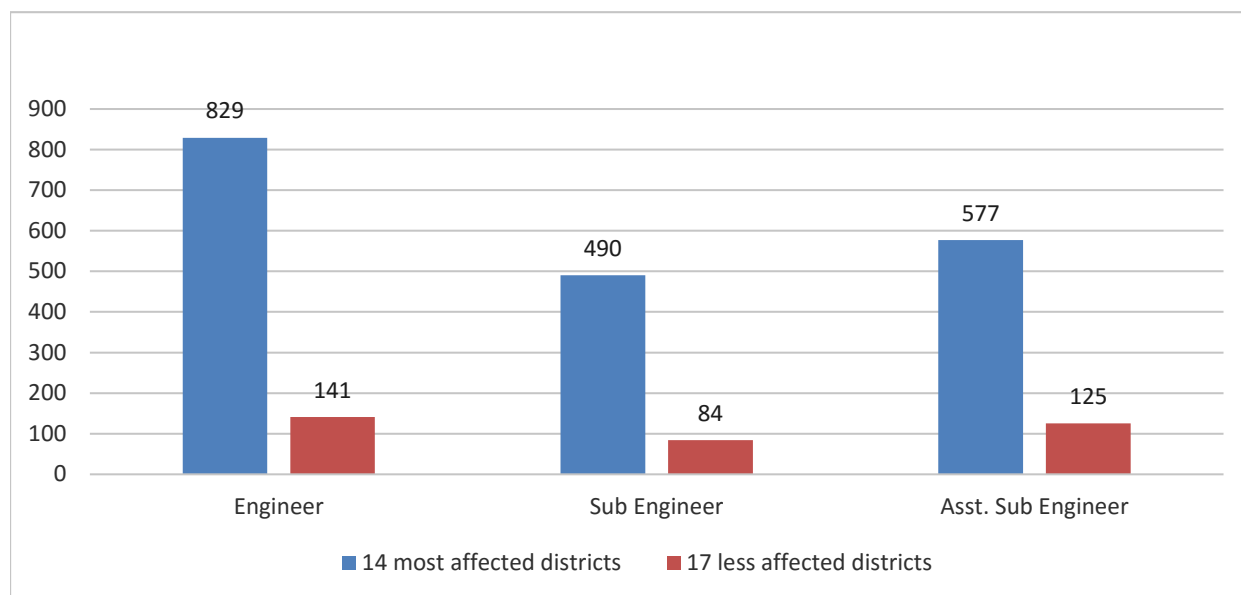
Source: NRA Annual Report 2077/78

As the housing grant assistance covered the construction costs only partially, a large part of the costs had to actually be covered by the homeowners, which they mobilized from various sources. Nearly two-thirds of the households obtained loans from neighbors, family members or relatives, while the remaining one-third borrowed from co-operatives, banks and/or other community groups. Almost half of the owners reconstructing their houses mobilized additional financial resources in the form of loans (CFP Report, Nov. 2018). About 1,300 households were able to access low interest loans from commercial banks. Loans obtained from informal sources came with high interest rates (as high as 36%) while formal loans were either interest free (communal collateral) or subsidized (2% interest). In some cases, people were able to obtain normal bank loans that had an annual interest rate of 10 percent.

3.4.5 Mobilization of human resources

Nepal's post-earthquake recovery and reconstruction program required a large number of human resources. The NRA and CLPIUs mobilized 96 senior and support staff from headquarters and various districts. Further, a total of 2,569 technical professionals (1,146 engineers, 714 sub-engineers, 709 asst. sub engineers) had been mobilized to the 14 most affected districts. In mid-2021 there were 1,896 technical professionals (829 engineers, 490 sub-engineers, 577 asst. sub-engineers) working in 14 districts. Another 495 staff (223 engineers, 136 sub-engineers, 136 asst. sub-engineers) had been mobilized initially to work in 17 other affected districts, whose number had increased to 350 (141 engineers, 84 sub-engineers, 125 asst. sub engineers) in mid-2021. The technicians were trained on safer construction and the housing reconstruction programs. Figure 9 provides an overview of the technical human resources deployed for the reconstruction program.

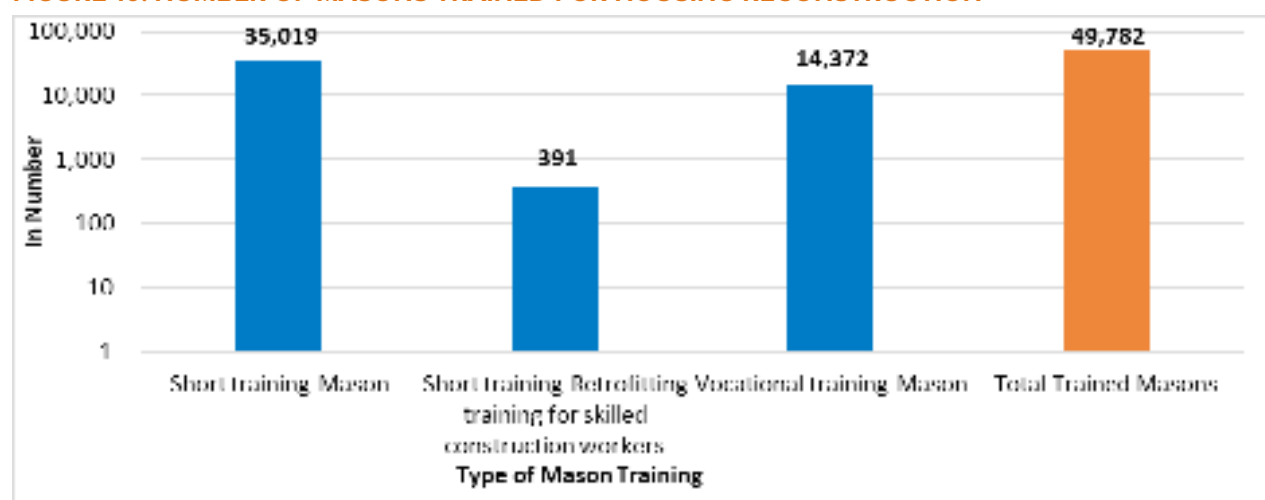
FIGURE 9: TECHNICAL HUMAN RESOURCES DEPLOYED BY CLPIU-BUILDING FOR HOUSING RECONSTRUCTION



Source: NRA

Housing reconstruction required about 100,000 masons. The NRA had developed a curriculum for training masons and had made arrangements of capacity development through governmental and non-governmental sectors. Figure 10 shows that the total number of trained masons as of February 2020.

FIGURE 10: NUMBER OF MASONS TRAINED FOR HOUSING RECONSTRUCTION



Source: NRA

“NRA engineers and social workers helped us to build a nice house.”

I am Neetu Tamang. My newly built house lies in ward no. 2 of Netrawati Rural Municipality in Dhading district. We have a family of three. We were in extreme pain the year we lost our home in the earthquake. We had no knowledge on rebuilding a safe house and spent a year doing nothing.



During the year, I gathered information about construction from various sources. I saw that the larger houses were destroyed, and then I thought of having a one-story, safer house. That's when engineers and social workers had visited the village, I also asked them what to do. We began building our house after consulting them. My husband worked with a trained mason, and we finished construction within NRs. 600,000. The house is well built and we are happy. We have also received all grant installments from the government.

I think everyone dreams of building a nice house. One shouldn't think that the government is providing only Rs. 300,000 and so I will build a house costing as much. You have to spend a lifetime in your house, so it must be safe. Even if the government hadn't provided anything, we still would have to build a house. The technicians came to the village, trained the masons, and made people aware about safety measures. They helped us to ensure that our houses were not weak. They have helped us for our safety.

NRA had received support for expert human resources to strengthen the socio-technical assistance from partner organizations. These experts and advisors were deployed to support the CEO, Secretary, and Executive Committee members. The World Bank, UNDP, USAID, EU, and DFID had deployed many national and international experts for supporting various functions of the NRA.

3.4.6 Technical standards for disaster resilient construction

Nepal's housing stock included many different typologies ranging from traditional stone and mud-based to cement or RC-based construction. Facilitating owner driven reconstruction required the NRA to come up with technical guidelines to match the needs, preferences and budget of homeowners as it was important to ensure that disaster-resistant features were incorporated in the newly build houses. The NRA prepared various technical standards and guidelines to guide the construction of different types of houses. In collaboration with MoUD, it also revised the NBC 203-2015 on rubble stone in mud mortar buildings to incorporate seismic-resistant measures.

Safe traditional houses: Stone mud mortar



Keshav Bahadur Karki of Ward 6, Marin rural municipality, Sindhuli district, had lost his wooden house in the earthquake. At the temporary shelter, he would think about building a new, safe house of which RCC was one option. He was also aware of the destruction of RCC houses in the urban areas and was not fully decided on the option.

He had heard about the mason training program and also had learnt that houses built with any technology could be safe if built in accordance with appropriate technical norms and guidelines. This meant that even stone-mud houses could be made resilient. He had also learnt about the importance of using skilled masons in construction.

Karki decided use skilled and trained masons and build a traditional stone house with mud mortar in hazard-resilient ways. He also supervised the construction with guidance of an engineer. He completed his house in full compliance with the technical norms and received all the three grant tranches.

In October 2015, the DUDBC brought out the first volume of the Housing Design Catalogue for reconstruction. The catalogue came with standard designs, drawings, materials quantity and cost estimates for several housing types and how they could be made compliant with the building codes and the minimum requirements. The catalogue had 17 designs for prevalent housing typologies in rural areas, including eight for Stone in Cement (SMC), seven for Brick in Cement (BMC) and one each for Stone in Mud (SMM) and Brick in Mud (BMM) houses. The design catalogue (volume 1), however, had not sufficiently considered the requirements of households or reflect Nepal's traditional architecture. The homeowners, engineers and other stakeholders thought the designs were rigid and this misunderstanding caused confusions. The NRA published a second volume of the design catalogue to provide alternatives in terms of building materials and technology options⁶ in March 2017. This second volume of the housing designs catalogue defined standards for construction materials such as interlocked hollow blocks, compressed soil blocks, stone and mud construction with reinforcement technology, and steel and timber structures⁷.

The NRA also clarified that the design layouts could be changed and adopted to the homeowners needs but maintained that compliance with the technical norms was mandatory. To facilitate the adoption of the technical norms, the NRA had introduced the Private Housing Reconstruction Technical Inspection Guidelines⁸ in November 2016. Its aim was to regulate the reconstruction of buildings and to assure the construction quality. The inspection guidelines covered the following aspects:

⁶ Catalogue: <https://www.dudbc.gov.np/uploads/default/files/a1efdb9058f9151775d9a2bae473ac0b.pdf>

⁷ Technical Guideline: https://www.preventionweb.net/files/63760_fnasq59djhd3wuko4ubh20180813.pdf

⁸ NBC 2015: <https://www.dudbc.gov.np/buildingcode>

- n Site selection: descriptions like geological faults, landslide susceptibility, steep slopes, filled areas, liquefaction susceptibility, riverbank/ waterlogged area and rockfall-prone area
- n Shape of house: specifications like number of stories, clear span of walls, room size, wall height and building proportions
- n Quality of construction materials: specifications of materials like stone, brick, cement/ mud mortar, concrete, rebar and timber
- n Foundation: features like foundation type, depth and width
- n Vertical members: features like continuity of vertical members from base to top, their positioning in corners and adequacy of anchorage
- n Plinth: plinth height from the ground level (minimum 1 feet), thickness, width and amount of reinforcement used
- n Walls: wall thickness, through stones, joints, buttresses and gable walls
- n Openings: size of openings, their placement from corners and strengthening of corners by providing vertical & horizontal reinforcements
- n Roofing: placing roofing materials, their connections, member quality/ type and workmanship
- n In case of RC buildings, some additional checklists were incorporated
- n Details on shape and size of frame elements
- n Details on quantity of reinforcement and spacing
- n Details on shear force resisting components and spacing, and
- n Connection details for joints.

The first technical inspection checked the quality and compliance with the technical guidelines for construction up to the plinth level. The second technical inspection focused on the structures built above the plinth level by verifying the quality and adherence to the building codes for walls, openings and other disaster resistant features. The two inspections were required for releasing the second and the third tranches of the housing grant. Finally, third and the last inspection was undertaken after the completion of the house. The owners were provided with construction certificates after all inspections and verification. Recommendations for corrective measures were made for all non-compliant houses during the inspections.

Wooden houses can also be safe

The house belonging to Mohan Kumar Jheli Magar at Marin-5, Ratamata in Sindhuli district had been affected by the Gorkha earthquake forcing the family to live in a temporary shelter for several months.

Most people in Sindhuli had wooden houses and preferred wood because it was locally available and also because the houses were suited with the culture/ traditions. But the residents of Sindhuli were confused after they heard that the NRA did not permit the construction of wooden houses.

Mohan Kumar was also confused about whether to build a house as per his choice or as instructed by the NRA. He was worried because there were no approved designs for such houses. The family did not build a house for two years after the earthquake.

The NRA formulated policies for such houses about two years after the earthquake after which reconstruction in Sindhuli progressed.

Mohan Kumar said, "If NRA had not permitted us to build wooden houses we would still have been in the temporary shelter. We did not want to buy steel rods and cement and the wood would have rotted and become useless." He added, "Today we have built a house as per our tradition, it has been stronger with help of technology".

Several new technical issues had emerged during the reconstruction. The NRA received information on the issues through DLPIUs, partner organizations, local authorities and the HRRP. The NRA, CLPIUs and key partner organizations then worked together to address the issues and challenges. The minimum requirements and inspection forms prepared in the initial period did not adequately incorporate construction using timber or light steel structures. The NRA then prepared a technical manual with inspection sheets and detailed evaluation methods (Annex 4) for such structures. After observing the use of hollow concrete blocks in more than 3000 houses, the NRA came up with the “Hollow Concrete Blocks Manual for load bearing structures” in collaboration with the HRRP in February 2019. The manual comprised of material specifications, designs and details of construction of load bearing structures using HCBs and also the criteria for assessment and relevant checklists.

Due to various reasons such as lack of awareness of technical guidance, many people-built houses without adhering to the norms of earthquake resilient construction. To address this problem, the NRA prepared the “Correction Exception Manual for Masonry Structures”. The correction manual covered issues related to site, irregularities of shape, poor quality of construction materials, inadequate depth of foundation, missing vertical members at corners and openings, missing plinth beams or horizontal bands in walls, weak masonry, vulnerable gable walls, inappropriate size of openings, heavy roofing materials, and high attic walls or vulnerable upper storey. The manual was for guiding engineers to provide advice and guidance for corrective measures for houses with certain levels of non-compliance. Homeowners were then required to complete these corrective measures in order to receive the subsequent tranches of the reconstruction grant.

As the reconstruction policy had not defined a minimum size of the rebuilt house, many house owners built single room houses to claim the grant assistance. However, there was other factors that also influenced house size and one was the limited financial capacity of house owners. In some cases, the deadlines announced by the NRA for receiving the next installment pushed the owners to quickly build small houses, fearing that they would not receive the next installment if construction was delayed. In a few cases, the families were small consisting of only one or two members and they did not require a large house. There was also the possibility that some homeowners had not been properly identified during damage assessment and may have built the single room houses only to obtain the grant assistance. As result there were quite a few houses of inadequate size and these did not fully support all household functions. However, some feedback from the low-income vulnerable households indicated that they were satisfied even with the new single-room houses.

Study on reasons for and suitability of single-room houses

The World Bank commissioned in early 2019 to understand the extent of single-room house construction and reasons behind the trend, including the types of beneficiaries building single-room houses and whether or not those dwellings were habitable. The assessment found four main reasons for building single room houses: (i) Single room was sufficient for the household: either a single person or elderly couple were living in such houses; (ii) financial constraints; (iii) having other arrangements/ alternate housing; and (iv) lack of adequate land. The study found that only 25 percent of these houses were appropriate for habitation. Lack of clear instructions on single-room house construction had led to significant confusion, as engineers used their own judgement on size and design. These findings along with concerns of relevant stakeholders on the growing trend of building single-room houses led the NRA to issue minimum parameters for single room houses on July 2, 2019. The minimum parameters for the single room house included a minimum interior area of approximately 120 square feet, a kitchen, a toilet and terrace, to make the house habitable.

Use of local and salvaged materials

Bhaktakumar Shrestha from Charangefedi, Netrawati Dubjong-5, Dhading had rebuilt the house using materials salvaged from the old house.



His original house was “20 hands long” (approx. 20 to 25 ft) and had three storeys including an attic. The old house had been built by his father when he was a toddler. Wood was easily available in the forest at the time and his father used lots of it and good quality stones to build the house.

The house was destroyed by the Gorkha earthquake after which he stored all reusable wood in a shed and also stacked the stones. They were living in Dhadingbesi – and not in the old location – and were not included in the list of beneficiaries. They were added on to the list after filing their grievance twice.

Shrestha used the materials he had salvaged and other local materials to build a two-room house. he has used iron rods for the bands in the walls and otherwise has used wood everywhere.

The cost of construction was lower because he had used locally available materials. He also used the advice of technicians to ensure that the new house was safe. He was provided with all three installments of government support.

The NRA continuously responded to the challenges of construction quality and technical compliance with appropriate guidance to enable homeowners to build resilient houses and access the grant assistance. The initial technical norms, had restricted houses with stone/ brick masonry in mud mortar to one storey and the ones with RC bands to one storey plus attic. Since many households needed two storeys to meet their requirements, they built the upper storey mostly with timber frame structures and CGI sheet roofs. Concerned about vulnerability of such structures, NRA issued new guidelines incorporating earthquake resilient features for such hybrid structures. However, even then some house owners had expanded their houses to add space after they had received the completion certificate from the NRA. Many of these houses could be affected by future earthquakes. For this, NRA came up with the House Extension Guidelines. The institution that succeeds the NRA and local governments would have to take this up and ensure that all reconstructed houses remain earthquake resilient even with incremental modifications homeowners may make over time.

3.4.7 Retrofitting of partially damaged houses

Retrofitting (also referred to as strengthening) is a technique to improve seismic performance of an existing building by adding or altering key structural components. In this report, “retrofitting” refers to the act of going beyond normal repair to make an earthquake-damaged house/ building stronger (in terms of earthquake resistance) than it was before. As the damage assessment had identified many houses that were partially damaged, the GoN responded with a policy to support repairs and retrofitting of such houses. This was because people were likely to discontinue use of the partially damaged houses and build new ones if they did not have information on repairs and retrofitting. Before the 2015 earthquake,

a significant number of research projects and demonstrations had been done to enhance the awareness on retrofitting techniques. The 2015 earthquake and the partial damage to houses resulted in attention for implementing learning from these projects for seismic strengthening through different retrofitting measures.

Retrofitting has made old house stronger and safer

Sixty-five years old Doma Sherpa of Khijidemba-2, Okhaldhunga realized the need of having a proper house after spending many cold winter days and rainy nights at a temporary shelter after the Gorkha earthquake.



She had moved to a temporary shelter after her house was destroyed and feared mice, snakes, snow, and rain. The dark nights were worse as she had to spend many sleepless nights worrying about her two young girls who were teenagers.

Doma was illiterate and was raising five children on her own. She still had debt that needed to be repaid which she had used to look after her family and send two of them abroad. Doma now has a stronger house, after her partially damaged one was retrofitted.

CRS (Catholic Relief Services) had identified her house as a candidate for retrofitting and done it as she was a single woman. The NRA had special provisions for assisting such beneficiaries.

Doma said, "If the organization had not helped, I would still be living in the temporary shelter". Now she wants to have a grand wedding for her eldest daughter at the retrofitted house after she comes home from abroad. She added saying, no matter how hard anyone danced (at the wedding) the house would not be destroyed.

Doma's house was selected for retrofitting as the location was a good one for doing a demonstration from which other beneficiaries could learn how to reinforce partially damaged houses, said Sushila Tamang, Vice-Chairperson of Khijidemba Rural Municipality.

Based on the detailed damage assessment, the NRA had identified more than 78,000 houses in need of retrofitting. Retrofitting as an option to make damaged buildings usable had also been mentioned in the PDNA. The assessment had estimated that 256,697 houses could be restored in this manner and had estimated that the financial requirement would be NRs. 31 billion (US\$ 267 million).

“Retrofitting technology helped me save my ancestral home”

Rudra Prasad Subedi of Bhimeshwar -5, Dolakha had to move to a temporary shelter after his ancestral home was partially damaged by the earthquake. The house had three stories and was built in the traditional style. “After it was damaged everyone suggested that I should demolish it, I wanted to keep it as it was even though I would not be living there,” said Subedi, now 72-year-old.

One day engineers working in reconstruction visited the village and inspected the damages. They had asked him whether he would be interested in retrofitting the house, which was what he had always hoped to do.

He then spent NRs.500,000 on the retrofitting works, while it could have cost him five times more if he had decided to build a new one. “The house has been so well built, I feel it has been stronger than before,” said Subedi.

He added that he was saddened seeing everyone demolish their ancestral homes and build two-room houses. Many of those people who demolished their houses now regret the decision.

Based on the detailed damage assessment, the NRA had decided that owners of houses with damage Grade 2 (Major) or Grade 3 (Minor) would be provided financial support for retrofitting. This categorization was done based on technical information regarding the grade of damage as documented by surveyors. The house owners receiving financial support for retrofitting had to comply with technical requirements and designs for repair and retrofitting, and suggestions of trained technical personnel, typically an engineer. To assure quality and compliance to standards, technical support was provided at two stages: (i) technical assistance prior to starting retrofitting works, and (ii) supervision and inspection of retrofitting works prior to the disbursement of the second tranche.

Trainings on building earthquake-resilient houses

Karna Bahadur Thami now has a new name – lead mason. He has also had a massive change in his daily schedule before and after the Gorkha earthquake.

He had been building houses from a very young age and had built about 100 houses in 2015. But the Gorkha earthquake did not spare any of them. All of the houses were destroyed and many also caused deaths that had made him very sad.

It was when he heard about government provided trainings on building earthquake resistant houses. He joined the training, with 32 others from Baabare village. After the training these masons built all the houses that were damaged by the earthquake in the village. All of the new houses are earthquake resistant.

Limited knowledge and skills on structural assessment, retrofit design and implementation were the key challenges of the retrofitting program. Specific codes and technical standards were not available and retrofitting was not a part of conventional education or training of engineers and builders. To facilitate retrofitting, the NRA developed the “Repair and Retrofitting Manuals” for masonry and RC structures with the support from partner organizations. These manuals outlined the standards and specifications and the minimum interventions required to carry out retrofitting as well as the repair and retrofitting methods considered suitable in terms of locally available materials, affordability, and ease of construction.

The manuals discussed two levels of interventions for damaged buildings to ensure a life safety level of performance under the standards set out in the Nepal National Building Code, NBC 105: 1994. The first and basic level was intended to bring the damaged buildings back to the pre-earthquake conditions. The second level of intervention aimed to ensure structural improvements to enhance the resilience against the future earthquakes. The basic level of interventions was mandatory for receiving the retrofitting grant, the second level of intervention works were highly recommended. These manuals aimed to support engineers for providing advice and guidance to homeowners for repairs and retrofitting and to undertake inspections after completion.

The NRA had identified various repair and retrofitting methods for earthquake damaged masonry and RC structures. Much of the retrofitting was a simple, easy and affordable such as a splint and bandage or jacketing of walls with GI wire plastered with cement and sand mortar. This process of caging structural walls and building components to prevent local failure was feasible for any type of masonry building. Similarly, the strong back technique of retrofitting was applied for retrofitting houses to hold the structure walls with support from the vertical column as a strong back to the walls and connected beams. However, the progress with retrofitting of partially damaged houses was slow.

Concerned with limited progress with retrofitting, the NRA organised a National Workshop on Retrofitting, bringing together government officials and partner organizations to gain a better understanding of the slow progress. It was found that the lack of adequate information on retrofitting to the general public and local governments was the main cause for delay. The workshop recommended strengthening the technical capacity of the DLPIUs and local-level technical personnel and the creation of a dedicated team of experts to support house owners and provide technical assistance for retrofitting. This led to two new initiatives – the Retrofit Task Force and the Retrofit Technical Working Group.

The Retrofit Task Force was formed through the initiative of the NRA/CLPIU Building to bridge the information gap and technical knowledge that was necessary to expedite retrofitting in earthquake affected communities. Task forces were formed at the central, district and local levels to take information to people through a door-to-door campaign. As of mid of 2020, the Task Force had been conducted a large number of orientations and information sessions and had begun supporting retrofitting houses of about 200 beneficiaries.

The Retrofit Technical Working Group (RTWG) was formed by the HRRP with the aim of supporting the NRA and CLPIU Building to promote retrofitting. The RTWG consisted of partner organizations involved in retrofitting projects such as NSET, Build Change, UNDP and CRS and mostly focused on standardizing the procedures for estimating retrofitting interventions in a building, compilation and development of information materials and supporting the CLPIU. It also supported the NRA and CLPIU Building by developing standard curricula for orientation and training programs, standardization of technical documents, solutions and approaches related to retrofitting.

The Repair and Retrofit Manual for masonry structures provided typical designs for retrofitting masonry buildings, based on length, breadth, height and configuration. However, during implementation, many typical houses in rural and urban areas did not fit into the typical design criteria. Another major challenge that hindered was the failure of the manual to provide technical solutions to many of the complexities that arose during implementation. Further, awareness about retrofitting options was still low and the shortage of skilled builders made it difficult for homeowners to have confidence for undertaking retrofitting.

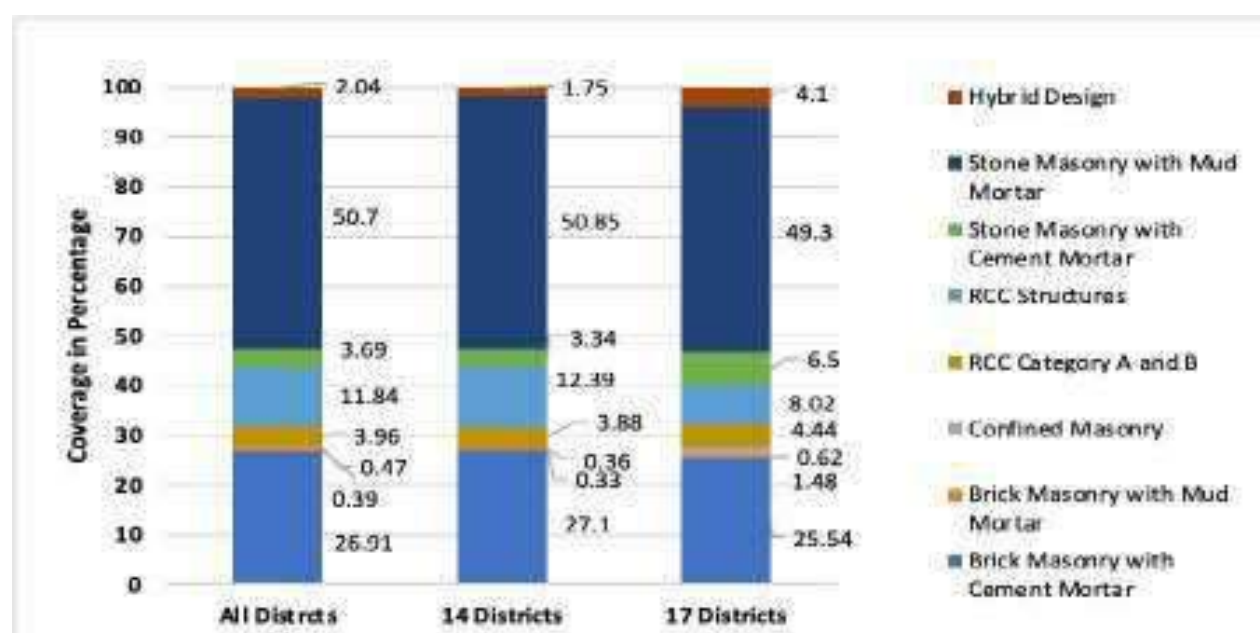
Retrofitting was a more cost-effective option compared to new construction and the assistance provided for the purpose was a third of the reconstruction assistance. However, the old houses needing retrofitting are large and therefore, required higher investments. The owner's financial contribution was therefore expected to be much higher in case of retrofitting than in reconstruction. The NRA management too proposed of increasing the retrofitting grant assistance to NRs 200,000 (US\$ 2000) from the existing NRs 100,000 (US\$ 1000). However, MoF didn't agree on this. This had made implementation of the retrofitting program very challenging. In FY 2019/20, the number of households eligible for retrofitting assistance was estimated at 77,999, out of which 51,064 were enrolled through the participation agreement. By the end of the same year 99 percent of the enrolled beneficiaries received the first tranche, but only 659 houses were retrofitted by September 2020. No RCC house was retrofitted and all retrofitted houses were of the masonry type. Of the building types presented in figure 11 below, 50.7 percent were stone masonry in mud mortar, which was also why most houses needing retrofitting were of this type.

TABLE 9: PROGRESS IN RETROFITTING (DECEMBER 2020)

District/ Municipality	Retrofitted building typology	Number of retrofitted houses	Retrofit technology
Dhading, Dolakha, Nuwakot, Okhaldhunga	Masonry building (stone and Mud)	68	GI wire jacketing
Kavre, Makwanpur, Ramechhap, Dhading, Sindhuli, Tanahau, Palpa, Lalitpur, Syangja, Gorkha, Okhaldhunga, Lamjung, Chitwan, Dolakha, Sindhupalchowk, Gulmi, Kaski, Nuwakot, Rasuwa.	Masonry building (stone)	230	Strong back
Others	Masonry building	361	Mixed of above two technologies

Source: NRA

FIGURE 11: BUILDING STRUCTURAL PROPORTION AS PER THE BUILDING TYPOLOGY



Source: NRA

3.4.8 Geo-hazard risks and relocation

An important issue that emerged from the damage assessment was that several settlements could not be rebuilt in situ owing to landslides or other hazards. More than 1200 landslides triggered by the earthquake had been reported. There were many contributing factors for the landslides such as: unstable slope, the ruptured plain, fragmented rock at ridge of hill slope, widening gullies and the massive filling at hill slope. Such hazardous conditions made the land inappropriate for housing reconstruction. The District Disaster Risk Committee (DDRC), chaired by the Chief District Officer (CDO), is the main institution responsible for managing disaster risks in the district. The committee also included the representatives of seven major political parties, district line agencies including local police and I/NGOs. With support from DDRC, the Ministry of Home Affairs (MOHA) prepared a detailed report on landslides.

The NRA began a detailed geological study in December 2016 in collaboration with the Department of Mines and Geology (DMG), Department of Soil Conservation and Watershed Management (DSCWM), and the Department of Water Induced Disaster Management (DWIDP). The study identified more than one thousand settlements at risk in the 14 severely affected districts. The vulnerable settlements were

categorized as I, II and III based on the extent of potential risk at the site. Category I included settlements with little or no geo-hazards risk and requiring no intervention. Category II included settlements with some risks and therefore, required appropriate mitigation measures. Category III settlements were highly vulnerable and required relocation. The total number of settlements in each category based on the surveys by the NRA (with technical assistance from the DFID funded landslide study project implemented by the Durham University and Durable Solution) is shown in Table 10.

TABLE 10: VULNERABLE SETTLEMENTS BASED ON INTENSITY OF DESTRUCTION

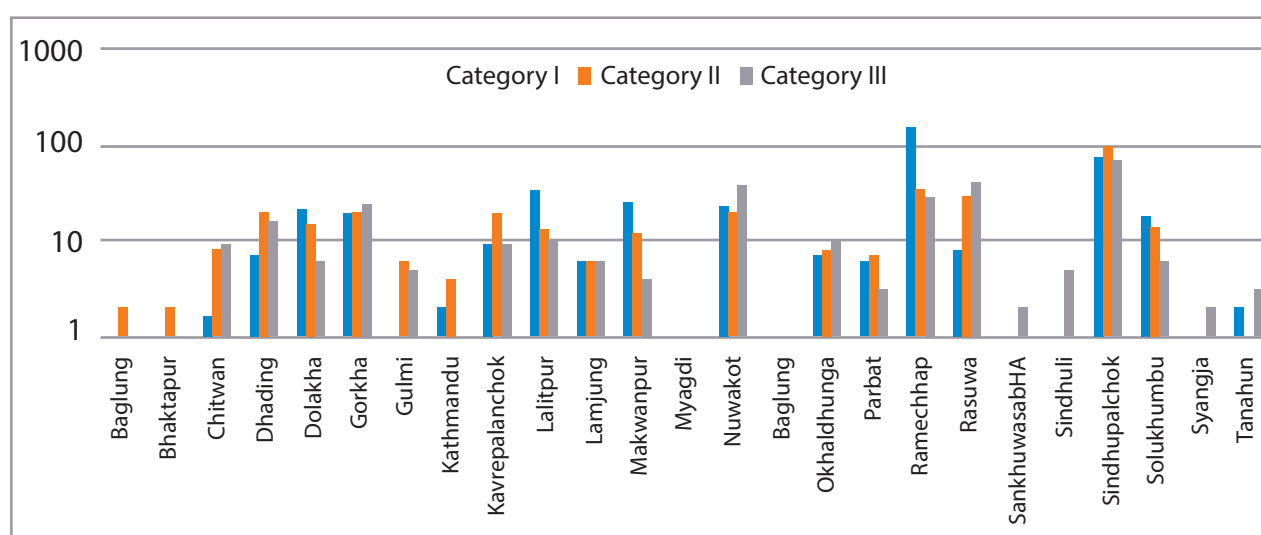
S.N.	Category	Number of Settlements
1	Category I	463
2	Category II	340
3	Category III	299

Source: NRA - Land Management and Geological Studies Section (LMGS section) 2020

In some cases, entire settlements with about 20 to 100 households needed to be relocated due to the likelihood of landslides. The NRA issued Procedures for the Relocation and Rehabilitation of Hazard Prone Settlements, 2073 to assist this process. A total of 4720 households in Category III settlements faced high geo-hazards risks and required resettlement.

Figure 12 shows the distribution of the vulnerable settlements in various earthquake affected districts based on the categories discussed above. In 25 districts, there were nearly 22,000 vulnerable households, with highest numbers in Ramechhap district. As can be seen in Figure 12, Sindhupalchowk district had the highest number of Category II & III settlements.

FIGURE 12: CATEGORY I, II & III VULNERABLE SETTLEMENTS ACCORDING TO THE DISTRICTS



Source: NRA

In all 2571 households were provided NRs. 200,000 (US \$ 2000) as grant for purchasing land and 629 households were provided government land, while 1057 households did not require government assistance. There were 463 households in the process of resettlement in early 2021.

NRA issued a Working Procedure related to Integrated Settlement Development that provided a means for providing suitable support to people whose houses were located on land with geo-hazards risk and households that were scattered. For this, the local government was required to prepare a proposal

for an integrated settlement. Upon the NRA's approval, the local government could build integrated settlements with up to 99 houses and those with more houses could be built by agencies designated by the NRA. NGOs wanting to support the development of integrated settlements were required to follow a similar procedure.

3.4.9 Urban housing reconstruction

There were 589 urban wards across the 10 rural, 84 urban municipalities, and 63 historic settlements in the 25 municipalities of Kathmandu, Lalitpur, Bhaktapur, Kavre, Dolakha, Nuwakot, and Gorkha districts. Many historic urban settlements had been severely affected by the earthquake. Rural areas had suffered more damage compared to urban areas, but urban reconstruction posed greater challenges. Thus, progress lagged in urban reconstruction, particularly in the Kathmandu Valley. In many cases there were houses that faced high risk of being affected by the demolition of adjacent damaged houses. Further, many house owners had small plot sizes for reconstruction. Clearing debris and storing salvaged material was also difficult.

In historic urban settlements, municipal development interventions had at times undermined the historic integrity due to lack of awareness and capacity. The newly formed municipalities required handholding for the preparation of appropriate plans. The house owners also required support to fulfill the reconstruction norms. Unavailability of an adequate number of crafts-persons skilled in traditional construction techniques was also a hinderance, particularly for preserving traditional architecture.

A study undertaken by the NRA indicated two major factors that inhibited progress in urban reconstruction – land issues and access to finance. The issues related to ownership titles of existing houses made reconstruction even more complex. Joint families sharing a house or collective ownership of a house of multiple families made reconstruction solutions difficult. The NRA introduced standard operating procedures to facilitate reconstruction of single buildings owned by multiple households.

Further, the building bye-laws and permit system were implemented strictly in reconstruction, and issues like proposed roads, planning setbacks, etc. made obtaining building permission difficult or required people to give up part of their land leaving only a small plot for reconstruction. The requirement of architectural and/or structural drawings for obtaining a building permit also resulted in additional financial burdens on the households. The complex building permit process remained unresolved. The municipalities could have handled this issue through land pooling and redevelopment of such areas but lack of technical capacity slowed down the reconstruction.

3.4.10 Grievance redressal

NRA had identified households entitled to a housing reconstruction grant based on the damage assessment survey done by the Central Bureau of Statistics (CBS). Excluded households could lodge their grievance as guided by the NRA's Grievance Management Working Procedure 2074 (NRA, 2017). In the first phase, grievances were collected from the 14 most affected districts and 216,285 were registered. In the second phase, grievances were collected from the 32 moderately affected districts.

The major grievances related to poor/faulty damage assessment, exclusion from the damage survey, inexhaustive verification list, counting of temporary shelter as a second house, family separation, and false record of another house.

The NRA had set up a dedicated section for grievance redressal headed by a gazetted second-class officer. There were three committees for handling grievances: at Ward level, at Municipal level and at the NRA

Executive Committee level. Within the NRA, the Executive Committee had formed a Grievance Handling Committee to support the Executive Committee's decision-making. Table 11 shows the composition of grievance handling committees.

TABLE 11: COMPOSITION OF THE GRIEVANCE HANDLING COMMITTEES

Ward Level	Municipal Level	Central Level – NRA
n Coordinator– Ward Chair	n Coordinator- Mayor/ Chief of Municipality/ Rural Municipality	n Coordinator – Executive Committee Member
n Member – NRA deputed Engineer or Sub Engineer	n Member – Deputy Mayor/ Deputy Chief of Municipality/ Rural Municipality	n Member – Joint Secretary (JS) related with grievance handling
n Member Secretary – Ward Secretary	n Member – Engineer of NRA	n Member – JS, Housing Division
	n Member – In charge of nearby police station	n Member – Under Secretary (US), MIS Section
	n Member Secretary – Chief Administrative Officer	n Member Secretary – US, Social Mobilization and Grievance Section

Source: NRA

Each committee was empowered with certain authority. If the lower-level committee did not have the authority to take a decision, it had to forward the case with an explanation to the upper-level committee within 15 days. The final decision was taken by the NRA's Executive Committee. All grievances were registered in the EHRP database, initiated at the district level and forwarded to the central level.

Management of the large number of grievances required a re-survey and a re-verification survey. Accordingly, the 10th NRA Steering Committee meeting decided to conduct a re-survey of the non-beneficiary households (NRA, 2016, b). The re-survey was done in 14 most affected districts in 2017. Following a request of the NRA, the DfID mobilized the United Nation Office of Procurement Services (UNOPS) for conducting the re-survey, which had deployed 332 experienced engineers and social mobilizers. The survey was conducted in collaboration with CBS and covered a total of 129,410 houses in 14 districts. The second phase of the re-survey was done from March 2019 to July, 2019 by 800 NRA engineers who were already based at the local level to provide technical assistance. In this phase 188,000 houses were surveyed.

The digitally registered grievances at the district level were forwarded to the central office where a separate team of engineers examined them and classified them as: potential beneficiary, probable beneficiary, retrofitting beneficiary, not surveyed, further field verification required, non-beneficiary, and, already a beneficiary.

Altogether 6,34,973 grievances were registered of which 1,06,415 were declared as reconstruction beneficiaries and 67,674 as retrofitting beneficiaries. The remaining 2,64,267 declared as non-beneficiaries. Others were listed as already beneficiary, not eligible, etc.

The NRA dealt with operation-related grievances through a toll-free telephone system established with the assistance of UNDP in 2017. The major grievances received through this channel were: land and ownership problems, delayed tranche release, delayed inspection, inadequate technical support, etc. The telephone operators were trained on all NRA policies and guidelines and that enabled them to respond directly to most cases. Where they were unable to respond, they passed the case on to the relevant NRA officer. More than 40,000 households benefited from this service.

The Act Related to Reconstruction of Earthquake Affected Infrastructure 2072 (GoN, 2015) provided for an independent appellate committee chaired by an ex-officio Appellate Court judge. The judge was supported by two members: a lawyer and an engineer. A plaintiff could file the case directly to this committee if they did not agree with the NRA's decision. The tenure of the Appellate Committee will end one year after the NRA's dissolution.

The main problems that caused grievances were property missed during the survey, lack of integrated household data, fraudulent intentions of ineligible plaintiffs, non-digitized grievances, communication problems, low local accountability, and artificial family separation.

3.4.11 Information management, monitoring and evaluation

Information management

The NRA used Information Technology (IT) extensively during reconstruction. Beneficiary identification was based on digitized surveys processed in the central information system. The entire grant administration was also fully IT based.

Private housing reconstruction and retrofitting beneficiaries were identified using the central information system based on the data collected from the earthquake affected regions under the earthquake affected housing reconstruction data collection program. The details of the damage collected in the central information system. Details of all the beneficiaries were managed through the agreement number released through the information system.

The NRA had a specialized central information system that was developed with a special focus on private housing reconstruction. Information such as damage details, home owners' characteristics, description of NGO providing support to reconstruction, progress with housing reconstruction, status of tranche disbursement, particulars of grievances, identity of trained individuals, and details about vulnerable groups were uploaded on the central information system. This enabled an efficient management of about 900,000 households in various earthquake-affected districts.

All details of private housing reconstruction and retrofitting have been uploaded in this system, including the tranches deposited in the beneficiaries' bank accounts. This helped to control leakages and delays in tranche distribution. The district level offices related to the NRA tallied the information on beneficiaries with the support of the information system while distributing the reconstruction grant. The information system ensured the release of each tranche was only after compliance was confirmed.

Photographs of the houses under reconstruction after being listed in the private housing reconstruction beneficiary list and receiving the tranches were sent to the information system via tablets after inspections. Subsequent tranches were recommended and the houses under construction were analyzed on the basis of this information. Details of the houses reconstructed with financial aid from the government can be obtained easily in the future by using this system.

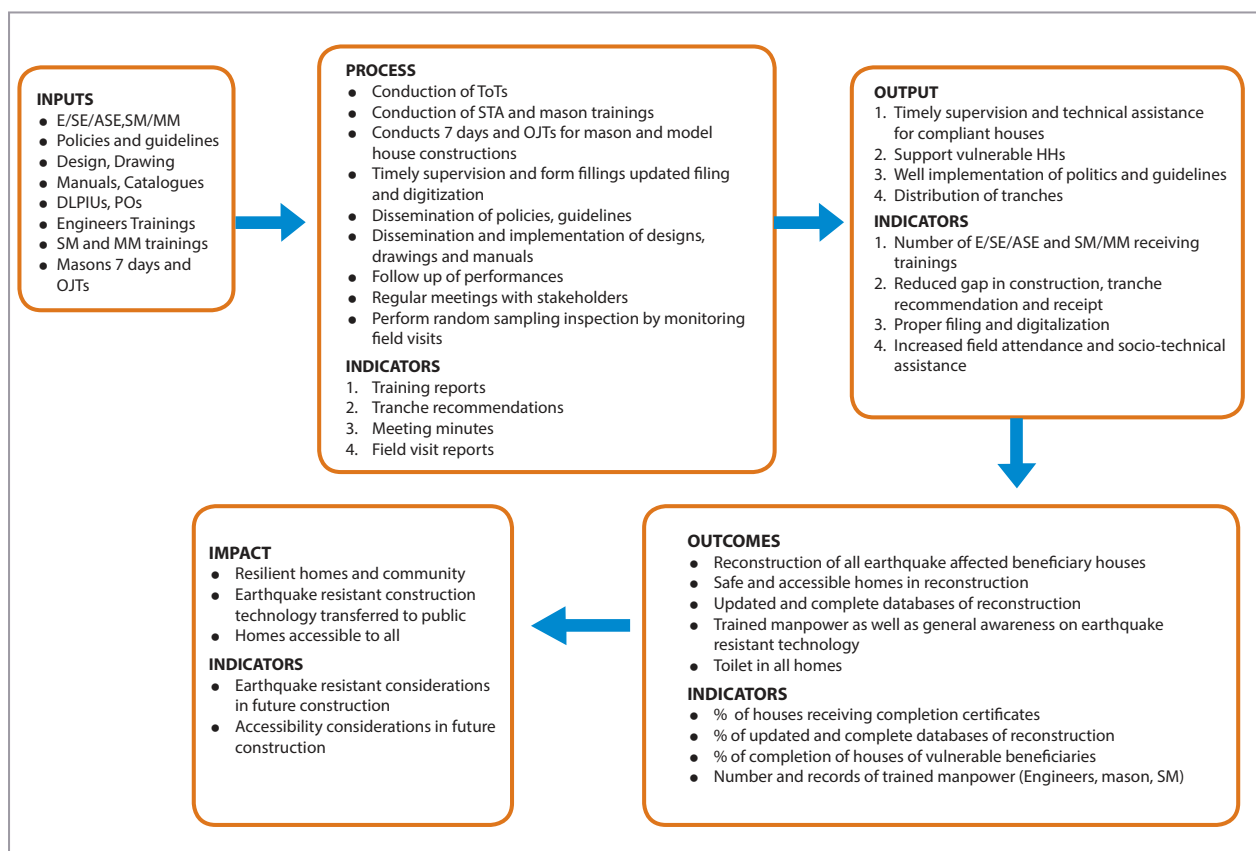
Also, the over 600,000 grievances related to the request for inclusion in the private housing reconstruction beneficiary list were analyzed using the information system. Without this information system, managing grievances would have been very difficult.

The NRA also developed a Project Monitoring Information System (PMIS) with details about the reconstruction of public schools, public buildings, roads, heritage sites, buildings of health institutions, as well as that of reconstruction-related works done by the non-governmental organizations. The information on public reconstruction activities can be accessed through this information system.

Monitoring and Evaluation (M&E)

The detailed procedures, activity levels and standard indicators used to monitor reconstruction progress are shown in Figure 13. The monitoring framework to measure the overall performance included inputs, outputs, outcomes and impacts. Different indicators were used, including the rate of safer housing reconstruction, formulation of policies and guidelines, designs, capacity enhancement trainings for workforce, and training of new skilled workers. Progress was monitored through training reports, tranche recommendations, meeting minutes and field visit reports. Similarly, outcome level indicators were measured in terms of number of people in the workforce trained, reduced time in disbursing grant tranches, timely digitization of information and presence of assistance providers in earthquake-affected areas.

FIGURE 13: M&E SYSTEM OF CLPIU-BUILDING



Source: NRA

The outcome factor was measured through indicators such as the percentage of households receiving completion certificates, updates regarding databases, vulnerable households completing reconstruction and record keeping of trained construction workforces. The impact level activities are generally reflected after the rebuilding process ends, and this is linked with the efforts that were made in the institutionalization process. This is further related to capacity enhancement of central/ local governments and knowledge, attitude and perceptions of people and stakeholders.

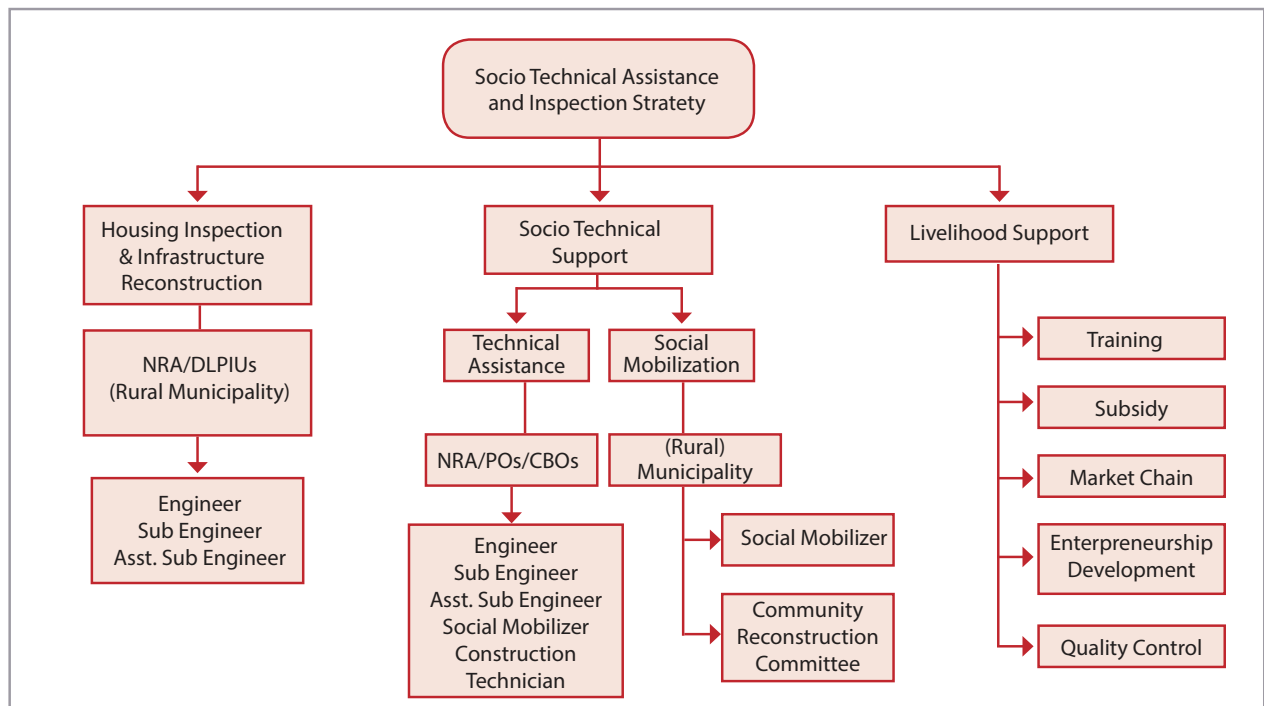
3.5 Enabling homeowners for reconstruction

3.5.1 Socio-technical assistance

Socio-technical assistance refers to the combination of various tools and techniques used to enhance the knowledge and skills of stakeholders involved in reconstruction. Socio-technical assistance included three types of support to homeowners: i) raising the demand for safe housing by enhancing community awareness on earthquake resilient building technologies; ii) capacity building of local builders to deliver disaster resilient houses; and iii) ensuring compliance with construction guidelines at local, district, and central levels through support, facilitation, and enforcement mechanisms.

The NRA had constituted the HRRP to ensure the reconstruction of disaster-resilient housing with the support of different donors and partners. Under the leadership of NRA and CLPIU, the HRRP coordinated the work of NGOs to support the NRA's socio-technical assistance program through training, awareness raising and information dissemination.

FIGURE 14: MODES OF SOCIO-TECHNICAL ASSISTANCE, COMPONENTS OF SOCIO-TECHNICAL ASSISTANCE



Source: NRA

FIGURE 15: DIFFERENT COMPONENTS OF TECHNICAL ASSISTANCE PROVIDED



Source: NRA

Community level orientations were provided on different aspects of safe construction, the government's housing reconstruction support programs, the procedures to be followed for receiving the reconstruction grant, etc. Such orientations were very helpful for building people's confidence on the housing reconstruction program. Short training for enhancing the capacity of masons, artisans, social mobilizers, stakeholders and technical personnel were also important. The trained human resource also assisted in raising awareness, while assuring construction quality through constant monitoring.

Mobile technical support was provided on-site to earthquake-affected people during the construction of houses. Homeowners as well as masons could interact with the technical support team and adopt correction measures during the construction in cases where mistakes were detected. The mobile technical teams consisted of an engineer, a social mobilizer and a construction technician. These teams visited the buildings under construction in every area they were assigned to and thus played a crucial role in ensuring earthquake-resistant housing. For this socio-technical assistance, NRA mobilized the support from various development partners and I/NGOs – JICA supported community mobilization program, Gol supported UNDP and UNOPS STFC (Socio-Technical Facilitation & Consultation), the WB supported socio-technical assistance via NRA's DLPIUs, and the USAID supported Baliyo Ghar Programme; were some of those notable assistances. With the assistance from WB, NRA provided the hands-on socio-technical assistance by 755 mobile masons and 246 social mobilizers mobilized by the NRA to ensure that no one was left behind, was a major achievement, despite the disruptions caused by the Covid-19 pandemic.

By 21 June 2021 – after 17 months of deployment – the socio-technical assistance teams had achieved the following:

- n 1,771 houses of vulnerable beneficiaries reconstructed (1,204 completed and 567 under construction).
- n Door-to-door technical assistance provided to 157,691 beneficiaries.
- n Collected 65,250 participant agreements for digitization.
- n Supported 24,765 non-beneficiaries in the appellate process.
- n Collected 41,627 photos and information of completed houses for final inspection.
- n Supported 19,779 retrofitting beneficiaries for making applications and filling up annex documents to change to the reconstruction category.
- n Supported 90,300 beneficiaries to obtain construction completion certificates.
- n Supported collection of socio-economic information from 1,054 beneficiaries for Socio-Economic Impact Study Survey undertaken by NRA.
- n Carried out needs assessment for 65 EHRP beneficiaries with disabilities for disability inclusion activities.
- n Collected information from 2,585 masons for Survey for Skill Test.

The reconstruction process created job opportunities for women in non-conventional skill areas, such as masonry. For example, of the 755 above-mentioned mobile masons recruited by the NRA,⁹ 149, or 20 percent, were women – twice the project aim of 10 percent. They were provided skill enhancement and diversification opportunities that was intended to help retain the women in the workforce.

Vocational on-the-job training courses of 50 days were organized for masons, carpenters, plumbers, and electricians helped to enhance the supply of skilled construction workers. The shortage of skilled construction workers had been identified as a major challenge by many communities who said shortage of trained masons was one of the main reasons for the slow pace of reconstruction.¹⁰ Besides vocational

⁹ Recruited under the World Bank-financed Earthquake Housing Reconstruction Project, EHRP.

¹⁰ Many partners contributed to such trainings. For example, USAID alone supported the training of more than 28,840 professionals on earthquake-resilient construction techniques, including more than 5,400 masons Supported by Multi-Donor Trust Fund financing.

training courses on construction-related areas, several agencies had also offered a wide range of courses on livelihood enhancement skills. A total of over 70,000 people benefited from such vocational training courses.

Women join men as skilled masons

Bimala Basnet of Bhimeshwor-2, Dolakha had faced many hardships even before the Gorkha earthquake. She has a son and a daughter. Her husband, a mason, had passed away when her children were young and she had been deprived of her husband's property because her in-laws feared that she would remarry.



Bimala was in Kathmandu to learn tailoring when the earthquake occurred. She was required to return to Dolakha because the earthquake had destroyed her house in the village. She built a temporary shelter after staying in a tent for a few months.

When the government assisted reconstruction began in the village, she heard that men in the neighborhood were to receive mason training. Though keen to participate in the training and take up the profession of her husband, she was not selected because she lacked of experience. She received another chance for a 50-day training organized by the Nepal Society for Earthquake Technology that aimed at preparing new masons to build earthquake resistant houses.

After completing training, she began working as a mason and had already built three houses as head mason when she was interviewed. She had also participated in building 15 other houses.

Aware of the male domination in construction work, she could not imagine even her husband allowing her to take up the profession, Bimala acknowledged that the training had helped change the mindsets and given women confidence of being able to do everything that men did.

"No need to go abroad now, reconstruction program gave us employment"

Ganesh Pahari of Golanjar-1 struggled to run his household and educate his children. The second child among 10 siblings was unskilled and was looking for employment in Kathmandu. He had returned home after the earthquake.

One day some people came the village offering to train people in building houses. Ganesh and some of his friends enrolled for in the 50 days on-the-job training. After training he worked with construction crews some time and soon began building houses for others on contract.



Everyone had to build the house, everyone wanted it to be completed as soon as possible. Ganesh had a group of skilled people working with him and his reputation also spread as someone who did a good job and also completed work on time. Later he became so busy that he was occupied all the time.

Next, he gathered his brothers who were at home and trained them on building houses and employed them in his crew. Ganesh who has built hundreds of houses so far said, "Now no one needs to go abroad to seek work. The training I received taught me the skills and there was work everywhere".

The NRA had set up information hubs in different areas to facilitate access to relevant information on technical specifications, the reconstruction process, and related policies and guidelines. These hubs also functioned as distribution points of information and communication materials.

Another tool that was used to strengthen community capacity and confidence were technology demonstration models that allowed communities to understand and visualize different technical specifications. This was possible by observing an actual construction, which consisted of a small-scale model or a new house built with local materials and in accordance with the technical guidelines. Such demonstration houses helped to increase the understanding of communities of the different building types that had been prescribed.

There were Community Based Reconstruction Committee (CBRC) to assist people at the local levels. These CBRCs consisted of independent organizations of local social leaders and activists selected by the earthquake-affected communities. They functioned in accordance with the roles and responsibilities in the “Community Based Reconstruction Committees Directives, 2073” and included activities such as coordination, inspiration, motivation and facilitation of reconstruction activities at the community level.

The socio-technical assistance program helped to achieve significant levels of community mobilization and local support including the “parma” system, where communities shared labor. This mutual aid system brought together a group of 5-6 individuals from nearby households as a team to build the houses of team members. They worked to build houses up to a certain level of one member in turns until all houses were completed. This system helped to reduce construction costs, reduce construction time and improve the construction quality. However, these practices were limited to villages with a high number of masons, because construction support had to be paid back in kind.

Labor exchange for building houses

It was customary for residents of Golanjor-1, Dingladeep, Sindhuli to exchange labor for different types of tasks, including agriculture, in the village. After the earthquake many people had to build houses but they did not have the skills to build earthquake-resistant houses locally.

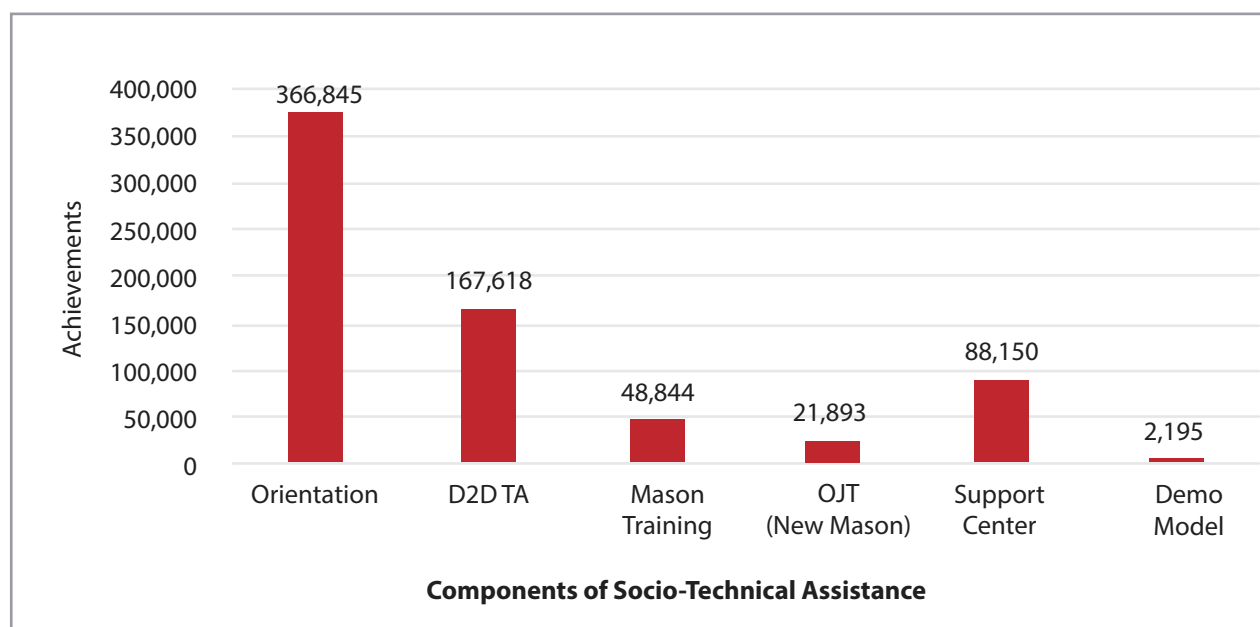
Ten people from the village participated in a training of masons organized by the NRA. After one member from each house was trained, they started building houses through labor exchange. It took almost 20 days for 10 people to build a house. In around 6 months they had completed constructing houses for everyone in the group.

The construction of houses through labor exchange was quicker than expected and the NRs. 300,000 was also enough to cover the costs. Tikabahadur Thapa, a trained mason, said, “If the government wouldn’t have provided us training, we would have struggled to build houses. Since everyone needed to build a house, we would not have been able to get the skilled masons or pay them with the money we had”.

After building their own houses through labor exchange the trained masons also built houses for others in the village.

The figure 16 below shows the coverage and progress of different forms of socio-technical assistance provided to earthquake affected homeowners by the government and other organizations.

FIGURE 16: PROGRESS IN NUMBERS AS AN OUTPUT OF SOCIO-TECHNICAL ASSISTANT COMPONENTS.



Source: HRRP

3.5.2 Training and capacity building

The National Planning Commission had estimated that more than 25,000 resource persons including masons, carpenters, junior engineers, community mobilizers, coordinators and higher-level staff would be required to complete the reconstruction and repairs of damaged private houses and public buildings. Housing reconstruction alone was estimated to require more than 352 million workdays. The PDNA had pointed to the lack of skilled human resources in earthquake affected villages, particularly owing to widespread migration. Thus, a large-scale training program was required to increase the availability of skilled workers for reconstruction. The NRA's reconstruction program had prioritized such trainings.

The NRA published the Training Conduction and Management Guidelines 2073, which aimed at standardizing the training curriculum and management and reporting. The NRA successfully trained more than 70,000 local artisans (masons, plumbers, carpenters, etc.) with support from the project implementation units and partner organizations. Similarly, thousands of technical professionals (engineers, junior engineers, architects, and technicians), social mobilizers and other professionals were also trained in various aspects of reconstruction. The trained human resources had facilitated the NRA's socio-technical support.

Existing training manuals, guidelines and curricula developed by the Department of Urban Development and Building Construction (DUDBC), the Council of Technical Education and Vocational Training (CTEVT), the National Society for Earthquake Technology – Nepal (NSET) and several other partner organizations were used in the training campaign.

To achieve the objectives of Building Back Better, the NRA had identified the need for appropriate, timely and effective communication to raise the awareness among the population for the reconstruction process. Immediately after formation, the NRA formed a Reconstruction Communication Working Group made up of subject-matter experts from government agencies, development partners and implementing agencies for preparing a communication strategy, which had adopted the following approach:

- External communication with affected populations, local governments concerned agencies and various stakeholders.

- n Internal communication within the NRA and among various government agencies and line ministries.
- n Outreach – direct face-to face interactions with communities by those directly assisting communities, i.e., engineers, local officials, etc.
- n Public relations – communication with a wide network of media, opinion makers and information intermediaries.

The NRA was the authorized body to disseminate information on post-earthquake reconstruction and recovery. The NRA guided the development and dissemination of all information in line with its policies and procedures. Hundreds of messages related to reconstruction were disseminated through various means, national television, radio and newspapers. Local mass media were used for district level communication.

“Raising awareness on safe construction through TV programs”

Sabin Khatiwada, a civil engineer, was among the technicians deployed for supporting reconstruction after the earthquake. He found there was very little knowledge among civilians, earthquake-affected people, and construction workers on rebuilding safe houses. “Everyone was afraid of earthquakes but no idea about safe reconstruction,” he said.



Although the NRA had started a massive reconstruction campaign to Build Back Better, it was difficult to explain this approach to people and masons. “We had an education and were also trained but still failed to fully remove the beneficiaries’ doubts about reconstruction,” he added

There was a television program – Baliyo Ghar – program that discussed about reinforcement, building safe mudstone and pillar houses. He said he used some episodes of the program during mason training.

Apart from the independent coverage of reconstruction in the mass media, there was a need for focused and dedicated programs on radio and TV to reach people in the grassroots with information and policies on the reconstruction process. Some partner organizations had supported the NRA with programs discussing reconstruction issues and spreading reconstruction-related messages. These programs also covered success stories and good practices in reconstruction. The radio and TV programs on reconstruction also provided a platform for stakeholders to discuss related issues, such as tranche disbursement, grievances and retrofitting.

The NRA published various publications including monthly bulletins and disseminated it among stakeholders. The bimonthly English and Nepali magazine Rebuilding Nepal provided a platform to share the progress and to showcase stories from the field. Regular media briefings and interactions, monthly newsletters, campaigns in social media and information through website and mobile applications were also effectively used to disseminate information.

3.5.3 Inclusion and support to women and vulnerable households

The PDNA had suggested that around 55 percent of the earthquake victims were women and that about 41 percent of the damaged dwellings belonged to vulnerable communities such as Dalits and Janajatis. Twenty-six percent of these houses belonged to women-headed households and 23 percent by elderly people. The GoN’s strategic recovery aimed at closing the development gaps across gender, social groups, the disabled, and people living in different geographical locations by mainstreaming

GESI strategies in the recovery and reconstruction process. This entailed strengthening the institutional framework, coordination, participation, protection, and promotion of economic empowerment. The GESI approach was developed to foster socially inclusive recovery by addressing the special needs of disadvantaged groups, including women.

The NRA and related implementing agencies had adopted several tactical approaches to deal with GESI related issues. One example was the provision to transfer housing grants directly to bank accounts of the recipients. This enabled many women to open bank accounts, thus contributing to their financial inclusion. Many of them were first-time bank account holders and they represented some 30 percent of the 800,000 beneficiaries. Their interaction with the banking sector enhanced both financial literacy and a sense of empowerment.

The policies of the NRA embedded GESI parameters. The NRA had also prepared documents to define and help to identify vulnerable people. At the implementation level, the NRA carried out different livelihood programs for marginalized and economically deprived groups in coordination with development partners. Vulnerable women and marginalized groups were actively encouraged to participate in capacity development and skill enhancement programs. Vulnerable households were also provided additional financial and material assistance for rebuilding houses. Those living in geo-hazard prone areas were provided financial assistance to relocate to safe locations.

In order to make the recovery process inclusive, the NRA had established a separate section to look into GESI concerns. The objectives and implementation strategies of this section included:

1. The publication of periodic newsletters that covered information on GESI and livelihood approaches and actions.
2. Workshops and seminars to share good practices, challenges and lessons.
3. Documentation of the plight of single women, the differently-abled, the elderly and children in the earthquake affected areas, and
4. Interactions at local level on measures to strengthen the GESI approach.

Different organizations involved in the livelihood sector supported women through the formation of cooperatives. These helped to create new opportunities, strengthen community cohesion and to start small scale projects to contribute to the rehabilitation of affected communities.

An exemplary cooperative was established in Barpak, Gorkha district to to enhance the capacity of women and ensure their participation in recovery. As most of the males were away, the cooperative encouraged local women to lead reconstruction. They could use the available resources/ funds raised locally for reconstruction loans. The local authority facilitated a revolving fund for reconstruction managed by local cooperatives from where the targeted homeowners obtained loans for their recovery at minimum interest. The initial investment was made by the local government.



Photo 20: Cooperative trainings for women

Source: NRA Monitoring and Social Development Section PowerPoint (Web)

Food security was promoted by training women on improved vegetable farming practices, nutrition awareness and provision of seeds. These training courses contributed to increasing cultivation, to enhancing sale of local produce, and to an improvement of the production process. Animal husbandry activities like goat farming were also promoted as a livelihood recovery strategy for women.



Photo 21: Training on vegetable cultivation for women

Source: NRA Monitoring and Social Development Section PowerPoint (Web)

The housing reconstruction responsibility in many cases had to be taken up by women as most young men had migrated from the villages in search of work. Prior to the earthquake women were generally only involved in construction as unskilled workers for aggregate crushing, mortar preparation and in carrying materials. Training courses offered during reconstruction offered women the opportunity to train to become masons. After training many began laying walls, concreting and bar bending activities. This helped to improve their socioeconomic situation.



Photo 22: Female masons practicing concretizing during an on-the-job training

Source: NRA/NSET

“I’m not worried... I now have the skills”

Bijula Bishwakarma of Kamalamaai-4 had to seek a loan to enable her husband who had gone abroad for work to return home.



The family had no source of income and was in a dire situation. Their house was destroyed by the earthquake. The Bishwakarmas had two sons and a daughter but no money for their education.

A year had passed after the earthquake when she had met social mobilizers deployed for reconstruction and learnt that a mason training was being planned. She enrolled for the training and learnt the skills needed for building houses.

She said, “My daughter had warned that the task would be difficult for women but I was determined to do anything.” The

trainees completed building a house in 50 days, while also learning the skills to become masons.

In three months after the training, her team had built 10 houses. “Now I earn a minimum of Rs. 15-20,000 a month, and run the house and send children to school.” The training has also given her confidence. “I am not worried even if my husband doesn’t work because I now have the skills.” She also rebuilt her own house after the training that was provided by Swiss Contact.

“I became a leader in the reconstruction of my village after a 7-day training in earthquake safe construction”

Balkumari Kafle of Dolakha was shattered when after the earthquake her son and his wife decided to move out. She had never thought she would have to look after her bed-ridden husband, youngest daughter, and grandchildren on her own.

She had previously been involved in some construction work, and got an opportunity to participate in a seven-days training on house building. The training helped her to gain confidence to lead construction crews herself.

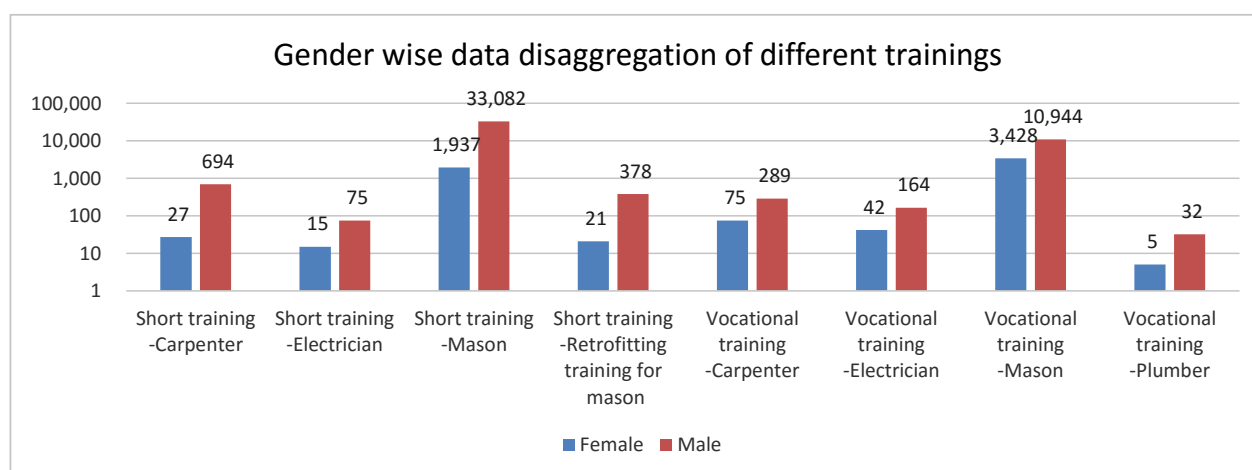
She had led construction of four houses when she was interviewed and had also participated in building another seven. She also teaches others who have not been trained and cares for her husband. The 60-year-old Balkumari said, “If I had not received mason training, I wouldn’t be able to fit in this field. The people in village recognize me just because of the training.”



Photo 23: Female trainees learning new construction techniques of frame structure (left) and retrofitting techniques (right) during on-the-job training Exercises.

Source: NSET

FIGURE 17: VARIOUS TRAININGS PROVIDED



Source: HRRP

Figure 17 above provides an overview of the involvement of male and females in different capacity development activities organized by the government and partner organizations. Around 20 percent of these were women. In absolute numbers, more than 10,000 women have benefited from different short-term vocational training courses. The number of trained female masons has also increased as result of trainings provided during the reconstruction drive.

3.5.4 Social protection for vulnerable households

The recovery strategy aimed to undertake and expand social protection where it did not exist and where coverage was low through social assistance, social insurance and work-related measures. There were initiatives for addressing the short-, medium- and long-term social protection requirements. For short term, the PDNA had suggested provision of top up support through existing grant mechanisms to the vulnerable homeowners (elderly, widows, uncared children, disadvantaged communities and dalit families).

The Standard Operating Procedure on Earthquake Affected Vulnerable Population provided the criteria for identification of vulnerable households. These included i) single women above 65 years, ii) elderly citizens of age 70 and above, iii) orphans of below age 16, and iv) people with disability (having red and blue cards from GoN). The application of vulnerable homeowners were verified, endorsed and documented by the NRA for providing top-up grant assistance. The list of vulnerable homeowners could be updated by local authorities at local or community level by re-verification. The NRA identified 18,505 households as vulnerable based on the criteria above. The vulnerable homeowners could be supported based on their need and resource availability at the local level. The support provided to vulnerable homeowners included:

- n **Support for identification of left-out vulnerable homeowners:** This support consisted of helping local authorities in identifying the vulnerable population, the housing reconstruction status and reasons why they had not been able to rebuild houses. This helped documentation of support for the grant process, and advocacy of issues for exploring solutions.
- n **Supporting reconstruction of vulnerable homeowners through vocational training:** Many vulnerable homeowners were supported through capacity building training courses for masons. This allowed them to save labor costs. This type of support worked well for those who couldn't afford additional costs apart from the grant provided by the NRA for building houses. As of July 2020, a total of 2,698 vulnerable households had been supported by various partner organizations for rebuilding their houses.

- n For medium-term, the approach was to further strengthen the administrative system for efficient rollout of social protection service delivery, with an emphasis on quickly scalable disaster responsiveness and temporary social protection schemes. The Unified Social Security Act can continue to address the social protection needs. Further, it is also recommended that data from the Poor Household Identification Survey by the Poor Household Support Board be used for continuing social protection in the 14 most affected districts. Similarly, for longer term, the PDNA was recommended addressing the coverage gaps and developing an integrated system for all social protection programs, and addressing different kinds of contingencies and risks.

“My house was rebuilt as part of a masons’ training”

Sundari Devi Barma Shah of Kamalamaai-4, Raitaar, Sindhuli lives alone. She was married but had no children, and her husband had remarried. Her husband died after the couple had separated.



She had a wooden house that had become unfit to live after the earthquake. She lived in the same house for two years after covering the roof with a tent. She had also spent the Rs. 50,000 she had received as first installment for house construction in household work. She had no source of income and believed that she would not be able to rebuild her house.

She met some technicians and social workers about two years after the earthquake and learnt a Thereafter Swiss Contact began build her house as part of an on-the-job training. She gathered construction materials with the money she had and did not need not pay the masons. Her house was built in 50 days.

She said, “I have no parents, no siblings no one on my paternal side... I am happy that no matter how long I live I have now an earthquake-resistant house to live in. I can die at peace in a house like this.”

- n **Inclusion of people with disabilities:** The housing reconstruction program introduced a number of initiatives to ensure inclusion of earthquake-affected people with disabilities. The NRA signed a memorandum of understanding with the National Disabled Fund to provide assistive devices and livelihood opportunities for housing beneficiaries with disabilities¹¹. Another ongoing activity, “Making Homes Accessible to All”¹², had included provisions in training manuals and the masons’ handbook for introducing the concept of disability, for making masons aware of the barriers faced by persons with disabilities in the built environment and for encouraging masons to ensure accessibility while building houses. Included in these tools were guidelines for conducting needs assessments of persons with disabilities, identifying structural/ non-structural accessibility interventions and provision of financing for reconstruction works. Through masons’ training, the houses were retrofitted to make them accessible to beneficiaries with disabilities.

¹¹ Activities financed by the World Bank-funded EHRP.

¹² Supported by Multi-Donor Trust Fund financing.

Top-up housing grants for vulnerable households: Vulnerable homeowners who were unable to complete their houses with resources at their disposal were eligible for a top-up grant of NRs. 50,000 (US\$ 500) from the government. These homeowners were slower in reconstructing their houses as compared to others. The September 2021 tranche status showed that out of the total 18,505 NRA identified vulnerable households, 93% (17,279) had received the first tranche, 76% (14,010) had received the second tranche and 71% (13,103) had received the third tranche. In total 2,698 HHs have been supported by various partner organizations.

Top-up support helped single women to build houses

Chanamati Gharti, now 77 years old is a single woman with a family of 17 including two sons, two daughters-in-law, and grandchildren. She had been living separately for about 12 years.

She was home at the time of the Gorkha earthquake and had wished she had died after seeing the destruction it had caused. She had not believed that she would be able to rebuild her house and that had caused many sleepless nights.

When she received the first tranche of NRs. 50,000 she had already completed the foundation and damp-proofing with a loan of NRs. 150,000. She uses the first installment to pay back some of the loan and for medicines.

Later engineers had come to the village and asked when she would build the house and had said she had no courage or resources to build one. Then she found out that the government was providing NRs. 50,000 to single women as top-up support. That helped build her confidence after which she asked her sons and neighbors to assist in the reconstruction. She now has a single-room house.

"I would have been dead if the government had not provided the additional amount... I received NRs.350,000," she said. "This house is built well and I can live here until I die."



- n **Material support:** Many vulnerable house owners were supported by NGOs with the construction materials, including CGI sheets. This support was vital for those vulnerable homeowners who could not mobilize additional financial resources to supplement the grant received from the government.

Construction materials for the disabled

Rana Bahadur Gurung of Arunghat-5, Pakhure, Gorkha, cannot see with one eye. His house was destroyed by the Gorkha earthquake and his family had to live in a temporary shelter for four years. He was not included as a beneficiary in the first survey and eventually managed to get enrolled through the grievance process. But he did not have the courage to build an earthquake-safe house and had instead repaired and started using the old one.

Most of the house in the village had been built through labor exchange. He had gone to help some neighbors when he also received the installment the government grant. The local government in coordination with its partner organizations also said they would provide construction materials. It was only when he began building his house.

The house has now been completed and the family feels safe. "I may never have built this house with the support as the construction that had been provided by a NGO", he said.

- n **Other financial support mechanisms for the vulnerable:** There were financial support schemes for vulnerable households, including top up grants and revolving fund. The revolving fund in many cases was initiated by municipalities to help vulnerable homeowners who were unable to complete the required stage of construction to receive the next tranche. Once they were able to access the next tranche, the money was paid back to the revolving fund and used to support others who needed it. Different partners such as DFID, JICA, UNDP, CRS, Helvetas, Practical Action, Phase NEPAL and

HRRP worked in coordination of the NRA and the EHRP to support vulnerable households under different projects.

The uptake of the various loans introduced by the Nepal Rastra Bank to support housing reconstruction was limited. In 2021, the NRA commissioned an assessment of the housing finance market,¹³ and its findings can inform policies with regard to housing reconstruction, particularly because urban reconstruction will continue beyond the NRA's closure.

Rebuilding a house on public land

Raju Putuwar, 48, and his family of four, has been living in Subedi village of Gagalfedi-1, Kageshwori-Manahara, Kathmandu. The earthquake destroyed his three-story house made of raw bricks after which he stayed under a bridge for some months. Unable to afford reconstruction, he decided to repair the ground floor of the damaged house to shelter from the cold. The house was unsafe could not consider rebuilding on land did not belong to him. His grandfather and father had lived on the same public land and reconstruction on it was problematic. To find a way out, he visited the Ward office almost everyday.

The NRA decision to allow people living on public land to rebuild at the same place opened up a possibility for him to build a house. He, however, needed a recommendation from the Ward office confirming intergenerational habitation on the plot, which he had secured. "I was sure that I would build a house even if I had to take a loan in addition to the government grant but was afraid that I wouldn't be allowed to on public land," he said. "It was possible after the NRA decision."

Patuwar has built a one-storeyed walled house and his third tranche was being processed at the time of writing.

3.6 Achievements, challenges and lessons learnt

The Gorkha earthquake that had caused a very high loss in terms of human lives and property. The timely and comprehensive reconstruction program was able to provide support to the people to avoid being pushed into poverty, while also providing them opportunities to build safer houses.

3.6.1 Achievements

In July 2021, 615,924 homeowners had completed the reconstruction of their houses, while 143,786 houses were under construction. Table 12 shows the status of reconstruction district wise; the status of fund disbursement for housing reconstruction is given in Table 13.

¹³ Financed by the Multi-Donor Trust Fund (MDTF).

TABLE 12: DISTRICT WISE HOUSING RECONSTRUCTION

District	Total number of houses to be constructed	Houses constructed (July 2021)	Houses under construction (July 2021)
Arghakhanchi	1191	705	206
Baglung	2369	1965	432
Bhaktapur	25153	11104	3104
Bhojpur	6186	3456	1729
Chitwan	8129	6401	2048
Dhading	80238	59565	15793
Dhankuta	3181	1896	1090
Dolakha	69916	62161	6675
Gorkha	68592	59251	7022
Gulmi	4205	3309	1520
Kaski	6414	4322	1192
Kathmandu	43614	19227	10141
Kavrepalanchok	77213	54609	14816
Khotang	9622	6056	4885
Lalitpur	26849	10097	7101
Lamjung	14048	6899	6845
Makawanpur	35787	22721	10615
Myagdi	901	713	64
Nawalparasi	1071	1075	17
Nuwakot	76536	68536	7539
Okhaldhunga	25787	22516	2730
Palpa	4573	2391	1334
Parbat	5665	4185	531
Ramechhap	54208	41275	7545
Rasuwa	12324	10905	1440
Sankhuwasabha	2036	968	532
Sindhuli	38933	20860	15218
Sindhupalchok	89394	79885	8005
Solukhumbu	12291	11334	1508
Syangja	8914	5170	1249
Tanahun	14139	12367	860
Total	829479	615924	143786

Source: NRA Annual Report 2077/78

TABLE 13: DISTRICT WISE FUND DISBURSEMENT TO SUPPORT HOUSING RECONSTRUCTION

District	Total No. of Beneficiaries	PA Agreement	First Tranche received	Second Tranche received	Third tranche
Sindhupalchok	90,274	89,301	89,301	85,180	79,254
Nuwakot	77,769	76,444	76,438	71,529	66,433
Dhading	81,467	77,628	77,008	71,958	65,613
Dolakha	71,546	69,916	68,933	64,853	62,276
Gorkha	68,506	66,482	66,609	63,131	59,733
Ramechhap	53,271	48,628	48,532	47,444	43,806
Kavrepalanchok	78,876	74,924	74,924	63,688	57,595
Sindhuli	38,575	37,207	37,028	33,166	25,793
Makwanpur	36,990	31,035	34,323	26,520	21,657
Okhaldhunga	31,457	23,260	23,260	21,535	20,350
Kathmandu	48,134	44,039	43,075	22,762	19,758
Rasuwa	12,900	12,167	12,144	11,537	10,949
Lalitpur	29,218	26,597	26,554	13,727	14,369
Bhaktapur	28,619	25,124	25,124	12,006	11,604
Lamjung	14,674	14,029	14,029	10,858	8,611
Tanahun	14,505	13,337	13,671	10,077	8,384
Solukhumbu	12,519	12,137	12,137	11,323	10,849
Khotang	9,433	9,068	9,068	8,058	7,398
Chitwan	8,164	7,478	7,837	6,343	5,672
Gulmi	4,532	3,964	3,964	3,236	2,577
Syangja	9,247	8,783	8,783	5,425	4,377
Kaski	6,418	6,406	6,406	4,352	3,677
Palpa	4,965	4,431	4,431	2,926	2,548
Bhojpur	6,364	6,277	5,816	5,156	4,731
Parbat	5,680	5,430	5,430	4,055	3,121
Dhankuta	3,272	3,215	3,012	2,679	1,915
Nawalparasi	880	1,052	1,071	1,021	954
Baglung	2,482	2,319	2,319	1,818	1,576
Arghakhanchi	1,211	959	959	683	525
Sankhuwasabha	2,073	1,891	1,891	1,439	1,329
Myagdi	971	971	901	672	610
National	854,992	804,499	804,978	689,157	628,044

Source: NRA Website, <http://www.nra.gov.np/en/mapdistrict/datavisualization> retrieved on 22 Feb 2021

A total of 804,499 households had been enrolled in the reconstruction program. This accounts to about 94 percent of 854,992 eligible households identified through the damage assessment survey and grievance redressal mechanism.

The NRA had realized that vulnerable households would need additional support to complete the reconstruction and had made provisions for top up grants for 18,505 vulnerable households. The NRA also supported another 12,788 landless and squatter households with appropriate policies and financial support. Further, it assisted the regularization of ownership of 11,437 households living on informally occupied plots of land. Another 1,351 homeowners were provided a grant that allowed them to purchase a plot for building a house. Further, 4,820 houses were located on land with high geo-hazards risks (category III). By November 2020, the NRA had provided safer sites for relocation to 4,257 households and work was underway to resettle the remaining households.

TABLE: YEARWISE PROGRESS OF TRANCHE DISBURSEMENT FOR PRIVATE HOUSING RECONSTRUCTION (NOVEMBER 2020)

S.N.		FY 2015/016	FY 2016/017	FY 2017/018	FY 2018/019	FY 2019/020	FY 2020/021
1	First Installment	35,145	597,577	713,893	763,755	784,822	828,763
2	Second Installment		55,055	464,391	591,438	670,974	750,459
3	Third Installment		2,734	221,776	456,272	601,401	703,307

Source: NRA Annual Report 2077/78

Even though initially slow because the reconstruction support mechanisms were being set up, by the end of the first year the NRA had provided the first installment of government support to nearly 70 percent of eligible households. There was a significant increase in the release of the second and third installments in FY 2017/18; the process gained pace after engineers were deputed to the local level, in 2017. The engineers expedited building inspections and the subsequent release of installments. Additionally, the NRA had also set deadlines for reconstruction, which helped to quicken reconstruction. The deadlines, however, were amended many times to ensure no one was left behind in the rush. By the end of the FY 2020/21, around 90.45 percent of the identified and registered households had received the second installment and among them, 84.77 percent had received the third tranche.

These results could be achieved because of enabling mechanisms that had been put in place to support homeowners to rebuild their houses. The measures included, among others, massive awareness raising programs on safe construction, technical guidance, and a wide range of training courses to build capacity of thousands of skilled and unskilled workers.

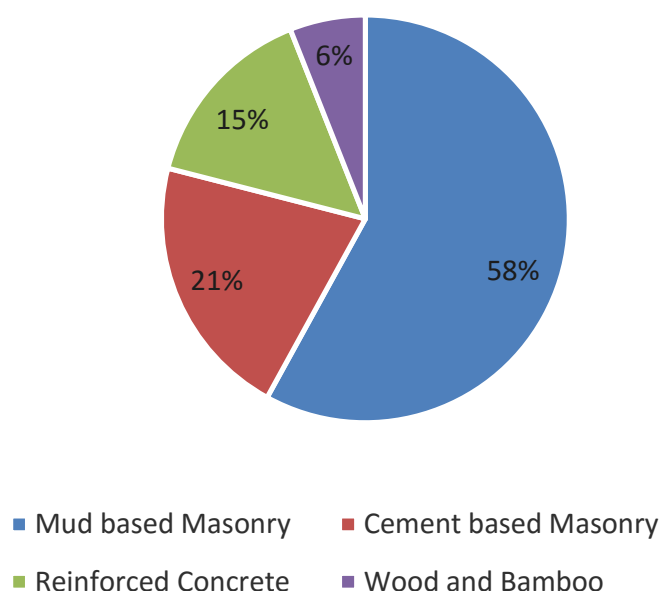
3.6.2 Challenges

As discussed earlier, while progress in the reconstruction of fully damaged houses was very satisfactory, major challenges were encountered in supporting the retrofitting of partially damaged houses. In fact, even though financial support for retrofitting had been provided to 51,064 households, by FY 2019/20, retrofitting had been completed in only 659 houses. Most of these houses were retrofitted as part of trainings organized by partner organizations. The slow pace reflected the hesitation of homeowners for adopting retrofitting, insufficient incentives to repair partially damaged houses, and the limited capacity of non-specialized technical staff to provide the necessary guidance. Addressing this problem will require major efforts not only in training practicing engineers on retrofitting techniques, but inclusion

of this important topic in the academic curriculum of engineering colleges, and the need to revisit the financial assistance package.

The reconstruction has brought about significant changes in the typologies of houses in the earthquake affected areas. Houses using stone masonry in mud mortar prevailed prior to the earthquake. While this remains a common typology, their proportion has decreased from 58 percent before the earthquake to about 50 percent (Dhungel et al. 2012). Compliance with building codes also resulted in change. The number of cement mortar and RCC-based buildings also increased after the earthquake. Some rural households preferred frame and cement mortar-based buildings. This can be observed in Figure 19, which shows that about 27 percent of the reconstructed dwellings were cement mortar-based and around 15 percent are RCC structures.

FIGURE 19: PREVALENT BUILDING TYPOLOGIES OF NEPAL AS PER CENSUS OF 2011



Source: CBS

3.6.3 Lessons learned

Several important lessons can be taken from Nepal's housing reconstruction program. First of all, identifying households with a genuine need of housing reconstruction assistance was a complex and delicate task that needed meticulous handling. It was extremely important to ensure that all genuine homeowners whose houses were damaged were included and no one was left behind. At the same time, it was important to ensure that no one received undeserved benefits. For this proper records and documents related to property ownership and citizenship had to be collected and verified. This was the basis for providing entitled homeowners necessary support to rebuild their houses. But there was still a risk of squatters, landless and vulnerable communities being excluded. This is where local authorities were important to identify the needy beneficiaries and to ensure their inclusion in the support programs by providing them with the appropriate documentation. The number of homeowners identified for reconstruction support was initially estimated to be about 600,000. But the number rose to 832,804 after grievances were addressed, which had also raised doubts about the accuracy of damage assessment. Therefore, it is important to ensure that damage assessment is effective, transparent, inclusive, and credible.

Transparent and accountable disbursement of financial assistance is another foundation for effective owner-driven reconstruction. The NRA was successful in ensuring the disbursement of reconstruction grants in a timely manner, with the support of the banking system. Post-earthquake reconstruction thus became an opportunity to also enhance financial inclusion by expanding access to the banking system. This system can also be used for social protection of the poor.

Both urban and rural Nepal have rich and diverse vernacular architecture which needs to be better protected and conserved. However, the appreciation of the vernacular architecture was initially nominal as communities in earthquake affected regions moved away from their building traditions in favor of non-traditional designs and cement-based solutions. Over the long run, this trend could result in a loss of Nepal's tangible and intangible cultural heritage to prevent which there would be need for area specific building laws and regulations.

The reconstruction of historic settlements was particularly challenging. For Nepal, a country with architectural traditions, a loss of such heritage can be devastating. It is important to focus attention on conserving vernacular architectural forms, identities and values given the rush to embrace modernity. To mitigate the risk of losing cultural heritage, there is an urgent need to enhance the capacity and confidence in building back better and safer based on vernacular designs and materials. This also requires enhancement of the capacities for appropriate planning and implementation at local, regional and national levels.

Nepal's housing reconstruction program was not equally successful in the retrofitting of partially damaged houses due to insufficient capacity at all levels of implementation. Retrofitting could have not only saved and strengthened the existing built structures but could also have contributed towards conserving vernacular architecture at considerably lower investments. Retrofitting also offers a more environmentally friendly option for Nepal's settlements by reducing the burden on the use of natural resources. A robust awareness campaign, training of engineers, technical staff and masons, and further demonstrations are therefore required to strengthen public confidence in retrofitting.

Rigorous focus on earthquake resilient house designs by experts resulted in options that often did not suit the requirements of households. Design catalogues were merely intended to provide examples of possible design options. However, homeowners, NRA field engineers, and local officials interpreted the catalogues to be rigid prescriptions that did not change despite the repeated circulars from the NRA to clarify the issue. As a result, many households had started reconstruction based on what they understood to be mandatory technical standards and later modified and extended them to meet their needs and preferences. These hybrid structures in many cases did not comply with the required disaster resilience standards. When the NRA realized this problem, it changed the reconstruction policy to clarify that house designs had to be affordable and meet the homeowners needs and preferences and that a standard size and design was not what it prescribed. This principle was also conveyed through the NRA's Design Catalogue Volume II, which included alternative technologies that offered more suitable and affordable housing options.

Many of the techniques prescribed and currently in practice in Nepal require the use of modern materials (cement, rebar, wire mesh, etc.). Communities without access to roads and where the materials are not locally available, such as the upper hilly and Himalayan regions, were not attracted by these techniques. Wood, a locally available material, was also not practical either due to its low quality or unavailability of proper treatment facilities. Further, research and development are therefore necessary to provide viable and sustainable building technologies suitable to varying needs and geographies.

Housing assistance from the NRA was available only if newly built houses had incorporated disaster resilient features or if partially damaged houses were retrofitted. This led to the use of certain modern materials in varying degrees, which require accessible markets that are not readily available particularly in mountainous and hilly regions. Such market hubs could become part of the delivery chain of necessary material to assure access to quality materials at reasonable prices. For instance, during reconstruction, many vendors in earthquake-affected districts were able to procure wire meshes in bulk from Kathmandu and significantly reduce the transportation costs. The establishment of permanent market hubs can ensure access to good quality building materials at lower prices in the long run.

The NRA's geological studies had revealed that a large number of mountainous settlements were located on steep unstable slopes. The importance of safe construction sites was included in the national building code. However, in many places the code could not be enforced due to the limited land availability in mountainous villages. Even finding land suitable for housing was a challenge in the mountainous and steeply sloped districts. Therefore, only villages that were affected by landslides were considered for mitigating measures or relocation. Livelihood considerations also impeded the resettlement of vulnerable communities. In the original locations, most households had a plot of land that they used for agriculture. However, while land for housing could be found in some areas, it was impossible to provide relocated families sufficient land to sustain livelihoods at the resettlement sites. These were reasons why reconstruction of some houses on land prone to landslides could not be avoided.

The low land availability also affects the development of the road network that is required to foster development and connectivity. Further, road building can also destabilize slopes and enhance vulnerability of settlements if not planned carefully. In addition, the increasing use of hazardous lands by communities can further exacerbate vulnerability. These challenges suggested that future earthquakes with similar magnitude could be devastating. Therefore, it is important to develop, where possible, in-situ risk mitigation strategies, to adopt appropriate resettlement policies and to stimulate a dialogue on these complex issues, raise peoples' awareness on safer land use practices, and encourage them to incorporate risk mitigation strategies in local development planning of housing and livelihoods. Site planning for reducing geo-hazard risks also requires strategic long-term planning. It also requires a multi-hazard risk assessment and risk sensitive land use planning to be adopted by each local governments; and thereby, identify safe places for building houses and other infrastructures.

Post-earthquake reconstruction and recovery in Nepal had led to a dramatic increase in demand for engineers. As a result, it took the NRA almost a year to mobilize an adequate number of engineers in the field. Before 2015 Nepal did not have an agency responsible for disaster preparedness. The newly instituted NDRRMA and the local governments will now have to plan in advance for training and engaging the required technical human resources future needs of post-disaster reconstruction and recovery.

A critical part of the implementation framework for housing reconstruction is the involvement of local governments. A review of the NRA's experience shows that involvement and leadership of local governments can play a critical role in the process. Facilitating owner-driven reconstruction entails many activities such as identification of homeowners, grievance redressal, special support to vulnerable households, verification processes for land and other entitlements. These require timely and responsive management mechanisms that local governments can provide. Therefore, capacity building and empowerment of the local governments is essential for effective post-disaster response, reconstruction and recovery.

Nepal's housing reconstruction policies and mechanisms required households to also contribute financially for rebuilding their houses. This was very challenging for a large number of poor households.

It was also important to revive the livelihoods of disaster survivors and the local economies to enable people to reconstruct houses. Recovery of livelihoods can provide the necessary confidence and means for households to contribute and take up reconstruction without neglecting disaster resilient features. Therefore, housing reconstruction and economic recovery processes must take place simultaneously.

Clear and strong political will formed the cornerstone of housing reconstruction and recovery in Nepal. This was reflected in the realization of the need for a special institutional mechanism to manage the recovery processes, and in the coordination with all stakeholders, including other ministries and partner organizations. It also included the decentralization of power and responsibilities to local governments, and continuous monitoring the gaps and challenges. This allowed the adoption of policy responses to the emerging issues during implementation. Good governance and effective management are therefore central in any successful housing reconstruction and recovery initiative.

The scale of housing reconstruction in Nepal was unprecedented and was the largest post-disaster owner driven reconstruction program in the world to date. Despite the limitations and challenges of Nepal's geography, infrastructure, resources, expertise, and institutions, housing reconstruction was successful and largely so because of the engagement, involvement and key roles played by the communities. The owner driven reconstruction approach pursued by the NRA not only enabled people to rebuild houses based on their own needs and preferences, but was also of important to call attention to the need of empowering communities for sustainable disaster resilience and risk reduction.

3.7 References

- Bilham, R., Larson, K., & Freymueller, J. (1997). GPS measurements of present-day convergence across the Nepal Himalaya. *Nature*, 386(6620), 61-64.
- Dhungel, R., Guragain, R., Joshi, N., Pradhan, D., & Acharya, S. P. (2012). Seismic vulnerability assessment of public-school buildings in Nawalparasi and Lamjung District of Nepal. In *15th World Conference on Earthquake Engineering, Lisbon, Portugal*.
- Duyne Barenstein, J. 2006. Housing reconstruction in post-earthquake Gujarat: A comparative analysis. London: ODI, *Humanitarian Policy Network Paper 54*. (Av. online)
- Gautam, D., Rodrigues, H., Bhetwal, K.K. et al. Common structural and construction deficiencies of Nepalese buildings. *Innov. Infrastruct. Solut.* 1, 1 (2016). <https://doi.org/10.1007/s41062-016-0001-3>
- Jha, A., J. Duyne Barenstein, P. Phelps, D. Pittet and S. Sena. 2010. *Safer Homes, Stronger Communities. A Handbook for Reconstruction After Natural Disasters*. Washington DC: The World Bank. (Av. online)
- National Reconstruction Authority. (2016). Inspection Manual for Houses that has been built under HOUSING RECONSTRUCTION PROGRAMME. Kathmandu, Nepal: National Reconstruction Authority.
- Housing Recovery and Reconstruction Platform (HRRP). (August 2017). *Core Socio-Technical Assistant Package*. Kathmandu, Nepal: Housing Recovery and Reconstruction Platform (HRRP).
- Rajib Khanal, Prem Upadhaya Subedi, Rupesh Kumar Yadawa, Bikram Pandey, 2021. Post-earthquake reconstruction: Managing debris and construction waste in Gorkha and Sindhupalchok Districts, Nepal, *Progress in Disaster Science*.
- Lauritzen, E. K. (1998). Emergency construction waste management. *Safety Science*, 30(1-2), 45-53.
- Housing Recovery and Reconstruction Platform (HRRP). (June 2018). *Temporary Shelter Research Report*. Kathmandu, Nepal: Housing Recovery and Reconstruction Platform (HRRP).

- INTERNATIONAL RECOVERY PLATFORM. (2010). Guidance Note on Recovery Shelter.
- National Reconstruction Authority (NRA). (December 2016). *Inspection Manual for Houses that has been built under HOUSING RECONSTRUCTION PROGRAMME*. Kathmandu, Nepal: National Reconstruction Authority (NRA).
- International Recovery Platform. (March 2013). *Recovery Status Report, The Great East Japan Earthquake 2011*. International Recovery Platform.
- Central bureau of Statistics- National Planning Commission Secretariat, Government of Nepal. (August 18, 2017). *Nepal- Household Registration for Housing Reconstruction Survey 2016-2017*. Kathmandu, Nepal: Central bureau of Statistics- National Planning Commission Secretariat, Government of Nepal.
- Housing Recovery Reconstruction Platform (HRRP). (September 2018). *THE PATH TO HOUSING RECOVERY, Nepal Earthquake 2015: Housing Reconstruction*. Kathmandu, Nepal: Housing Recovery Reconstruction Platform (HRRP).
- Sadasivam, B. (2001). From relief to recovery: the Gujarat experience. *United Nations Development Programme*.
- Central Bureau of Statistics. (n.d.). *Key findings on Household Registration for Housing Reconstruction survey in 14 Districts*. Ramshah Path, Kathmandu, Nepal: Central Bureau of Statistics.
- Central Bureau of Statistics. (n.d.). *Key findings on Household Registration for Housing Reconstruction survey in 17 Districts*. Ramshah Path, Kathmandu, Nepal: Central Bureau of Statistics.
- Cluster, G. S. (2019). *Shelter Projects: 2017-2018*. Fédération internationale des sociétés de la Croix Rouge.
- Shelter Projects 2017-2018. (2017-2018). Nepal 2015-2018/ Recovery. www.shelterprojects.org, 78-97.
- Maurer, R., & Oblitas, K. (2001). Gujarat earthquake recovery program assessment report. *Joint Report by the World Bank and the Asian Development Bank to the Governments of Gujarat and India*.
- ERRA. (n.d.). Pakistan's Earthquake Reconstruction and Rehabilitation Authority and United Nations (ERRA-UN) Housing Programmes. *Case Studies of Lessons Learned on Post Disaster Recovery*. Pakistan.
- UNDP. (2016). *Annual Progress Report 2016: Comprehensive Disaster Risk Management Programme (CDRMP)*. Kathmandu, Nepal: UNDP.
- National Society for Earthquake Technology-Nepal (NSET) and Department of Urban Development & Building Construction (DUDBC). (2009). *Seismic Vulnerability Evaluation Guideline for Private and Public Buildings—Part II: Post Disaster Damage Assessment*.
- Sharma, R. K. (March 2016). *A case Study on Pilot Enrolment Camp for Housing Reconstruction Grant Distribution Singati, Dolakha*. Kathmandu, Nepal.
- LAURIE A. JOHNSON AND ROBERT B. OLSHANSKY. (2016). *POLICY FOCUS REPORT Lincoln Institute of Land Policy After Great Disasters How Six Countries Managed Community Recovery*. Lincoln Institute of Land Policy
- Government of Nepal Ministry of Physical planning and Works Department or Urban Development and Building Construction EARTHQUAKE RISK Reduction and Recovery Preparedness Programme for Nepal. (MAY 2011). *Seismic Vulnerability evaluation guideline for private public buildings*, Kathmandu, Nepal
- Earthquake Reconstruction and habitation Authority (ERRA). (n.d.). 2005-2010 PAKISTAN EARTHQUAKE HOUSING RECONSTRUCTION. Pakistan.

- The Asia Foundation (November 2016). *Nepal Government Distribution of Earthquake Reconstruction Cash Grants for Private Houses, IRM – Thematic Study*: The Asia Foundation.
- Guragain, R., Shrestha, S. N., Maharjan, D. K., & Pradhan, S. (2015). *Building Damage Patterns of Masonry and Non-engineered Reinforced Concrete Buildings during April 25, 2015 Gorkha Earthquake in Nepal*. Kathmandu, Nepal: National Society for Earthquake Technology- Nepal (NSET).
- Baniya, J., & Gautam, A. (May 10, 2020). *Nepal Earthquake 2015 and Its Aftermath, A bibliographic resource guide*. sway.soscbaha.org: SOAS, University of London.
- Johnson, L. A., & Olshansky, R. B. (2016). *After great disasters: How six countries managed community recovery*. Cambridge, MA: Lincoln Institute of Land Policy.
- Yasir, A. (2009). The political economy of disaster vulnerability: A case study of Pakistan earthquake 2005.
- National Reconstruction Authority (NRA). (2076). *FOUR Years of Reconstruction*. Kathmandu, Nepal: National Reconstruction Authority
- Mistry, R., Dong, W., & Shah, H. C. (Eds.). (2001). *Interdisciplinary observations on the January 2001 Bhuj, Gujarat earthquake*. World Seismic Safety Initiative.
- Mistry, R., Dong, W., & Shah, H. (2001). Interdisciplinary observations on the January 2001 Bhuj, Gujarat Earthquake. World seismic safety initiative and earthquake and megacities initiative. Retrieved MAY 2, 2018.
- Coles, J. B., Zhuang, J., & Yates, J. (2012). Case study in disaster relief: A descriptive analysis of agency partnerships in the aftermath of the January 12th, 2010 Haitian earthquake. *Socio-Economic Planning Sciences*, 46(1), 67-77.
- Earthquake Recovery in Canterbury | EQ Recovery Learning <http://www.eqrecoverylearning.org/about/earthquake-recovery-in-canterbury/>
- Risk sensitive land use plan, Kathmandu metropolitan city (February 28, 2010) <https://www.preventionweb.net/publications/view/16255>

CHAPTER 4

RECOVERY AND RECONSTRUCTION OF HERITAGE STRUCTURES





Source: NRA

RECOVERY AND RECONSTRUCTION OF HERITAGE STRUCTURES

4.1 Introduction

4.1.1 Background

The 2015 Gorkha earthquake had affected all sectors. While the damage to private and public infrastructure and buildings was massive, Nepal, a culturally rich and diverse country also suffered massive loss of its heritage, both tangible and intangible. Lying in one of the most seismic prone regions in the world and with high levels of vulnerability (11th in terms of earthquake risk, UNDP 2004), Nepal has been frequently rattled by earthquakes that have caused significant damages on life and property.

The 1255 earthquake – the first earthquake in historical records – killed one-third of the population in Kathmandu Valley including King Abhay Malla; the 1934 Great Nepal Bihar earthquake had destroyed many of prominent structures and settlements across the country, and the 1988 Udayapur earthquake had caused significant damage in eastern Nepal and Kathmandu Valley. Heritage monuments and structures suffered major damages during the 2015 earthquake. Given very little scientific documentation of heritage structures and changing political, administrative, and socio-cultural values, many monuments damaged by past earthquakes have been lost, transformed, or remodelled during recovery. Further, Nepal's cultural and religious heritage monuments are not standalone structures but encompass a diaspora of intangible culture, values and norms of local communities, and personal and social lives, livelihoods and the local economy. Thus, heritage recovery is a complex issue, one that is related with the recovery of both the affected communities as well as the country.

4.1.2 Extent of damage

Several heritage monuments had collapsed or were damaged by the 2015 earthquake. The extent of damage is given below:

TABLE 14: DAMAGE OF HERITAGE MONUMENTS AND STRUCTURES DURING THE 2015 EARTHQUAKE

Completely collapsed monuments	133
Partially collapsed monuments	95
Monuments with damages of varying degrees	692
Total monuments affected	920

Source: NRA

In the case of monasteries (Gumba), post-earthquake recovery efforts were not carried out by the Department of Archaeology (DoA), the government institution responsible for conservation and management of heritage sites. Instead, the recovery of 845 monasteries was done by the Boudda Addhyayan and Gumba Vyavasthapan Samiti, in coordination with the NRA. The restoration of monasteries is reported separately.

A. Damage assessment of historical structures in Kathmandu Valley

Kathmandu Valley was very hard hit in terms of the severity of damage suffered by heritage monuments. Over 30 heritage monuments had completely collapsed and up to 120 historical structures were heavily or partially damaged. The DoA carried out a rapid damage assessment at the world heritage sites in Kathmandu Valley, which provided insights on the severity of damage, and it also recommended more detailed assessment. Some of the damages reported included:

- n Lack of maintenance and repair,
- n Deterioration of materials used in construction of monuments and structures: timber, mortar, masonry units, etc., and
- n Ageing, alteration and modification of structural elements/ connections in isolation during maintenance.

It had also proposed the following processes for detailed assessment and reconstruction of collapsed monuments:

- n Provide overview of the damage status.
- n Identify major onsite technical problems and recommend ways to deal with them, taking heritage conservation issues into account.
- n Propose recommendations together with the DoA in preparing plan of action to deal with the conservation, restoration and rehabilitation of heritage structures.
- n Prepare and update detailed inventory and measured drawings of all damaged monuments as per the UNESCO format for structural assessment and other purposes, and
- n Collect arts and artifacts in wood and brickwork for further use.

Likewise, damage assessments were also carried out at nine major buildings from the Rana period (before 1950), namely, Singha Durbar, Sita Maharani Mahal, Babar Mahal, Sital Niwas, Shree Mahal, Harihar Bhawan, NRB building at Baluwatar & Thapathali, Bahadur Bhawan, and Kaiser Mahal. Retrofitting designs were prepared after key documentation and soil tests of these buildings were obtained.

4.1.3 Targets and milestones

The target set by the NRA was to recover all heritage monuments by the year 2023. In the first five years of the NRA, 589 recovery projects were completed. Among them, recovery efforts of 182 monuments were carried out by municipalities, several national and international partners and donor agencies, and local communities. The remainder of the work was done by the DoA. In 2021, 195 recovery projects were underway, and among them were a few multi- year projects started before 2020. These projects were expected to be completed by mid-July 2021 and the GoN would continue conservation of all heritage monuments and sites based on annual plans until the work is completed.

A. Stakeholder institutions

Several stakeholders have been assisting the DoA to recover heritage structures damaged in the 2015 earthquake, with financial and technical and implementation support. The key stakeholder institutions included:

TABLE 15: KEY STAKEHOLDERS INVOLVED IN RECONSTRUCTION, RETROFITTING AND RESTORATION OF HERITAGE MONUMENTS AND STRUCTURES

National stakeholders	- n National Reconstruction Authority - n Local governments – Kathmandu Metropolitan City, Lalitpur Metropolitan City, Bhaktapur Municipality, Changunarayan Municipality, Madhyapur Thimi Municipality, Godavari Municipality, Mahalaxmi Municipality, Gorkha Municipality, Bidur Municipality, and other Rural Municipalities - n District Administration Offices - n District Coordination Offices - n Ministry of Physical Infrastructure - n Ministry of Urban Development - n Ministry of Culture, Tourism and Civil Aviation - n Kathmandu Valley Heritage Trust - n Heritage and Environment Conservation Foundation and several NGOs
International stakeholders	- n Government of Sri Lanka - n Government of China - n Government of India - n Government of Japan - n Government of Germany - n Government of the United States of America - n Government of Switzerland - n UNESCO World Heritage Center and UNESCO - n Miyamoto Global Relief - n John Sanday Institute and many other institutions.

Source: NRA

4.2 Approaches and principles

4.2.1 Recovery approaches

Owing to the wide diversity in culture, traditions and community linkages in the damaged heritage structures and settlements as well as availability of knowledge and resources, various approaches were taken during the recovery. Some prominent approaches are discussed below.

A. Community-based participatory approach

The community-based participatory was conceptualized as the involvement of one or more social groups closely linked to the cultural heritage, especially in construction and regular and periodic rituals, maintenance, restoration, and conservation. These social groups shared a common set of values and customs, and cultural identity and interest, and respected and had strong ownership of the

damaged heritage. As the social groups were directly linked with the cultural heritage for generations, the communities had gathered and preserved much needed indigenous knowledge on construction techniques, cultural significance, norms and values related to the damaged heritage. Community-based participatory approaches thus blended the project management expertise of established institutions with indigenous knowledge and skills of community and social groups. The Kasthamandap Sattal was reconstructed through this approach, where the job was done by a contractor, but with community participation assured by a four-party agreement between the NRA, DoA, Kathmandu Metropolitan City and “Campaign to Rebuild Kasthamandap”, a volunteer group comprising of local community and social leaders.

B. Community-led approach

A community-led/driven approach refers to one that actively includes the earthquake affected communities and beneficiaries in reconstruction and recovery of cultural heritage with little or no outside influence. It is an approach where communities have direct control over important project decisions including planning, design, financial and material management, and construction. Such an approach was used in reconstruction and rehabilitation of cultural heritages where the heritage belonged to a specific social or cultural group, and those where in cases outsiders were not even allowed to enter core premises. In this approach heritage reconstruction was undertaken through the Upabhokta Samiti (user’s committee), which comprised of members of the local community who implemented all reconstruction decisions. Various cultural heritage structures such as the pond in Rani Pokhari and the Rato Macchindra Nath temple in Bungmati, southern Lalitpur, were reconstructed under this approach after an earlier decision to employ a private firm had failed. This approach increases community participation, especially through the use of local skilled masons and craftsmen, and is highly recommended for cultural preservation.

C. Contractor-driven approach

Many historical and heritage structures were reconstructed and rehabilitated using contractors. This approach followed the basic principles and guidelines of the procurement policy of the GoN. While a contractor-driven approaches has been critiqued for lack of adherence to cultural significance and community participation, it also provides more efficient construction management and financial planning due to the involvement of expert firms. The approach is suitable in reconstruction programs where clear specifications and designs are available and where reconstruction does not necessarily involve use of site-specific monument, specific historical and cultural techniques, norms and values. The reconstruction of Dharahara tower was done through this approach.

4.2.2 Financial resources

Budgetary activities concerning recovery of damaged cultural heritage structures were coordinated through NRA and provisioned for recovery projects implemented by the DoA. The financial contributions from donors were varied depending on the nature of support. Some foreign governments contributed directly to specific recovery projects and handed it over to the GoN after completion. Similarly, some provided technical support or a combination of financial and technical support.

4.3 Heritage sector recovery

4.3.1 World Heritage Site

Kathmandu Valley has seven of 10 World Heritage Sites in Nepal. The Valley reflects rich Newari culture

During reconstruction, depending on the monument, a detailed study was first carried out, including various tests of construction materials. In many monuments, traditional construction methods were adopted by replacing mud mortar with *lime surkhi* (combination of mud and lime) mortar, and wooden and bamboo nails with iron nails. As per the recommendation of archaeologists and engineers, existing construction materials were stacked and reused wherever possible to preserve historical value. Damaged materials were either repaired or reused in the same position of monument. At various stages of the recovery process, religious or culturally significant rituals were also performed by local priests; and local experts and human resources were engaged in demolishing and recovery of the heritage structures.

A. Kathmandu Durbar Square

FIGURE: SCHEMATIC MAP SHOWING THE DIFFERENT ZONES IN KATHMANDU DURBAR SQUARE COMPLEX



Out of 140 damaged monuments in Kathmandu Valley, 39 were located in the Hanuman Dhoka Durbar Square. Some monuments had collapsed while many were partially damaged. The status of damaged structures was as follows:

TABLE 16: RECONSTRUCTION AND RESTORATION STATUS OF DIFFERENT MONUMENTS IN KATHMANDU DURBAR SQUARE AREA

S.N	Monuments	Completed	Ongoing	Yet to Start
1	Temples	1	Trailokya Mohan Narayan Temple Jagannath Temple Restoration of Nine Storey Palace	Shree Krishna Maha Vishnu Temple
2	Palaces	Conservation/ Restoration of Gaddi Baithak		Aagam Chhen and western wing of the palace
3	Sattals	Renovation of Singha Sattal (Conserved by KMC & Guthi Sansthan)	Restoration of Kasthamandap	

Source: NRA

Conservation Master Plan

The Conservation Master Plan of Hanuman Dhoka integrates various infrastructural projects like underground electricity, sewerage and drainage systems, regeneration of Bahals and market alley, Bhugol Park, conservation of Ikha Pukhu, and relocation of the district police office, army quarters and Nepal Sanskrit University. The proposed engineering design are as follows:

FIGURE 20: SCHEMATIC IMAGES OF MASTER PLAN DEVELOPED FOR REGENERATION OF HISTORICAL URBAN CENTER OF KATHMANDU DURBAR SQUA RE AREA



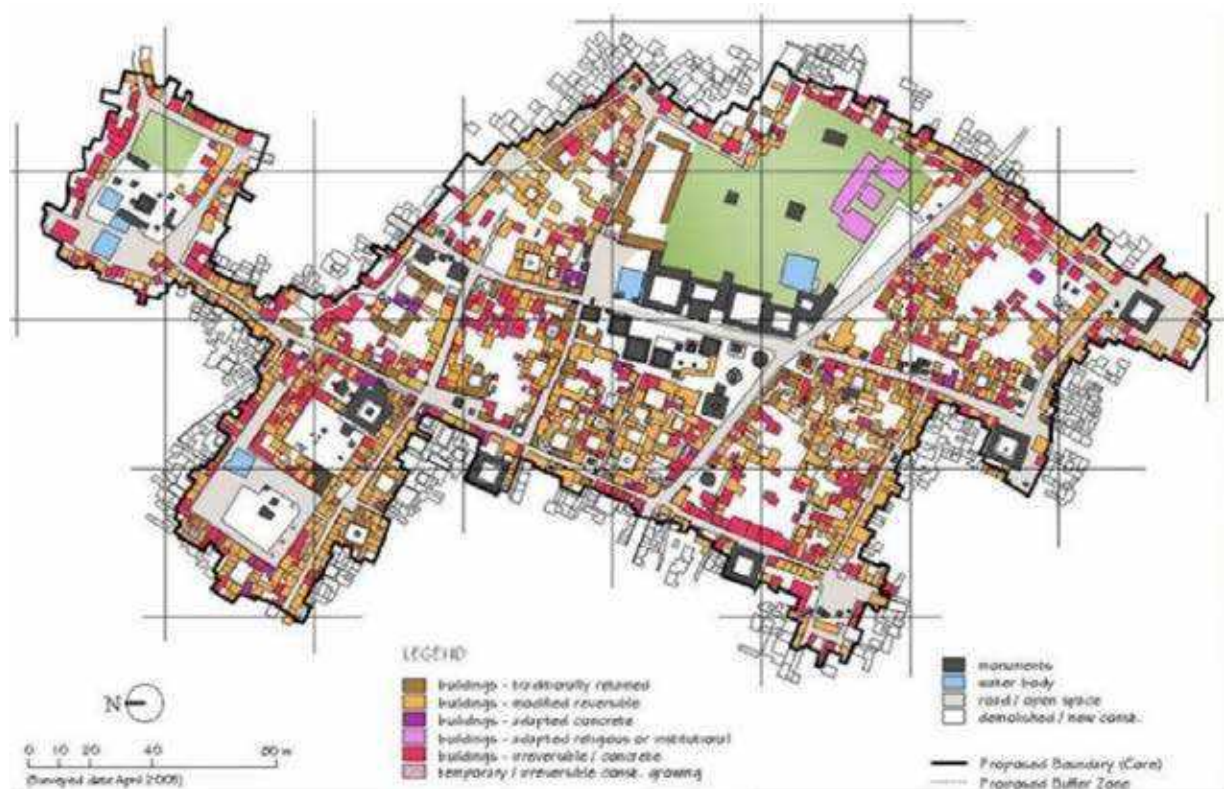
Source: NRA

The implementation of restoration was slow, particularly owing to project designing.

B. Patan Durbar Square

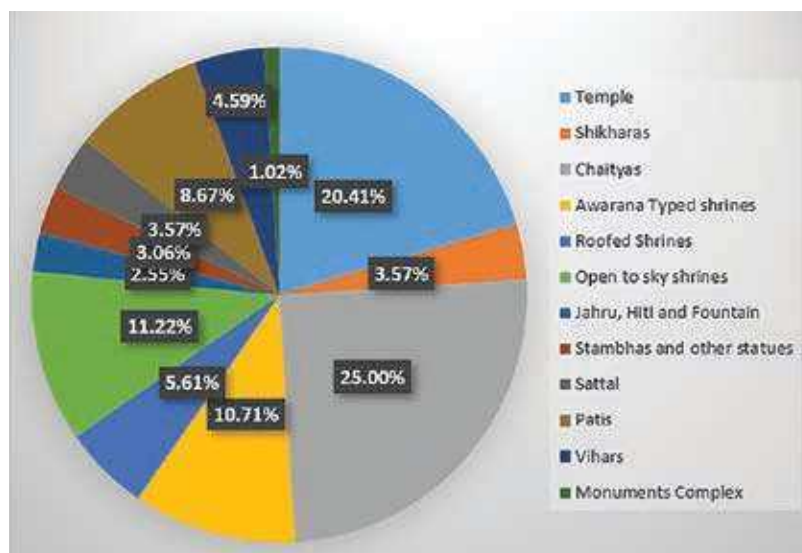
Patan Durbar Square is situated in Lalitpur Metropolitan City, historically known as Patan, the administrative headquarter of Lalitpur district. The palace square covers 5.3 ha of core area and 13.55 ha in total, including the buffer area. It is bordered by streets on all sides. The complex has 12 different types of historical, cultural and religious monuments as shown in Figures 21 and 22 below.

FIGURE 21: MAP SHOWING THE BOUNDARY AND VARIOUS ZONES IN THE PATAN DURBAR SQUARE COMPLEX



Source: NRA

FIGURE 22: DISTRIBUTION OF VARIOUS TYPES OF MONUMENTS IN THE PATAN DURBAR SQUARE COMPLEX



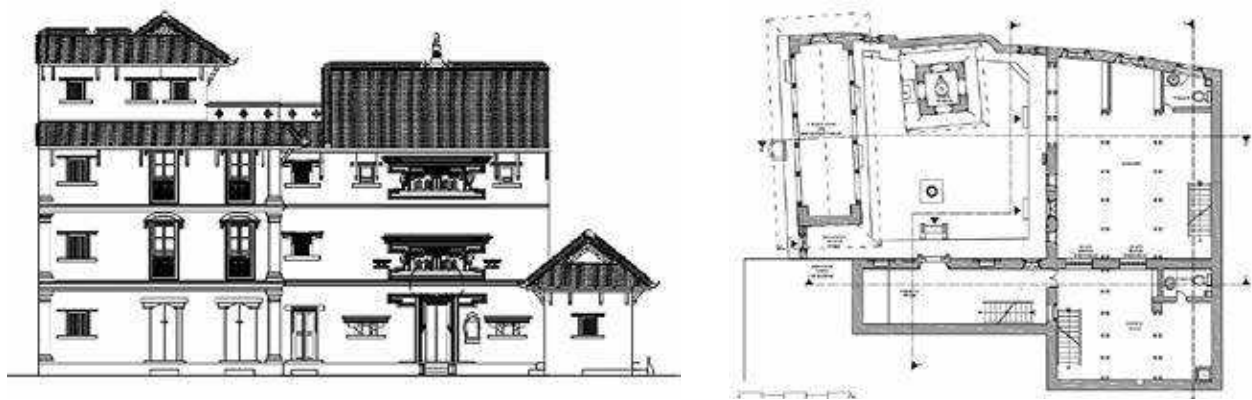
Source: NRA

foundation of Charnaryan Temple that was damaged in the earthquake was replaced.

1. Conservation Master Plan

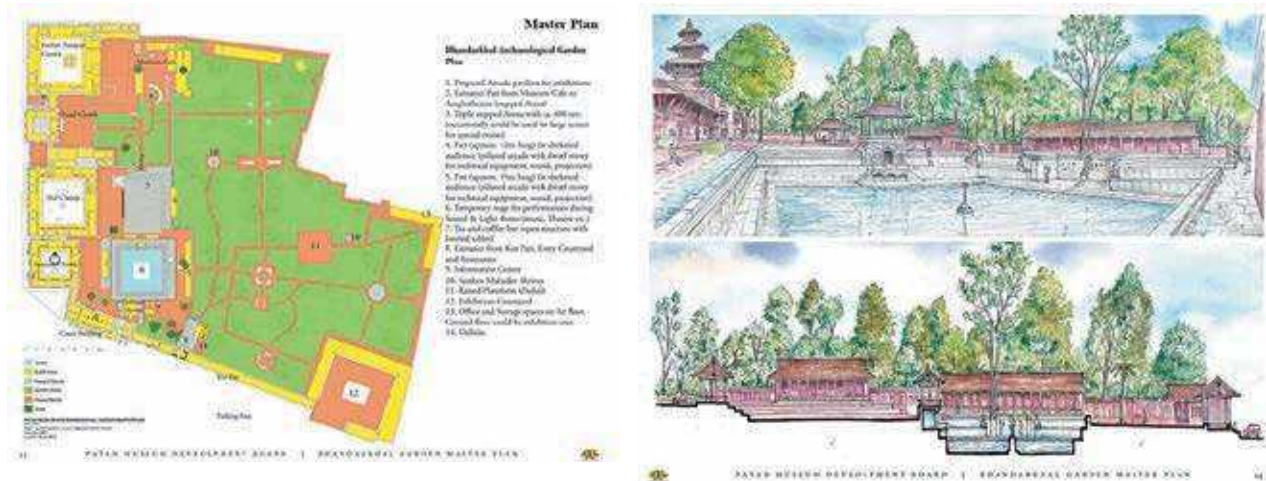
Kathmandu Valley Development Authority (KVDA).

PREPARED FOR RECONSTRUCTION



Source: NRA

ARCHAEOLOGICAL GARDEN IN PATAN DURBAR SQUARE COMPLEX



Source: NRA

C. Bhaktapur Durbar Square

Bhaktapur Durbar Square is an ancient royal centre of the city of Bhaktapur. The status of damaged monuments in the city being recovered is given below.

TABLE 17: DESCRIPTION OF DAMAGED HERITAGE IN BHAKTAPUR AND RECOVERY STATUS

Heritage Structures	Completely damaged	Partially damaged	Recovery completed
Pagoda Style temples	3	5	2
Ghanakuta temples	4	6	2
Shikhara Style temples	2	3	
Dyochhen		1	
<i>Falcha (Pati)</i> (Resting place)	15	15	
Total	24	30	

Source: NRA

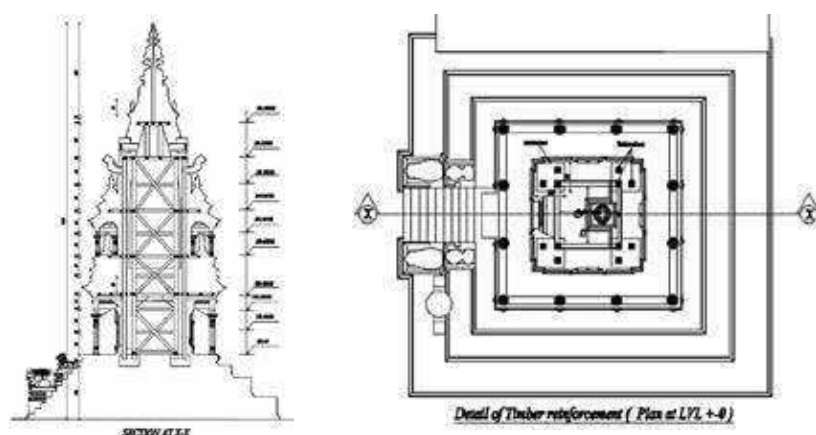
Heritage monuments that collapsed or were partially damaged during the earthquake in the Bhaktapur Durbar Square Monument Zone were:

1. Vatsalya Devi Temple
2. Silu Mahadev temple
3. Kedarnath temple, and
4. Western Entrance of the Durbar Square.

Gopinath temple, Rameswor Temple and Badri Narayan Temple were partially damaged. Some temples and *sattals* were also damaged outside the palace square, including *Jetha ganesh Deo chhen* and the National Bronze Art gallery. All temples that were partially damaged and had diagonal cracks from the top to the plinth level, which were repaired and restored. Certain layers of the foundation of those structure was also removed and rebuilt to reinstate seismic strength. Wooden structural framing and stainless-steel chicken wire mesh were also added for structural strengthening.

All reusable materials were used during reconstruction and restoration. All the stone parts were sorted layer by layer in the reconstruction area and reused in the same layer by using lime surkhi mortar and wooden frames with vertical post. Mud mortar was replaced with lime surkhi mortar, and wooden and bamboo nails were replaced with iron nails during reconstruction. Various tests of construction materials were done by the DOA for assessing the strength of lime surkhi mortar, brick wall and Nepali Sal timber. The UNESCO office in Kathmandu along with the DoA monitored the quality of construction including testing the ratio of the lime-surkhi mortar.

FIGURE 24: DETAIL OF TIMBER REINFORCEMENT ARRANGEMENT DATES BACK TO THE MEDIEVAL ERA.



Source: NRA

This artistic stone temple was reconstructed using local resources and local technology (hand chilling), unique to medieval Nepali architecture. Various sculptures including the lions installed at the mid-level of the temple that were damaged by the earthquake, were repaired using new material (epoxy). Wooden frames were also introduced in the inner walls of this temple to improve seismic strength.

Conservation Master Plan

The conservation master was prepared for the core area and buffer area. Some infrastructural projects identified in consultation with the local people are as follows:

- n Solid waste management
- n Stone pavement in the alleyway
- n Development of heritage walk route – a vehicle free zone and vehicle parking
- n Installation of underground cables in Gai Jatra Route
- n Groundwater recharge system/ Storm water management
- n Provision of water/ ATM in the main squares
- n Installation of smart toilets, and
- n Greenery and landscape development

Bhaktapur municipality set an example of the local government's active role in reconstruction and restoration of heritage structures. The reconstruction work of the heritage sites was nearing completion, with 90 percent of the reconstruction almost complete. The temples and public rest houses were reconstructed through municipal resources. Reconstruction of major temples in the Bhaktapur Durbar Square area such as the Shankar Narayan, Bhimsen Narayan, Til Mahadev Narayan, etc. were completed using traditional methods. About 130 structures had been damaged and of them, reconstruction of 91 had been completed and 18 others were expected to be completed within a year. These monuments date back to about 800 years. About NRs 130 million had already been spent in reconstruction of monuments in Bhaktapur. The old art museum within the Durbar Square and its Lal Baithak (hall) remained to be restored (figure 25).

FIGURE 25: THE ART MESUEM AT THE BHAKTAPUR DURBAR SQUARE REMAINED TO BE RESTORED



Source: NRA

D. Changunarayan Temple

The Changunarayan Temple, is one of seven heritage sites in Kathmandu Valley. The temple complex lies near a traditional Newar settlement and has inscriptions dating back to the 5th century.

Reconstruction and restoration

Changunarayan temple was partially damaged at the lower corner walls and inner walls of ground floor and top floor. The inner walls had separated from main outer wall. The nature of damage was similar to other temples within the complex. During the process of recovery, inner wooden posts were found to have decayed, as shown in the image below, and were replaced. The table below shows other temples and patis around the complex that were also damaged.

TABLE 18: STATUS OF DAMAGE AND RECONSTRUCTION OF HERITAGE MONUMENTS AND STRUCTURES IN THE CHANGUNARAYAN TEMPLE AREA

Heritage structures	Completely damaged	Partially damaged	Completed
Pagoda style temples	1	2	3
Falcha (Pati)	3		3

Source: NRA

FIGURE 26: DAMAGES AT THE CHANGUNARAYAN TEMPLE AND OTHER STRUCTURES IN THE COMPLEX



Cracks in corner wall of temple



Decayed timber post inside wall



Cracks in corner wall of temple



Separation inner and outer wall

Source: NRA

Conservation Master Plan

Conceptual zoning was done with three zones and detail engineering designs were prepared in consultation with the local people. Detail engineering design of the park was as follows:

FIGURE 27: 3D SCHEMATIC IMAGES OF RECONSTRUCTION AND RESTORATION OF THE GAMDHOKA PARK



Source: NRA

E. Pashupati

The Pashupati area is considered to be among the most sacred places for Hindus and has numerous important monuments. The site spreads across 99 hectares and includes major monuments including Pashupatinath and Guheshwori temples. The Pashupati area lies on the banks of holy Bagmati river and is also home to forests, kundas (ponds) and cremation ghats.

Reconstruction of monuments

Many temples, monuments and structures in the Pashupati area were recovered. And, NRA was directly involved in some of those recovery works. Below is the overall progress status:

TABLE 19: RECONSTRUCTION PROGRESS IN PASHUPATI AREA

Temples, monuments and other structures	Numbers	Expenses including VAT (NRs)
Recovery completed	67	804885655.10
Recovery ongoing	9	321400000.00
Recovery remaining	30	1250000000.00
Total	106	2376285655.10

Source: Pashupati Area Development Trust (Nov, 2021)

The recovery process of temples and sattals in the Pashupati area are discussed briefly below. The Kotilingeswar temple situated in southern part of Pashupatinath was built in the second half of the 17th century by King Pratap Malla. The temple built has a circular plan and is an important heritage building. It has been restored by preserving its original foundation and dismantling the damaged superstructure. Few bricks were dislocated on the upper floor, and few vertical cracks were observed in the lower parts of the temple. However, the wooden elements had started to rot and cement plaster used for repairs before the earthquake was also damaged.

Bhasmeswar Sattal situated in Bhasmeswar Ghat area of Pashupati was built in the courtyard. The northern Sattal, which was in poor state of conservation, had partially collapsed in the 2015 earthquake. All damaged parts of the structure including the foundation, were dismantled and restored.

Conservation Master plan

Conservation Master Plan of Pashupati Heritage Site was prepared and some infrastructure projects were identified in consultation with authorities of Pashupati Area Development Trust (PATD). Detailed engineering design of some projects were also done. Following were identified as development project at the site:

- n Expansion of width of ghats
- n Provision of toilets
- n Repair of walls/ gate at Shanti Tirtha/ghat
- n Electrical lighting of roads and surrounding
- n Garden/ park design, and
- n Dustbins, drinking waters and parking facilities

However, these projects have to ensure that there is no adverse impact on the heritage value of the sites.

The detail engineering design of river side restoration at Pashupati was prepared and is being implemented. The proposal presented in Figure 28 below is for the development of Guheshwori-Gurighat river front area.

FIGURE 28: SCHEMATIC 3D IMAGE OF MASTER PLAN SHOWING THE BANKS OF THE BAGMATI RIVER AS PART OF PASHUPATI AREA RECONSTRUCTION AND RESTORATION PROJECTS

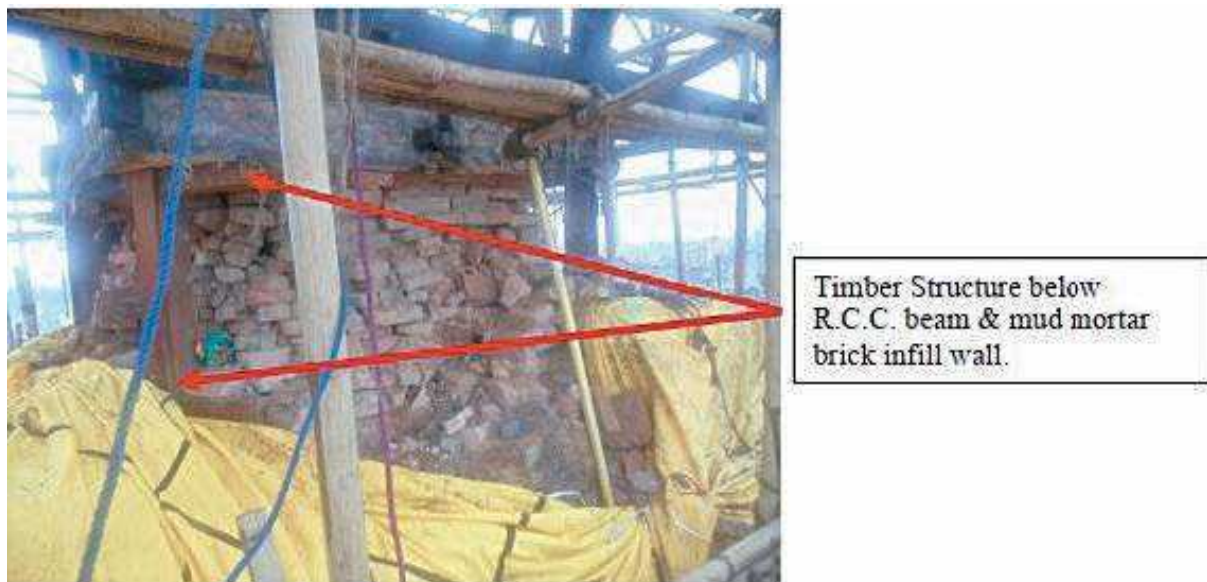


Source: NRA

F. Bauddhanath Stupa

The Bauddhanath Stupa is one of the largest stupas in Asia and lies six kms east of central Kathmandu. The dome of Bauddhanath Stupa is approximately 120 ft in diameter and 142 ft in height. There are series of recessed niches encircling the periphery of the dome where a total number of 108 stone sculptures of different Buddhist deities have been installed. The core area of the stupa is approximately 6756 square meters. Boudhanath stupa was listed as a World Heritage Site in 1979.

FIGURE : DAMAGE TO BAUDDHANATH STUPA IN THE 2015 EARTHQUAKE



Source: NRA

Reconstruction of monuments

The earthquake of 2015 had affected *Gajur* (top portion) of Stupa. The dome of the stupa was intact with minor cracks and no distinct failure. The renovation work was completed within a year with community involvement, which was one of the fastest recoveries of a heritage monument damaged by the earthquake in Nepal.

Recovery activities

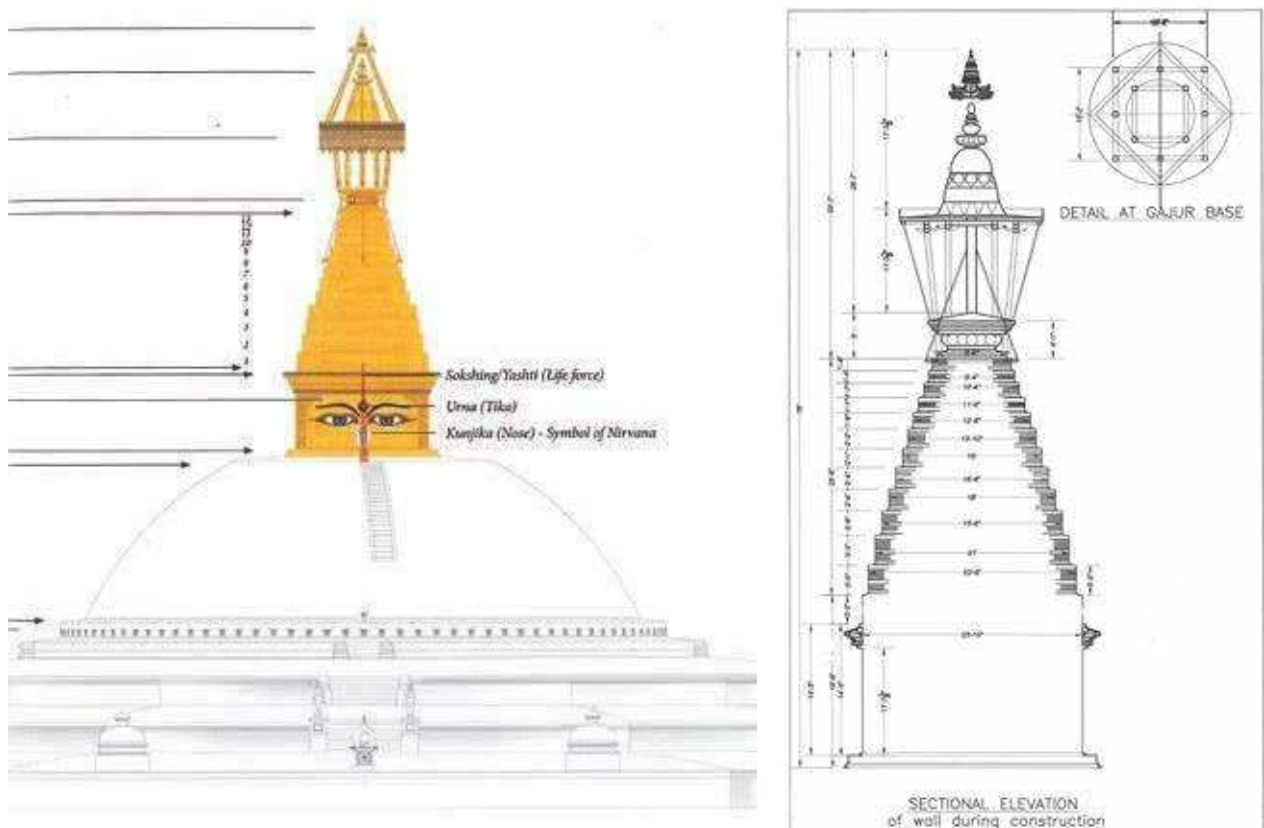
After receiving approval from the DoA, the Bauddhanath Area Development Committee (BADC) established a steering committee including technical personnel from DoA, representatives from concerned ministries, Kathmandu Metropolitan City, Nepal Police, Guthi Corporation, other local institutions and local leaders. Inventory preparation was started before the dismantling works began for preserving and

keeping records of monuments components to ensure that each component was placed at the right place during restoration. The stored components were kept secure in coordination with the Nepal Police and the use of close circuit television camera surveillance.

In the beginning of the conservation work, bamboo scaffolding was erected on the upper part, and next metal scaffolding was built with its base on the ground level. Metal scaffolding was used for a longer period instead of bamboo to reduce the effect of weather. Besides, a metal trolley with a capacity of two tonnes was installed to transport building material to the top of the Harmika level.

The recovery process began in June 2015 and was completed in November 2016. It was restored in a short period of time compared to the other monuments in Kathmandu Valley. First phase of the restoration included repair of cracks at the sanctum sanctorum. It was repaired by using epoxy grouting. The grouting solution was used to fill the cracks and gaps using high pressure. The central post called *Yasti* or *Soxing* made of Sal wood was installed on a full moon day, as per the recommendation of the stupa conservation committee and priests. It is 11 feet tall and moulded with copper sheet. Some religious *Dharni Mantra* (chants) were also placed alongside the post. The structure above the Harmika was built with solid brick masonry with wooden frame inside.

FIGURE 29: SCHEMATIC DIAGRAM AND SECTIONAL ELEVATION OF BAUDDHANATH STUPA

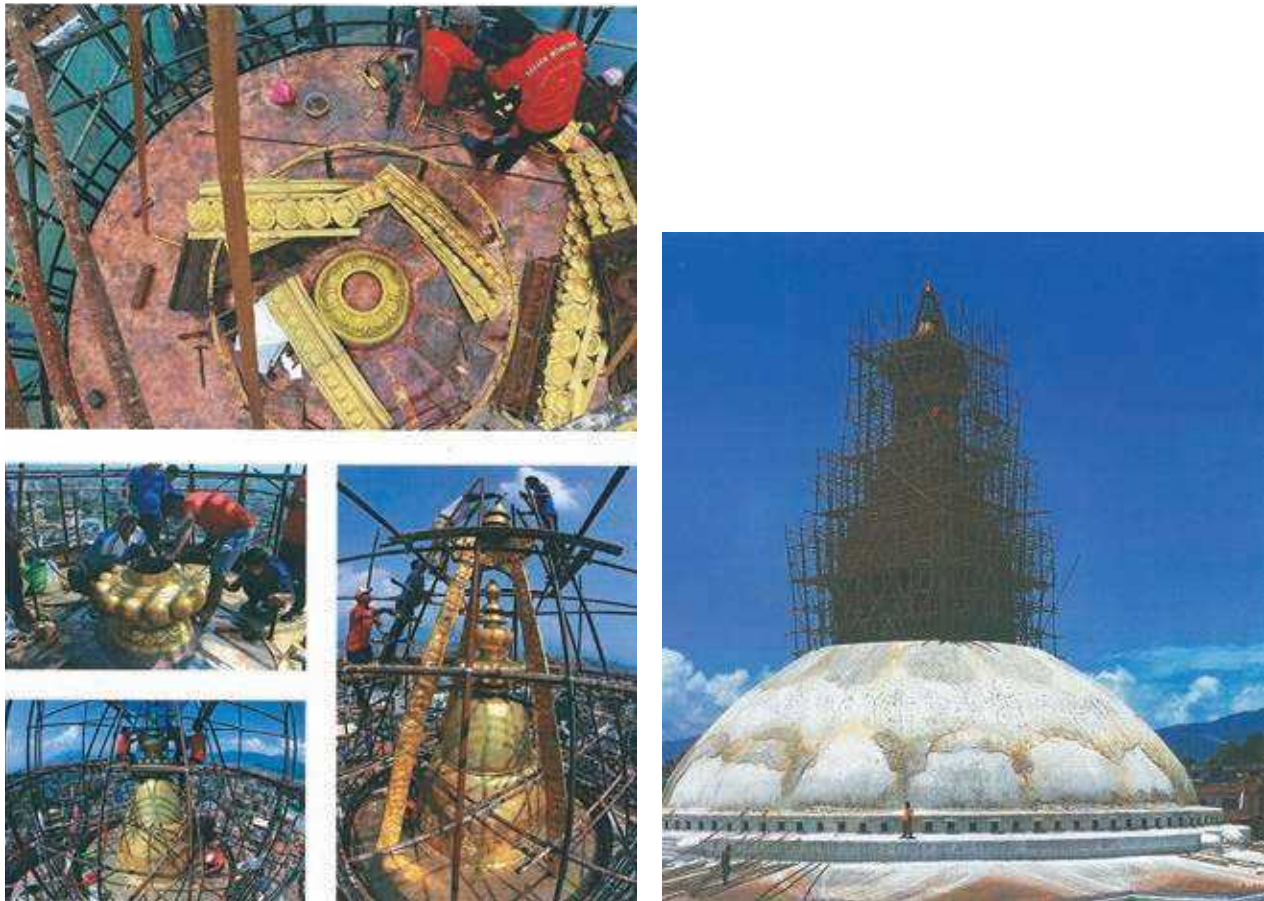


Source: DoA

Removing copper sheets, cleaning, and gilding

As the upper part was damaged in the earthquake, the copper sheets were removed and cleaned, and gold was re-plated. Traditional hand plating method was used for gold plating in copper. Various religious practices like *Chhema Puja* (apology prayer) and *Soksing Puja* were performed while removing and reinstalling different parts of the stupa. After the assessment, the upper Gajur portion of the stupa was restored through the initiative of local community, led by the BADC.

FIGURE 30: RECONSTRUCTION OF THE GAJUR AND BAMBOO SCAFFOLDING AT BAUDHANATH



Source: DoA

Management of dilapidated material obtained from restoration.

During restoration process, unused materials of the stupa, which were considered sacred, were managed as per religious belief. About 15 percent of the bricks from the stupa was used in the restoration. Clay collected from the stupa was distributed to devotees who visited the stupa as gift. Similarly, unused sacred bricks and wood were provided free of cost to various organizations for religious purposes, such as building temples and shrines. The remaining soil was discharged in the holy rivers like Bhotekoshi and Indravati.

Conservation Master Plan

Conservation master plan proposed short-term projects, for Baudhanath, for completion within two years:

1. Manage electric wires laid within the premises and wall of the Stupa, and fix solar lights in the premises.
2. Install brick pavement in the buffer zone of Baudhanath, starting from Fulbari area, and
3. Build an underground sewer system from Fulbari Chowk to Hulunglung, Tathagat Marg to Fulbari Chowk, Seto Gumba to Dhara Tole.

G. Swayambhu

The Swayambhu hillock is located in the western side of Kathmandu and is an important protected monument zone. Many stupas, temples and shrines, monasteries and traditional houses are scattered on the top of two hills and surrounding areas. There are various architectural styles in the area, such

as dome structure, pagoda style temple and Ghrantakut style temple. The following monuments were restored by the NRA:

1. Swayambhu chaitya
2. Anantapur temple and Pratappur temple
3. Gyanmala Bhajan Ghar

FIGURE 31: DAMAGE TO SWAYAMBHUNATH STUPA DOME STRUCTURE DUE TO EARTHQUAKE (CRACKS HIGHLIGHTED BY RED ARROWS)



Source: NRA

The Swayambhu stupa was damaged with horizontal and vertical cracks across the dome of Stupa. Cracks were repaired by using epoxy grouting method.

The Anantapur Shikhara temple, in south-eastern corner of Swayambhu hilltop, is one important heritage structure on Swayambhu hill. The foundation of this temple was restored as it had been damaged by the earthquake, as shown in the image below.

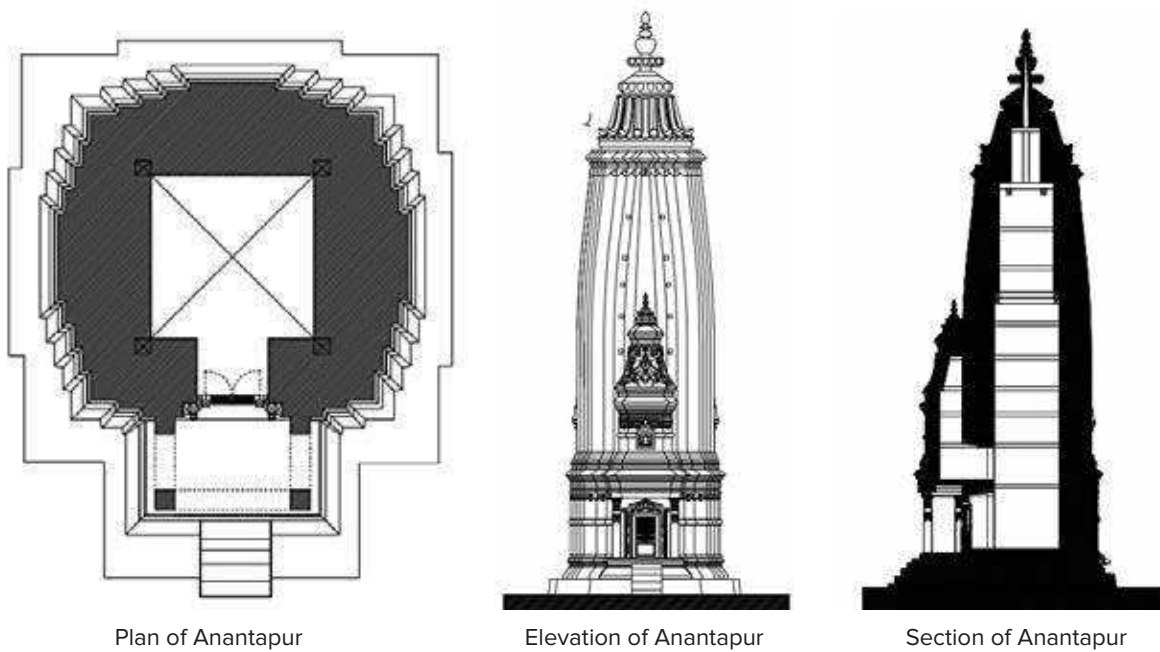
FIGURE 32: DAMAGE TO ANANTAPUR SHIKHARA TEMPLE IN THE SWAYAMBHUNATH



Source: NRA

The temple in the south-eastern corner of Swayambhu hill was built in 1654. It is another dominating structure located on Swayambhu hill. The damaged structure was dismantled and has been restored in its original position from the foundation.

FIGURE 33: PLAN, ELEVATION AND SECTION OF ANANTAPUR TEMPLE FOR RECONSTRUCTION PURPOSES.



Source: NRA

TABLE 20: STATUS OF DAMAGE AND RECOVERY IN THE SWAYAMBHUNATH AREA

Heritage Structures	Completely Damaged	Partially Damaged	Recovery completed	Remark
Ghrantakut Style Temples	1		1	
Ghrantakut Style Temples		1	1	
Falcha (Pati)		1	1	

Source: NRA

The Pratappur temple was partially damaged with circular cracks all around the plinth level. It was restored, keeping its original foundation intact but by dismantling the damaged superstructure.

Similarly, the Gyanmala Bhajan Ghar situated just on the eastern side of Pratappur is a Sattal structure built in the 20th century. The monument has intangible value, as Buddhist Bhajans (hymns) and other rituals take place at this location. The was partially damaged by the 2015 earthquake. However, the Sattal was severely damaged. The Bhajan Ghar was restored from the foundation and the Sattal was restored by preserving its original fabric but removing the upper floor. Although individual monuments around Syawambhu have been reconstructed and restored, conservation master plan of Swayambhu remains to be implemented.

4.3.2 Recovery of heritage monuments and structures

1. Rana palaces

The 2015 earthquake had damaged many historical buildings in Kathmandu Valley. The NRA, through NRA-CLPIU, allocated a budget to recover traditional heritage buildings in accordance with the Post Disaster Recovery Framework (PDRF) and urban housing reconstruction strategies for regenerating urban heritage through heritage protection and conservation. The heritage buildings listed for restoration were as follows:

- n Singha Durbar
- n Babar Mahal
- n Keshar Mahal
- n Bal Mandir (Sita Maharani Mahal)
- n Harihar Bhawan
- n Nepal Rastra Bank Bhawan (NRB) at Baluwatar and Thapathali
- n Shree Mahal
- n Sital Niwas
- n Bahadur Bhawan

These buildings were designed with courtyards to suite the microclimate of Kathmandu valley. Out of these 10 Rana palances, four palaces – Harihar Bhawan, two NRB buildings and Shree Mahal were not possible to retrofit; hence were decided to reconstruct with similar architecture, whereas, six others were decided to retrofit. The major philosophy behind adopting the retrofitting technology to restore the buildings was to protect the structure following the principles of conservation, while ensuring optimum safety. Out of the four buildings, Singha Durbar, Sita Maharani Mahal, Sital Niwas and Bahadur Bhawan were retrofitted using metal strips in the inner and outer walls. Finite Element Method (FEM) and permissible stress method was used in the analysis and design of retrofitting of the structures.

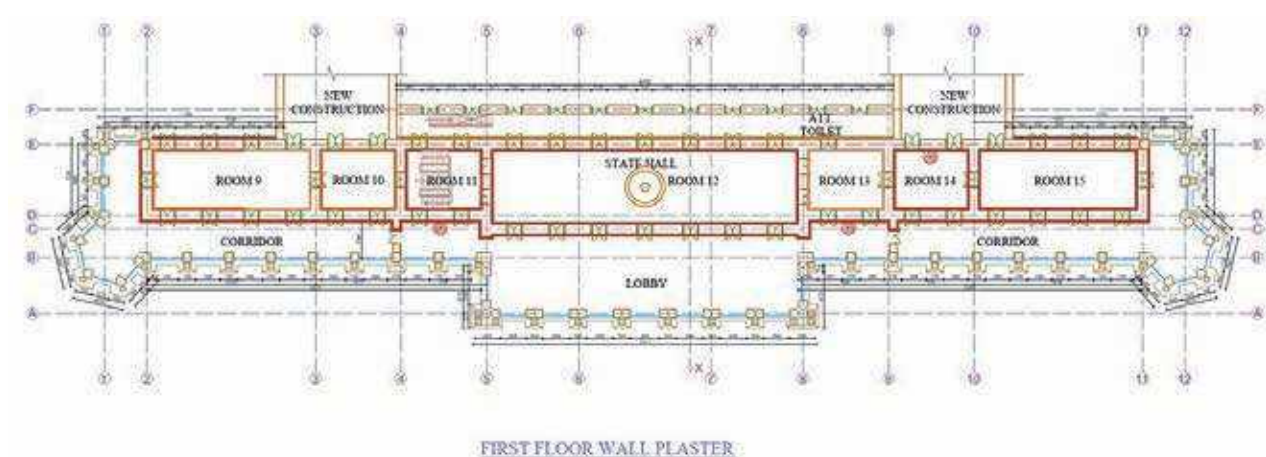
Two other buildings, Keshar Mahal and Babarmahal, were retrofitted with carbon laminate and glass fiber in outer walls and metal strip in inner walls. Carbon laminate and steel flat was installed as vertical splints and glass fiber was installed horizontally. Carbon laminate and glass fiber wrapping techniques were recommended for the outside wall to preserve the traditional architecture and heritage value.

Micro pilling was done in all the buildings to increase bearing capacity of the soil, and mud mortar was replaced with Lime Surkhi mortar. Various tests were carried out to assess appropriate retrofitting design. The north wing of Singha Durbar was partially restored while retrofitting was underway at the other buildings when this report was prepared.

2. Singha Durbar

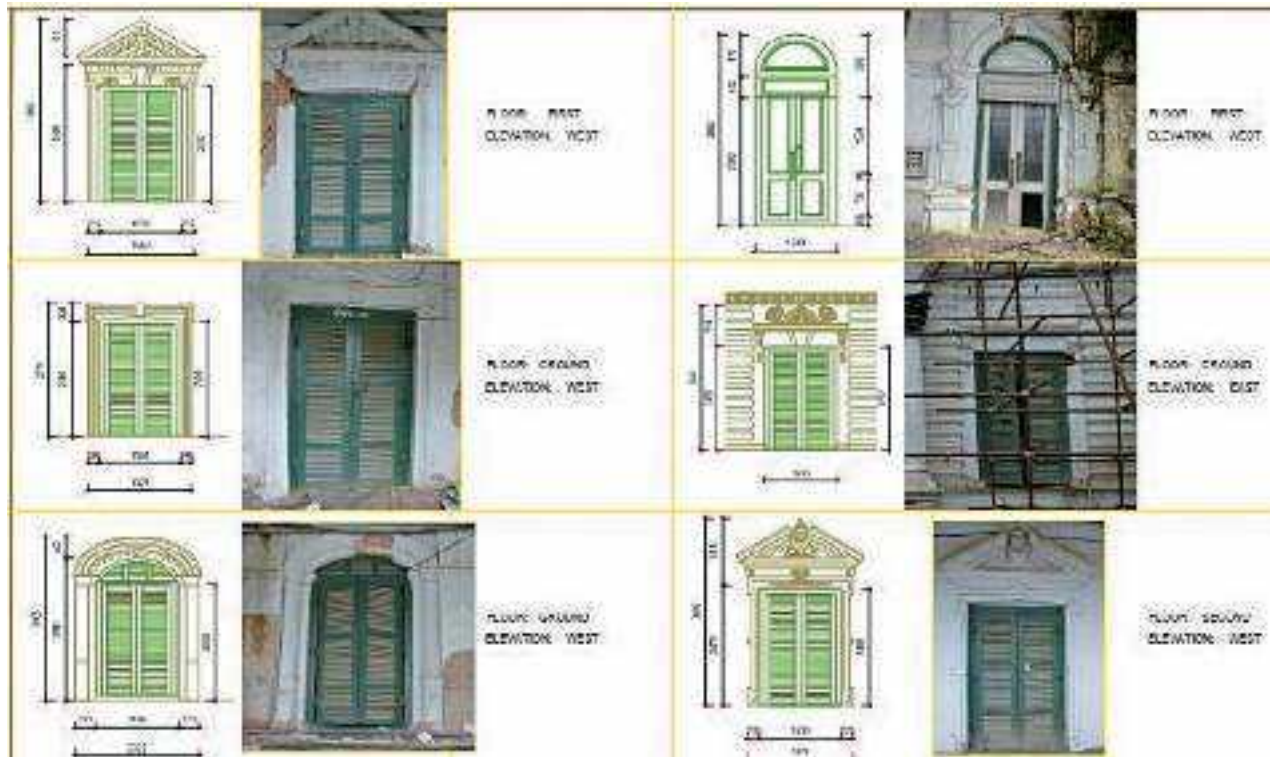
Singha Durbar is a neo-classical building built in 1903 by then Prime Minister Chandra Shumsher. The footprint is approximately 107 meters long in north-south direction and 15 meters wide in east-west direction of the west lounge. The height is about 17 meters to the parapet above the west arcade, and about 21 meters to the top of the roof truss. The magnificent facade of well-proportioned archways is held by Corinthian colonnades that give a sense of magnificence and splendour. The building has a large double height hall at the centre. This hall has an intricate timber ceiling and wall panelling.

FIGURE 34: SAMPLE PLAN (FIRST FLOOR) OF THE SINGHA DURBAR BUILDING



Source: NRA

FIGURE 35: DRAWINGS OF VARIOUS WINDOWS AND INTRICATE DESIGNS FOR DOCUMENTATION DURING RESTORATION



Source: NRA

The walls, columns and roof of the building were partially damaged by the earthquake. Initially, government agencies had different positions on the recovery process. The Ministry of Urban Development suggested reconstruction, whereas the DOA suggested retrofitting to preserve their historical value.

FIGURE 36: DAMAGES CAUSED BY THE EARTHQUAKE



Source: NRA

FIGURE 37: PROTECTIVE WORKS BEFORE RECOVERY



A study was conducted to identify optimum solution for damage recovery, which suggested retrofitting was the way to go. Before retrofitting commenced, an architectural documentation of the monument was carried out to preserve its valuable components. New methods were introduced while retrofitting Singha Durbar: micro pilling in foundation, structural anchoring of beam and joist and stiffening of

Corinthian pillars, to name a few. Corinthian pillars boxed will have metal angle sections in the base and the vertical strips will cage the circular pillar with ties. GI wire mesh wrapping of low strength masonry section was recommended.

Sample brick wall in Lime Surkhi with Lime Surkhi plaster on top of the chicken wire mesh fixed in metal strip was constructed, and its strength was tested. Similarly, cube testing was also performed for concrete used in the foundation. Due to the unavailability of over seven meters long wooden beams, they were replaced with MS 'I' sections during recovery.

FIGURE 38: EXCAVATION FOR MICRO PILLING



Source: NRA

FIGURE 39: INSERTION OF METAL ROD INSIDE METAL PIPE & ANCHOR BOLT



FIGURE 40: VERTICAL & HORIZONTAL METAL STRIPS IN BRICK PIER

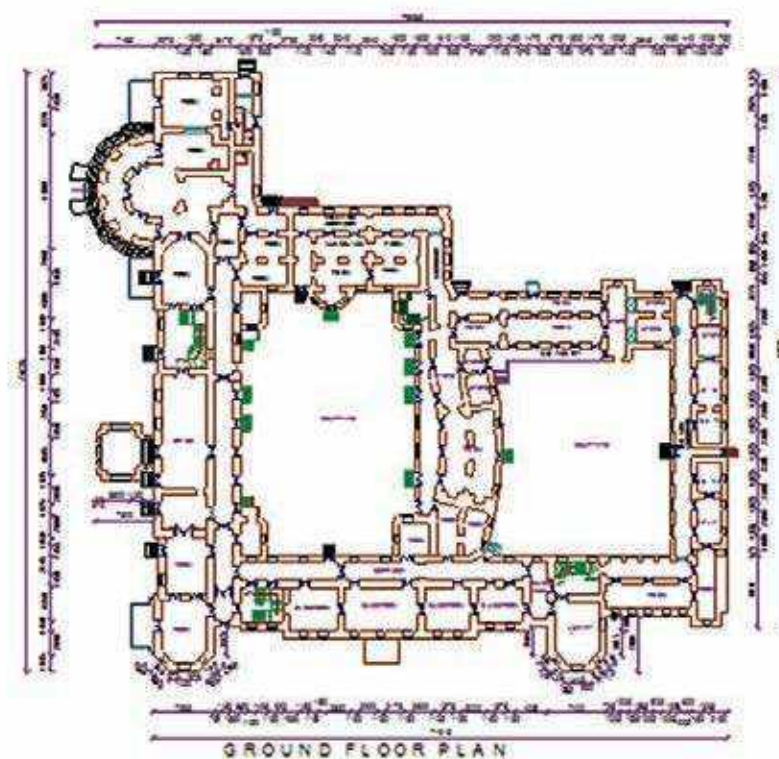


Source: NRA

3. Sita Maharani Mahal

The Sita Maharani Mahal, as known as the *Bal Mandir* building is a 130-year-old three-storey building with a double courtyard. Its floors were of flexible diaphragms of pinewood joists or steel I-beam and jack arch. The roof was either flat covered by telia bricks, or with timber truss covered by clay tiles.

FIGURE 41: SCHEMATIC BUILDING PLAN OF SITA MAHARANI MAHAL PREPARED FOR RETROFITTING



Source: NRA

The Sita Maharani Mahal was severely damaged in 2015 earthquake and the severity varied across the building. Some walls piers had collapsed completely, while others had minor hairline cracks. The overall damage of the building was Grade-3, as per EMS classification and had been recommended for structural strengthening.

FIGURE 42: DAMAGES IN SITA MAHARANI MAHAL CAUSED BY THE EARTHQUAKE



Collapse of south west corner



Source: NRA



Damage in ceiling



Damage in Vault Arch

FIGURE 43: IN-SITU PUSH SHEAR TEST TO DETERMINE STRUCTURAL STRENGTH



Source: NRA

From field tests it was found that the foundation soil was susceptible to liquefaction. Hence, it was concluded that the building needed. Using structural steel was deemed to be most effective and hence, a detailed design of vertical and horizontal bands and connections was prepared.

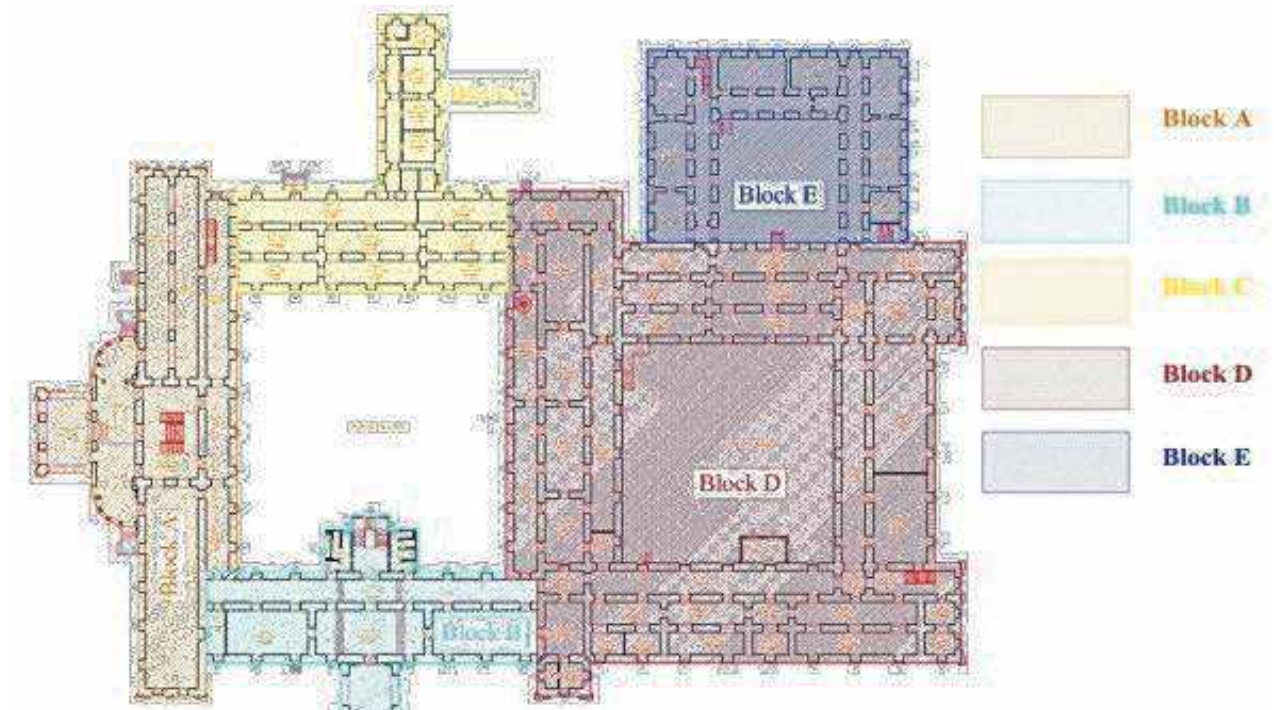
The building's columns have been jacketed with vertical steel bars, and the entrance porch has been secured with the main structure using horizontal bands at two levels. Steel strips have been used around arches to connect them to the nearby vertical and horizontal lintel bands, as protection of opening. For structural improvement to roof structure, diagonal braces were to be added between rafters, with the rafters connected to roof bands using steel strips. Due to archaeological importance of this building, clay

tiles of its sloped-roof were retained and secured safely. Placing gravel piles around the foundation wall has been planned to reduce the risks of foundation failure due to liquefaction.

4. Babar Mahal

Babar Mahal is a Rana palace built by Chandra Shumsher Jang Bahadur Rana in 1910 in the neo-classical style. The palace building is of the conventional load bearing brick masonry type, with three floors, and attic and decorative cornices and columns on the outer side. Average floor height of three storey place is 3.7 m and it has three courtyards.

FIGURE 44: SCHEMATIC FLOOR PLAN OF BABAR MAHAL PALACE



Source: NRA

A minimal intervention technique of retrofitting was recommended for the palace, considering its traditional architecture and heritage value. The technique involves simple and special repair, restoration, seismic retrofitting, replacement, etc. Carbon laminate and horizontal glass fiber was used for retrofitting the outer walls, and MS plate was used for the inner walls. During retrofitting, its decorative columns and cornices and pediments above doors and windows were preserved.

FIGURE 45: DAMAGES AT BABAR MAHAL PALACE CAUSED BY THE EARTHQUAKE



Source: NRA

The foundation area of the palace was found insufficient to bear the load of the building, hence it was recommended that it be strengthened with micro-pile.

FIGURE 46: RETROFITTING AND RESTORATION TECHNIQUES USED AT THE BABAR MAHAL PALACE



MS plate in inner wall



Glass fibre



Carbon laminate



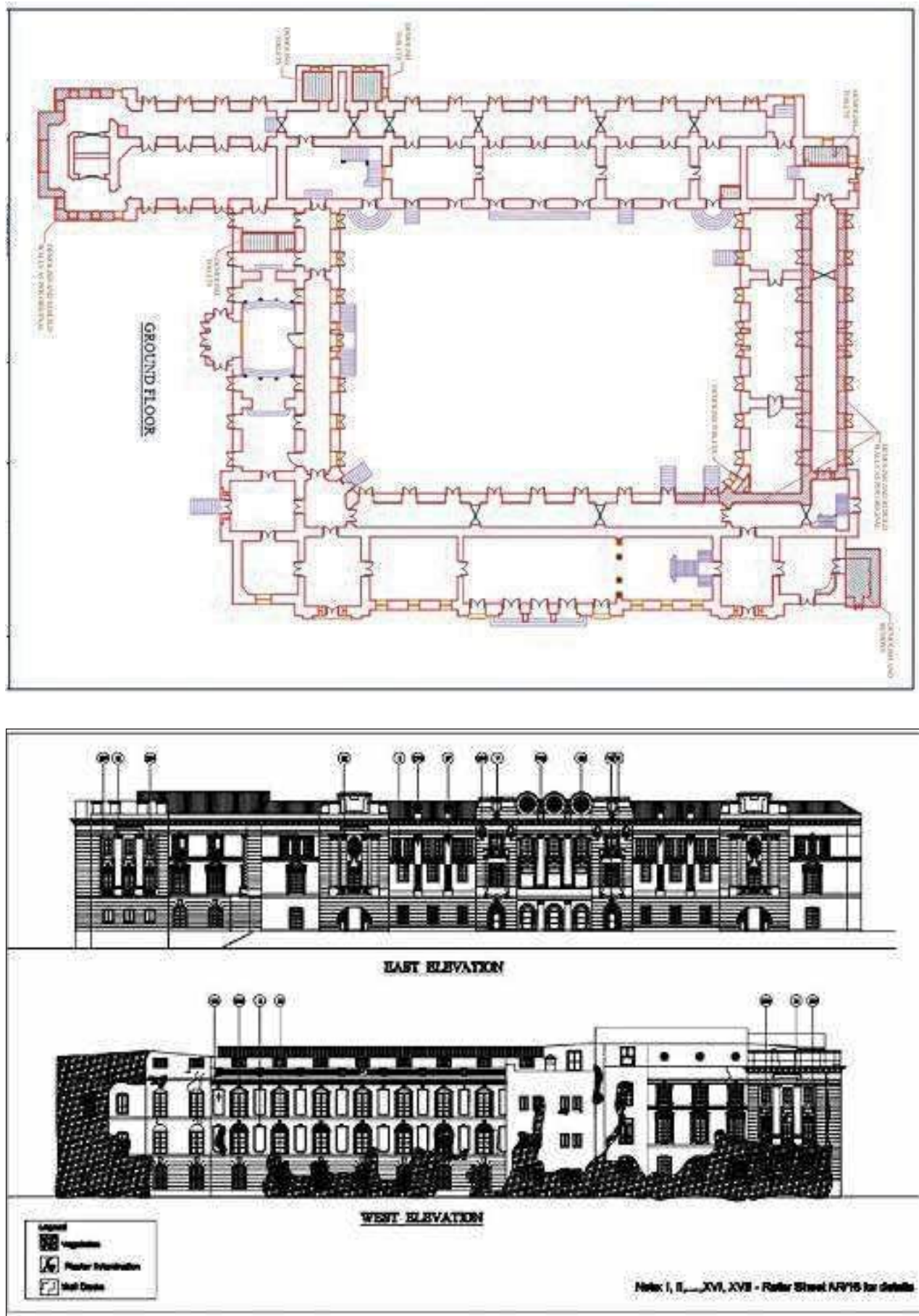
Carbon laminate and glass fibre used in retrofitting of wall

Source: NRA

5. Kaiser Mahal

The Kaiser Mahal was constructed in 1839 for Jit Shamsher, under the direction of Kishor Narsingh Rana. It was then sold to then Prime Minister Chandra Shamsher in 1908, who later expanded and gifted it to his son Kaiser Shamsher Rana. The building is constructed in neoclassical style, with courtyard and projected wings on south-east and south-west sides. It is a load bearing structure in mud masonry with Jack arch and timber flooring. The north-west and south-west wings were partially damaged in the 2015 earthquake. Soil investigation showed that the load bearing capacity was low and micro pilling was done inside the building to improve the soil condition. The building has one of the largest private libraries in Asia, which was donated to the government.

FIGURE 47: SCHEMATIC PLAN AND ELEVATION OF THE KAISER MAHAL PALACE



Drawings showing existing condition and details of artifacts present at the palace was prepared before restoration.

TABLE 21: DETAILS OF VARIOUS ARTIFACTS COLLECTED AND PRESERVED AT THE KAISER MAHAL PALACE

DESCRIPTION				NO.	LOCATION	DESCRIPTION				NO.	LOCATION
S/N	DESCRIPTION ELEMENT	TYPE				S/N	DESCRIPTION ELEMENT	TYPE			
1.		I		4	ENTRANCE CORNER ON EAST ELEVATION	2.		II		4	CAPITAL CORNER ON EAST AND WEST ELEVATION
3.		XI		3	ENTRANCE CORNER ON EAST ELEVATION	4.		IV		4	CAPITAL CORNER ON EAST ELEVATION
5.		V		2	CORNER OF BALCONY WALL ON EAST ELEVATION	6.		VI		4	CORNER OF BALCONY ON EAST ELEVATION
7.		VII		3	CORNER ON LAMP OF PRAYER ROOM ON EAST ELEVATION	8.		VIII		3	CORNER ABOVE PRAYER ROOM ON EAST ELEVATION
9.		IX		12	CAPITAL CORNER OF BALCONY CORNER OF ALL BALCONY	10.		X		7	CORNER AT LAMP OF PRAYER ON WEST ELEVATION
11.		XI		7	CORNER AT LAMP OF DOOR LAMP, BALCONY OF WEST ELEVATION	12.		XII		40	CORNER AT LAMP OF LAMP ON WEST ELEVATION
13.		XIII		7	CORNER AT LAMP OF DOOR LAMP, BALCONY OF WEST ELEVATION	14.		XIV		6	CORNER BALCONY AT LAMP OF DOOR LAMP ON EAST AND WEST ELEVATION
15.		XV		12	CORNER BALCONY AT LAMP OF DOOR LAMP, BALCONY OF EAST AND WEST ELEVATION	16.		XVI		4	CORNER BALCONY OF WALL OF EAST ELEVATION
17.		XVII		4	CORNER ABOVE PRAYER ROOM ON EAST ELEVATION						

Source: NRA

FIGURE 48: DIAGONAL AND CORNER CRACK IN THE WALL



Source: NRA

FIGURE 49: TESTING AND RESTORATION OF THE PALACE BUILDING



Ongoing micro pilling in an inner room of the building



Timber test by Resistor-meter test

Source: NRA

It was also proposed to improve the dilapidated garden in front of the building with necessary infrastructure.

FIGURE 50: PROPOSED MASTER PLAN OF THE PALACE AREA INCLUDING THE GARDEN



Source: NRA

6. Ranipokhari

The Balgopaleshwor Temple situated in the centre of Ranipokhari (the queen's pond), was severely damaged in the 2015 earthquake. Reconstruction of the temple and the bridge was delayed by three years as construction companies failed to submit adequate documents to meet the criteria for restoring the pond and temple. The temple was demolished by the Kathmandu Metropolitan City (KMC), with consent from the DoA to rebuild it in with its original dome-shape. The recovery work was protested by locals and conservationists who opposed the planned use of concrete and modern materials for reconstruction. An expert committee was formed to make suggestions to the KMC on the reconstruction. Investigations by experts after the damages revealed that most of the sanctum level wall and design

belonged to the Malla period, and only the upper level and its colonnaded outer porch were later added by then Prime Minister Jung Bahadur Rana. The *dachi apa* brick wall from Malla period was covered by lime plaster in Rana period. The temple was constructed using brick masonry with wooden frames inside, as seen in many other traditional temple structures. This provided a basis to deduce the original plan from and pursue reconstruction of the traditional *Granthakut* style temple. The earlier sketch of the original temple built by King Pratap Malla, drawn by an artist in 1845, shows a different type architecture and not a dome shaped temple. After investigation, the experts committee finalized the architecture to be the Granthakut style, which King Pratap Malla had built. The expert committee also recommended that the temple, bridge and the pond to be restored in its original form.

FIGURE 51: SKETCH OF RANIPOKHARI AND BALGOPALESHWAR TEMPLE BUILT IN GRANTHAKUT STYLE (CIRCA 1845 AD)



FIGURE 52: : RANIPOKHARI AND BALGOPALESHWAR TEMPLE BEFORE THE EARTHQUAKE



Source: NRA

FIGURE 53: RANIPOKHARI AND BALGOPALESHWAR TEMPLE AFTER RECONSTRUCTION



Source: NRA

The NRA led the recovery of Rani Pokhari. The reference of the elements of the temple, like *Gajur*, motifs and symbolic elements were adopted from Granthakut style temple of swayambhu (Pratappur and Anantapur) which had been built by King Pratap Malla. Terracotta deities found during site clearing were placed at the four corners of the temple, as per expert advice.

The pond and boundary wall were also restored using traditional technology. The users' committee was responsible for construction of plinth of the pond and boundary wall. Traditionally, the pond bed was prepared using black cotton soil and sand alternately, with thickness ranging from 1.5 inches to two feet. During the recovery process, a meter deep layer of black-cotton (*Kalimati*) soil was added on top of the previous bed-layer, and flat brick (Ma-appa) dry soling was done. Kalimati was brought from several places like Sankhu, Madhyapur Thimi and Bhaktapur. This soil has very low permeability, a property that allows it to hold water. The mud layer and bricks were primarily laid in the pond by expert masons from Bhaktapur, mainly women.

Two small size dummy ponds were constructed using black cotton soil knead with feet and another with machine. Both techniques yielded the same result. So, to save time, the machine was used to knead the black cotton soil.

Similarly, brick walls around Ranipokhari were built with herring bond, as per the old photographs and existing wall elevation. The wall construction technology paid attention to the water seeping system from the peripheral ground level. Both lower and upper dry-brick walls were constructed using different sizes of Ma-appa bricks. Embankment walls on the side of the pond were constructed using bricks, specially manufactured with lime and brick dust mortar. In the middle of the pond wall, there are two layers of flat bricks placed for strengthening the dry structure. And *Phya-appa* bricks, generally found in ponds, were used as topping to protect the wall. The ancient dry herring bond wall technology was only used in certain parts.

FIGURE 54: DETAILS OF POND STRUCTURE (DACHI APPA BRICKS) AND ARCH BRIDGE IN THE RANIPOKHARI AREA



Embankment wall around pond

Arch wall below bridge before reconstruction

Source: NRA

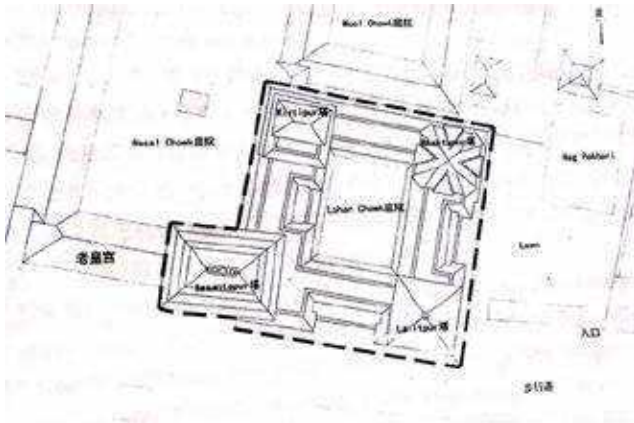
The bridge leading to the pond was completely demolished and reconstructed using traditional technology. It has been constructed on a stone foundation over a 6.5 feet high brick structure, using yellow soil mud mortar. The yellow soil is less soluble in water, so it was used in masonry that had constant contact with water. The arch wall of the bridge consists of lime-mortar masonry to strengthen the upper portion. It has several key stones, not used in many other arched constructions.

7. Basantapur tower complex

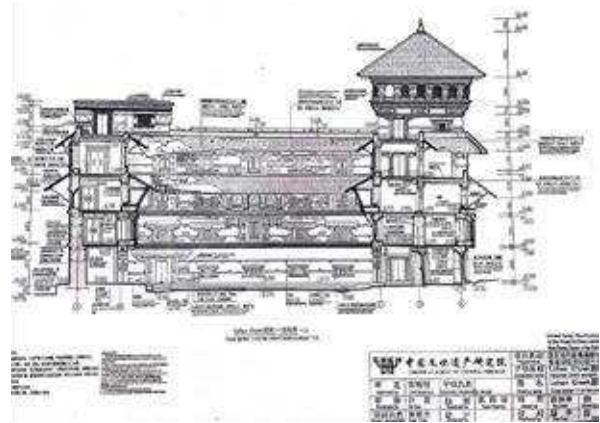
The Basantapur tower complex consists of Lohan Chowk and quadrangle towers. The complex was built in the 17th century, with Lalitpur Tower (Southeast corner) Bhaktapur Tower (northeast corner) Kirtipur Tower (northwest corner) and Basantapur Tower of nine stories (southwest corner) in four corners. Lalitpur, Bhaktapur and Kirtipur tower were built on the fifth storey.

Basantapur Durbar is a nine-story building with rectangular shape, wooden corridors extending outside the walls and diagonal bracings supporting the large eaves. The tower complex was severely damaged by the earthquake. The walls at the third and fourth storey of south side of Lohan Chowk were tilted southward; All six stories of the Lalitpur Tower was tilted south-westward; the Bhaktapur Tower had collapsed at the sixth story.

FIGURE 55: SITE PLAN AND ELEVATION OF BASANTAPUR TOWER COMPLEX



Site plan



Elevation of existing condition of building

Source: NRA

FIGURE 56: DAMAGES IN THE TOWER COMPLEX AFTER THE EARTHQUAKE



Source: NRA

Proposed temporary stabilization after the earthquake

- Remove loose tiles and debris from roofs of Nautalle tower. Reuse the tiles during restoration.
- Remove debris around the base of walls in outlined area.
- Use demolition equipment to demolish the east (see arrows in the figures below, from South and North).
- Install stabilization bracing. Figure 57 shows the proposed locations assuming the debris has been removed.
- Once the bracing is installed, survey the interior space and install vertical, horizontal and diagonal timber braces, as needed to stabilize the Throne Area.

FIGURE 57: DAMAGE TO THE STRUCTURE OF THE TOWER COMPLEX



Source: NRA

FIGURE 58: RECONSTRUCTION WORK AT THE TOWER COMPLEX (LEFT: SCAFFOLDING FOR RECONSTRUCTION AND RIGHT: INTRICATE DETAILING IN STRUTS PRESERVED)



Source: NRA

The building was recovered with the assistance of Government of China after carrying out the geotechnical engineering investigations, testing and evaluation of architectural structure and on-site investigations and surveys. After detailed investigation, the potential risks such as theft, water and termite damage and loss were eliminated following which wooden sculptures and artifacts were collected from the debris. This was challenging task because the sculptures had been stolen and misplaced.

The restoration employed skilled carpenters from various parts of Nepal. It was a joint venture of Chinese and Nepali experts who sometimes had different approaches. The Chinese team had insisted on the principle of minimum intervention while the Nepalis wanted brand-new replacements. The Chinese team

also faced difficulties during the work due to lack of detailed references about the heritage, but they drew pictures and made specific records on methods and approaches used for restoration.

8. Nyatapole Temple

Nyatapole is the tallest temple in Nepal. The damage on the 108 ft high temple was based on the visual observations, following which feasible interventions to improve seismic performance were recommended. The architectural drawings and structural components were prepared based on in-situ measurements. Visual damage assessment indicated that the ground floor and top floor of the temple were most affected. The temple structure had numerous large shear diagonal cracks (up to 20 mm) above door openings and adjacent piers at the base wall. Vertical cracks were also seen on interior walls of the ground floor due to in-plane and out-plane bending.

FIGURE 59: DAMAGED NYATAPOLE TEMPLE UNDER RECONSTRUCTION (LEFT) AND SCHEMATIC DRAWING FOR RECONSTRUCTION (RIGHT).

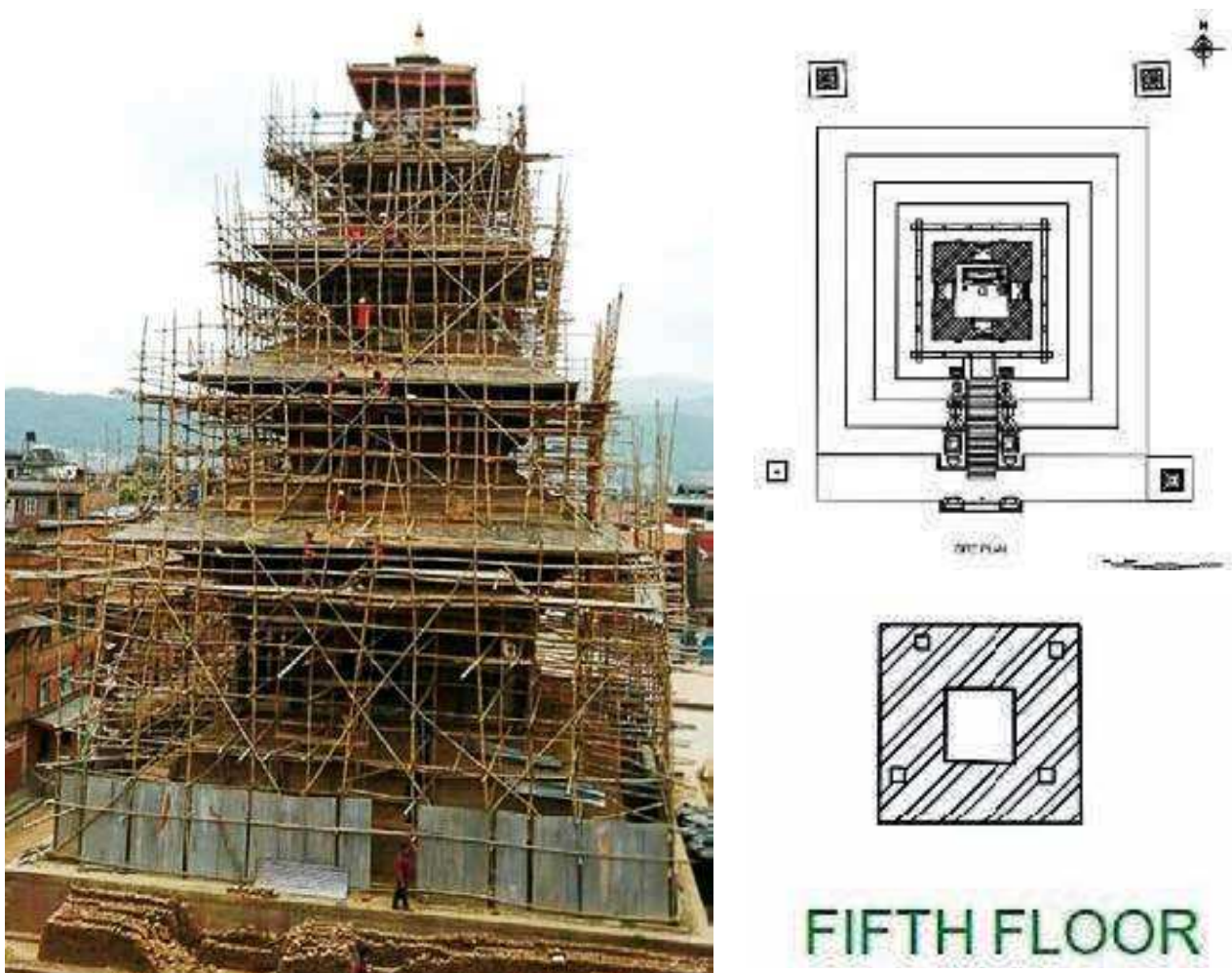


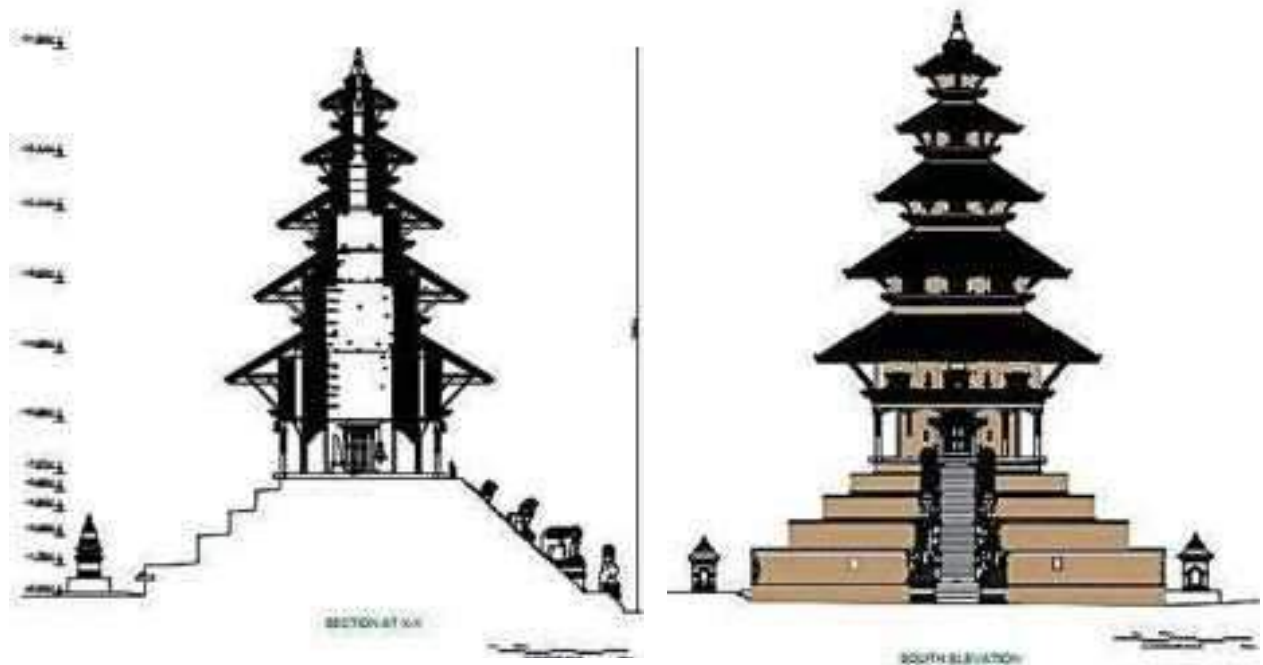
Photo: Arpan Bhuju 2021

The damages were repaired as recommended and the process was documented to keep records of all changes and interventions. The top (fifth) story was severely damaged and was completely dismantled, to begin renovation work that was started from the top. Horizontal timber member (*Laka Shi*) and timber column (*Tha*) was installed as the first step. The wall construction and timber work for the base of pinnacle was completed in seven days. One of windows on west side, corner strut (*Bilapu*) and some timber sections were replaced during reconstruction. End pieces of the four-corner roof brick called *Gonga*

Appa was replaced using clay bricks to replace cement bricks used earlier. The roofing work of the fifth floor was done without including interested local volunteers who had participated in the roofing of other floors. To conserve local technology bamboo and rope were used for scaffolding instead of steel pipes. The temple was reconstructed using local resources, both financial and labor.

One challenge during recovery was to obtain a rare, traditional mud type called *Pahelo mato* (a form of mud which was used for heritage construction in ancient times). This mud is sticky and helps cement the bricks together.

FIGURE 60: SCHEMATIC ELEVATION AND SECTIONAL DRAWINGS OF NYATAPOLE.



Source: NRA

9. Monuments in Patan Durbar Square

Patan Darbar Square was another monument zone that was severely affected by the 2015 earthquake. Several monuments collapsed and many were structurally damaged. The historic physical structures showcased Valley's art and architecture, which had developed over several millennia. None of the public monuments or private residences there were based on a standard design and therefore were unique.

Saving human lives is always the priority after earthquakes. This was what had happened after the earthquake at all monument sites – at the Dharahara tower, the inner city *bahas* and *bahis*, or the durbar squares. But it was different at the Patan Darbar Square where a group of local residents had immediately rushed to save important elements, mainly gilded objects of the monuments that had collapsed or were damaged.

FIGURE 61: LEFT: PATAN DARBAR SQUARE. COMMUNITY ENGAGED IN RESCUING ARTEFACTS IMMEDIATELY AFTER THE EARTHQUAKE. RIGHT: RESCUE OF PEOPLE TRAPPED UNDER THE RUBBLE. PHOTOS: S. LAKHE. APR. 25, 2015.



The DoA and Patan Museum were in the frontline with concerned agencies and local stakeholders in the Patan Darbar Square to protect and rescue artifacts at risk of the theft. All the historic elements were rescued from the rubble with the help of local community and security forces and were transferred to the Patan Museum courtyards for security. This work was coordinated by the DoA and the Kathmandu Valley Preservation Trust (KVPT). At the Patan Darbar Square all the artefacts were rescued and the rubble had been cleared within 10 days after the earthquake.

FIGURE 62: LEFT: ALL CARVED ELEMENTS FROM COLLAPSED MONUMENTS WERE CARRIED FROM THE DESTROYED SITE AND KEPT IN THE PATAN MUSEUM COURTYARDS. PHOTOGRAPH: R. RANJITKAR. APR. 30, 2015. RIGHT: UNUSABLE DEBRIS WAS COLLECTED FOR TRANSPORT TO A DUMPING SITE AFTER REUSABLE BRICKS WERE STACKED IN THE SQUARE. PHOTO: R. RANJITKAR. MAY 01, 2015.



Some of the monuments did not collapse, but were severely weakened, and some had structural damage. It was clear that many temples and parts of palaces and other structures could collapse in the aftershocks. Therefore, one of the first responses by the KVPT was to shore up unstable sections of different monuments to prevent further damage.

FIGURE 63: LEFT: VISVESHVARA TEMPLE, PATAN DURBAR SQUARE. TEMPORARY TIMBER SUPPORT WAS FIXED AT THE MONUMENTS THAT FACED STRUCTURAL RISKS. PHOTOGRAPH: R. RANJITKAR. MAY, 2015. RIGHT: NORTH TALEJU TEMPLE'S ROOF WAS DISLODGED. SCAFFOLDING WAS STARTED WITHIN A WEEK OF THE EARTHQUAKE AND THE TOP TIER WAS SECURED TO PREVENT FURTHER DAMAGE TO LOWER ROOFS. SOLDIERS ARE SEEN IN THE BOTTOM TRANSFERRING RESCUED BRICKS FROM THE SQUARE TO THE BACK GARDEN. PHOTO: R. RANJITKAR. MAY 10, 2015.



Storage of artefacts

Proper storage of artifacts was important owing to risk of theft and to protect the valuable items from weathering. In the melee, rescued artifacts were mixed up without proper segregation as many people had contributed to the effort. The piles were later segregated and almost all the pieces were assembled before storage.

FIGURE 64: LEFT: THE SALVAGED WINDOW PARTS OF VARIOUS TEMPLES AND CARVED TIMBER ELEMENTS AND STRUTS WERE STORED IN A NEWLY BUILT SHED. PHOTOGRAPH: KVPT. JUNE 07, 2015. RIGHT: CARVED ELEMENTS WERE SORTED AND ASSEMBLED, AND ALL COMPLETE SETS FROM THE PILE OF RESCUED ELEMENTS WERE PLACED IN STORAGE. PHOTO: KVPT. MAY 02, 2015.



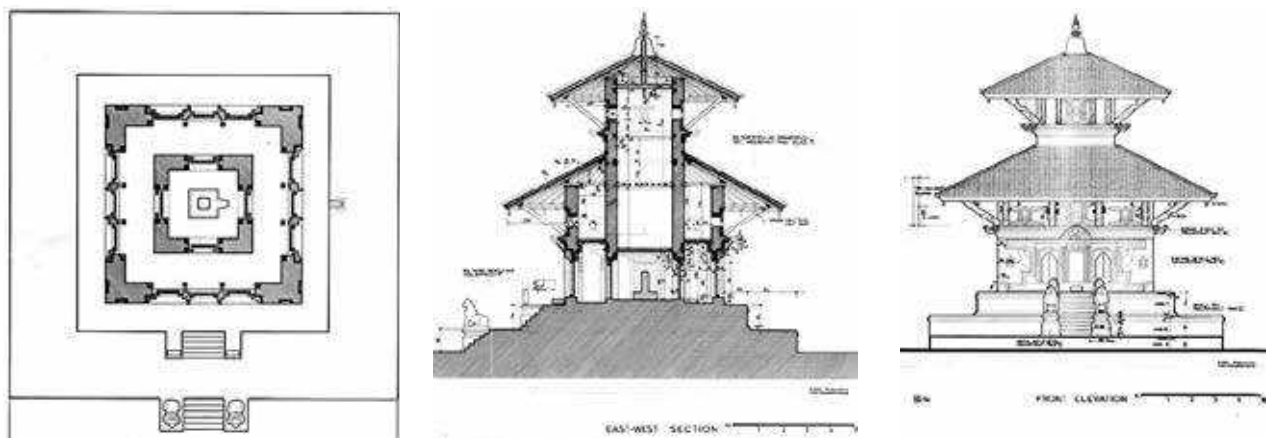
Cataloguing: It was apparent that rebuilding would take some time to start, and therefore it was important that all the salvaged elements were catalogued for future use. This was important that the elements were placed in the right locations during reconstruction and also because historicity of a heritage site needed to be preserved by using the original elements as much as possible.

FIGURE 65: LEFT - DAMAGED PARTS WERE INDIVIDUALLY MEASURED AND PHOTOGRAPHED AS SOON AS THEY WERE TRANSFERRED TO A SAFER ZONE. PHOTOS: R. RANJITKAR, MAY 07, 2015 (RIGHT) AND MAY 09, 2015 (LEFT).



Documentation: Unfortunately, the focus after the earthquake was on physical interventions, and documentation was secondary. Also, those who supported the work were more interested in brick-and-mortar work or results to show tangible contribution, rather than on documentation. It is important to prepare documents on individual heritage buildings and sites of the Valley, so that there is consolidated information for future use.

FIGURE 66: CHAR NARAYAN TEMPLE, PATAN DARBAR SQUARE. PLAN, SECTION AND ELEVATION. DRAWINGS MADE IN THE 1970S BY WOLFGANG KORN (PUBLISHED IN "TRADITIONAL ARCHITECTURE OF THE KATHMANDU VALLEY") HAD MADE THE RECONSTRUCTION PROCESS EASIER.



Recovery issues and efforts: Heritage conservation and restoration works requires long preparation, even in normal times. Nepal has some individuals who have continued the traditional building practices but there are not enough specialists to support heritage conservation. The earthquake brought down or weakened so many structures that made the recovery a major challenge. There were also newer challenges faced at the site, particularly the need to excavate foundations of the temples and conduct soil tests before reconstruction.

Repairing of damaged elements and artefacts: Reusing the historic elements was important to maintain a link to the past and to the original artists, artisans and builders. But many carved elements had been damaged when the monuments collapsed, and had to be repaired for reuse, together with newer elements.

FIGURE 67: LEFT: DAMAGED DOOR BRACKET FROM HARISHANKAR TEMPLE, RESCUED FROM RUBBLE. RIGHT: REPAIRING THE BRACKET USING AS MUCH OF THE HISTORIC SECTION AS POSSIBLE, WITH ONLY UN-REPAIRABLE SECTIONS RE-CARVED. PHOTOS: KVPT. JULY 2017.



The materials had to be cleaned before reuse as doing that would be difficult after installation. all items also needed to be photographed with details clearly visible, which would have been impossible once the elements are put on the structures, sometimes many stories high. The cleaning was also important because the wooden and other items had collected a lot of pollutants over the decades that could contribute to corrosion.

FIGURE 68: LEFT: CLEANING OF CARVED WOODEN ELEMENTS, RESCUED FROM THE RUBBLE. RIGHT: AFTER CLEANING. PHOTOS: KVPT. MAY 2015 & JULY 2017.



Replicas of damaged elements: Non-repairable wooden elements were copied from the original broken pieces, as all of the columns had different designs. In case of missing or broken parts, the only way to remake them was to use photographs, sketches, community memory, and support of elders. As a rule, however, it was important to understand that every part big or small tended not to be repeated as each one of them had been custom built.

FIGURE 69: LEFT: PILLARS AFTER REPAIR FROM THE MANI MANDAP, PATAN DURBAR SQUARE. THREE OF TWELVE OUTER COLUMNS AFTER REPAIRS WITH THE ADDITION OF MISSING AND DAMAGED SECTIONS. REPAIRS WERE SPECIFIC TO THE DAMAGED CONDITION OF EACH COLUMN. PHOTOGRAPH: R. RANJITKAR. JANUARY 22, 2016. MIDDLE: FULL SIZE DRAWING OF UNUSABLE PILLAR MADE BEFORE THE CARVING. DRAWING: BIJAY BASUKALA. RIGHT: ONE OF THE PILLARS WAS STRUCTURALLY UNUSABLE AND WAS REPLACED WITH A NEW ONE, REPEATING THE DESIGNS FROM THE BROKEN PILLAR. ALL COLUMNS HAD DIFFERENT DESIGNS. PHOTO: INDRAPRASAD SILPKAR. DECEMBER 2015.



Reinforcements: All the structurally damaged monuments were strengthened and collapsed monuments were rebuilt with improved details to account for future earthquakes. All improvements were made with traditionally used materials, or with other materials with minimal interventions, where traditionally used materials were not compatible.

FIGURE 70: LEFT: NEW ADDITIONAL MASONRY WALLS IN MUD MORTAR USING MA-APA IN BETWEEN PLINTH WALLS, WHICH WAS FILLED WITH RUBBLE. PHOTO: KVPT. MIDDLE: BHIMSEN LION PILLAR HAD COLLAPSED IN THE EARTHQUAKE. PHOTO: S. LAKHE. APRIL 25, 2015. RIGHT: BROKEN PIECES WERE REPAIRED USING STAINLESS STEEL PINS TO JOIN BOTH ELEMENTS. PHOTO: KVPT. AUG. 2015.



FIGURE 71: LEFT: HARI SHANKAR TEMPLE BEFORE THE EARTHQUAKE. PHOTO: STANISLAV KLIMEX. 2008. MIDDLE: TOTALLY COLLAPSED TEMPLE AFTER THE EARTHQUAKE. PHOTO: R. RANJITKAR. APRIL 27, 2015. RIGHT: TEMPLE AFTER RECONSTRUCTION. PHOTO: KVPT. NOVEMBER 27, 2019.

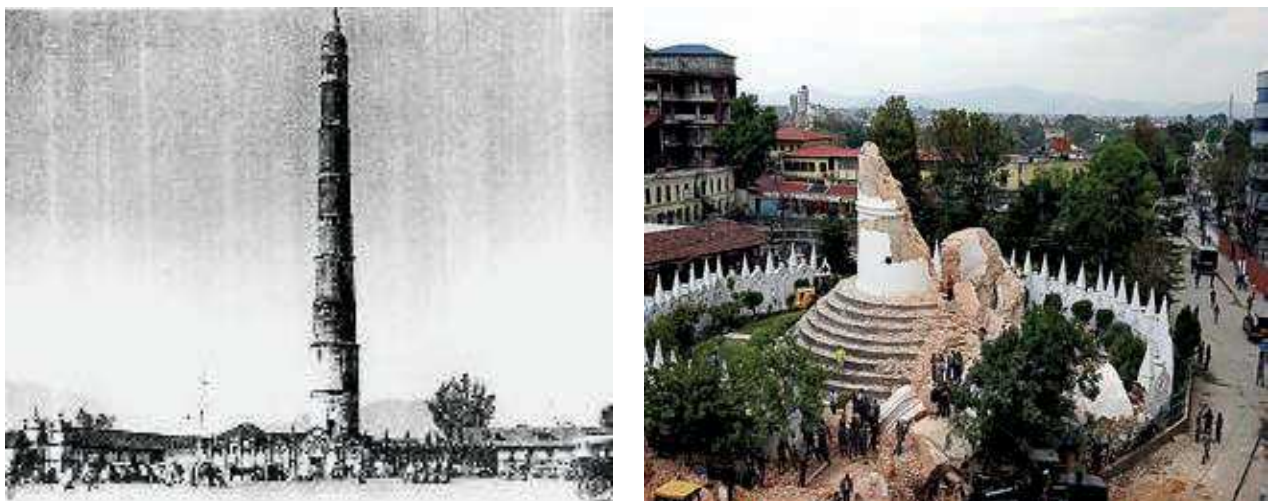


10. Dharahara

The historic tower Dharahara – also known as Bhimsen Sthambha – at the center of Kathmandu had collapsed in the 2015 Gorkha earthquake. Only its base had remained standing. Bhimsen Thapa, the first Prime Minister of Nepal (1832) had built the tower in Mughal and neoclassical style under the commission of Queen Lalit Tripura Sundari. It was a defining structure in Kathmandu, also recognized by UNESCO. The originally 11-story tower was reduced to nine after it was devastated by the earthquake of 1934. The nine-story tower comprised had 213 steps in a spiral staircase with a 5.2-meter bronze mast and a small Shiva shrine at the top. The original tower was constructed using adobe, lime surkhi mortar that comprised of brick powder, lime and sand.

In February 2016, the government decided to rebuild the tower, and launched a fundraising campaign: *Mero Dharahara ma banauchhu* (I will construct my Dharahara). In September 2018 the contract for building of new Dharahara was awarded to a Nepali construction company Raman Construction and its Chinese joint venture partner GIETC at an estimated cost of NRs. 3.48 billion. Reconstruction of the tower commenced on 27 December 2018 and the reconstruction was overseen by the NRA's central office directly.

FIGURE 72: HISTORICAL DHARAHARA TOWER THAT HAD COLLAPSED IN THE 2015 EARTHQUAKE.



The new Dharahara resembles the old one but it is equipped with modern amenities and modern technology and uses cement mortar. The new Dharahara is 245 ft. tall with 11-stories, and 21-stories from inside. The new premises spreads over 42 ropanis (about 21,400 square meters) of land. The new structure has a mini exhibition theatre on the 18th floor, a mint museum, a Green Park, a musical fountain, vehicle parking area, a souvenir shop and a food court. The new Dharahara was built near the remains of the old Dharahara, which will remain within a glass wall in memory of the April 2015 earthquake. The reconstructed tower has a 330 kg pinnacle mainly made of brass and is plated with 95 kgs of gold. This tower structure has been presented as symbol of national unity and of rising back.

FIGURE 73: DETAIL SKETCH OF DHARAHARA

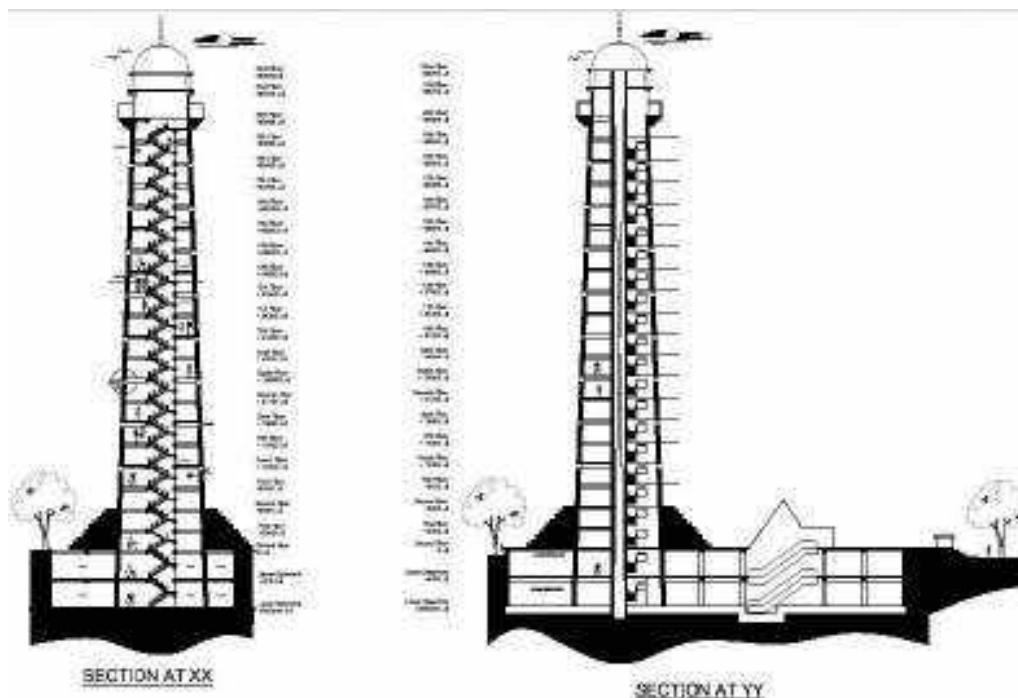
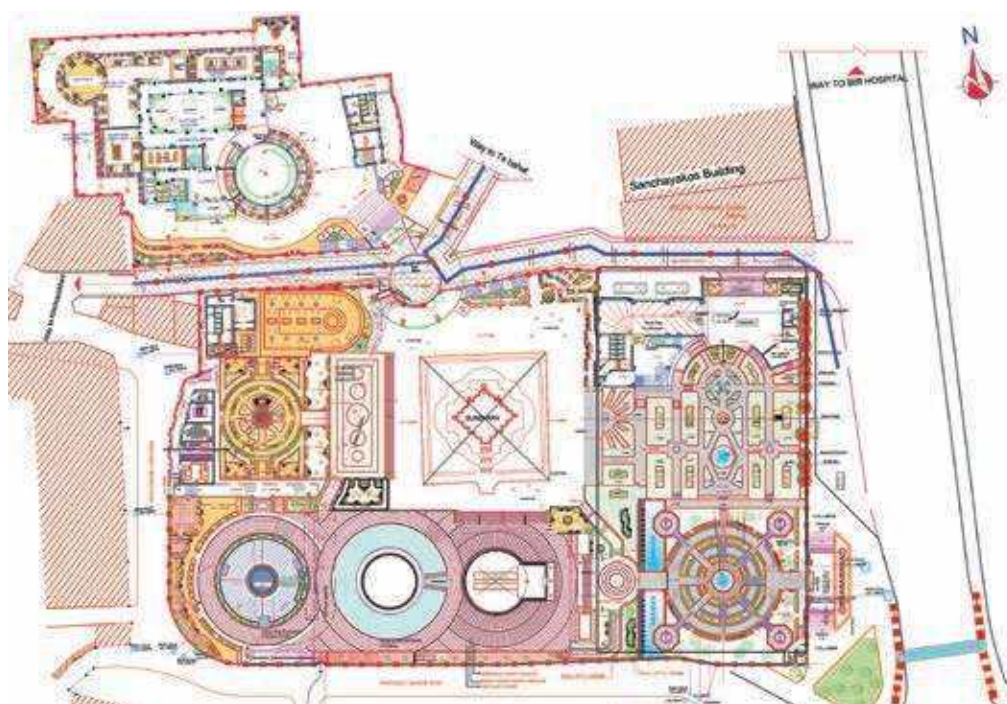


FIGURE 74: RECENT MASTER PLAN OF DHARAHARA



The following are some features of the Dharahara:

- n Although it seems as if it is 11 storied from outside, it is 23 storeyed with two floors underground. Altogether Dharahara is 25 storied minar.
- n Its 83.85 meters high from the ground level and 92.25 meters high, if measured from the underground floors.
- n There are two elevators that can accommodate 10 people. Dharahara also has a steel staircase.
- n For the sight-seeing, 20th floor of Dharahara has a balcony with a width of 2.5-meters.
- n The Shivalinga, an aniconic representation of Lord Shiva has been reinstalled from the damaged Dharahara on the 22nd floor.
- n Pinnacle popularly known as Gajur has been installed at the top of the tower.

FIGURE 75: RECONSTRUCTION OF DHARAHARA TOWER WHICH WAS INAUGURATED BY THE RIGHT HONOURABLE PRIME MINISTER. (NRA,2021)



11. Kasthamandap

Kasthamandap is a public wooden pavilion from which Kathmandu is said to have got its name and identity. This pavilion had collapsed during the 2015 earthquake. It was the oldest public building in Kathmandu. Legend has it that Kasthamandap was built from wood obtained from a single tree. The building had undergone numerous repairs, remodelling, and renovations over the centuries. It was originally a public rest-house (*sattal*) but also served many social and religious functions. It is likely that during its original founding, the *sattal* or the area around it also acted as a marketplace. This has been inferred from the following watercolor painting from the 1860s by Oldfield (see fig. 76).

FIGURE 76: (LEFT) AN OLD PICTORIAL REPRESENTATION OF KASTHAMANDAP (CIRCA 1860S) AND (RIGHT) THE SITE OF KASTHAMANDAP AFTER REMOVAL OF DEBRIS.



The Kasthamandap is a building with a rigorous square plan, with the geometric form derived from a mandala and therefore has a religious origin. It had three levels. After the earthquake, a soil investigation was carried out using percussion drilling, Standard Penetration Test (SPT), and laboratory tests and

prediction of the allowable load bearing capacity of the site under consideration. The level of water was recorded in the boreholes at least 24 hours after boring to establish the ground water level. There were no traces of water after 24 hours of observation.

The old foundation of Kasthamandap was preserved during reconstruction as it was found undamaged. The archaeological investigations were carried out by Durham University using Ground Penetrating Radar (GPR) and excavation to identify and map surface of the archaeological heritage and evaluate the foundations of the monument.

From these investigations, the team concluded that the foundation was resilient and undamaged by the 2015 earthquakes or previous seismic events, and that the collapse could have been linked to superstructure maintenance issues. They found that the main foundation was two meters deep and one meter wide measuring some 12 by 12 meters and was set in a clay mortar.

The investigation team also identified the location of saddle stones supporting three of the monument's massive central timber pillars, but a fourth pillar to the northeast, was missing. This indicated that the Kasthamandap's superstructure rested on three locked joints and one mobile one, weakening the stability of the building.

FIGURE 76: (LEFT) AN OLD PICTORIAL REPRESENTATION OF KASTHAMANDAP (CIRCA 1860S) AND (RIGHT) THE SITE OF KASTHAMANDAP AFTER REMOVAL OF DEBRIS.

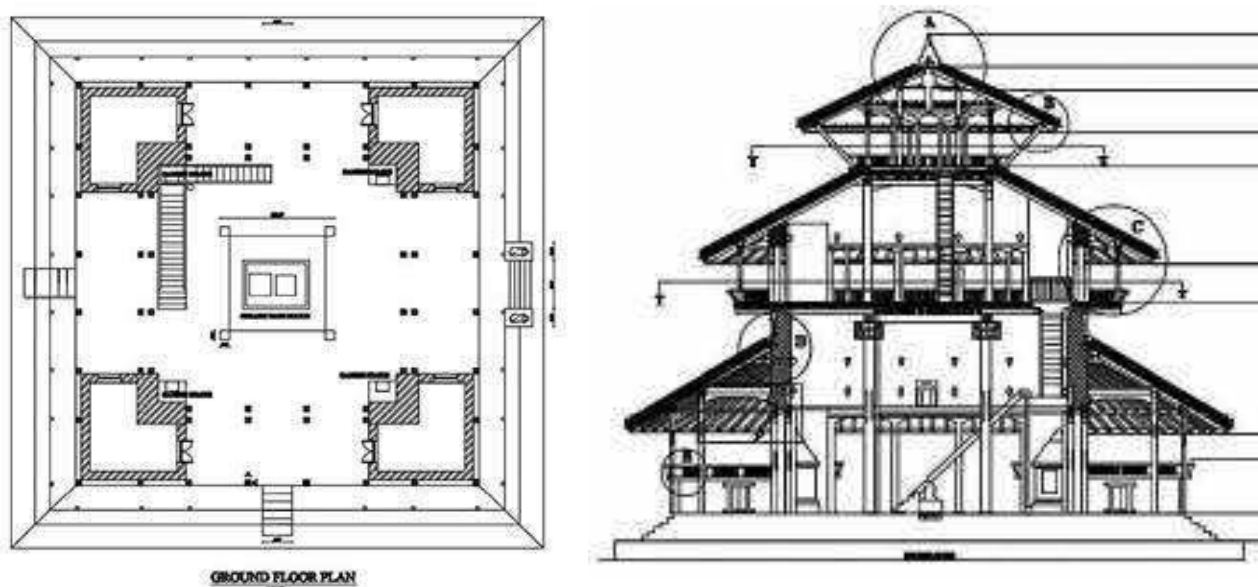


FIGURE 78: RECONSTRUCTION OF KASTHAMANDAP, PHOTO TAKEN ON 25 DECEMBER 2020



Reconstruction of the structure was being done using traditional material – mud mortar, brick and timber. Reconstruction was being done by a users' committee and most of the old timber was reused reconstruction.

12. Gaddi Baithak

The Gaddi Baithak was a neo-classical building built in 1908 by Prime Minister Chandra Shamsheer, and is one of Nepal's 10 World Heritage Sites. The Miyamoto Global Disaster Relief undertook the repair and structural upgrade of the building with a grant provided by the US Ambassador's Fund for Cultural Preservation. The project aimed to repair the building and improve its structural safety and resilience to earthquakes.

Approach wise, performance-based analysis was performed for detailed damage assessment and code-based design of structural retrofits were done using response spectrum method of analysis. The process involved:

- n Site visit and preparation of architectural drawings,
- n Damage assessment and damage mapping, and
- n Material testing

Detailed damage assessment with computer simulation on ETABS was done considering the April 25th earthquake. Retrofitting design analysis with computer simulations as per Indian Codes/Standards was done for developing repair and rebuild plans, and the construction drawing for retrofitting.

The building structure was of unreinforced brick masonry wall. The footprint dimensions were about 50 meter long in east-west direction and 18 meter wide in north-south direction. The height was about 17 meters to the parapet above the south arcade and about 21 meters to the top of the truss roof. The main hall space was about 32 meters by 10 meters.

The building comprised of a large double height hall space with two boxlike areas on either end, and a mezzanine level. Below the main hall space, was a basement like area at the ground level. Figure 79 shows the floor plan at first story level, and Figure 80 shows longitudinal section through east west direction.

FIGURE 79: FIRST FLOOR PLAN

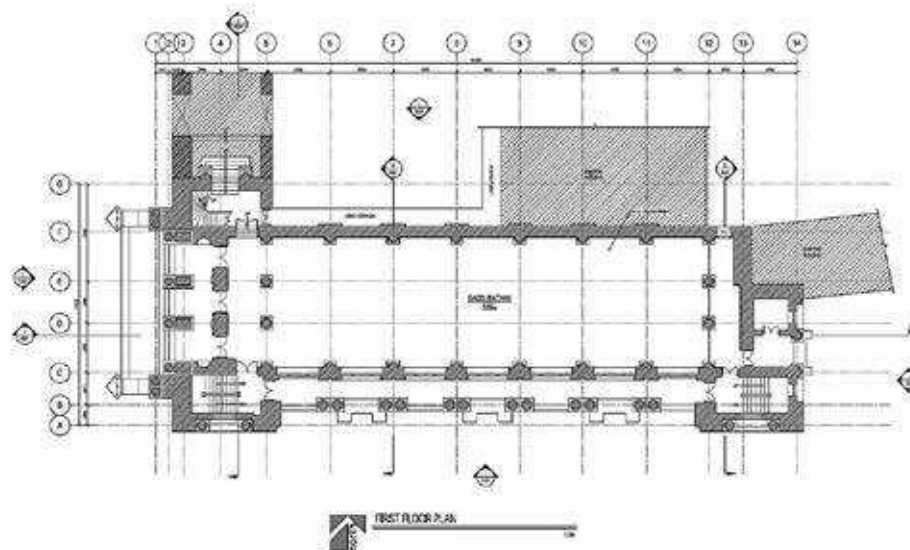
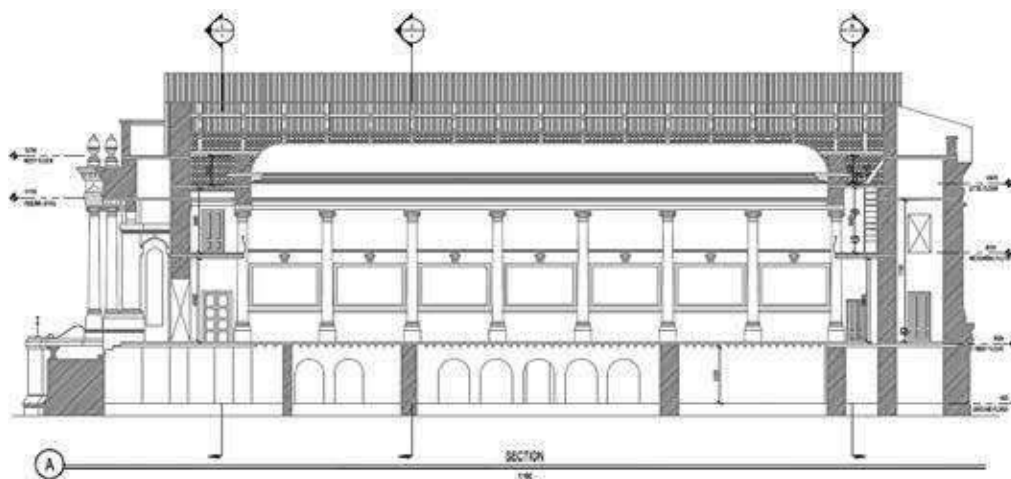


FIGURE 80: LONGITUDINAL SECTION THROUGH EAST-WEST DIRECTION



The building's walls and columns were made of brick with mud mortar. Columns and brick work on the upper part of the structure was built with lime mortar. Heavy timber trusses span over the hall space, supporting a wooden structure, which made up the ceiling. Bricks were observed to be of varying quality throughout the building, from quite low-quality brittle bricks to high quality bricks (dachi-appa bricks) amongst lime mortar courses. Different shapes and sizes of bricks were also observed.

Lime mortar was used in the building in a few distinct locations. Parapet walls and columns contained lime mortar. It was also used within brick walls at horizontal intervals of approximately 1.8 m. The roof was made up of large timber sections roof trusses that spanned over the main hall. Ceilings and floors throughout the building were framed with wood sections.

Steel section elements were used throughout the roof area for truss connections and connection of the truss to the main ceiling. Steel elements were also used as straps to attach the main hall ceiling to the wooden trusses. Steel pins were observed within walls to pin/connect large wood elements to masonry walls.

FIGURE 81: MORTAR TYPES IN WALL AND WALL PIER

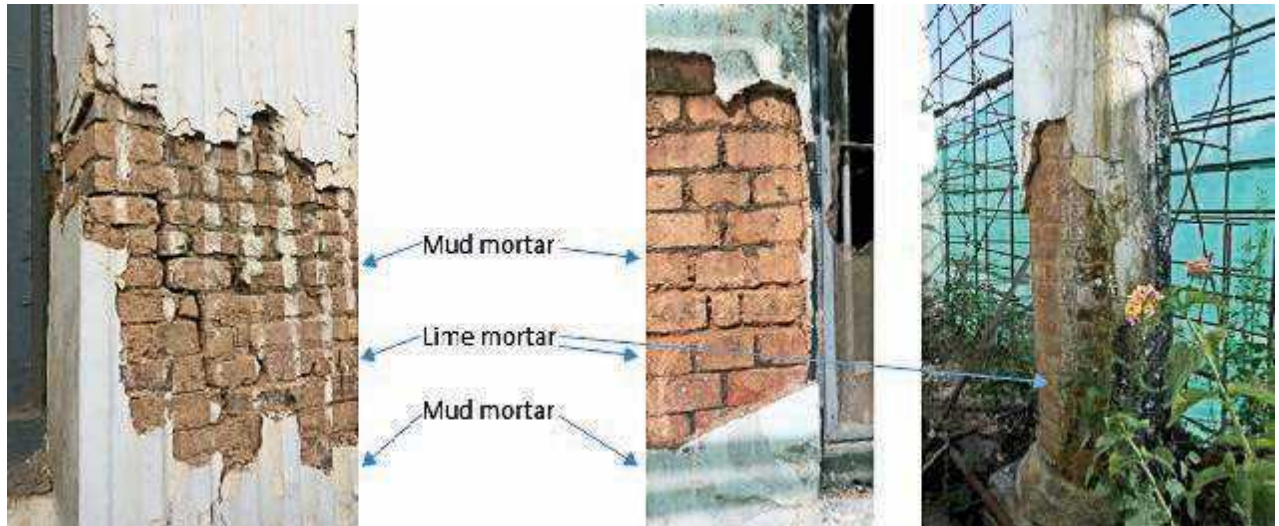
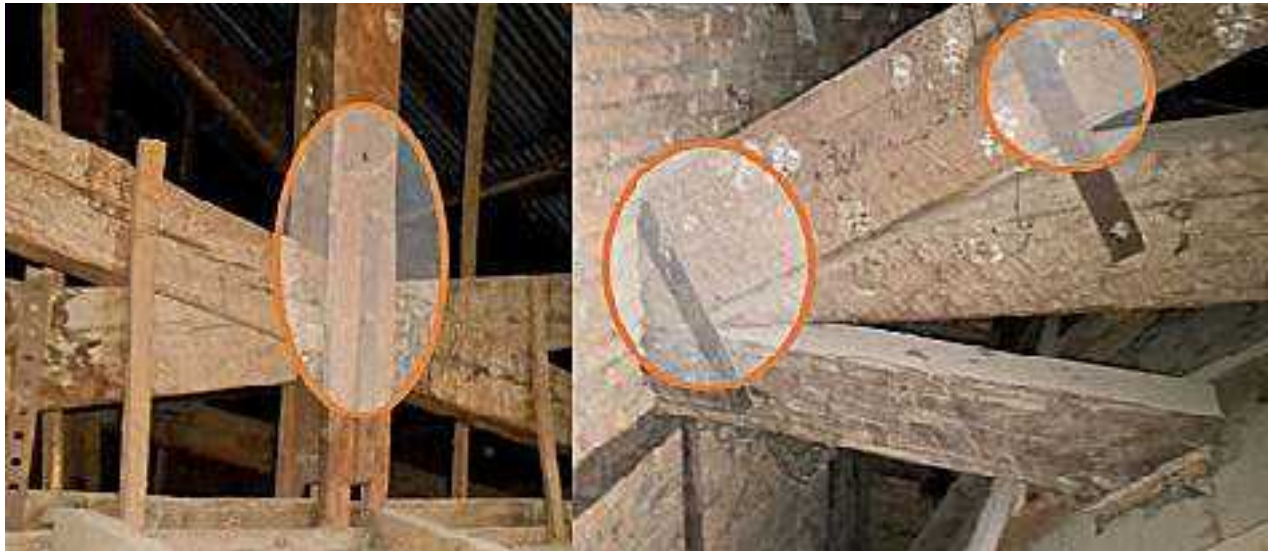


FIGURE 82: STEEL PINS



Retrofitting reinforcement straps

What appears to be a steel reinforcement strap was observed in one section of the building. This could have been added after the 1934 earthquake.

Tin:

Ornamental tin sheets were used in the ceilings across the structure.

FIGURE 83: ORNAMENTAL TIMBER CEILING



Steel rod intervention were introduced to prevent fall of the side wall that was separated by wide and long cracks.

Tripuraswore Mahadev Temple

The pinnacle and top roof of Tripureshwor Mahadev Temple had collapsed in the 2015 earthquake, and the pinnacle was completely damaged. It was sent to the National Museum, Chhauni for storage until repairs were carried out.

This temple complex was built in 1818 by Queen Lalita Tripura Sundari in the memory of King Rana Bahadur Shah. The Shivalaya had a three-storey temple, one of the largest temples built during the reign of the Shah Dynasty, as well as sattals and a garden. This Shivalaya was damaged in the earthquake of 1833 but had been restored. Construction details were inscribed on a pillar in the premises. The courtyard of the temple was a site for many communal festivals, music and rituals.

In 2015, the Department of Music, Kathmandu University was granted rights to restore the temple and house its academic and research wing in the Tripura Sundari complex, Tripureswor by the Guthi Sansthan. It was intended to not only restore the historical site but also support the preservation of musical heritage and the site for future generations. This was also a plan for adaptive reuse of the surrounding sattals, while the main temple would remain as it was with all the existing religious activities.

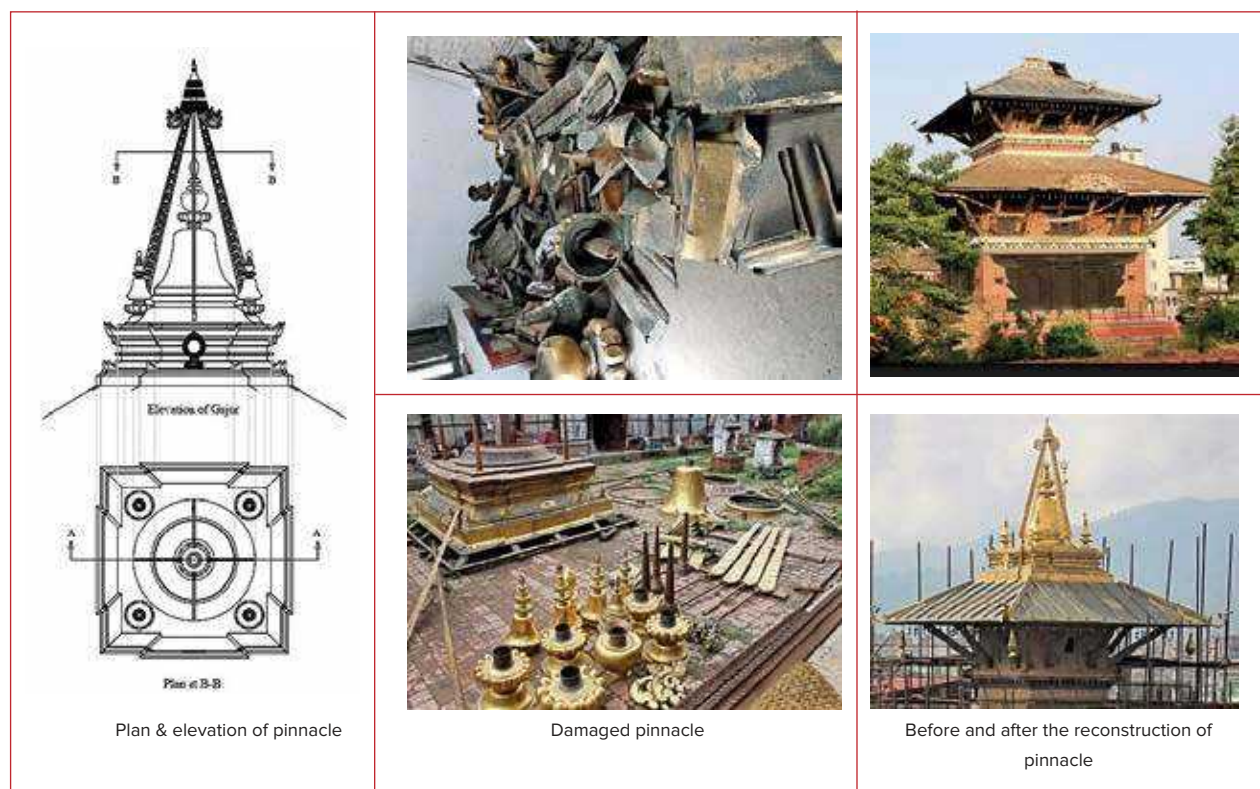
Restoration of Pinnacle

The finial of the Tripureshwor Mahadev temple was crowned with five gilded metal pinnacles sheltered under a decorative metal umbrella. The pinnacle parts were crushed and cracked in many places. Although the repair and assembling of each and every piece during restoration was a challenging task, expert metal workers were able to restore it into its former shape and aesthetics. Old pictures, drawings, scars and marks in the metal pieces were taken as reference to place them in their original positions. The metal components of pinnacle were all gilded. To preserve the gold in the elements, hammering and riveting of the crushed and cracked parts was the preferred method of repair. The holes of screws from where water could penetrate and ruin the entire roof structure, were riveted to prevent leakage. In addition, for additional protection new copper sheets were added beneath the gilded layers.

The pinnacle consisted of an internal wooden support also termed as *bhanggi*. The wooden parts were not strong enough to be reused, hence wood inside pinnacle was replaced by new sal wood. All the parts were properly cleaned before assembling.

The plan of the pinnacle measured 9 feet 7.5 inches in square and the height was 16 feet from the base of the bhanggi. Firstly, a model of top roof was made in the ground for ease of repair and assembly. Then the parts were numbered and then disassembled and finally, every piece was carried to the roof and reassembled.

FIGURE 84: DETAILING OF STRUCTURE OF TRIPURESHWORE MAHADEV TEMPLE



4.3.3 Traditional Heritage Settlements

The 2015 Gorkha Earthquake and subsequent aftershocks had damaged 62 historically important settlements in Kathmandu and in the districts. The NRA prioritized the integrated and sustainable recovery of traditional heritage settlements and made arrangements for recovery of six such settlements through NRA/ CLPIU. The six traditional heritage settlements identified for recovery were Bungmati, Khokana, and Sankhu in Kathmandu Valley and Gorkha, Dolakha and Nuwakot outside Kathmandu.

Majority of inhabitants in three settlements in Kathmandu Valley – Bungamati, Khokana and Sankhu – belong to the Newar community and share a similar culture, including the architecture of the houses. Most houses were four stories with brick, timber and mud mortar as construction materials. The settlements had narrow alleys courtyards. All three settlements had central space for various cultural activities. Newari architecture also had some influence in the other three settlements but also had stone in mud mortar buildings.

H. Bungmati

The heritage settlement of Bungmati is located 10 kms south of Kathmandu. It dates back to the 6th century and is considered to be one of the oldest settlements of Kathmandu Valley. Around 90 percent of houses had either been damaged or had collapsed during the earthquake, including important monuments such as the *Rato Machhindranath* Temple, the Hyagriv Bhairab Temple and the Manakamana Temple. The NRA requested technical support from expert consultancies to work on the reconstruction master plan prepared by UN-Habitat at Bungmati. The main objective of reconstruction of this settlement was to preserve its cultural identity and integrity. Some infrastructure development projects identified in consultation with the local community at Bungmati were:

Machhindra Bahal Complex

This area is popularly known as residence of the Rato Machhindranath, the God of rain. The Machhindra Bahal is at the centre of the settlement, and the diety is directly related to their main livelihood, i.e., agriculture. Major interventions proposed for the Machhindra Bahal development plan are: paving, surface drainage, and revitalization of a sunken stone spout.

Basimali and Dhoka Falcha

FIGURE 85: OLD PICTURE (LEFT) AND THE MORE RECENT PHOTOGRAPH (RIGHT) OF BASIMALI FALCHA AND DHOKA FALCHA

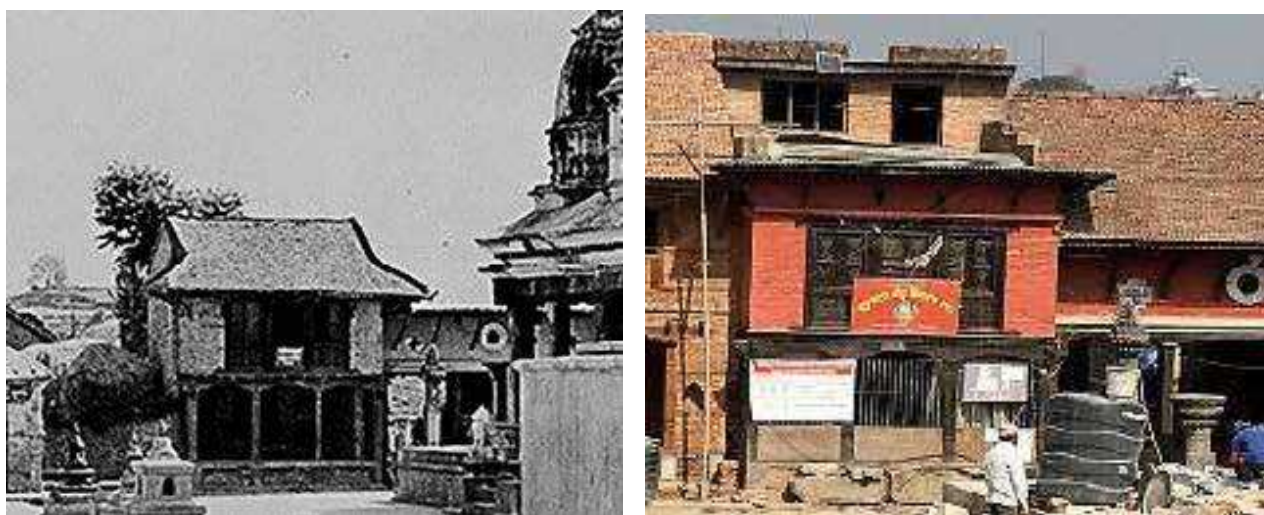


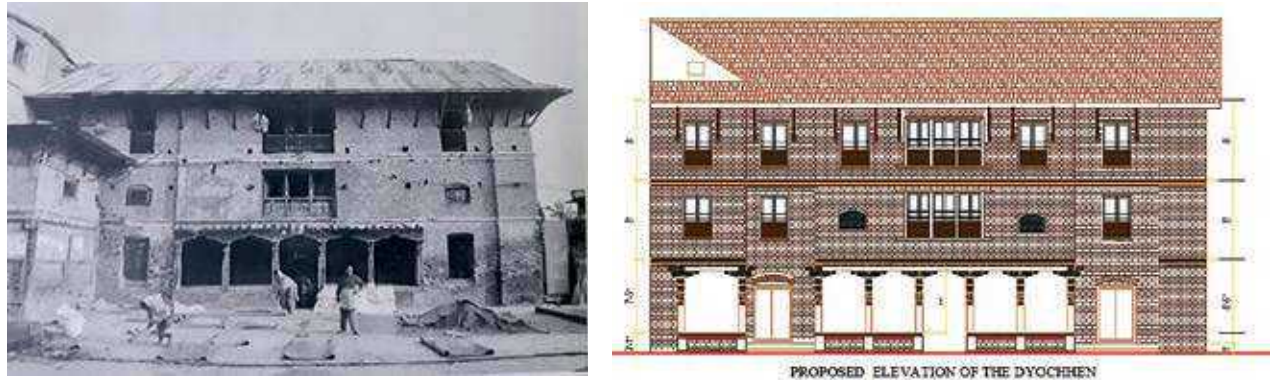
FIGURE 86: PROPOSED VIEW OF BASIMALI FALCHA AND DHOKA FALCHA



The Basimali Falcha is situated in the north of the Machhindra Bahal and is related to the worship and jatra (a cultural and religious procession) of Rato Machhindranath. The roof structure of this Falcha was changed from clay tiles to CGI sheets, which has degraded its appearance and has been proposed to be rebuilt while preserving its original appearance.

Similarly, Dhoka Falcha was been used as a resting space by people arriving from the North side of the Bahal, and had semi-open resting spaces on the ground floor and space for cultural activities in the upper floor. This falcha has been proposed to be rebuilt in its original form.

FIGURE 87: OLD PICTURE (LEFT) AND PROPOSED VIEW (RIGHT) OF DYO CHHEN



Dyo Chhen was another important cultural and religious building in the Machhindra Bahal area. The building was at the north-west corner of the Bahal and was used to store the valuable belongings of *Rato Machhindranath*. It also served as residence for the families of the caretakers of the temple. However, the structure was completely damaged during the 2015 earthquake. Dyo Chhen is proposed to be built using traditional materials and technologies.

I. Khokana

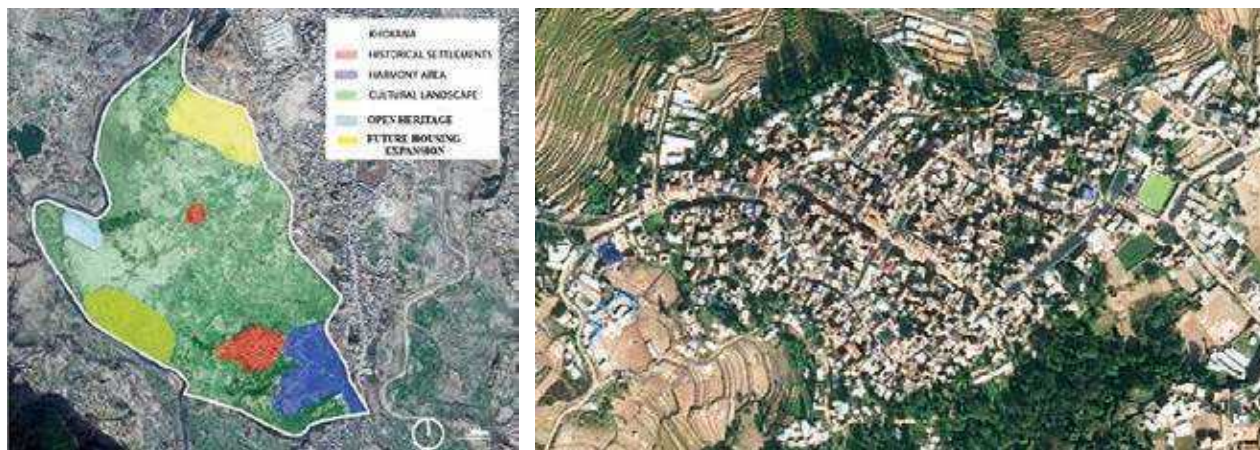
Khokana, the ancient Newari town with an area of 3.2 sq. kms is about 8 kms south of Kathmandu. The town is well-known for the production of rich mustard oil since ancient times. The GoN has nominated this settlement to be on the tentative list of nominations as a UNESCO World Heritage site. About 80 percent of all houses in the settlement were damaged or had collapsed in the 2015 earthquake.

A total of 812 houses were damaged and 355 homes were partially destroyed in the nine wards of Khokana. The consultant employed by the NRA prepared the conceptual master plan for the conservation of the heritage settlement and engineering designs for restoration of the settlement.

Heritage area zoning

It was recommended that the core heritage zone and buffer zone were demarcated in consultation with the local community and local government for protecting and conserving the heritage. That would make it possible to enforce laws for heritage zones for controlling unplanned development. It was proposed to use heritage zoning of the traditional settlement already mapped during the nomination of Khokana to the World Heritage list.

FIGURE 88: ZONING OF HERITAGE SETTLEMENT OF KHOKANA, REVITALIZATION OF THE CULTURAL HERITAGE ROUTE



It was also essential to preserve cultural *jatras* and their routes. For this, the master plan proposed improvements of the main streets, the routes of the main *jatras*, developing streetscapes along these routes in traditional building patterns, and adopting contextual amenities required for heritage tourism development. The streetscape improvement strategies had proposed the retention of traditional vernacular architecture.

The private housing reconstruction progressed after the NRA provided some flexibility on financial support for the damaged houses. The acceptance for the multiple ownership of a single house allowed NRA to provide multiple grants treating each owner as a beneficiary. ThebNRA also provided additional NRs. 50,000 each for the preservation of frontal architecture at historic towns like Khokana. However, the revitalization of culture route and traditional irrigation facilities were still under construction and the plan will be implemented by sectoral ministries after the phasing out of NRA.

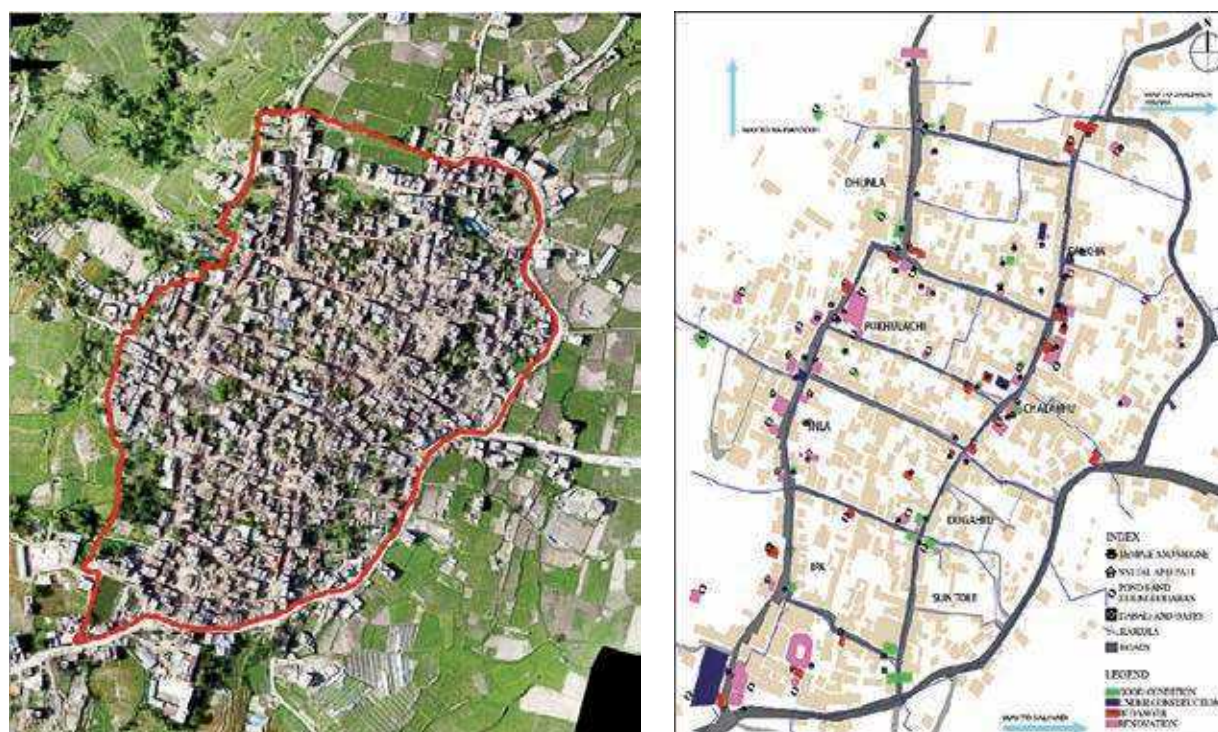
Detailed engineering designs

The study report proposed a number of multisectoral projects for heritage conservation under the reconstruction program of such settlements. The projects were identified through field visits, community consultations, study of the needs of community for sustainable development through heritage conservation and an integrated development approach. Among others, the consultants proposed the following as priority projects for the reconstruction of Khokana: (1). Design and development of Samlacho open space for community center, and (2). Reconstruction of the Kutsa Oil Mill.

J. Sankhu

Sankhu is a traditional Newar settlement located about 17 kms northeast of Kathmandu. Sankhu was added to the tentative list of World Heritage sites in 2008. It was severely affected and around 65 percent the buildings had either collapsed or were damaged. Approximately two-thirds of the monuments such as temples, rest houses (*sattals*), *chaityas* and other small shrines were severely damaged. The reconstruction master plan guided the reconversion activities, with the core area is divided into different zones to classify the settlements.

FIGURE 89: SATELLITE IMAGE AND MASTER PLAN OF THE TRADITIONAL SETTLEMENT OF SANKHU



Site specific bylaws were proposed for the different zones to regulate proper building construction in the future, and to ensure improvements in the urban fabric of Sankhu. The detailed reconstruction programs included restoration of traditional irrigation channel (Rajkulo) and also the road network in core area. Different levels of interventions were proposed for important monuments and heritage structures in core area.

1. Planning and building bylaws

Defining zones cannot be meaningful until construction in those zones is controlled. Therefore, based on suggestions from local stakeholders and concerned experts, the consultant drafted specific land use regulations and bylaws for different zones in Sankhu.

2. Thematic maps

A thematic map was prepared by clustering similar types of structures of the area. The maps were further differentiated with colors to explain the current physical condition of each structure. These maps were prepared on the basis of architecture and engineering site surveys conducted by different survey teams. The thematic maps were prepared for temples and shrines, *dabalis* and gates, ponds and stone spouts, sattals and patis, notable buildings, Rajkulo and the road. The detail engineering design identified for first phase of development work in consultation with local people and it included:

i. Project 1: Rajkulo

Rajkulo is an important traditional water channeling technology of Sankhu that needed to be restored to its original form. The local government will implement the project with support from line ministries after the phasing out of NRA.

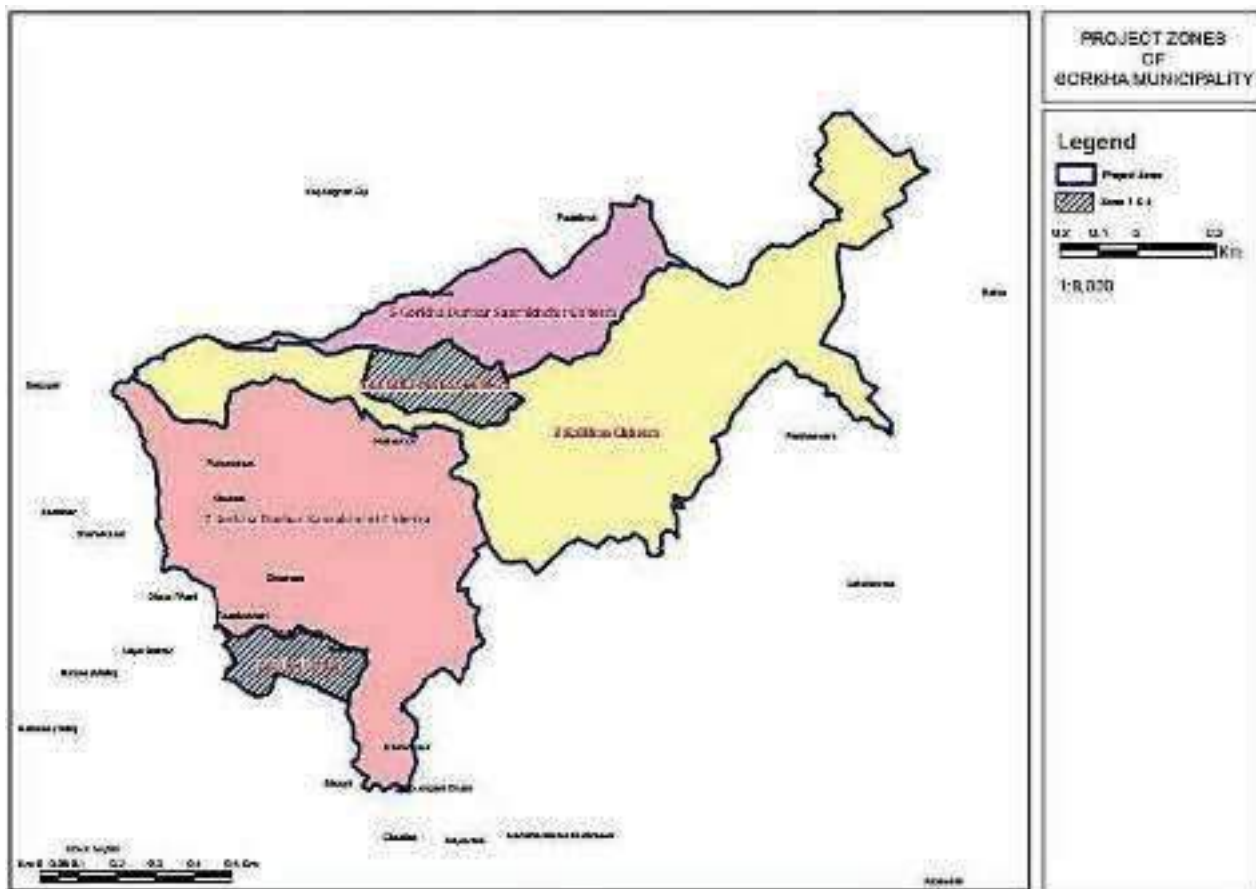
ii. Project 2: Paving of road

Stone paving of roads of core area was proposed as a future extension of the reconstruction effort. The local government was expected to make this investment, which had not begun.

K. Gorkha

Gorkha municipality is located 141 kms west of Kathmandu. Most parts of the municipality lie in the hilly region, while some lie in the flatlands. Gorkha Durbar, Gorakhnath temple, Kalika Temple and Tallo Durbar are some historic sites in the municipality.

FIGURE 90: CONSERVATION AREA 2073

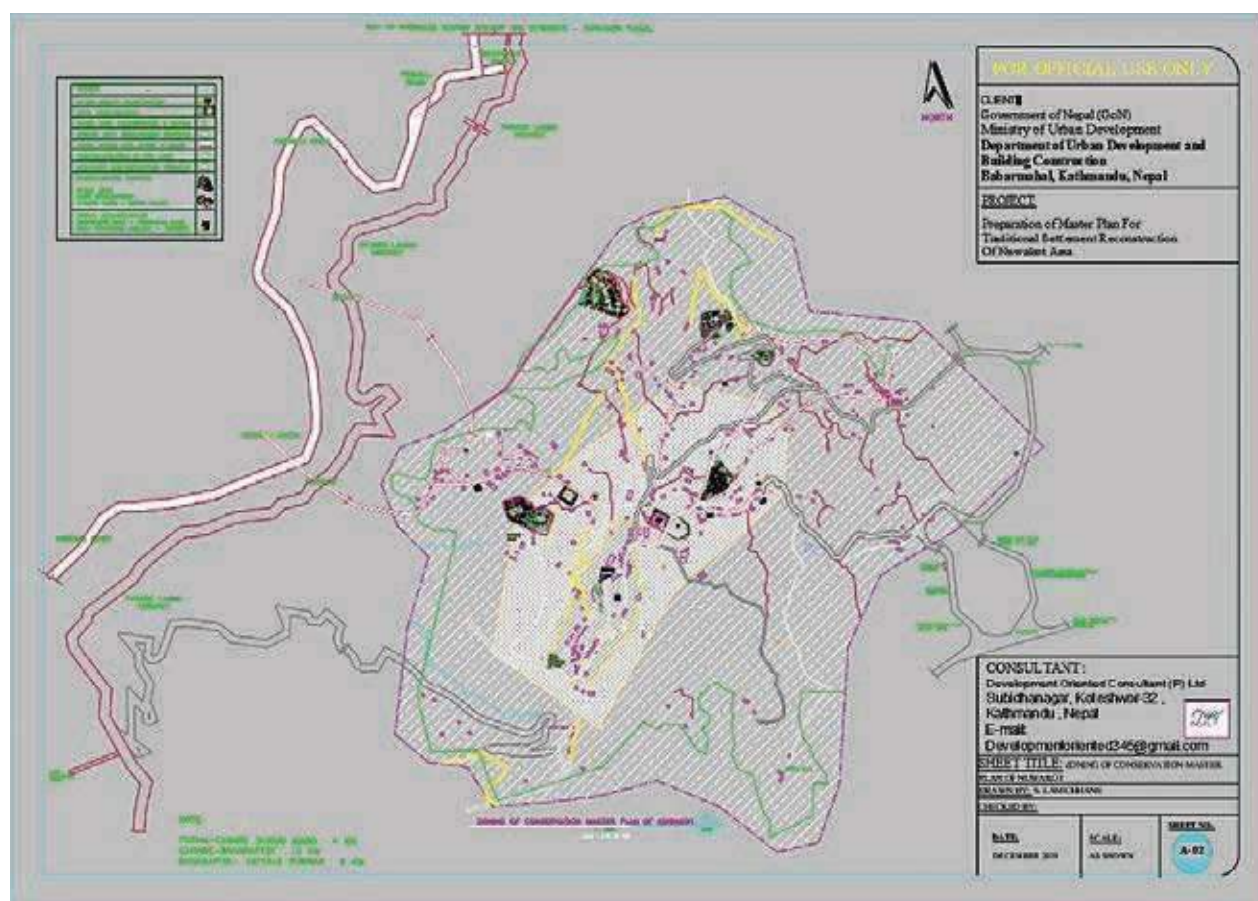


After the 2015 earthquake, the residential buildings around the conservation zone of Gorkha required reconstruction. The locals wanted revisions in the conservation zone boundary of Gorakh monument area to avoid strict rules. Inventories of the monuments were done in core conservation zone through a quick reconnaissance survey and the Gorkha Tallo Durbar, Gorkha Upallo Durbar were identified for reconstruction with a master plan and detailed engineering designs. The monuments in of need interventions were noted and categorized into those needing reconstruction, restoration, retrofitting and general maintenance. The projects were further divided into the year of execution of reconstruction, with funding agencies identified for supporting the work.

L. Nuwakot

Nuwakot is situated in Bidur Municipality of Nuwakot district. It is located in the east of Trishuli river and north of the Tandi river. The district is shaped like a half moon, and covers an area of 1121 sq. kms. It lies about 75 kms west of Kathmandu Valley. The seven-story Nuwakot Palace and surrounding complex was used in the 18th century to support trade routes linking Kathmandu with India and Tibet.

FIGURE 91: DETAILED MASTER PLAN OF NUWAKOT DURBAR AND TRADITIONAL SETTLEMENT AREA



Important monuments and structures

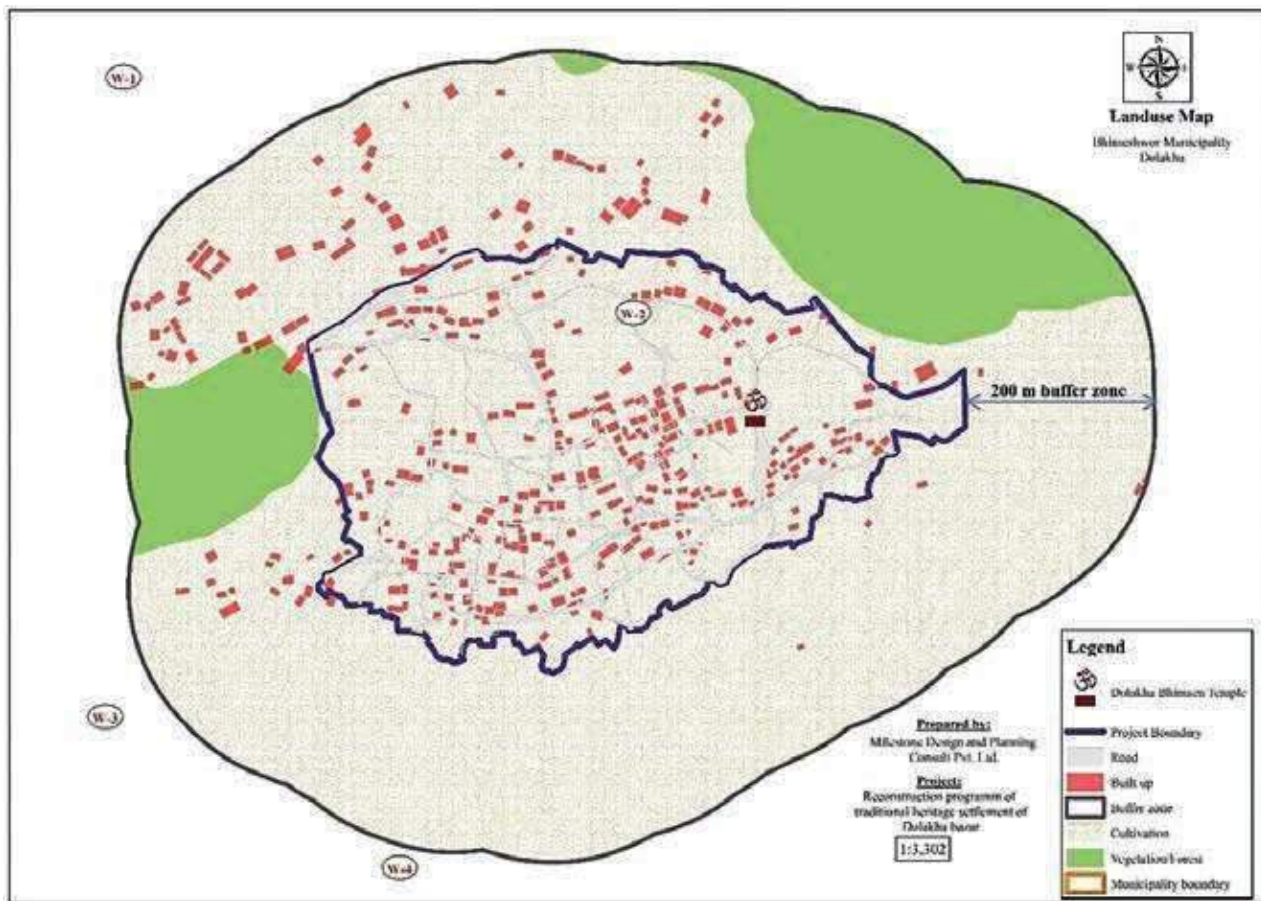
Nuwakot heritage premise consisted of heritage infrastructure ranging from the palace to patis (resting place) of different kinds. The traditional heritage area was divided into five sub-areas: Palace sub-area, Bhairahwi Devi Temple sub-area, northern sub-area, eastern sub-area and western sub-area.

The stakeholders such as the Ward office, DLPIU (Building), Nuwakot Sampada Gaon and the local community selected two projects – Alternate Heritage Road (or bypass road) and Malika-Kalika Trail – as infrastructure development projects outside of core monument zone and Mahamandal area of traditional heritage settlement area, for detail engineering design. The bypass road was selected as alternate heritage road to divert vehicles to pedestrianize the core area. The construction of Kathmandu-Hetauda fast track project aligns with this and bypass road. The trail selected for construction follows nearly the same path used by local people, trekkers, and worshipers, and it is also believed to be the same path taken by Bhrikuti (a Nepali princess) while traveling to Tibet during the Lichchhavi Period (circa. 7th century).

M. Dolakha

Dolakha Bazaar was another severely affected heritage settlements. It is a historic site situated north-east of Charikot Bazaar. About nine percent of the total traditional houses were damaged or had collapsed during the earthquake (NSET, 2016). There were more than 62 ancient heritage structures and about 1,099 households in the settlement (Bhimeshwor Municipality, 2018). The approved heritage zone and buffer zone of Dolakha Bazaar is shown below.

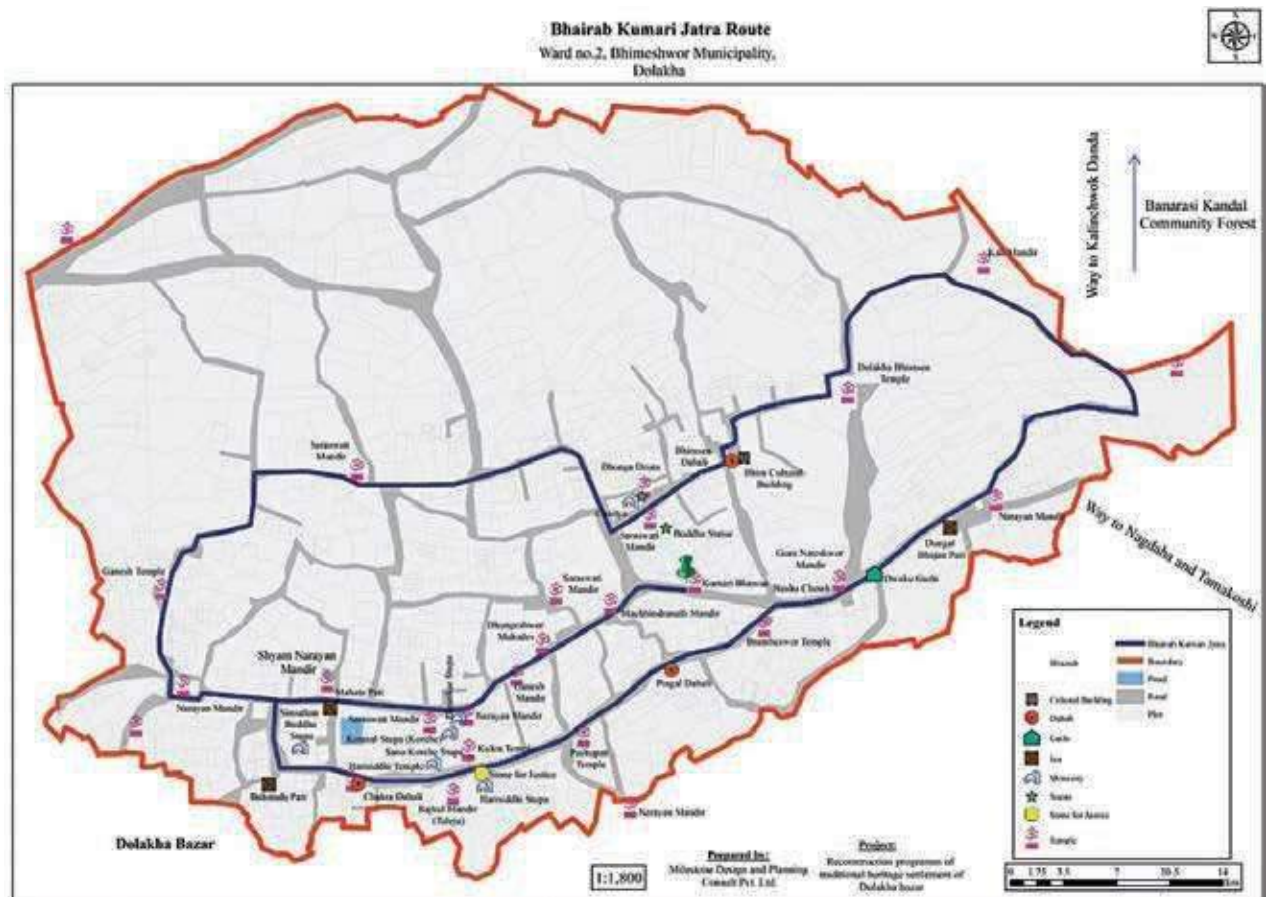
FIGURE 92: MASTER PLAN AND SCHEMATIC MAP OF DOLAKHA HERITAGE SETTLEMENT AREA



The Earthquake had damaged the Tripura Sundari, Pashupati, Harishddi and Narayan temples. The Kumari Chhe, the starting point for the Bhairav Kumari Jatra was also damaged. The destruction of tangible heritage had hampered the continuity of cultural activities such as *Lakhe naach* during Hiley Jatra, and ritual sacrifices during Khadga Jatra on last day by the Thami community which had been discontinued.

The area is rich in both tangible and intangible heritage. There were around 62 heritage sites in the area, including monuments, temples, chaitya, patis, ponds, stone conduits and other heritage components. The study was completed by the DoA and detailed description of each site was prepared.

FIGURE 93: SCHEMATIC MAP SHOWING A ROUTE OF A JATRA (A RELIGIOUS PROCESSION) IN DOLAKHA TRADITIONAL SETTLEMENT AREA



The detailed engineering study proposed many multisectoral projects for heritage conservation under the reconstruction program. After a preliminary study, field visit, and consultation with the stakeholders and community, the study identified the following projects for reconstruction: reconstruction Kamari Bhawan, Tasicha tole; Rajhiti, Narayan tole; Bhimeshwor Narayan Temple, Ganesh temple, Ganesh tole; Stupa, Korchhe tole; stone Pavement from Ganesh tole to Palchuti; and stone pavement from the old local government building through Dokulunga and to Red Cross Building. From this list of prioritized projects, the Kumari Building was selected as first priority after consultations with the local government. The total reconstruction of the building was proposed with complete design and cost estimate.

FIGURE 94: DESIGN OF THE PROPOSED KUMARI BUILDING



4.3.4 Monasteries

Many monasteries were affected by the earthquake of 2015 which had disrupted the day-to-day rituals and needed to be restored with urgency. The Earthquake Monastery Reconstruction Project (EMRP) was established under the CLPIU/GMaLI/ NRA to carry out maintenance and reconstruction of monasteries damaged by the earthquake. The EMRP supported the Monastery Management Committees by reconstructing severely damaged structures and carrying out both major and minor maintenance, as required, in close coordination with Buddhist Philosophy Promotion and Monastery Development Committee (BPPMDC).

3. Major interventions

The EMRP was a sub-project under CLPIU GMaLI to carry out reconstruction and maintenance of monasteries. These are activities in the reconstruction of monasteries included, damage assessment survey, preparation of working guidelines and directives; preparation of model designs, preparation of individual designs, maintenance and reconstruction.

The damage assessment survey was done in 2017/18 in close coordination with BPPMDC and other stakeholders to obtain data on the damages. The assessment revealed that about 1,320 monasteries were affected by the earthquake.

The NRA prepared and issued the working procedures ("Earthquake affected monasteries/bihar/stupa's preservation, maintenance and reconstruction working procedures 2075") and directives ("Earthquake affected monasteries/ bihar/ stupa's preservation, maintenance and reconstruction directives 2076").

These instruments provided a clear roadmap for implementation i.e., procedures, concerned authority's roles and responsibility, financial management, contracting, and so on.

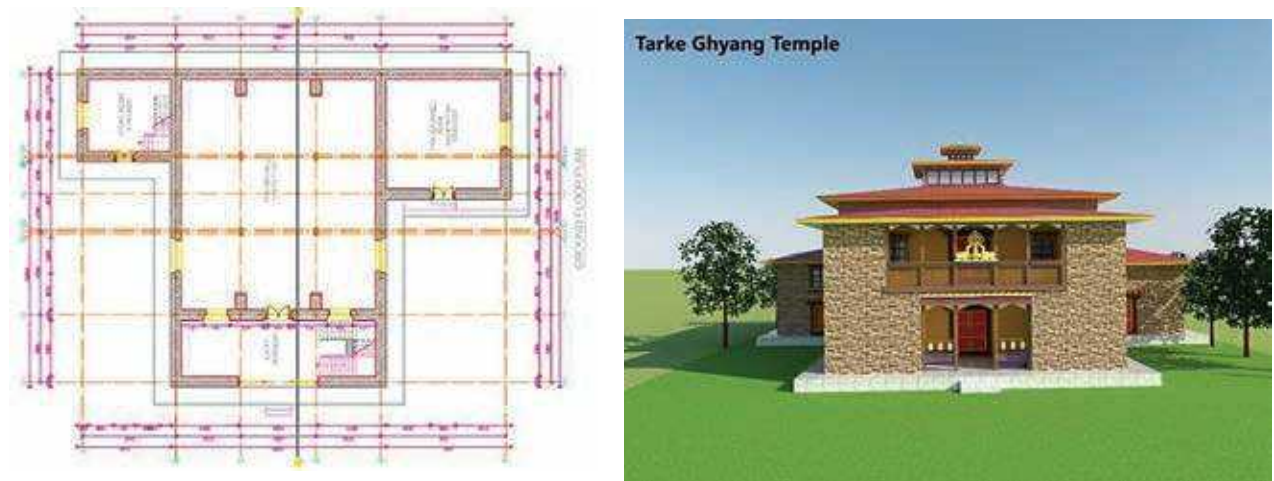
Several individual and model designs were prepared for the reconstruction. Altogether 24 types of model designs (12 types each for RCC and masonry type) were prepared and approved. There were primarily six types of model designs (RCC & Masonry) based on plinth area (i.e., 600 sq.ft., 800 sq.ft., 1000 sq.ft., 1200 sq.ft., 1400 sq.ft. & 1800 sq.ft.) for each single and multi story monastery. The model designs were used for monasteries that were less than 100 years old and had plinth area less than 2000 sq.ft. Monasteries over 100 years were considered to be heritage sites, so the recovery required specific design based on their previous architecture, materials and technology. Further, monasteries with plinth area greater than 2000 sq. ft were considered for individual design based on structural importance and geographic condition. Altogether 264 monasteries (above 100 years old and plinth higher than 2000 sq. ft) required individual designs. The detail project reports of 13 monasteries were prepared and approved of 264 monasteries, and remaining were in the process of DPR preparation.

In 2018/19, the maintenance of 402 monasteries of damage grades 1, 2 & 3 were undertaken by DLPIUs through users' committee and were expected to be completed by the end of fiscal year 2021/22. Reconstruction of the monasteries were to be done by the CLPIU/DLPIUs, while DLPIUs were to undertake the task for 631 monasteries that were less than 100 years old and plinth area less than 2000 sq.ft. These were to be done through user's committees or tendering (if users committee demanded). The monasteries above 100 years old and with plinth area greater than 2000 sq.ft. were to be implemented by CLPIU/ DLPIUs through tendering.

From structural point of view, the main construction details identified for making the monuments earthquake resistant were:

1. Symmetric configuration
2. Symmetrical location of the opening
3. Presence of timber bands
4. Vertical post at corners that acted as vertical tensile reinforcements
5. Timber corner stitch
6. Boxing of openings by timber frames, and
7. Use of timber wedges, carpentry joints

FIGURE 95: PLAN AND 3D ELEVATION IMAGE OF TARKE GYANG MONASTRY



4.4 Key issues and challenges

4.4.1 Documentation of heritage

Documentation according to the nature of the damaged property needs to be prepared for proper restoration and reconstruction of all heritage structures. While documentation of the structures prior to disasters is fundamental for comparison, it is equally important to carry out early recording of damage and of surviving elements. The priority for documentation should be established on the basis of historical records and heritage value. The following activities are recommended:

1. Damage assessment.
2. Excavation work to investigate the condition of foundation, if necessary.
3. Recording measurements.
4. Creation of measured drawings for record and future reference.
5. Archaeological notes, and
6. Photographs.

The activities above are important before execution of restoration and reconstruction works. The Kathmandu Valley Preservation Trust and Bhaktapur Municipality have undertaken detailed documentation of the restoration work in Patan and Bhaktapur heritage areas. There is also detailed documentation on the restoration of the Nautalle Durbar and the Lalitpur Tower at Hanumandhoka. Similarly, the CLPIU prepared detailed documentation on the reconstruction of the western façade of Singha Durbar, Keshar Mahal, Sita Maharani Bhawan (Balmandir) and Babar Mahal. Rest of the conservation work/ projects at different sites were not very successful at keeping detailed records. The DoA needs to complete the documentation.

4.4.2 Reconstruction technology

Both traditional and modern renovation technology are important for the restoration and reconstruction of heritage buildings. The technology depends upon the condition of the structure. Modern technology is used to preserve monuments for longer periods, while taking care to retain the heritage values to the maximum extent possible.

Post-earthquake research on heritage structures have found that physical vulnerabilities of structures are the cause of damage in an earthquake. According to the Soyambhu Mahasamiti, the wall of Shantipur there had been damaged due to the insufficient support of the long-brick masonry mud-mortar wall. Later, during reconsevation it was provided with sufficient reinforcement using wooden pillars and support and replacing the mud mortar with lime-surkhi mortar.

Likewise, the previous restoration of Batshala and the Durga Stone temples had resulted in physical vulnerabilities, that were the reasons for the damages in 2015. During restoration, wooden reinforcement was added according to the conservation principles to increase the structural strength. The KVPT project also executed structural strengthening as per its restoration and reconstruction policy.

4.4.3 Reconstruction architecture

Post-earthquake recovery and reconstruction is an opportunity to undertake measures to reduce pre-earthquake vulnerabilities resulting from inherent structural weaknesses or previous interventions. However, these decisions must ensure that there is minimal impact on the heritage value and heritage architecture.

4.4.4 Social and political concerns

The earthquake of 2015 affected the social and political outlook with regard to the vision for heritage conservation. The community had understood the benefits of the heritage on their livelihood and economy. Thus, heritage conservation was influenced by both socio-political attitudes towards conservation and restoration. Again, the growing international concerns for the conservation of the heritage after the earthquake also contributed towards raising awareness of the importance of restoring heritage. It was also evident that national policy still needed to be looked into for sufficiently addressing heritage recovery. Related and important issues like shortage of wood, and the capacity for geotechnical engineering investigations and building capacity of qualified artisans must also be addressed. This would also necessitate increasing public awareness through workshops, talk-programs and seminars with support of organizations like the NRA.

4.4.5 Ownership of monuments

Monuments over 100 years old come under the Ancient Monuments Preservation Act, 2013. But, Guthi Sansthan Act, 2033 and Local Governance Act, 2072 also have provisions on restoration and reconstruction of the properties. Similarly, Pashupati Development Trust Act, 2044 has provisions on restoration of monuments within the jurisdiction, even though, all the above-mentioned acts need to be in compliance with the Ancient Monument Preservation Act, 2013. Private trusts (Guthis) have also existed in Nepal since the medieval times. The Guthi members organize related festivals and rites within their clan and community. Guthis also celebrate different festivals and also care for the restoration of heritage. But, if the monuments need major restoration, the Guthis also need to seek the permission of the DoA.

People's participation is desirable for good conservation practice as it helps to enhance the status of artisans as demonstrated in the restoration and reconstruction work undertaken by Bhaktapur Municipality. The contractor system often imposes a compulsion to complete the restoration work with limited artisans without caring for work quality. As there are very few people who work on stone and traditional bricklayer contractors may often also not pay attention to employing qualified artisans as their main motive is profit-making.

Maintenance

Regular maintenance of monuments can keep them in impeccable conditions. Historically, a regular maintenance system of monuments was established in the Lichchhabhi Period, which called for *Samaraja* (maintenance), *Upalepana* (clean, colouring) and *Sanskrita* (conservation), as and when necessary. The Mallas continued this system by establishing the *Chhenbandel Adda* (office). The early Shah period also followed the same system for the maintenance of damaged monuments. After BS 2030, the government established the Palace Maintenance Office (*Durbar Herchaha Adda*) for the regular restoration of historical palaces and monuments in Bhaktapur, Lalitpur and Kathmandu. A Germany-supported project had introduced the systematic management restoration and also of different positions such as carpenter, bricklayer and awale (pottery tile or jhingati-layers). The project had also set up an annual Emergency Rescue Fund for that purpose. This was continued till 2001.

Institutional strength

NRA with the technical expertise from the DoA worked for reconstruction and recovery of heritage sites. The DOA has limited technical capacity and therefore the need for investment in capacity building for developing expertise within the department. Similarly, the traditional construction skills had been eroding

over generations that had made availability of skilled craftsman a challenge during reconstruction. Resources also need to be allocated for capacity development of local craftsman and experts needed for the institutional strengthening of the DoA. The following factors can play a vital role in enhancing the strength of any institution: clarity of operational responsibilities, development of expertise and skills, effective use of resources, preparedness and risk management and disaster response planning.

Restoration work is a complex process where one has to deal with operations and development of expertise and skills, which are the basic strengths of the institution responsible for the work. The strength of the institution is also reflected in ways resources are mobilized and used. As mentioned before, contracting out is not always best for proper restoration. Preparedness and risk assessment and disaster risk management planning can help to enhance strength of the institution.

Socio-cultural assessment

Disasters is not affected tangible heritage, but these also influence the socio-cultural activities of the people. The people are vulnerable and suffer losses through injury, death and displacement that can affect the community's socio-cultural and physical capacity and resilience for recovery. Socio-cultural assessments are important for understanding the impact on heritage. Proper study of the intangible values can help to increase the awareness of the community to consolidate their efforts during conservation. Many damaged monuments remained to be fully restored and that continued to hamper religious activities, thereby impacting intangible heritage, in many communities.

The effects of disasters on the society and culture and the socio-economic process depends on the relationship between heritage sites and the communities who live there and depend on them for incomes through tourism. Thus, intangible heritage is an essential component of the tangible heritage as it not only contributes to preserving values but also helps to sustain the local economy. But very few restoration and recovery projects emphasized the impact on socio-cultural values. It is integral that the recovery process prioritizes the recovery of intangible attributes as well, to ensure that local communities also benefit from the conservation.

4.4.6 Key lessons

Out of the 920 damaged and destroyed monuments, 589 have been recovered, 195 are in reconstruction process, and 136 are in the recovery process remained to be started when this report was prepared. The reconstruction and restoration of the remaining heritage structures will be completed under the guidance of the DoA. The lessons learned from reconstruction and restoration initiatives are as follows:

A. Community ownership

Local communities need to be involved and consulted at various stage of construction to enhance the ownership of recovered monuments. Recovery Coordination and Management Committees need to be established at various sites including local community members for the smooth operation of the project activities.

Heritage structures in Nepal are living monuments as they are related to community living. Therefore, several sacred or religious activities were carried out at each monument at various stage of reconstruction. The Chhema Puja (seeking forgiveness any wrong activity during renovation) was performed by priests of local communities before removing and reinstalling different parts of the monument. These religious activities are important part of the heritage and should be respected during reconstruction. The local people considered unused material of reconstructed or restored monument as sacred, so these should be managed as per religious belief and not be disposed at any location.

B. Amendment of the Public Procurement Act for heritage recovery

Repair, restoration or reconstruction of traditional monuments is complex and time-consuming and cannot be carried out without passion. The tendering system under the procurement rules led to the award of jobs to the lowest bidders. Contractor usually speed up work to meet deadlines, which can result in poor quality of work, including the loss of traditional processes during repair and rebuilding. As per experience in reconstruction / restoration it was conformed reconstruction was best when done through user groups instead of contracting. The amendments in the law need to consider effective procedures for the protection of heritage structures as well as the intangible heritage.

C. Involvement of competent agency in heritage recovery

A competent agency like the DoA should be involved in the recovery of damaged heritage structures. If regular department like the DoA are overloaded, then an agency similar to CLPIU should be formed with responsibility to carry out projects. However, the agency needs to have qualified heritage conservation professionals to steer the recovery process. Special purpose organizations like the NRA can be formed for effective coordination between agencies. The NRA's effort to increase the ceiling for working with user committees had provided some flexibility for undertaking work costing up to NRs 100 million. Besides the NRA had also worked to take projects forward even when they had become controversial (in the case of Dharahara and Ranipokhari, for example).

D. Use of traditional materials and techniques

In each reconstruction project priority was given to the use of traditional knowledge, skill and materials. Kasthamandap and Nyatapole and monuments in the Patan Durbar Square are some examples of projects that had used local material particularly mud mortar. Appropriate modern technology and materials should be allowed only for stabilizing damaged structures and not for reconstruction. All the reconstruction projects should be carried out by local artisans who have the skills and knowledge to work on historic structures. Examples of such projects are the Nautalle Durbar and Gadhibaitak of Hanumandhoka. The availability of traditional quality material like brick, Sal wood and stone was a challenge during reconstruction. Such traditional materials need to be managed before starting reconstruction.

E. Supervision by competent agency

There needs to be a credible agency for supervising recovery projects to ensure smooth operations, which needs to involve local communities and also special purpose organizations like the NRA. The Boudhanath Stupa reconstruction was an example of the community initiative done under the supervision by an engineer from the DoA.

F. Management of funds

The financial as well as the technical support from the different national and international institutions and/ or governments was made available for reconstruction through the NRA. The NRA had maintained two-way communication with the beneficiaries and donors to improve coordination and prevent misunderstandings. The NRA had ensured integrity and accountability of funds to gain donor confidence and support. Flow of fund should be integrated with work during reconstruction of heritage construction. The NRA had also established an environment that minimized corrupt practices.

G. Research on traditional materials and skills, and documentation

Research is required on traditional knowledge, rituals, skills and materials for ensuring quality of reconstruction of heritage structures. Proper conservation requires detailed documentation of tangible

and intangible heritage, that can later be used for integrated management of the sites, monuments, artefacts, as well as the intangible heritage.

H. Governance system

The governance system for cultural heritage needs to be clarified within the parameters of the 2015 Constitution of Nepal and laws, while also providing feedback for amending the laws as needed keeping in mind the DoA as the responsible technical authority for protecting cultural heritage.

4.4.7 Conclusion and way forward

Heritage conservation contributes to the economy but national policy often always looks for direct returns from investment. It rarely assesses the value of heritage and its attachment to community. The historical documents reveal how different past regimes had attached importance to the conservation of monuments. The six monument zones in Kathmandu Valley are located within a 25-kilometer distance, with hundreds of other monuments between the monumental zones. The rulers of the past had contributed to the construction of the numerous monuments within the Kathmandu Valley. Heritage conservation has many challenges, one of which is the difficulty to predict the scale of destruction particularly after a large calamity. Each circumstance has brought into sharp focus the variety of reconstruction techniques appropriate for damaged World Heritage sites and other sites. The most challenging situations were faced was that the monuments were part of life in the communities, and hence shall be restored through communities consensus. The earthquake of 1934 had also caused massive damage to property and the recovery was done by the then rulers. The recovery and restoration were done based on principles but there was no documentation available. Thus, the need for ensuring that all interventions are recorded for future response to disasters.

Detailed principles and approaches need to be established for the recovery of heritage structures and settlements by considering the significance of the monuments as well as safety.

How to move forward in the task of the recovery of heritage is a question that can be addressed by understanding and exploring the specific nature of each circumstance, transmission of proper information, and adaptation to suitable technologies. Political will is also important for timely completion of the tasks. The responsible institution needs be in communication with the political leadership to draw attention for addressing challenges faced in the process.

The regulatory agency must have the overall capacity to draw the political attention to strengthen the institutional frameworks, and for creating the conditions to tackle the challenges. This can be achieved by establishing a sound structural framework for the institution, particularly for defining relationships with other agencies.

The principle of intervention needs to be based on the idea of maintaining as much as possible, the original characteristics of the heritage buildings, and ensuring that strengthening techniques do not compromise originality. However, continuous use of the heritage buildings is also very important to avoid abandonment, and therefore the need to incorporate adequate safety features. Another challenge is the selection and use of the correct structural modelling tools. Therefore, the right diagnosis and seismic assessment of historical structures must be done for appropriate design of retrofitting and strengthening. The heritage structures that are subjected to ageing must be monitored periodically in order to prevent irreversible deterioration of materials and structures, and to reduce the vulnerability to natural hazards such as earthquakes. For this, there is need for a robust organization with necessary skills and competencies to make the right decisions on reconstruction and retrofitting of heritage buildings. All the above-mentioned factors need to be effectively managed for which, the institution would need to establish a separate section to address reconstruction issues.

CHAPTER 5

RECOVERY AND RECONSTRUCTION OF PUBLIC BUILDINGS AND INFRASTRUCTURE





RECOVERY AND RECONSTRUCTION OF PUBLIC BUILDINGS AND INFRASTRUCTURE

5.1 Damage and losses in public buildings and infrastructure

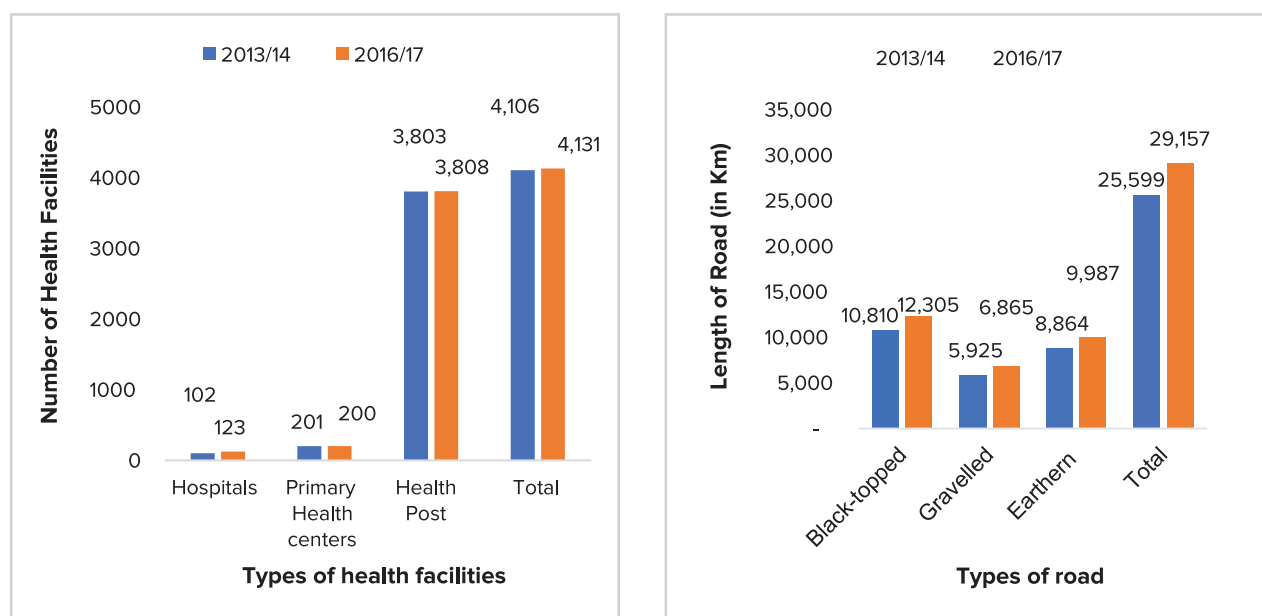
5.1.1 Introduction

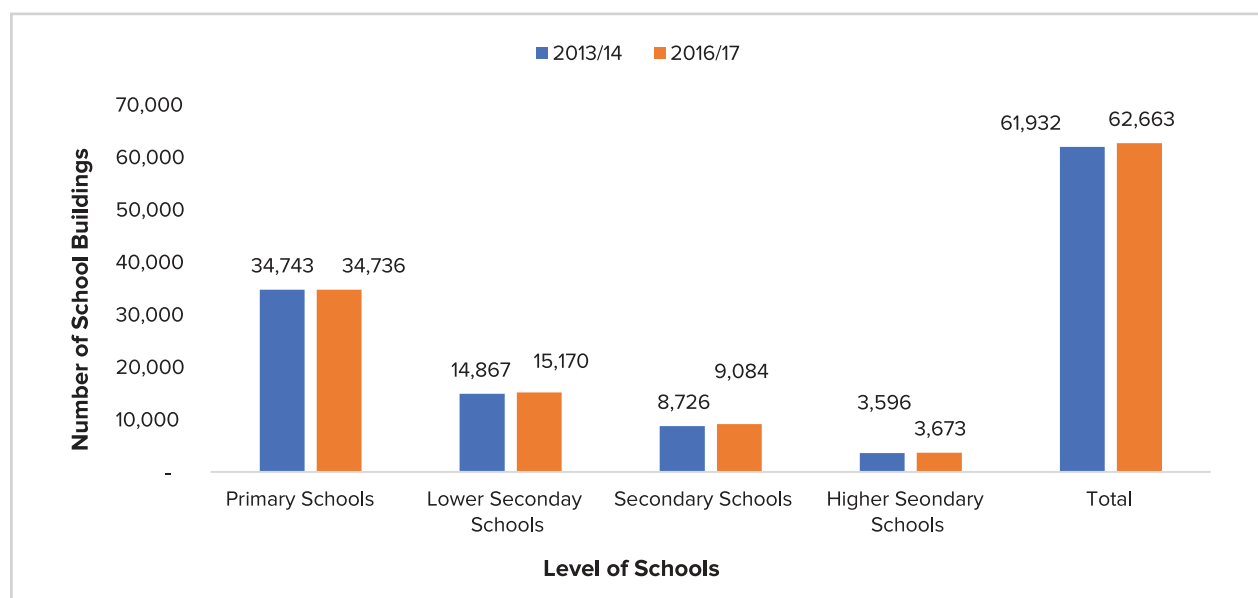
This section discusses reconstruction of public buildings and infrastructure (PBI) after the 2015 Gorkha earthquake, and includes key lessons learnt on reconstruction and recovery. In particular, this report covers the reconstruction and recovery of mainly schools and educational institutions, hospitals and health institutions, government office buildings, and buildings owned by security organisations i.e., Nepal Army, Nepal Police and the Armed Police Force, in addition to reconstruction of infrastructure such as roads, bridges, power stations, and water supply services.

5.1.2 National data on public buildings and infrastructure

Figure 96 below shows the national data on public buildings and infrastructure in 2014 and 2017, representing the situation before and after the earthquake. Nepal had 4,106 health facilities and 61,932 education buildings, and 25,599 km of roads. In 2017 the number of health facilities buildings increased to 4,131, education buildings to 62,663 and the total road length to 29,157 km.

FIGURE 96: NATIONAL STATISTICS OF PUBLIC BUILDINGS AND INFRASTRUCTURE



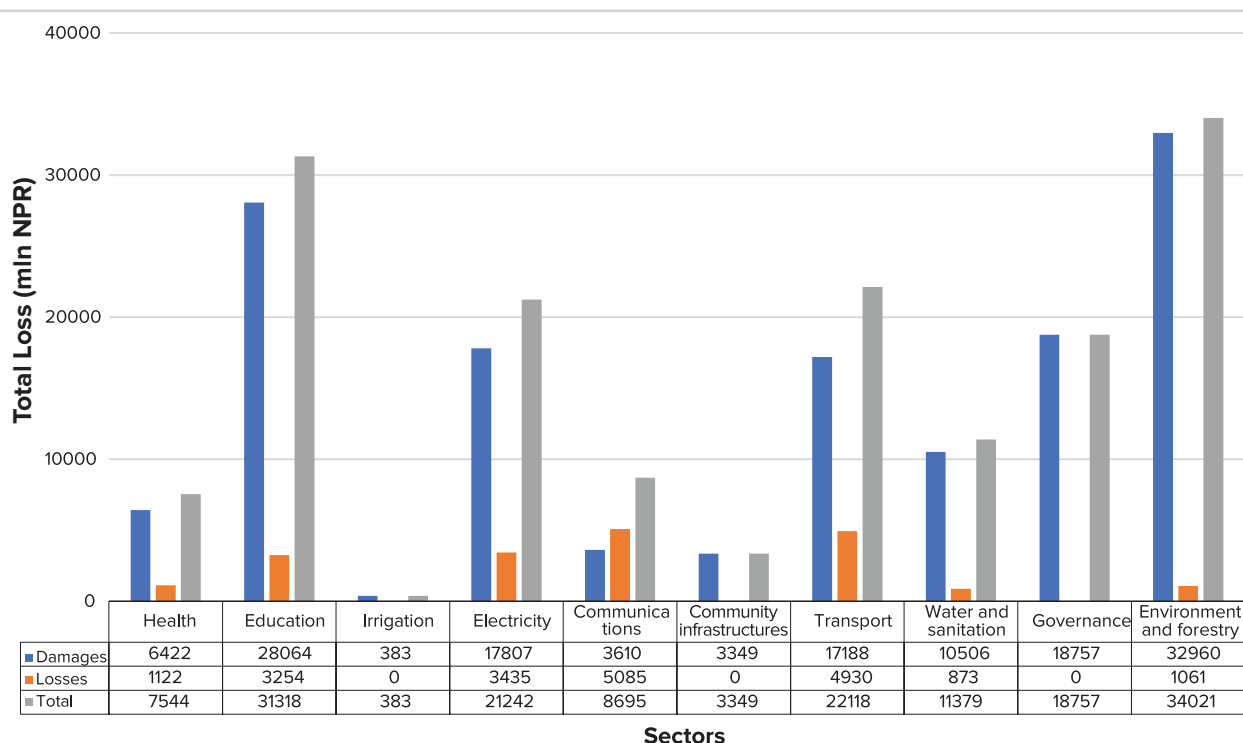


(Source: Nepal in figures 2014 and 2019 by CBS)

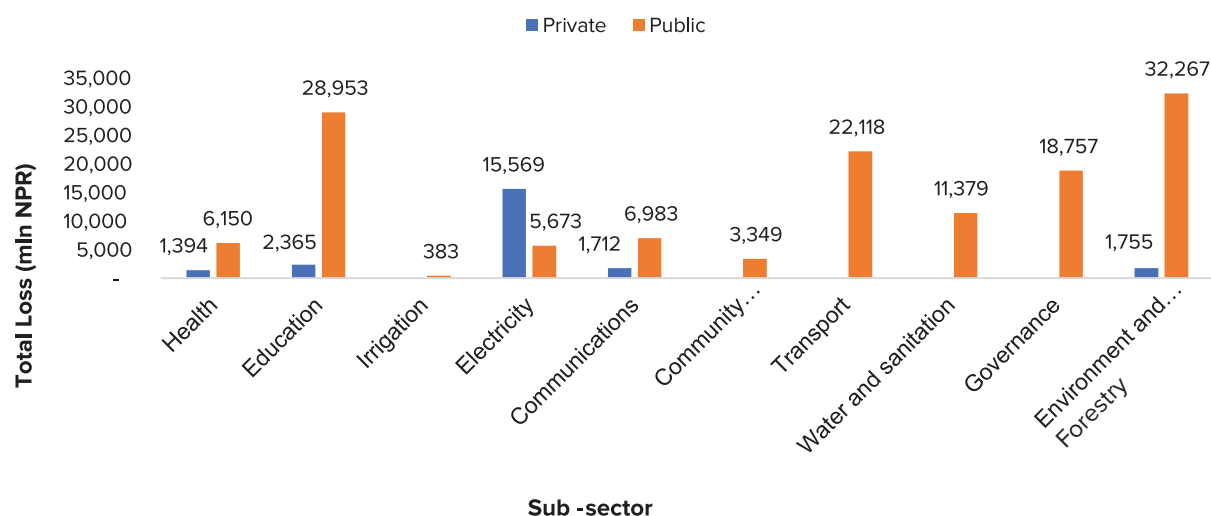
5.1.3 Damage and losses

The damage assessment report (PDNA) stated that 2,656 government buildings had been severely damaged and 3,622 were damaged partially. Similarly, 544 buildings of health institutions were completely damaged, and 653 partially damaged. At the 8,242 public schools affected by the earthquake, 19,000 classrooms were fully destroyed and 11,000 were partially damaged. Additionally, 383 security-service related buildings were damaged, which included 204, 31, 139, and 9 buildings belonging to the Nepal Army, Armed Police Force, Nepal Police and Department of National Investigation, respectively. In the infrastructure sector, 89 bridges and 1020 km of 77 different roads were damaged (GoN, 2015).

The PDNA had indicated that the estimated monetary loss caused by the earthquake in the PBI sector added up to NRs. 159 billion (US\$ 1.5 billion). Figure 97 depicts the disaggregation (in terms of million NRs.) of the total financial loss in different sub-sectors. Similarly, Figure 98 shows the breakdown of the total sectoral loss in terms of public or private ownership. The education sub-sector was hit the hardest in terms of monetary value, which was about 20 percent of the total loss incurred by the PBI sector. The irrigation sub-sector had suffered the lowest damages.

FIGURE 97: MONETARY LOSS DISAGGREGATION ACROSS PUBLIC BUILDING AND INFRASTRUCTURE

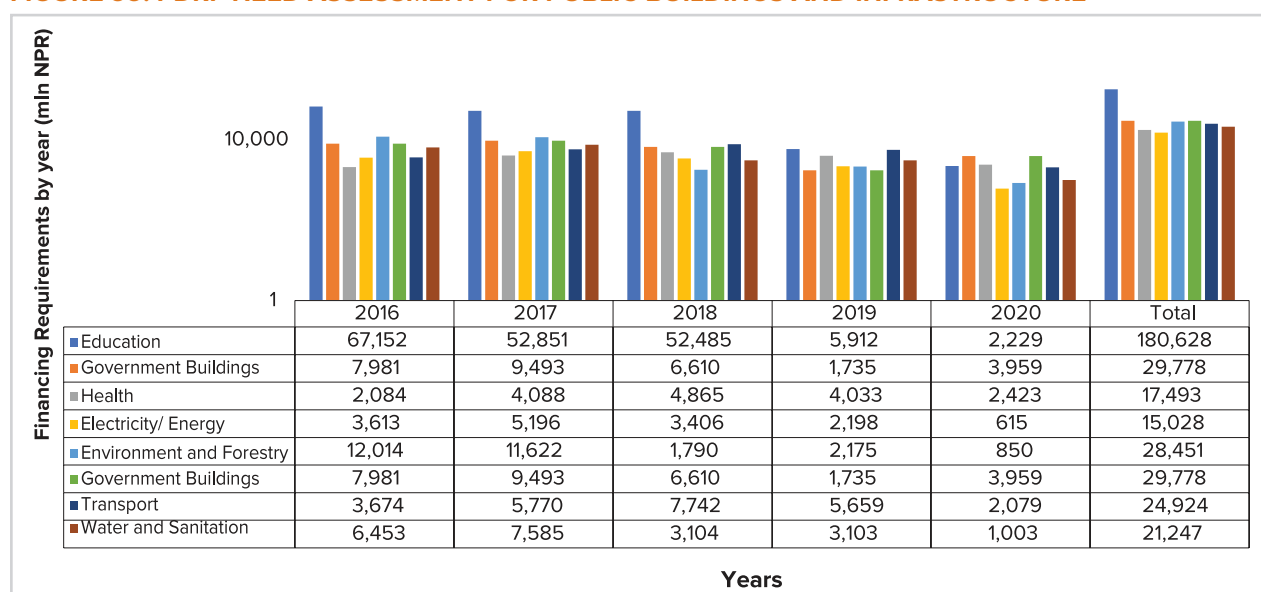
(Source: PDNA)

FIGURE 98: SECTOR-WISE MONETARY LOSS

Source: PDNA Vol. A (GoN, 2015)

The needs assessed by PDNA were further reviewed, updated and reassessed in the PDRF prepared in 2016 by the NRA. Sectoral plans in the PDRF were used to guide and estimate the resource requirements for recovery and reconstruction activities. The PDRF's sectoral financing requirements and the numbers of infrastructures to be built in PBI reconstruction is given in Figure 99.

FIGURE 99: PDRF NEED ASSESSMENT FOR PUBLIC BUILDINGS AND INFRASTRUCTURE



Source: PDRF 2016-2020 (GoN, 2016)

TABLE 22: PBI SECTOR IN RECONSTRUCTION (AS PER UPDATED PDRF 2021)

PB	Target	Completed	Ongoing
Schools	7583	6647	906
Health facilities	1197	751	413
Government buildings	415	388	26
Security related buildings	216	216	-
Roads (km)	764	657	107
Bridges	15	9	6
Water supply	1500 (schemes)	1500	-

5.1.4 Existing vulnerabilities in public buildings and infrastructure

Located in a high seismic region, buildings and infrastructures in Nepal are highly likely to experience several earthquakes in their lifetime. Nepal comprises of three longitudinal geological belts: the flat plain, middle hills, and higher mountains. The altitude changes from 60 m in the plains and peaks at 8848.86 meters (Mt. Everest). Associated with the rapid change in terrain in the north-south direction, buildings and infrastructure in Nepal are exposed to different types of hazards. In the plains the main risks to buildings and infrastructure are flooding, inundation and liquefaction. The middle hills are exposed to increased risk from monsoon-induced landslides, and dry slope failures caused by earthquakes. The higher mountains have hard rocks that pose challenges in finding suitable locations for construction; buildings or infrastructure there face the risks of rock slides and amplification of earthquake-induced shakings due to the ridge effect.

The seismic risks vary in different locations. Although modern infrastructure is abundant in urban areas, many of the buildings and infrastructure date back to last century. Many government offices are housed in old buildings constructed during the Rana regime. As following proper engineering design was not common in Nepal until a few decades ago, and therefore buildings in many urban areas have a large number of unengineered buildings and infrastructure.

The epicenter of the 2015 Gorkha earthquake was close to some major urban areas in the mid-hills and higher mountains. Due to the challenging topography, lack of proper planning, feeble enforcement of structural codes/standards, and low of awareness of seismic hazards/ risks among the decision makers, most structures in the earthquake-affected regions were highly vulnerable to damage.

Most public buildings in Nepal have inadequate seismic resistance because old public buildings were built before the National Building Code (NBC) and relevant structural codes were developed. The building codes were also not fully enforced in many of the relatively newer public buildings. The limited availability of good quality construction materials and limited skills among the construction workers also contributed to an increase in the vulnerability of these buildings. The sections below summarize the exposure, vulnerability and risks in the PBI sector and sub-sectors.

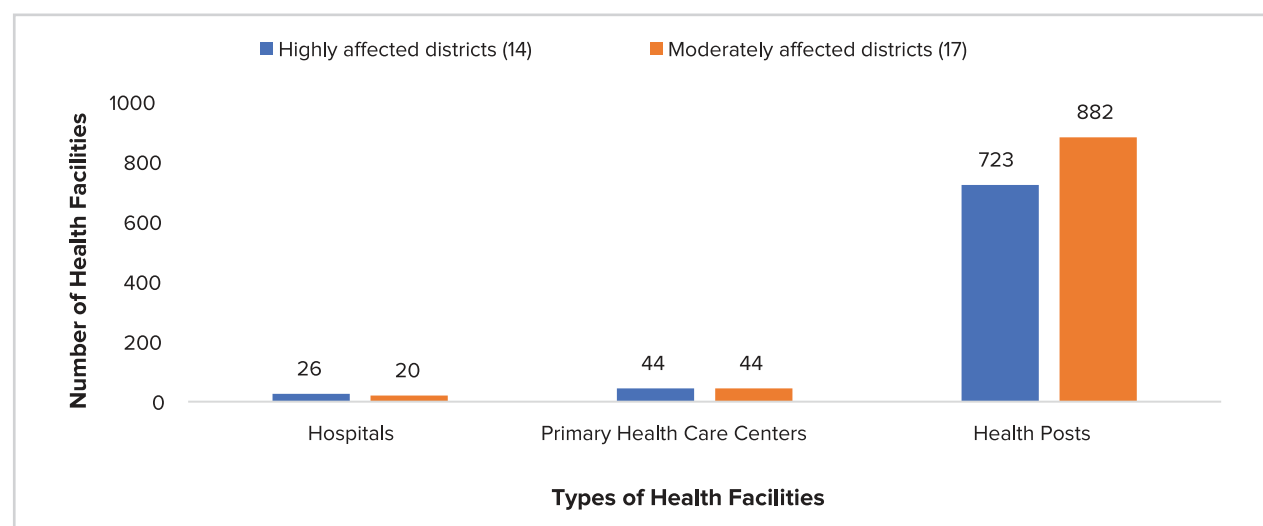
1. Government office buildings

The 2015 Gorkha earthquake damaged (fully or partially) 1,711 central, district, municipal and village level government office buildings. Among them, 1,109 were army structures, and the remaining 602 structures were district courts, police buildings, district administration offices, prisons, central ministry buildings, etc. The major reasons behind the severe damage were identified to be the lack of maintenance of old and historic buildings, negligence on enforcement of building codes, and poor practices of design and construction (Adhikari, Bhagat, & Wijeyewickrema, 2015).

2. Hospitals and health institutions

A network of 4,118 health facilities function under the Ministry of Health and Population (MoHP). These facilities vary from central-level specialized hospitals to local urban health centres and health posts. Additionally, there are 350 private health facilities. Of these 793 (19 %) were in the 14 earthquake affected districts and 946 (23%) in the 17 moderately affected districts (GoN, 2015). The others are distributed in the remaining 44 districts. The distribution of health facilities is roughly proportional to the population of the districts – according to the population profile of the country, 20 percent and 17 percent of the total population live in the highly and moderately affected districts, respectively. The distribution of health facilities in the earthquake-affected districts is shown in Figure 100.

FIGURE 100: NUMBER OF PUBLIC HEALTH FACILITIES



Source: PDNA Vol.B Sector Reports (GoN, 2015)

3. Schools and educational institutions

The education sector under the Ministry of Education (MoE) is the largest public sector both in terms of the population involved and the annual government budget allocations. The education sector covers Early Childhood Education and Development (ECED), school education (grades one to 12), Technical and Vocational Education and Training (TVET), higher education, and non-formal life-long education. Earthquake damage to schools accounted for 88.8 percent of the total loss in the entire education sector (GoN, 2015).

A physical assessment of 643 school buildings within Kathmandu conducted in 1998 had shown that 60 percent of the building units were built with poor construction materials that perform poorly during earthquakes. Only five percent surveyed school buildings had earthquake resistant components; such as bands and vertical reinforcement, and only three buildings were found to have been constructed in compliance with the NBC. Majority of the surveyed school buildings had ignored the need to design for seismic forces during earthquakes (Pandey, Dixit, & Kandel, 2004). This was the main reason for the vulnerability.

Another earthquake risk assessment of school buildings had been done in Lamjung, Nawalparasi and Humla districts in 2012. This assessment highlighted the vulnerability of school structures due to their construction methodology and human resources used. Lack of sound technical knowledge and inadequacy of skilled human resources had contributed greatly to the vulnerability. Masonry structures were found to be the most common building typology used in schools, and they were mostly adopted without any earthquake-resistant components. The less common frame structures were also found to lack adequate seismic detailing (Dhungel, Guragain, Joshi, & Pradhan, 2012).

These studies showed that the risk associated with school buildings was alarmingly high. However, more recently, the school safety initiative led by the Department of Education (DoE) for a decade has significantly enhanced the seismic performance of many school buildings. The school earthquake safety program adopted by the GoN was a successful initiative that had retrofitted about 250 school buildings before the 2015 earthquake; thereby significantly reducing the physical losses incurred by the schools.

A comprehensive Structural Integrity Assessment of Educational Infrastructure was undertaken in 2015, supported by the Global Facility for Disaster Risk Reduction (GFDRR)¹⁴, to provide a baseline for prioritizing reconstruction of educational infrastructure. The aims and findings of the assessment were:

¹⁴ Safer School Technical Assistance project, funded by the Global Facility for Disaster Reduction and Recovery (GFDRR).

School reconstruction: Structural integrity assessment of educational infrastructure

The Safer School technical assistance project aimed to make schools and the communities they serve resilient to disasters by assessing the damage to educational infrastructure caused by 2015 Nepal earthquake and by developing short-, medium- and long-term recovery and reconstruction plans.

The three pillars of the project comprised: (i) structural integrity and damage assessment (SIDA) of education facilities located in areas affected by the disaster; (ii) prioritized investment plan for reconstruction, retrofitting and repair of education infrastructure; and (iii) technical input for the education infrastructure planning, construction, retrofitting, operation and maintenance framework and policy reform. Based on prioritization criteria agreed with the Department of Education in July 2015, SIDA was completed in fourteen (14) districts in the first phase: Schools in Kathmandu, Lalitpur, Bhaktapur, Kavre, Makwanpur, Ramechhap, Sindhuli, Okhaldhunga. In the second phase, education facilities in Sindhupalchok, Dolakha, Nuwakot, Rasuwa, Dhading and Gorkha were assessed, using the same SIDA procedure. The assessment findings served as a baseline for planning recovery of educational infrastructure affected by the 2015 earthquake.

The major findings had revealed that casualties at schools would have been massive, had the classes been in session on April 25, 2015. Out of 5,760 public schools and 17,618 buildings surveyed, 3,599 buildings had completely collapsed. The number of rooms in the completely collapsed school buildings was 12,568, of which 9,313 were classrooms. The number of students enrolled in the collapsed classrooms was 184,778. This revealed the risks associated with the education facilities in Nepal.

The findings of the assessment indicated that more than 50% of the schools were structurally vulnerable and 20% of the buildings had collapsed. This pointed to the urgent need to conduct a nationwide structural integrity and multi-hazard assessment of schools and other critical infrastructure, to assess the extent of exposure to multiple hazards, including climate change impacts, and to undertake required interventions and corrective actions to make them resilient to disasters.

4. Roads and bridges

In Nepal, the Department of Roads (DoR) and the Department of Local Infrastructure (DoLI) are responsible for the road and bridge sector. As Nepal is a landlocked country, roads are the predominant mode of transport. But the roads are prone to damages and blockages due to earthquakes, floods, landslides and monsoon rain. If not maintained properly, there is a high risk of transportation disturbance especially in case of rural roads (GoN, 2015). Hence, development and maintenance of road networks is essential for economic growth.

Nepal has about 14,902 km of strategic roads, including national highways and feeder roads. Still, 22 percent of the population do not have access to roads. Among the total roads in the SRN, 10% are in good condition, 74% are in reasonable condition, and 16% are in need of immediate repair. In addition to the Strategic Road Network (SRN), Nepal also has about 50,944 km in the Local Road Network (LRN), including the District Road Core Network (DRCN) and the Village Road Core Network (VRCN). The SRN extended 5,140 km and the LRN covered about 29,443 km in the 31 most affected districts (GoN, 2015).

5. Power stations and electricity infrastructures

The Nepal Electricity Authority (NEA) is responsible for all power stations and electricity infrastructure in Nepal. It provides electricity services to more than 2.7 million consumers through 90 distribution centres. The total number of consumers in the 14 earthquake-affected districts accounted for 23 percent of the NEA's total customers.

In Nepal, almost all transmission lines pass through hilly terrain and deep forest. The total route length of transmission lines, including 6,093 towers, is 1,948 km. The vulnerability of transmission lines arises

mainly from stress developing in the foundations due to disproportionate shifting of the base during ground movement that could weaken the structure. There is also a risk of equipment damage and disruption in power supply during disasters (GoN, 2015).

6. Water supply and sanitation

According to the Joint Monitoring Programme 2015, 92 percent of Nepal's population had access to improved drinking water and 46 percent to improved sanitation. In the 14 most affected districts, the majority (i.e., 11,288) of water supply systems were gravity-fed from springs or streams. Among them, around 1,570 systems were totally damaged, and 3,663 systems suffered partial damage. Ninety percent of the damaged water supply systems were in rural areas. In Nepal, the Ministry of Water Supply and Sanitation is responsible for the Water, Sanitation and Hygiene (WASH) sector, and Department of Water Supply and Sewerage (DWSS) works as its lead operational agency.

In summary, buildings will be safe only if they are designed and built in compliance with NBC. Although the enforcement of NBC during construction is challenging, particularly in private housing, new public buildings generally follow the NBC standards. But a significant proportion of public buildings that were built well before the NBC was enforced are not code-compliant and may require retrofitting/strengthening to perform better in earthquakes. Old buildings that were not retrofitted and new buildings that had not undergone regular repair and maintenance were those that suffered damages during the 2015 earthquake.

Further, the standards for roads, bridges and other infrastructure also need to be developed. However, no national standard like the NBC (for buildings) was available for other infrastructure in 2015. The respective ministries had put some design guidelines in place to cater to the lifelines/ infrastructure under their portfolio, and these were used as much as possible during the reconstruction of the damaged infrastructure.

5.1.5 Scope of this chapter

There are five sub-sections in this chapter. The first section discusses the pre- and post-earthquake situation of the PBI sector, and presents the extent of damages/loss in the sector. The second section presents the strategy, approaches and policies used in the reconstruction of the PBI sector and also summarizes the overall progress. Similarly, section 3 presents an update on the progress in the reconstruction of buildings and other infrastructure, including the status of government buildings, hospitals and health institutions, education institutions (ranging from primary school buildings to university level structures), security institutions (army, police, etc). It also summarises the reconstruction of roads, bridges and lifeline services like water and power supply. The fourth section consolidates the key issues and challenges faced during the reconstruction of the PBI sector, and the last section discusses the major learnings and the way forward.

In preparing this chapter, key government-led initiatives like the PDNA, PDRF, and national policies and guidelines were reviewed. In addition, information was also obtained from various research papers. The key lessons were derived from the issues/ challenges collectively experienced by government agencies leading the reconstruction under the NRA umbrella.

5.2 Recovery policies, approaches, and overall progress

5.2.1 National Acts, Technical Standards and Guidelines for Public Buildings and Infrastructures

A review of different acts, policies, technical standards and guidelines prevailing in Nepal indicated that there was no single clear, concise and concrete policy and law that could guide the NRA for reconstruction of the PBI sector. Different line ministries had policy documents to cover the construction of buildings or infrastructure under the agencies. Hence, the NRA had to lead the reconstruction of public buildings and infrastructure following the existing policies and laws, and the reconstruction act, and policies it prepared. The main laws and policy documents relevant to the reconstruction were:

1. Ancient Monument Preservation Act, 1956

This act has provisions for preserving ancient monuments by monitoring the buying and selling of archaeological objects and excavation of ancient monument sites (GoN, 1956).

2. Town Development Act, 1988

The main objective of this act is to specify provisions of necessary services to urban residents by reconstructing, expanding and developing existing towns and by constructing new towns to maintain health, opportuneness and economic interest of general public (MoUD, 1988).

3. Kathmandu Valley Development Authority (KVDA) Act, 1988

This law has provisions for development of vital infrastructure services and facilities for a planned development and urbanization of Kathmandu Valley (KVDA, 1988).

4. National Building Code, NBC (1998)

NBC is the only technical standard for building structures. It was formulated after the 1998 Udaypur earthquake to address the need for improvements in building construction and design.

5. Building Act, 1998

The Building Act includes requirements for disaster-resistant building design and construction standards. Section 4 mandates the formulation, adoption and implementation of NNBC (MoUD, 1998).

6. National Urban Policy, 2007

The main objective of National Urban Policy to provide support to sustainable development and poverty reduction, improving quality of life of urban residents, and making urban management effective (DUDBC, 2007).

7. The Constitution of Nepal, 2015

The Constitution of Nepal aims for sustainable peace, good governance, progress and prosperity through a federal, democratic and republican system of governance. The Constitution grants local governments autonomy and full authority to plan for their territories. It has made disaster risk management a responsibility of all levels of governments (GoN, 2015).

8. Land Use Policy, 2015

The key objective of this policy to categorize land use zones, safeguard land use plans, mitigate hazards, and apply property valuation and the land tax system (MoLCPA, 2015).

9. Basic building bylaws for Settlement Development, Urban Planning and Building Construction, 2015

This Building bylaws provide the basic required standards for building construction and urban planning (MoUD, 2015).

10. Basic Guidelines for Settlement Development, Urban Planning and Building Construction, 2015

This guideline provides the minimum required standards for building construction and urban planning (MoFAGA, 2015).

11. National Plan of Action for Safer Building Construction, NaPA, 2016

This plan is focused on contributing to safer building construction and discusses the issues, challenges and strategies on the enforcement of the NNBC and bylaws in addition to the other dimensions of safer building construction (MoUD, 2016).

12. Local Government Operation Act, 2017

The key objective of Local Government Operation Act is firming up local governance practices and institutionalizing legislative, executive and judicial practices at the local level by developing local leadership through necessary provisions for the operation of local governments. Articles 3 and 4 mention the obligation to implement bylaws and the NNBC for building construction (MoFAGA, 2017).

13. Disaster Risk Reduction and Management (DRRM) Act, 2017

The key objective of the DRRM act is to protect human beings, possessions, environment, natural and cultural heritages and physical infrastructures from the risk of disasters. The DRRM act clarifies the roles and responsibilities of stakeholders at federal, provincial, district and local levels for disaster risk reduction and management (MoHA, 2017).

14. National Urban Development Strategy, 2017

The main aim of the National Urban Development Strategy is to provide strategies for urban development. One strategy includes internalization of the resilience perspective in land use regulations, NNBC and bylaws (MoUD, 2017).

15. Environment Protection Act and Rule, 2019

It has provisions to protect and maintain a clean and healthy environment. It requires a preliminary environmental assessment report to be submitted to the respective government authority for all local development projects (MoFE, 2019).

Further, there are sector specific standards that are as follow:

16. Health Infrastructure Development Standards Volume 2, 2016

(Updated as Nepal Health Infrastructure Development Standards Volume 4, 2017)

This standard ensures that health infrastructure, when completed, are functional and designed to deliver high quality health services. It also provides an opportunity to reorganize the health system for optimal delivery of high-quality health services (MoHP, 2017).

17. Education Act 2016 - Eighth amendment (2073 BS)

This act provides for functional and structural reforms and provides the school sector the responsibility for governing and managing schools (MoE, 2016).

18. School Sector Development Plan (SSDP), 2016–2023 (2073-2080)

This plan ensures an inclusive and equitable education system. It aims to enhance the quality of the learning environment and increase the efficiency of the education system. This plan also seeks to strengthen the governance and management of the education system and make the education system resilient (MoE, 2016).

19. Public Road Act, 1974 (2031 BS)

This act has provisions to classify all kinds of public roads, to acquire lands required for public roads and to collect development tax. This act provides for the right of way (ROW) and setback from roads to be maintained while constructing buildings near roads. This act also prohibits the construction of buildings within the prescribed setback and the ROW (MoPIT, 1974).

20. Roads Board Act, 2002 (2058 BS)

This act has provisions on repair and maintenance of roads and aims at minimizing the expenditures incurred maintenance works and in making the work transparent (DoR, 2002).

21. Motor Vehicle and Transport Management Act, 1993 (2049 BS)

This act has provisions to make transportation services consolidated, efficient and effective. This act classifies the vehicles and has provisions for the registration of vehicles (MoPIT, 1974).

22. Standard Specification for Road and Bridge Work, 2001 (2058 BS)

This document provides the standard specifications for all road and bridge works.

23. Nepal Water Supply Corporation Act, 1989 (2046 BS)

This act establishes the Nepal Water Supply Corporation as an autonomous corporation controlled by government and responsible for the supply of drinking water.

24. Water Resource Act, 1992 (2049 BS)

This is the main law governing water resource management. It provides the hierarchy of water use, discusses ownership of water in the state, establishes a system of licensing and has provisions for forming water user associations.

25. Water Resource Regulation, 1993 (2050 BS)

This is the main regulation that governs water resource management. It specifies procedures to register a water user association and to obtain a license. It also establishes the District Water Resource Committee and the rights and obligations of water users' associations and license holders. It also deals with the acquisition of house and land and compensation.

26. Drinking Water Regulation, 1998 (2055 BS)

This regulation regulates the use of drinking water and provides for forming drinking water users' associations. It provides procedures for registration and licensing of drinking water, pollution control and quality standards for drinking water. It also has provisions for the acquisition of house and land and compensation.

27. Irrigation Regulation, 2000 (2056 BS)

This regulation deals with irrigation water users' associations and the transfer of projects to the associations. It provides for a joint management system by government and water users associations. The regulation has provisions for irrigation and river control committees and the protection, repair and maintenance of irrigation systems.

5.2.2 Technical standards for public buildings

After the earthquake of 2015, the GoN updated NNBC 105: 1994 Seismic Design of Buildings in Nepal, the major code guiding seismic design of buildings. The code was originally developed in 1994, and had not been revised or amended despite significant progress globally in terms of knowledge and practice in earthquake resistant design. The code provides prescriptive guidelines applicable to design and construction of all types of buildings (both public and private), and is a key regulatory framework for building design. The CLPIU (building) began revising the code in 2017 and was completed in 2019. The Council of Ministers has approved the "Updated National Building Code 105:2020" to replace the existing "National Building Code 105:1994".

5.2.3 Recovery vision, objectives and principles

The Reconstruction and Rehabilitation Policy 2072 (2016) provided the guiding principles for reconstruction and rehabilitation. The policies and guidelines clarified the roles and responsibilities of various organizations and the recovery vision and strategic objective for the reconstruction program. The vision was "Establishment of well-planned, resilient settlements and a prosperous society" and the strategic objectives were:

1. Safe Structures: Restore and improve disaster resilient housing, government buildings and cultural heritage, in rural areas and cities.
2. Social Cohesion: Strengthen the capacity of people and communities to reduce their risk and vulnerability and to enhance social cohesion.
3. Access to Services: Restore and improve access to services and improve environmental resilience.
4. Livelihood support: Develop and restore economic opportunities and livelihoods and re-establish productive sectors.
5. Capacity Building: Strengthen capacity and effectiveness of the state to respond to the people's needs and to effectively recover from future disasters¹⁵.

These strategic objectives were set under the following policy objectives:

- n Reconstructing, retrofitting and restoration of damaged (partial and completely) private, community and public buildings and heritage sites, to make them disaster resilient with the use of local technologies;

¹⁵ Many partners supported capacity building. For example, USAID supported orientation of 4,103 municipal professional and political leaders on earthquake-resilient building construction and building code implementation.

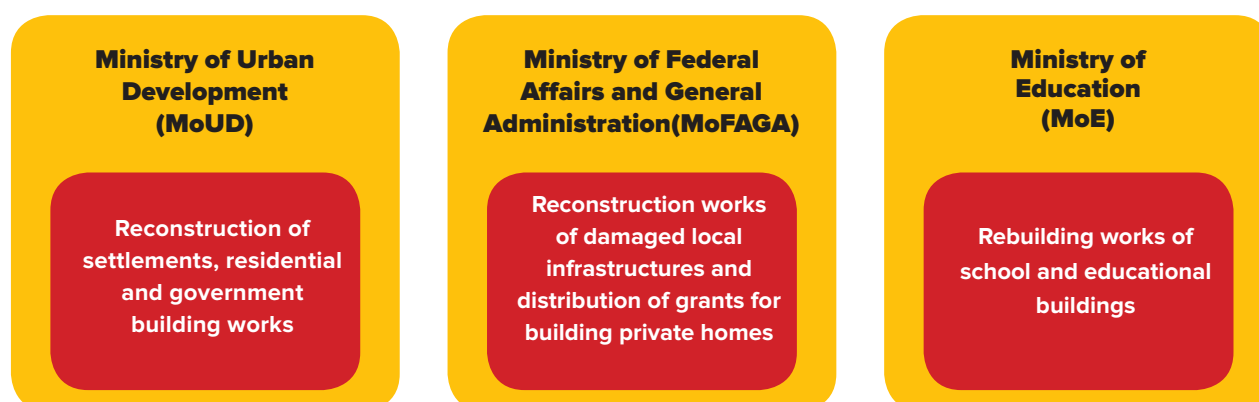
- n Reconstructing damaged towns and villages to their initial form, and improving their resilience;
- n Developing resilience among public and societies at risk in the earthquake affected districts;
- n Generating new economic opportunities and livelihoods by regenerating productive sectors;
- n Studying and researching earthquake science, effects and post-earthquake recovery including reconstruction, resettlement, rehabilitation and disaster risk reduction; and
- n Resettling the impacted communities by selecting a proper resettlement area.

5.2.4 Implementation mechanism

The recovery and reconstruction of public buildings and infrastructure were taken care by the CLPIU (Building), CLPIU (Education) and the GMALI and their units in the affected districts. They were responsible for the reconstruction of public buildings, educational institutions, local roads and water supply services, respectively. The reconstruction of hospitals, major strategic roads, electricity services, telecommunication facilities, security buildings were undertaken by reconstruction units at the NRA/CLPIU, Department of Roads, NEA, Nepal Telecom and the corresponding security organisation, respectively.

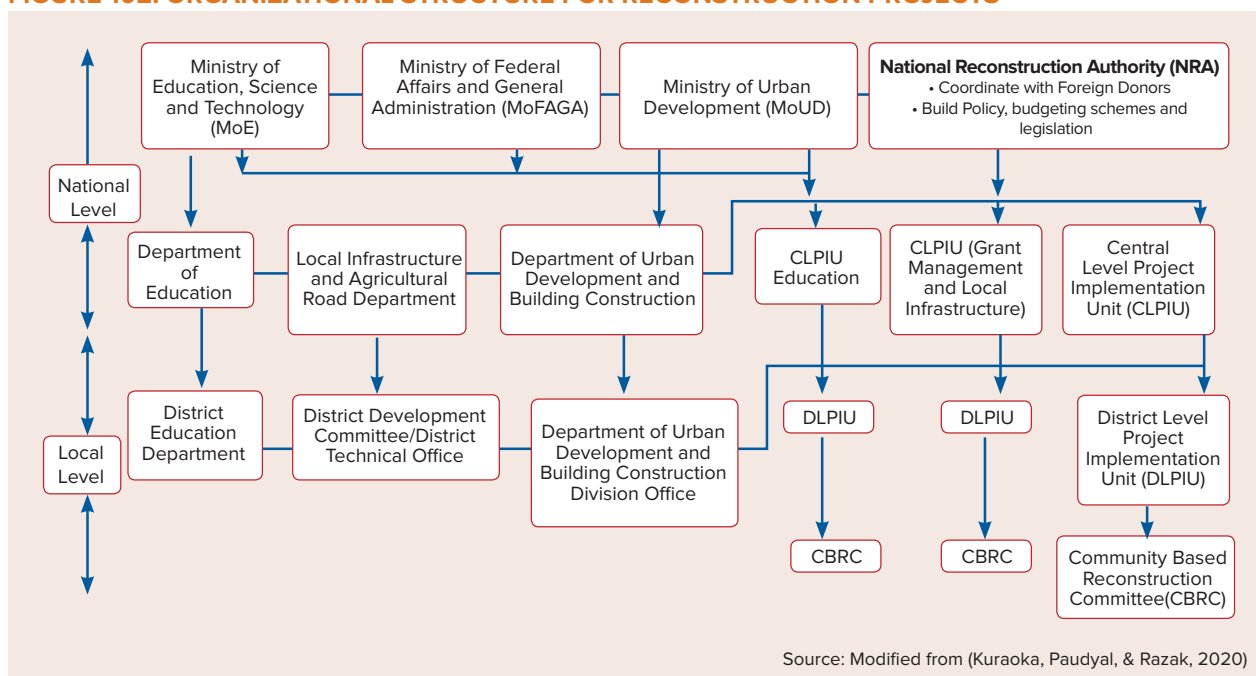
Three ministries were responsible for a large volume of the reconstruction work in the public buildings and infrastructure sector, i.e., the (MoUD), Ministry of Federal Affairs and General Administration (MoFAGA) and the MoE. The work areas handled by these three ministries in the PBI sector are shown in Figure 101. To lead and manage their share of reconstruction, each ministry had set up a CLPIU that were engaged in the recovery and reconstruction activities in coordination, communication and collaboration with relevant government agencies, international and national non-state entities, and development partners. The CLPIUs were required to follow the policies, directives and resources made available by the NRA and the line ministries.

FIGURE 101: WORK AREA AND RESPONSIBLE MINISTRIES



The CLPIUs setup DLPIUs as required at district level. The NRA adopted policies for reconstruction from the corresponding ministries and authorised reconstruction projects and disbursed funds to the CLPIUs. The project directors of CLPIU delegated implementation tasks to the DLPIU project managers. The DLPIUs focused on implementing and monitoring the recovery and reconstruction projects in the districts (Figure 102). In the later phases, the CLPIUs and DLPIUs, were brought under the jurisdiction of the NRA to speed up recovery and reconstruction work. After the NRA phases out, the remaining recovery and reconstruction work will return to the jurisdiction of the ministries.

FIGURE 102: ORGANIZATIONAL STRUCTURE FOR RECONSTRUCTION PROJECTS



1. Involvement of development partners and NGOs

Several development partners, including UN agencies and national and international NGOs provided a range of technical, financial, and material services during relief and early recovery, and many provided substantial support to recovery and reconstruction. Development partners and NGOs participated in recovery in several ways (GoN, 2016) as listed below (Tables 23 and 24):

- n Development partners were represented in Development Assistance Coordination and Facilitation Committee (DACFC),
- n NGO participated in the Civil Society Coordination and Facilitation Sub-Committee of the DACFC, and
- n NGOs also participated through established coordination mechanisms, such as the Association of International Nongovernmental Organizations in Nepal (AIN) and the Housing Reconstruction and Recovery Platform (HRRP).

TABLE 23: DEVELOPMENT PARTNERS THAT SUPPORTED RECOVERY AND RECONSTRUCTION

Development partner	Sector	Support activities
Asian Development Bank	Infrastructure, schools, capacity building	Roads, bridges, school, district level government facilities, disaster preparedness and management capacities, vehicle purchase, civil works, equipment and supplies, capacity building and training, consulting service
JICA (JFPR)	Housing, public infrastructure, schools, livelihood	Housing, Consulting Services, Civil work and Procurement of Equipment, Public Facilities and Livelihood, Public Infrastructure, Project Implementation Support
China	Housing, cultural heritage, schools, health, infrastructure	Housing, School Reconstruction, Cultural Heritage Construction, Roads, Hospital Recovery
IMF	Private and public sector	Budgetary support
India	Housing, cultural sites, schools, health	Housing grant, school construction, construction of health infrastructures, construction of cultural sites
Germany	Cultural heritage, health	Construction of cultural heritage, construction of health facilities, rural electricity

KOICA	Public infrastructure	Construction of health infrastructure
MDTF	Housing reconstruction	Housing grant
DFID	Housing, WASH	Housing grant, investment, enrolment, coordination and capacity development, policy reform WASH, trail, durable solutions for internally displaced, community feedback, operational support to the NRA including geo-hazard survey, enrolment and housing damage surveys
USAID, US	Agriculture, education, health, cultural heritage, Governance, GESI	Agriculture, education, health, WASH, environment and forestry, gender and social inclusion, governance, cultural heritage
Saudi Arabia	Education, housing	School reconstruction, private housing

Source: NRA

TABLE 24: UN AGENCIES THAT SUPPORTED RECOVERY AND RECONSTRUCTION ACTIVITIES

S.N.	UN Agency	Sector	Key recovery Activities
1.	UNICEF	Health	Construction of prefab health facilities (type I-II); cold chain strengthening in 22 districts; establishment of referral system for maternal and newborn services in 9 districts
		WASH	WASH Cluster coordination, WASH facilities reconstruction (in communities, schools and health posts), DRR in WASH
		Education	900 transitional learning centers, latrines, training of teachers and SMC members, distribution of educational materials
2.	UNDP	Recovery planning coordination and the NRA institutional strengthening	Support to PDRF, local recovery planning, the NRA institutional strengthening through deployment of experts, recovery coordination at national (DACFC) and district levels
		Governance and public services restoration	Public service restoration through prefab buildings (25), assessment and demolition of 3462 private and 207 public buildings, technical support for 650 temporary learning center reconstruction; 4,350 people (40% women) involved in debris management through cash-for-work, 20,000 women benefited from mobile legal aid clinics in 10 districts
		Energy, environment and disaster risk management	Rehabilitation of 26 micro-hydro plants, promotion of safer building construction, 711 engineers and 550 masons trained on safer reconstruction
		Community infrastructure, livelihoods & social inclusion	257 Community infrastructures rehabilitated, 11,745 enterprises re-established, 24,678 new micro enterprises created

Source: NRA

5.2.5 Projects implemented with assistance from development partners

The plans and programs of reconstruction were clustered into different projects and the following major projects were implemented by the NRA and relevant stakeholders.

1. Earthquake Housing Reconstruction Project (EHRP)

The Earthquake Housing Reconstruction Project (EHRP) was implemented with World Bank/ International Development Association financing of US\$ 500 million. The development objective of the EHRP was to restore affected houses with multihazard resistant core housing units in targeted areas and to enhance the government's ability to improve disaster resilience. The project had of four components. The first component, was housing reconstruction, finances: (a) the provision of housing grants for reconstruction of about 141,680 multihazard resilient core housing units; and (b) the establishment of an owner-driven housing reconstruction program. The objective of the second component, disaster risk management systems, was to support the GoN in putting in place systems to provide better disaster risk reduction,

preparedness, and disaster response, in line with global best practices. The third component, project implementation support, financed the establishment and operation of the project management unit (PMU), project implementing units (PIUs), and district-level PIUs (DL-PIUs). The fourth component, contingency emergency response, was for drawing resources from the unallocated expenditure category and/or allow the GoN to request the Bank to re-categorize and reallocate financing from other project components to partially cover emergency response and recovery costs. In addition, the World Bank-administered Multi-Donor Trust Fund (MDTF) provided additional housing grants, and supported disability inclusion activities and technical assistance for longer-term disaster resilience.

2. Earthquake Emergency Assistance project (EEAP)

Earthquake Emergency Assistance Project (EEAP) was implemented with loan assistance from the Asian Development Bank (ADB), with financial support from the USAID through ADB and with technical assistance from Swiss Agency for Development and Cooperation (SDC), and complementary funding from the GoN. The EEAP covered 12 affected districts. The project aimed to rehabilitate and reconstruct infrastructure and services and had four outputs: Reconstruction and upgrading of schools; Reconstruction and upgrading of roads and bridges; Reconstruction and upgrading of district-level government facilities; and strengthening of disaster preparedness and management capacities. This project reconstructed 162 school buildings from the support of ADB, USAID and JICA.

3. Emergency School Reconstruction Project (ESRP)

This project was implemented with the assistance of the Japan International Cooperation Agency (JICA) and the ADB. The project aimed at rebuilding and retrofitting schools in districts severely affected by the earthquake. The project covered the 14 most-affected districts, among which JICA covered Lalitpur, Dhading, Nuwakot, Rasuwa, Gorkha and Makwanpur districts and the remaining districts were covered by the ADB.

4. Disaster Resilience of Schools Project (DRSP)

The project was supported by the ADB and complemented the work of other ADB projects, including the EEAP and Disaster Risk Reduction and Livelihood Restoration for Earthquake-Affected Communities Project. The project aimed to fill the funding gap to rehabilitate 174 heavily damaged schools to improve the quality of education, access and school management.

5. Disaster Risk Reduction and Livelihood Restoration for Earthquake Affected Communities Project

This ADB supported project was established to rebuild schools with disaster-resistant design and construction; and for raising community awareness about disaster preparedness. The project aimed to improve equity and enhanced social inclusion in the earthquake-affected districts and improve disaster preparedness and resilience of earthquake-affected communities.

In addition, the government of India supported the reconstruction of 70 schools in different packages – 10 each in Gorkha, Dhading, Nuwakot, Sindhupalchowk, Kavrepalanchowk, Dolakha and Ramechhap. As of January 2021, 70 percent of the schools had been completed. Similarly, the Indian EXIM Bank prepared a detail project report of 39 colleges for reconstruction. The Saudi Fund supported the reconstruction of 25 schools in eight districts; Tanahun, Lamjung, Kaski, Syangja, Palpa, Bhojpur, Gulmi and Khotang.

5.2.6 Availability of financial resources

The needs assessed by the PDNA were further reviewed, updated and reassessed by the PDRF. Sector plans of the PDRF were used to guide, plan and estimate resource requirements for sectoral recovery and reconstruction activities. Validation workshops for the PDRF were organized with government ministries and agencies, development partners, NGOs and civil society organizations (CSOs) after which separate sector plans were prepared with estimated financial requirements. Table 25 presents the status of expenditure in the PBI sector.

TABLE 25: EXPENDITURE IN THE PBI SECTORS TILL 2019/20 (IN 100,000 NRS. /US\$)

Component	Program	Total financing requirement	Expenditure till 2019/20	Current F/Y budget		Funding required beyond current F/Y	Sources of funding
				Budget	Corrected		
Education	University	13,631(136.31)	13,631(136.31)	0	0	0	ADB, JICA, JFPR, GoN, GoI, EBI, SFD
	School	960,078 (9600.78)	526,940(5269.4)	134,264(1342.64)	204,127(2041.27)	229,011(2290.11)	
	Colleges	127,684(1276.84)	0	51,741(517.41)	51,741(517.41)	75,943(759.43)	
	Total	1,101,393(11013.9)	540,571(5405.7)	186,005(1860.05)	255,868(2558.68)	304,954(3049.54)	
Road and Water Sanitation	SRN roads	33,132(331.32)	33,132(331.32)	0	0	0	ADB, GoN
	Local roads	41,674(416.74)	41,660(416.6)	0	0	14(0.14)	
	Local road and bridges	89,677(896.77)	64,483(644.83)	19,023(190.23)	24,186(241.86)		
	1,008(10.08)						
	Watsan	7,033(70.33)	7,033(70.33)	0	0	0	
	Trail routes	572(5.72)	572(5.72)	0	0	0	
	Total	172,088(1720.88)	146,880(1468.8)	19,023(190.23)	24,186(241.86)	1,022(10.22)	
Public Buildings	Government	320,791(3207.91)	114,687(1146.87)	48,904(489.04)	70,149(701.49)	135,955(1359.55)	IDA, ADB, JICA, GoN, EBI, EU
	Army	62,027(620.27)	61,442(614.42)	0	585(5.85)	0	
	Police	14,865(148.65)	13,823(138.23)	0	1042(10.42)	0	
	Intelligence	703(7.03)	703(7.03)	0	0	0	
	Security posts in sanctuaries	3334(33.34)	3,334(33.34)	0	0	0	
	Administration cost	78,555(785.55)	53,482(534.82)	11,421(114.21)	13,653(136.53)	11,694(116.94)	
	Total	480,275(4802.75)	247,470(2474.7)	60,325(603.25)	83,197(831.97)	149,608(1496.08)	
Health	Health sector buildings	159,111(1591.11)	8,183(81.83)	70,039(700.39)	73,791(737.91)	77,138(771.38)	GoN, GoI, EBI, SFD
	Total	159,111(1591.11)	8,183(81.83)	70,039(700.39)	73,791(737.91)	77,138(771.38)	

Source: NRA

5.2.7 Overall progress

Significant progress has been achieved during the six years of the reconstruction that had begun with the establishment of the NRA as shown in Table 26 below.

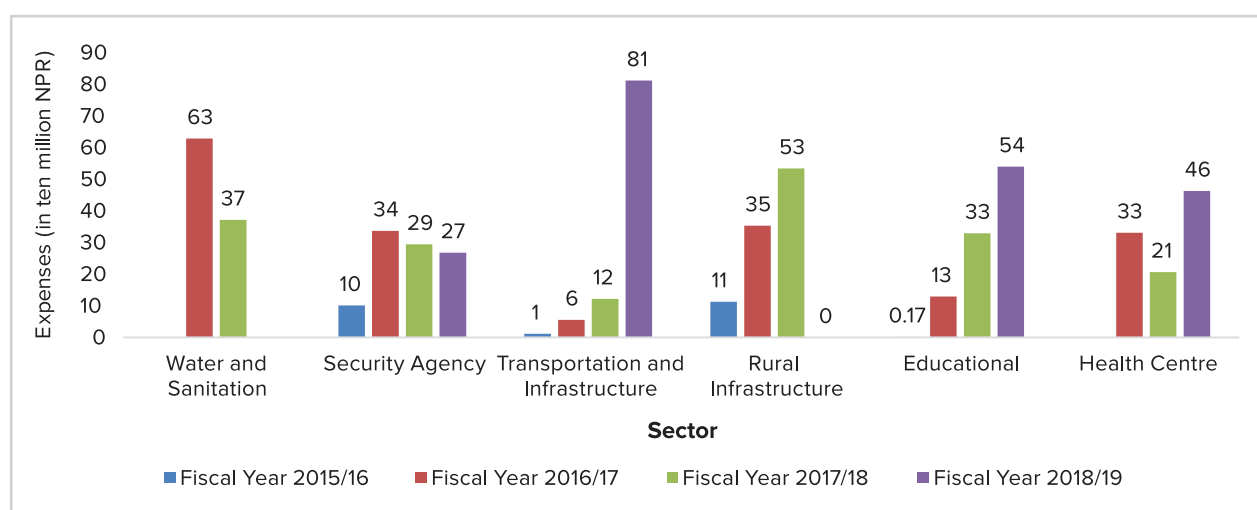
TABLE 26: SECTORWISE RECONSTRUCTION PROGRESS

S.N.	Particulars	Target (to be reconstructed)	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	Reconstructed	Ongoing
1	Government buildings	415	0	182	66	55	50	35	388	20
2	School buildings	7553	0	2,456	1,360	1,247	995	589	6,647	906
3	Health facilities	1197	83	296	264	22	33	53	751	354
4	Security related buildings	383	0	18	75	90	24	9	216	0

(Source: NRA Annual Report 2020/21)

Figure 102 shows that much of the spending was in the education sector (around NRs. 38.21 billion / US\$ 0.38 billion) followed by security agency (NRs. 8.4 billion/ US\$ 84 million), transportation and infrastructure (NRs. 8.28 billion), rural infrastructure (NRs. 7.08 billion/ US\$ 70.8 million), water and sanitation (NRs. 0.7billion/ US\$ 7 million) and health centres (NRs. 0.45 billion/US\$ 4.5 million). In water and sanitation sector, 63 percent of the budget was spent in fiscal year 2073/74, and much (81%) of the sectoral budget in transportation and infrastructure was spent in fiscal year 2075/76. Similarly, 54 percent of the total budget for education buildings was spent in fiscal year 2075/76. Rehabilitation of the water and sanitation sector and reconstruction of damaged health centres used relatively less budget compared to other sectors.

FIGURE 102: SECTORWISE EXPENSES IN THE LAST FOUR YEARS OF RECONSTRUCTION



(Source: NRA Annual Report, 2018/19)

5.3 Progress and achievements

5.3.1 Reconstruction of government office buildings

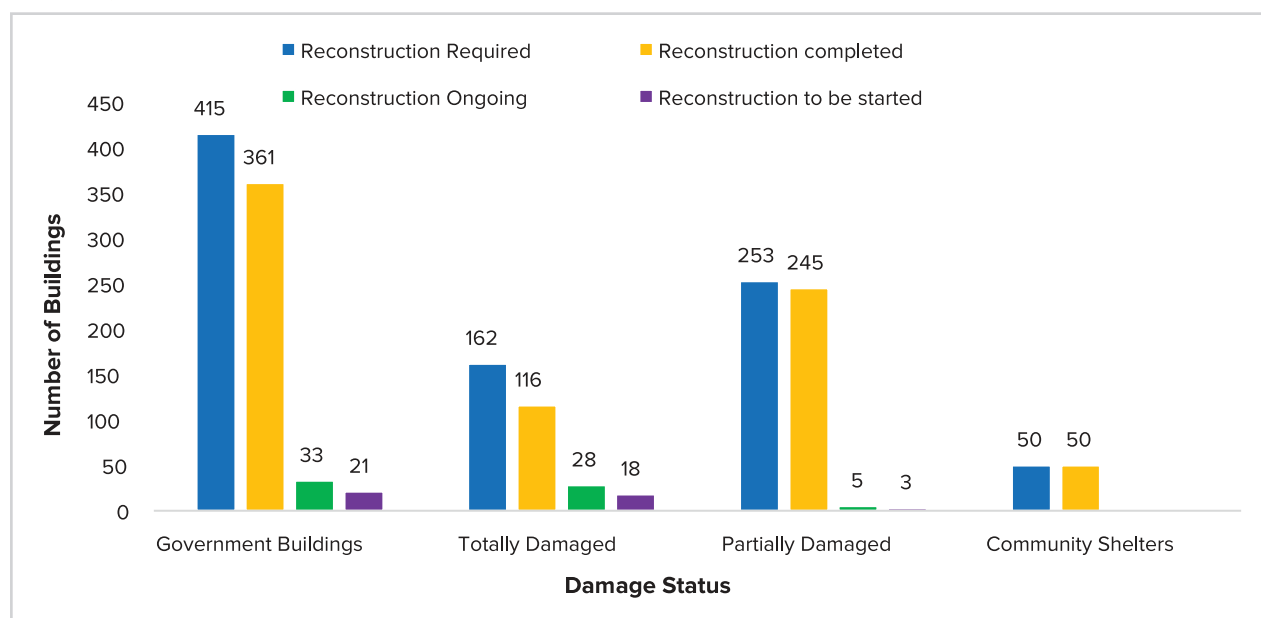
The number of government buildings affected in 32 districts was 2,656 severely damaged and 3,622 partially damaged. Of all the damaged government buildings, 230 central and district level buildings were fully damaged (and required reconstruction) and 253 were partially damaged (these could be repaired/ retrofitted). As Nepal adopted a federal system of governance after the earthquake, several buildings damaged by the earthquake did not require reconstruction because many district level offices did not continue to function or exist. Therefore, of the 230 fully damaged government buildings, only 162 buildings needed to be rebuilt.

1. Targets and achievements

As reported at the end of the fiscal year 2020/21, out of the required reconstruction of 162 fully damaged government buildings, 116 buildings have been reconstructed, 28 buildings were under construction and the reconstruction of 18 government buildings had not started. Similarly, 245 damaged public buildings were repaired and/or retrofitted (Figure 103).

While the damaged public buildings were being reconstructed, 288 transitional buildings were established through the ADB funded EEAP project to enable continuous delivery of public services. The effectiveness of this approach was exhibited by the quick resumption of the public services.

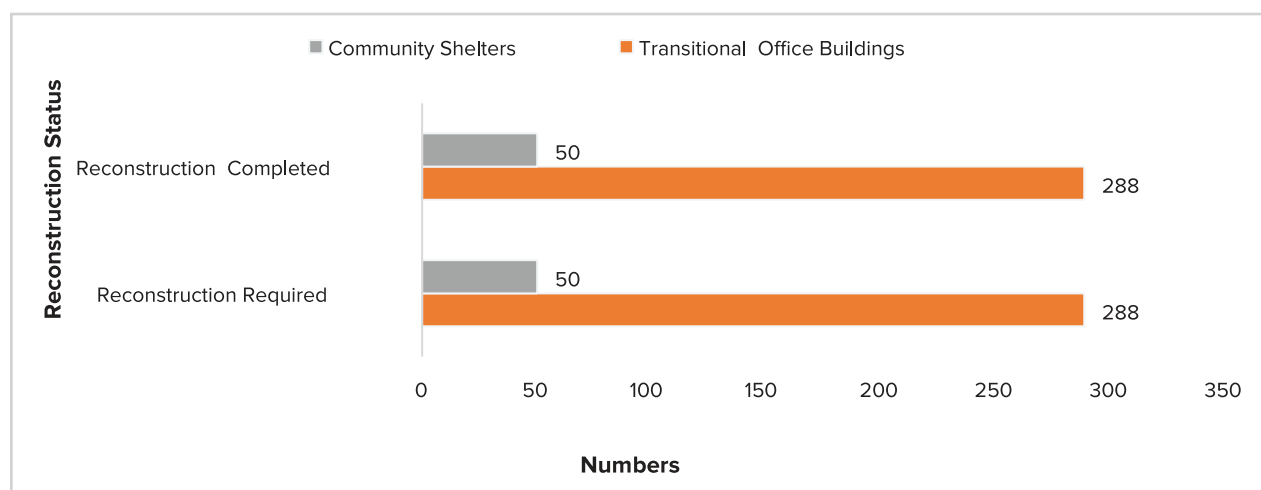
FIGURE 103: RECONSTRUCTION STATUS OF GOVERNMENT BUILDINGS DAMAGED BY 2015 EARTHQUAKE



Source: NRA

Reconstruction of 50 community shelters in 10 districts (Rasuwa, Nuwakot, Dhading, Makwanpur, Kavrepalanchowk, Sindhupalchok, Okhaldhunga, Sindhuli, Ramechhap and Dolakha) have also been completed. These community shelters can provide housing for 756 families during future emergencies and they can be used for multiple purposes during normal times. The reconstruction of public buildings was funded by the GoN funding, a loan from the EXIM Bank and the ADB-funded EEAP loan.

FIGURE 104: RECONSTRUCTION STATUS OF GOVERNMENT AND SECURITY AGENCIES BUILDINGS



Source: NRA

2. Reconstruction approach for government buildings

Earthquake resilient design principles were incorporated in the design of new government buildings to ensure they were safe. All buildings were designed to allow access to differently-abled people to rooms on the ground floor. Adequate public spaces (such as waiting areas, toilets, etc.) were included. The offices inside the buildings were designed to meet the space standard of office buildings developed by the DUDBC. The rebuilt and repaired office buildings include District Court, District Jail, DUDBC Division

Office, DWSS Division Office, District Forest Office, District Attorney Office, District Post Office, Chief District Officer (CDO) residences, District Treasury Comptroller Office, etc. and central offices like Office of the Attorney General, Office of the Public Service Commission, Office of the Department of Mines and Geology, Office of Radio Nepal, etc.

Wherever land was available, and functions of the government buildings to be built were related to each other, and were combined in a single integrated building to provide convenience to service seekers. For example, the integrated office building in Rasuwa (photo 24) includes the division offices of the DWSS and the DUDBC, and the integrated office building in Sindhuli (photo 25) hosts the offices of the DUDBC and DWSS together with the district attorney's office and the district post office. After state restructuring in 2017, some of the reconstructed government buildings have fallen under the jurisdiction of provincial and local governments.



Photo 24: Integrated office building (DUDBC and DWSS Division Office), Rasuwa



Photo 25: Integrated Office Building, Sindhuli

(Source: CLPIU)

The functions of the offices hosted in the buildings and architectural expression to their match that of the neighbourhood were considered along with the planning/designing while building government office buildings. For example, the Central Office of the Attorney General located at Ramshahpath was designed to ensure harmony with the brick-clad neighbouring buildings of the Rastriya Banijya Bank and Agriculture Development Bank. The Office of the Attorney General (photo 26) and Public Service Commission (photo 27) were planned with a central courtyard to provide proper light and ventilation to all work spaces. While, the vernacular architecture was maintained by designing a courtyard and using brick exposed façade, modern architecture was also introduced by balancing the horizontal and vertical design elements. The modern volumetric design was intended to create a new landmark in the city.



Photo 26: Office of Attorney General, Ramshahpath



Photo 27: Central office of Public Service Commission, Kamalpokhari

(Source: CLPIU)

3. Approach for reconstruction of Rana palaces

The 2015 Gorkha earthquake had damaged many historical buildings. Most of such buildings (especially those located inside Kathmandu valley) have archaeological and heritage value. They have unique architecture along with rare paintings, art, artefacts, designs, etc. These buildings were palaces built by Ranas during their rule (1846 to 1951). To decide the course of action for preserving and reconstructing the buildings, they were first subjected to detail building assessments, which included evaluation of the strength of existing building elements through non-destructive tests, foundation exploration,

geotechnical study and detail damage assessment. This helped to identify whether the buildings could be retrofitted or not. If the buildings were found feasible for retrofitting, a retrofit design was initiated and if it was not found feasible, it was decided to reconstruct a new one with the same outlook and footprint after receiving necessary approval from the DoA.

A main criterion of retrofitting of such buildings was to retain the building's features so that the existing art, artefacts, design, architecture could be conserved. For this, expert design consultants were hired for preparing retrofitting designs that were approved only after the team of experts (structural engineers, archaeologists, engineers and conservationists) agreed on the suitability of the retrofitting technology. In most buildings where archaeological and heritage values were important and needed to be conserved, traditional materials like bricks, lime, surkhi, iron, wood, and glass were used. Guidelines of the DoA on the choice and method of construction were fully adhered and retrofitting technologies that were helped to maximise the preservation of the building's heritage features without compromising safety were selected.

4. Reconstruction of Rana palaces

Rana palaces like Hariharbhawan, Singha Mahal (also known as Thapathali Durbar, which hosts the banking office of the Nepal Rastra Bank), Subarna Mahal (hosting the central office of Nepal Rastra Bank in Baluwatar), Radio Nepal and adjoining structures of Singhdurbar main (west) gate were found to be structurally unsafe and not feasible for retrofitting. They were to be reconstructed. The reconstruction of Singha Mahal (photo 28), Subarna Mahal (photo 29), Radio Nepal and adjoining structures of Singhdurbar main (west) gate were underway while the reconstruction of Hariharbhawan had not begun when this report was written.



Photo 28: Proposed building of Singha Mahal (Banking office, Nepal Rastra Bank)



Photo 29: Proposed building of Subarna Mahal (Central office of Nepal Rastra Bank, Baluwatar)

(Source: CLPIU)

Gaddi Baithak, the Royal Seat of Nepal (photo 30) was restored in 2018. The Gaddi Baithak (1908) is a UNESCO World Heritage site and therefore traditional materials such as wood, mud mortar and bricks, among others, were used in the reconstruction.



Photo 30: Gaddhi Baithak before and after reconstruction

(Source: NepaliSansar, 2019)

5. Retrofitting Rana palaces

Rana palaces like the Babar Mahal, Kesar Mahal, Bal Mandir, SAARC Secretariat, Central Law Library, Singha Durbar (west lounge and the main administrative complex), Shital Niwas and Bahadur Bhawan were found to be feasible for retrofitting. The retrofitting of Babar Mahal, Kesar Mahal, Bal Mandir, Singha Durbar (west lounge and the main administrative complex) were underway retrofitting works of the SAARC Secretariat and Central Law Library had been completed when this report was prepared. The retrofitting designs of Shital Niwas, Bahadur Bhawan and Tri-Chandra College have been completed, but the work had not started in end 2020.



Photo 31: Retrofitting of Singhadurbar (South Lounge)

(Source: Kantipur)

The main administrative building of Singhadurbar (photo 31) was used as the Office of the Prime Minister and the Council of Ministers since the Rana period. There was much debate on retrofitting vs. demolition and construction of a new building and the use of materials for reconstruction. Difference of opinions between the MoUD and the DoA on structural configuration and conservation had delayed the work. Eventually, all responsibility of building construction was handed over to CLPIU (Building), and NRA completed the retrofitting of the South Lounge in March 2021.

5.3.2. Reconstruction of hospitals and health institutions

Nineteen percent of all health facilities in Nepal were located in the 14 earthquake affected districts and 23 percent were in the 18 moderately affected districts (GoN, 2015). Many of these were damaged by the earthquake.

1. Targets and achievements

The earthquake had damaged 1,197 buildings of health sector institutions. Of these, 544 buildings were completely damaged and needed reconstruction, while 653 buildings were partially damaged and needed repair and maintenance. As of February 2021, out of the 1,197 health buildings that required reconstruction, 698 (58%) had been completed, 143 (12%) were under construction and reconstruction of 356 (30%) had not started (Figure 105).

The reconstruction of health facilities was overseen by the Project Coordination Unit (PCU) at the MoHP. Later, the PCU remained involved in repair and maintenance works while the responsibility of reconstruction of 544 completely damaged health facilities was handed over to CLPIU (Building). As an interim arrangement, 273 prefab buildings were built to serve as temporary health facilities.

FIGURE 105: RECONSTRUCTION OF DAMAGED HEALTH INSTITUTION BUILDINGS



(Source: NRA website)

Repair of damaged health facilities

Detailed engineering study of damaged buildings were carried out in all 32 earthquake affected districts and repair and restoration of 330 health facilities had been completed through assistance of various organizations.

Reconstruction of health facilities

Out of the 544 health buildings to be reconstructed, reconstruction of 59 facilities had been completed in end 2020 and the remaining buildings were wither under construction or were planned to start construction in 2021. The reconstruction status of the 544 health facilities carried through CLPIU (Building) are listed in the Annex. After reconstruction of all 544 health institutions, the facilities are estimated to provide services to 53.5 million people in 32 earthquake affected districts. Some pictures of the reconstructed health institutions are presented below (Photo 32-36):



Photo 32: Completed health post building at Sukrauli, Nawalparasi



Photo 33: Bir Hospital, Kathmandu after reconstruction



Photo 34: Reconstruction of health post at Lamachaur, Kaski



Photo 35: Reconstructed health post in Nalang, Dhading



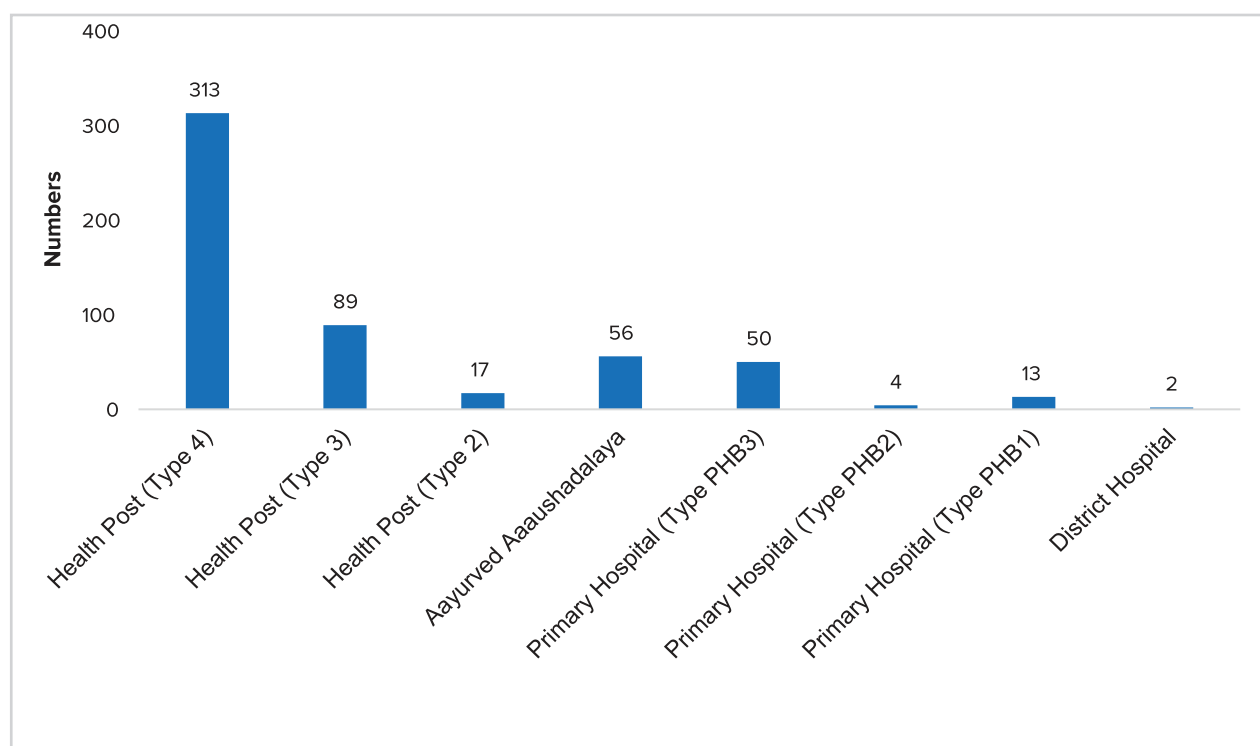
Photo 36: Reconstructed health post in Sindhure, Lamjung

Source: MoHP

2. Approach and institutional arrangement

Health facilities are categorized as per the Health Infrastructure Development Standards, 2017. Accordingly, the 544 totally damaged facilities needing reconstruction were categorized as: 419 health posts (17 Type 2, 89 Type 3, and 313 Type 4), 67 primary hospitals (13 Type PBH1, 4 Type PBH2, 50 Type PBH3), 56 Aayurveda Aaushadhalayas and two district hospitals as shown in Figure 106. The physical requirements of these buildings were different based on the type.

FIGURE 106: TYPES OF HEALTH FACILITIES



The standard designs prepared by the MOHP were used wherever the site conditions allowed. Before reconstruction, it is ensured that the health facilities had land ownership certificates and the land area was enough as provisioned in the Health Infrastructure Development Standards Volume 2, 2017. All requirements specified in this standard were strictly followed. The main modalities employed for the reconstruction or rehabilitation of health facilities buildings were:

Construction with GON funding through DUDBC/ MOHP

The Health Infrastructure Team of the Nepal Health Sector Support Programme (NHSSP) assisted the MOHP and DUDBC in strengthening the planning, programming, budgeting, and construction of health facilities. The NHSSP had three key performance areas:

1. Building a strong policy environment, to ensure that the MOHP and DUDBC adopt and implement relevant codes, standards, and guidelines for construction and maintenance of health facilities and infrastructure,
2. Enhancing the capacity of the MOHP, DUDBC, and the private sector (including contractors and construction professionals) to be efficient, technically competent, and capable of implementing resilient design, construction, and maintenance,
3. Building resilient and effective health infrastructure to ensure that health facilities are retrofitted, rehabilitated, maintained, and monitored in earthquake affected districts, and that facilities are resilient to future seismic shocks, environmental impacts, and other natural disasters.

The activities above are intended to continue supporting improvements in the MOHP and DUDBC joint efforts on physical facility development of health institutions even after completion of reconstruction period. (https://www.nhssp.org.np/Resources/HI/ EQ_Performance_Appriaisal_Report_Aug2017.pdf)

Construction by donors

Some health facilities were reconstructed using donor's support directly in coordination with the Department of Health. For example, Adventist Development and Relief Agency (ADRA) (adra.org) reconstructed 32 health posts in Kavrepalanchowk district. The USAID supported the reconstruction of four health facilities in Sindhuli district, two facilities in Makwanpur and one in Sindhupalchowk Barhabise (<https://np.usembassy.gov/usaids-starts-construction-of-seven-new-public-facilities/>).

Construction by NGO partners

The NRA had a provision to allow local NGOs and community groups to reconstruct health facilities with the support of international NGOs and charities.

Construction by community groups

Community and consumer groups were also allowed to reconstruct health facilities by generating local fund or using support from municipalities and wards through users' committees.

3. Case Study:

Paropakar Maternity and Women's' Hospital and Bir Hospital

The reconstruction of the main building of the Paropakar Maternity and Womens' Hospital (photo 37) and one building of Bir Hospital (photo 38) were carried out by the MOHP with the financial support of the Japanese government. These newly built hospitals are among the best-equipped government hospitals in Kathmandu Valley. There are 192 beds in the reconstructed main building of the Maternity Hospital and 94 beds in the new building of Bir Hospital. These hospitals followed the Build Back Better concept of rebuilding to a higher standard. The 50-year-old third ward (about 3,100 square meters) at Bir Hospital was completely destroyed by the earthquake. It is the largest and oldest (established in 1889) hospital in Nepal and serves as a referral hospital. Similarly, Paropakar Maternity and Womens' Hospital (about 5,400 square meters), popularly known as Pasuti Griha is also a top referral hospital that serves expectant and nursing mothers. It was established in August 1959 at the initiative of Paropakar, a community-based organization and late king Mahendra (then Crown Prince) in memory of his wife, who had died due to pregnancy-related complications.



Photo 37: Paropakar Maternity and Womens' Hospital (Existing building on the left and new design on the right)



Photo 38: Bir Hospital (Existing building on the left and new design on the right)

(Source: JICA 2016)

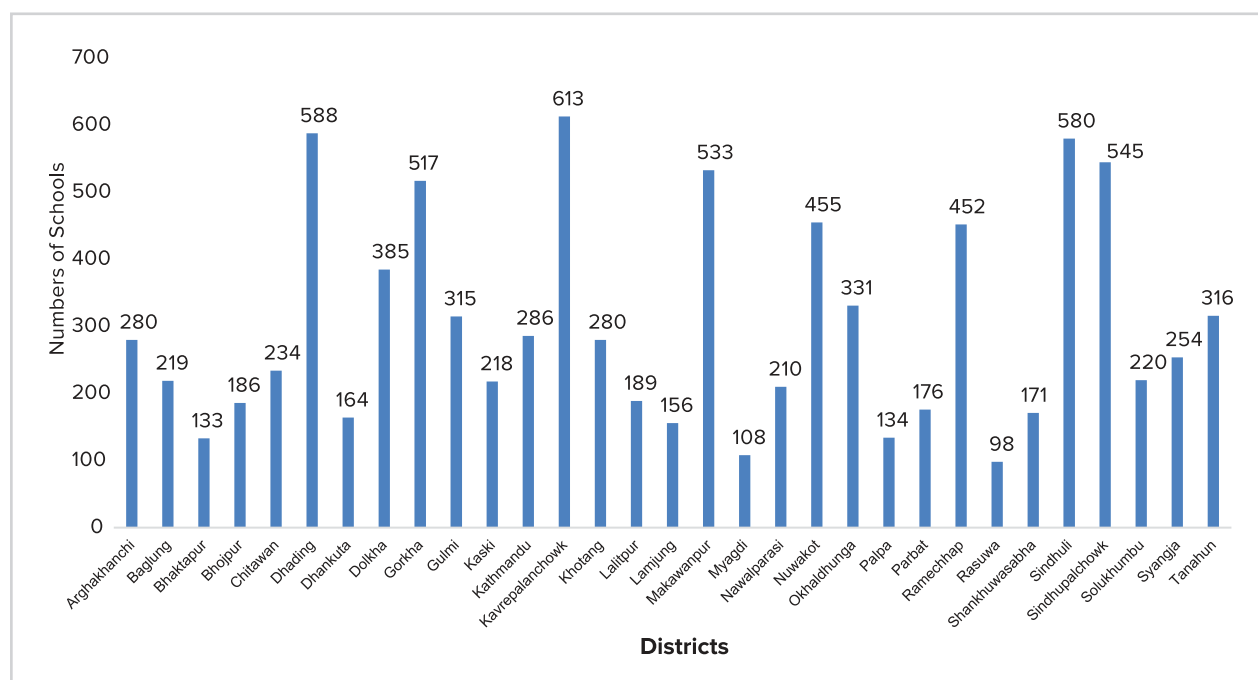
5.3.3. Reconstruction of schools and education institutions

There were around 9,346 schools in the 32 earthquake-affected districts (Figure 107). The earthquake damaged 8,242 public schools in which 25,134 classrooms were fully destroyed and 22,097 were partially damaged. Private schools also faced substantial infrastructure damage: 956 classrooms were fully destroyed, and 3,983 classrooms were partially damaged. School infrastructures including 4,416 toilets, and WASH facilities, and 1,791 boundary walls were also damaged (GoN, 2015).

The Technical and Vocational Education and Training (TVET) subsector suffered damage of 356 classrooms and partial damage of 184 classrooms. Similarly, the higher education subsector suffered destruction of 1,292 classrooms and partial damage of 3,040 classrooms (GoN, 2015).

The estimated net value of the damages to the education sector was estimated at NRs. 31,317.9 million (US\$ 313.2 million), of which the public sector covered 92 percent and the private sector covered eight percent. The total recovery and reconstruction cost incurred for the school subsector after the earthquake was estimated as NRs. 39,705.8 million (US\$ 397.1 million), which is 91 percent of the total reconstruction cost for the education sector (GoN, 2015).

FIGURE 107: TOTAL NUMBER OF SCHOOLS IN EARTHQUAKE AFFECTED DISTRICTS OF NEPAL.



Source: NRA

1. Target and achievement

The second largest sector affected by the 2015 earthquake after housing was education and therefore, reconstruction of educational buildings was given high priority. The NRA had adopted different modalities for rebuilding education institutions. The CLPIU (Education) was responsible to rebuild educational buildings. Although the total number of damaged school buildings was 7923 and because a few of them merged after the earthquake only 7583 school buildings required to be reconstructed.

FIGURE 108: SCHOOL RECONSTRUCTION (APPROACH-WISE)

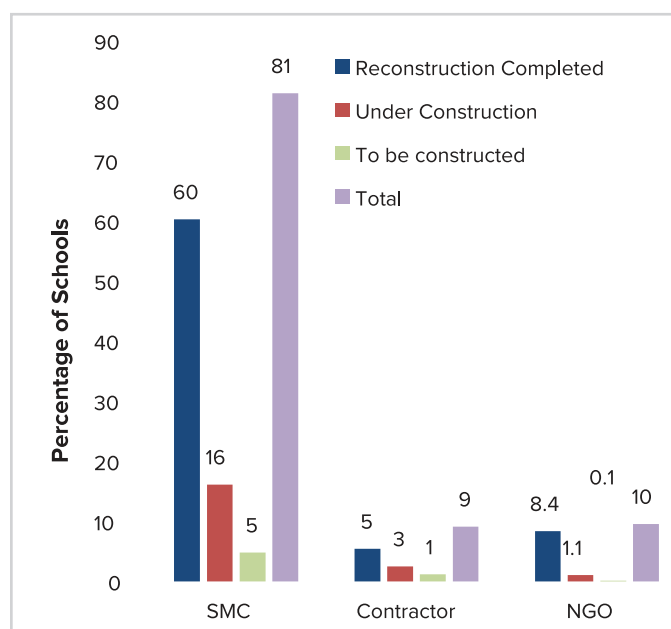
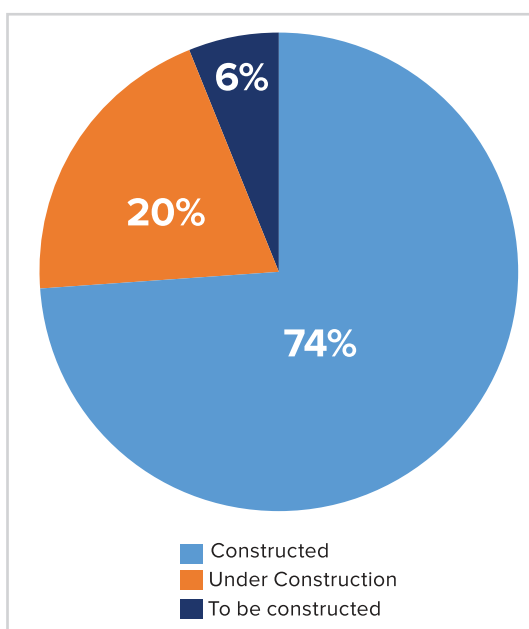


FIGURE 109: SCHOOL RECONSTRUCTION OVERALL

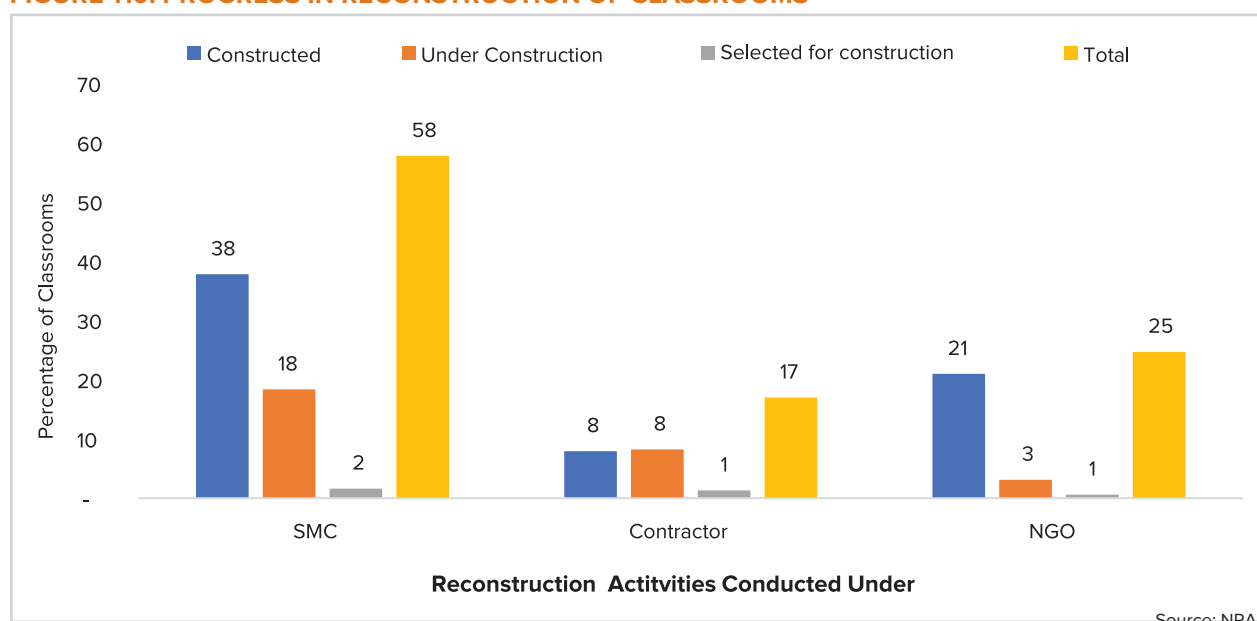


Source: NRA

As can be seen in Figure 108, a large part (81%) of school reconstruction was done the School Management Committees (SMCs) through the GoN funding and 19 percent was done by NGO's and contractors through external funds.

The progress in reconstruction of school buildings (end 2020) is depicted in Figure 109. Altogether, 74 percent of school buildings (that required reconstruction) had been constructed, 20 percent were under construction and six percent remained to be constructed in 2021 (Figure 109). Among the reconstructed school buildings, 60 percent, 5 percent and eight percent were constructed by SMC, contractors (funded by donor agencies ADB, JICA, USAID, etc.) and NGOs, respectively (Figure 110).

FIGURE 110: PROGRESS IN RECONSTRUCTION OF CLASSROOMS



A total of 42,617 classrooms needed reconstruction, of which 58 percent was undertaken by the SMCs, 17 percent by contractors with foreign support and the remaining 25 percent by NGOs. As of January 2021, 67 percent of classrooms had been constructed, 30 percent were under construction and the construction of three percent had not begun reconstruction. Examples of reconstructed school buildings in Ramechhap and Solukhumbu districts are presented below (Photo 39, 40).



Photo 39: Agleshwori High School, Ramechhap



Photo 40: Mahendrajyoti High School, Solukhumbu

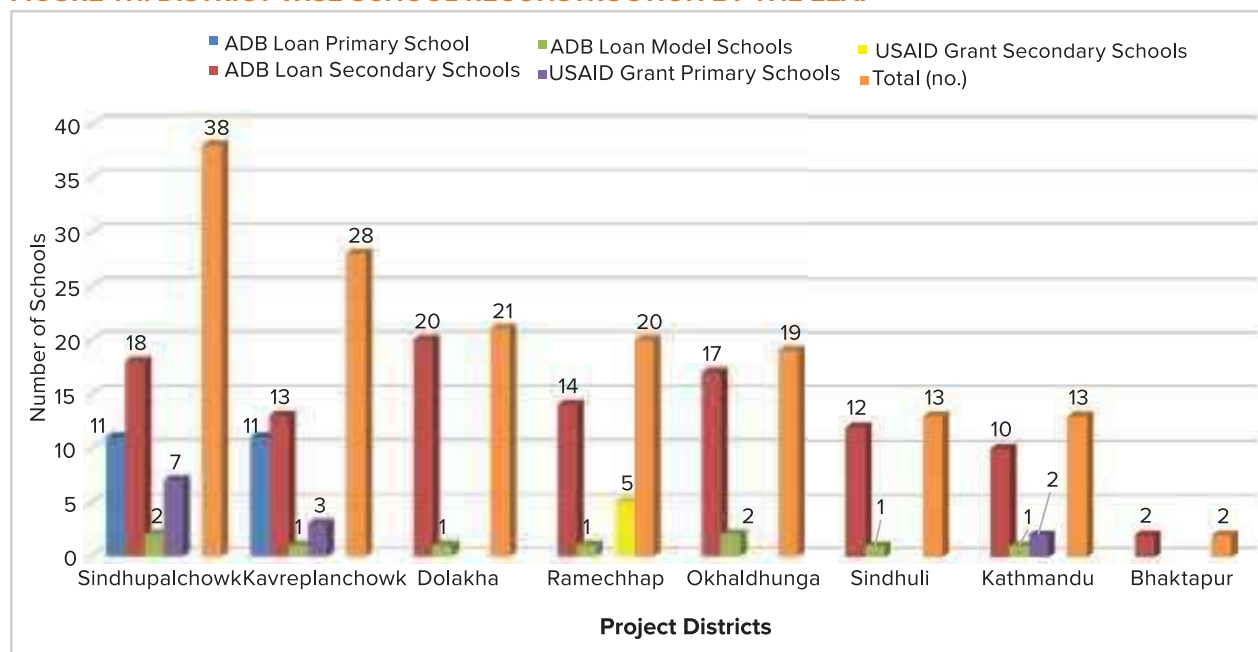
Source: MoE

2. Project-wise progress

Earthquake Emergency Assistance Project (EEAP): The EEAP was implemented by the NRA and CLPIU (Education) with financial support of \$105.29 million from the ADB and USAID. The major objective of this project was to rebuild 154 schools (112 Secondary and 42 Primary) in eight districts (Kathmandu, Bhaktapur, Kavrepalanchowk, Sindhupalchok, Dolakha, Ramechhap, Okhaldhunga, and Sindhuli) with adequate health and safety features.

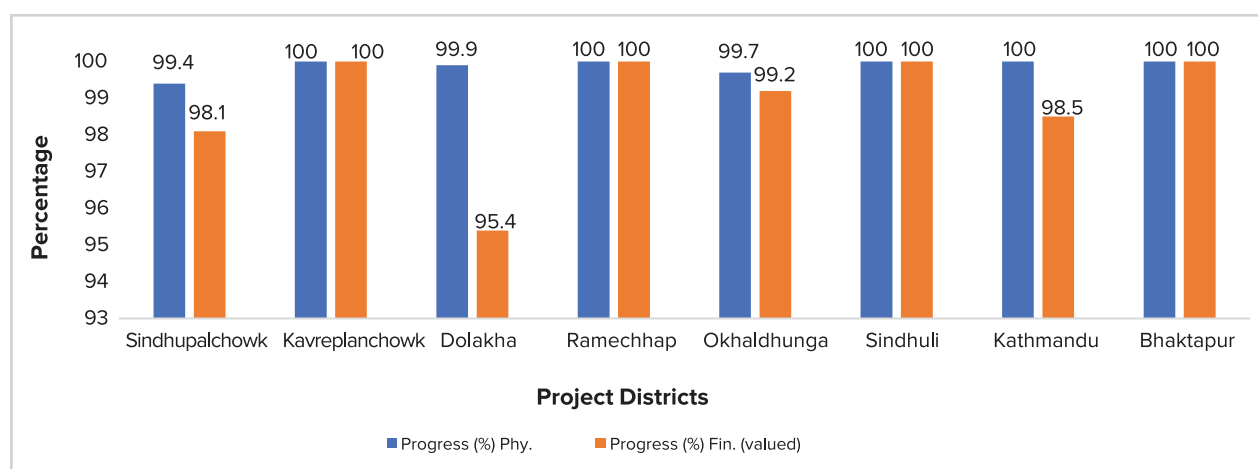
The schools reconstructed under this project (with loan from the ADB and grant from USAID) were carried out in eight districts as shown in Figure 111. The 154 schools reconstructed under this project included 34 primary schools, 111 secondary schools, and nine model schools. Figure 112 summarizes the progress of the project as of January 2021.

FIGURE 111: DISTRICT WISE SCHOOL RECONSTRUCTION BY THE EEAP



Source: NRA

FIGURE 112: PHYSICAL AND FINANCIAL PROGRESS OF EEAP PROJECT

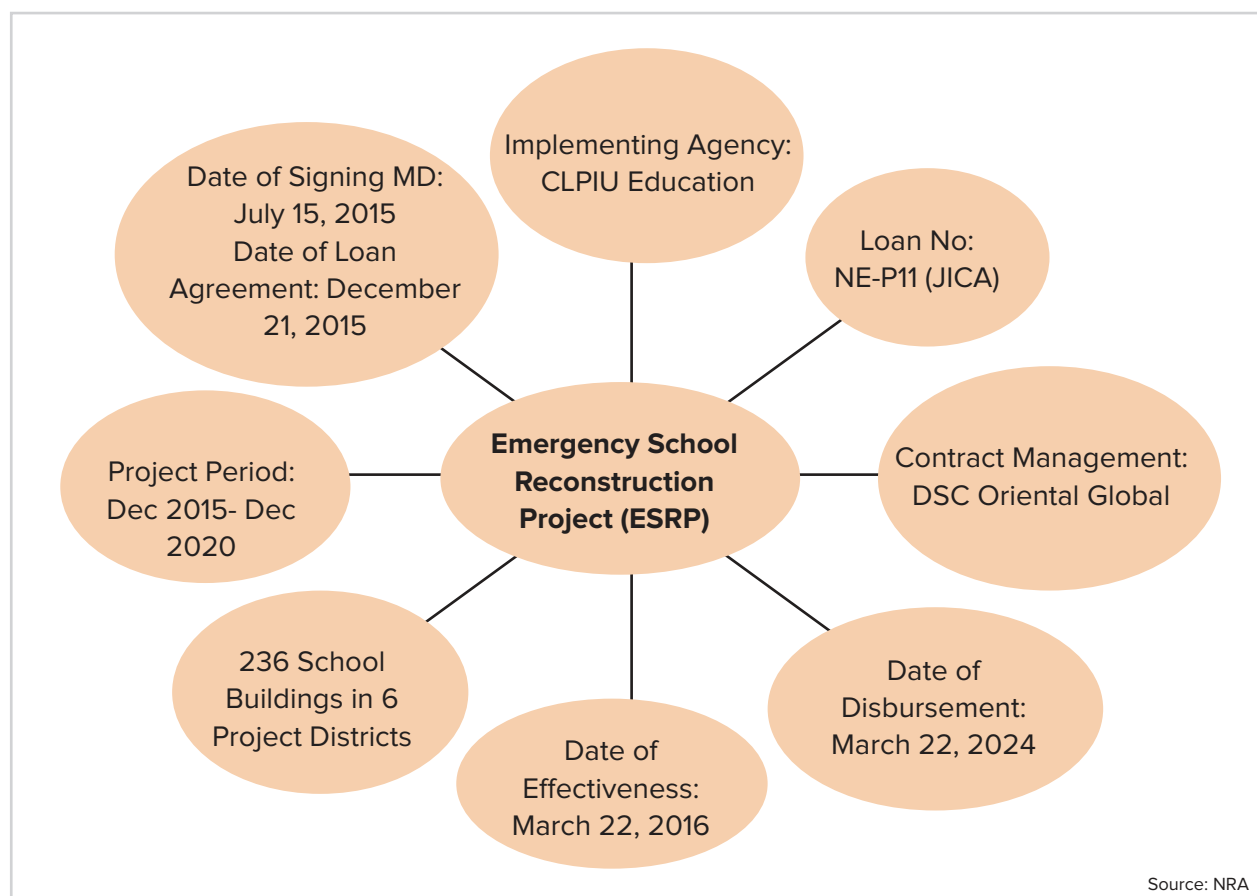


Source: NRA

Japan Fund for Poverty Reduction (JFPR): The Japanese funds for poverty reduction administered and monitored by the ADB reconstructed eight model schools. The project had a budget of US \$15 million (of which US \$ 8.1 was for model schools) in eight districts (Ramechhap, Dolakha, Gorkha, Rasuwa, Dhading, Lalitpur, Makwanpur, and Nuwakot).

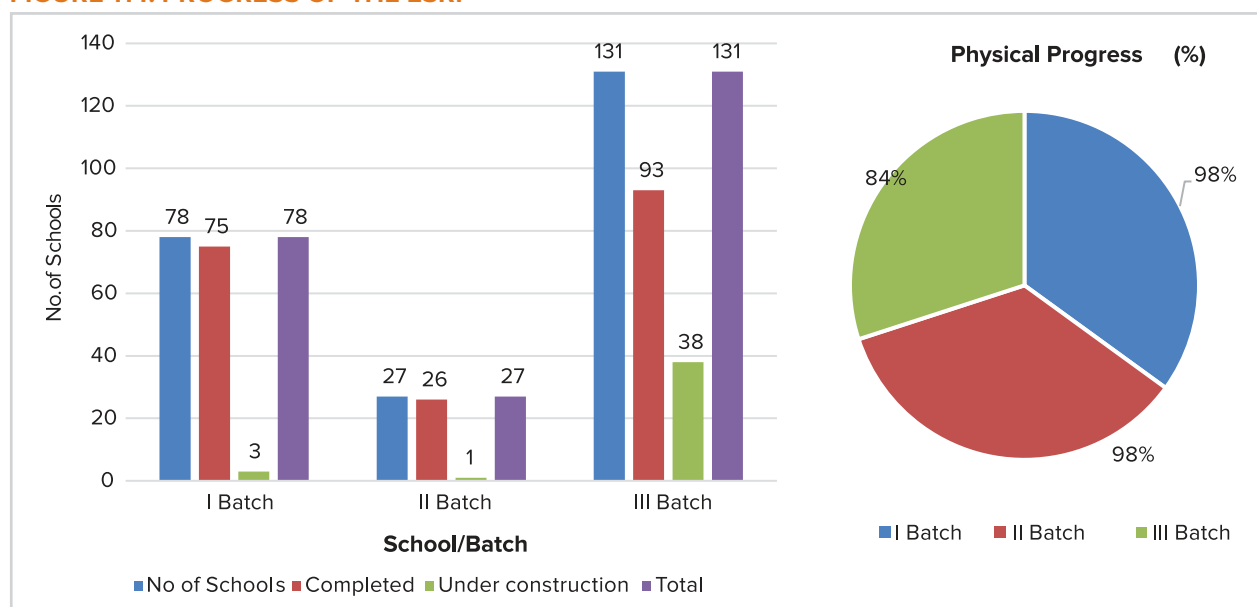
Emergency School Reconstruction Project (ESRP): This project sought to rebuild 236 school buildings in six project districts (Lalitpur, Gorkha, Dhading, Rasuwa, Nuwakot and Makwanpur) with a loan from JICA. It was executed by the NRA and implemented by CLPIU (Education) under a contract managed by Oriental Consultants Global. Figure 113 provides other project details.

FIGURE 113: KEY FEATURES OF THE ESRP



Of 236 school buildings targeted for reconstruction under the ESRP project, 194 had been completed in end December, and 42 were under construction in three different batches (Figure 114). As also shown in Figure 114, schools in batch I and II had 98% progress whereas schools in batch III had 84 percent progress. In end of 2020, NRs. 7442 million (US\$ 74.42 million) had been spent in the ESRP project.

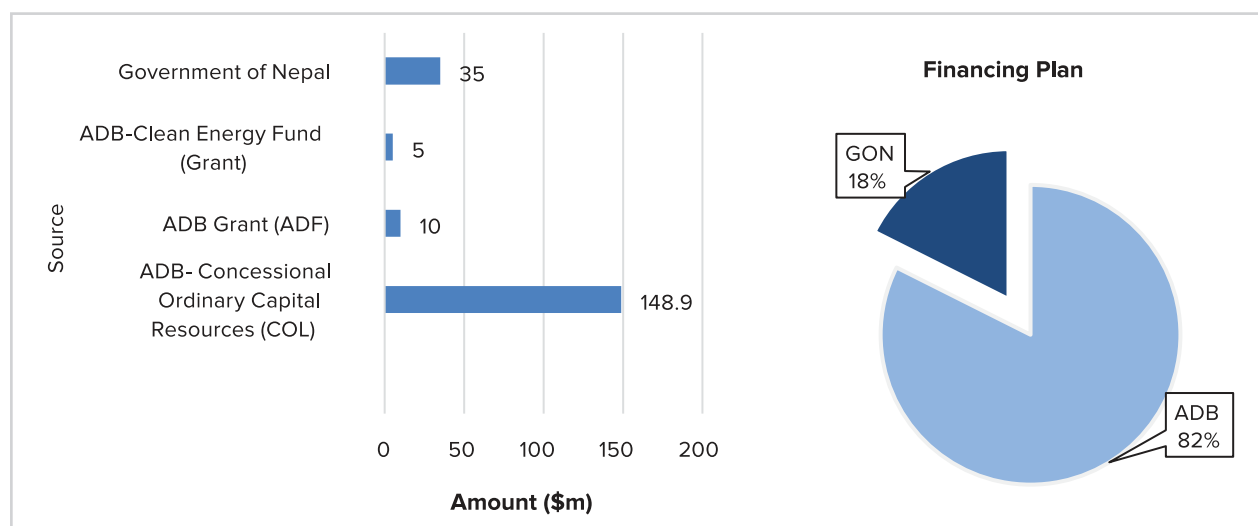
FIGURE 114: PROGRESS OF THE ESRP



Note: Expenditure amount: NPR. 7442 million (US\$ 74.42 million)
Source: NRA

Disasters Resilience of Schools Project (DRSP): The DRSP was another ADB loan project which began in December 2018 and is expected to be completed in September 2022. The project will continue to be executed by the NRA until its tenure then be handed over to the MOE. The goal is to improve the disaster resilience of schools in three provinces (1, 3 and 4), including the 14 highly affected districts. The project is to reconstruct 173 schools and retrofit 150. The project aims to improve the learning environment and by 2023 the enrolment rate at the schools is expected to be restored to the pre-earthquake levels with at least 89,000 students (including 46,200 girls).

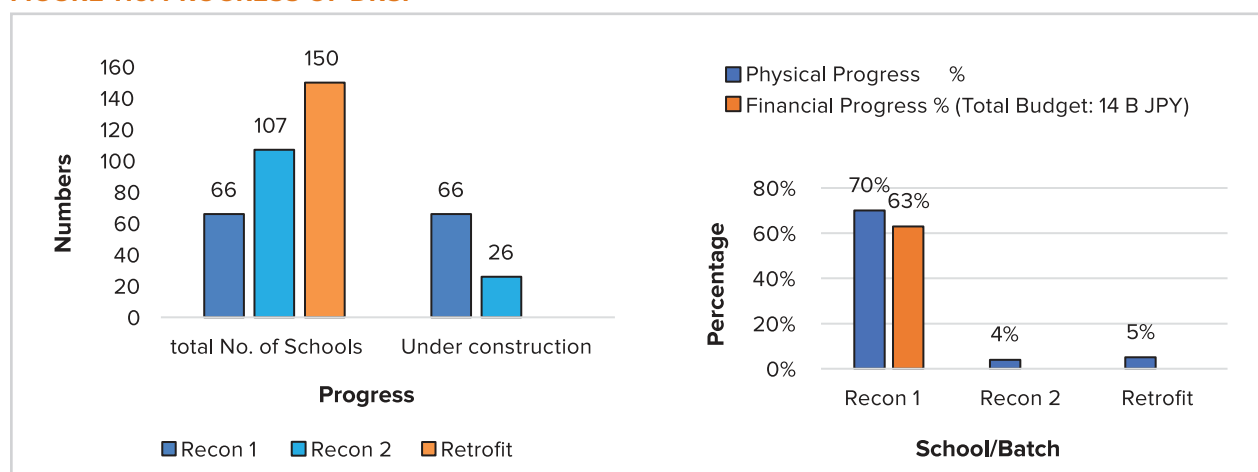
FIGURE 115: FINANCIAL PLAN FOR THE DRSP



Source: NRA

The DRSP is co-funded by the GoN (18%), the remainder is covered by the ADB loan (Figure 115). Of the 173 schools targeted under DRSP, 92 were under construction in two different batches (i.e., reconstruction 1 and reconstruction 2). As shown in Figure 116, the first batch of schools being reconstructed had reported 70 percent physical and 63 percent financial progress. The physical progress was only four percent for the second batch. Similarly, out of the 150 schools targeted to be retrofitted under this project, the physical progress was only 5 percent.

FIGURE 116: PROGRESS OF DRSP



Source: NRA

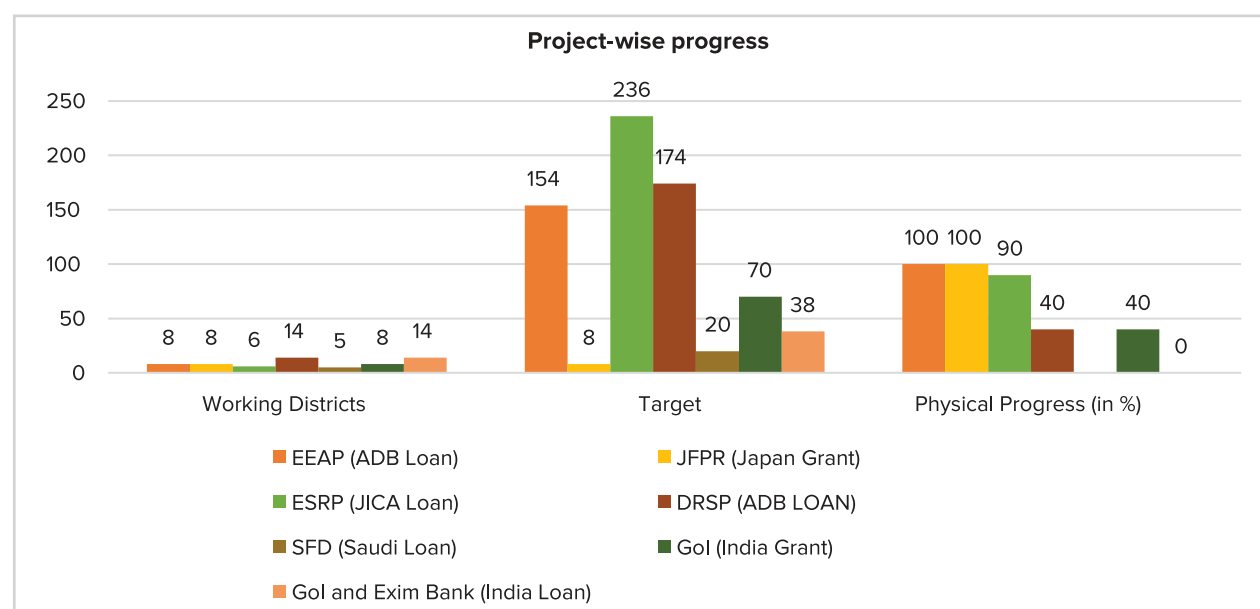
Reconstruction of Education Facilities through the Saudi Fund for Development (SFD): The loan agreement for building 20 schools in five districts between the GoN and the government of Saudi Arabia was signed on October 11, 2019. The disaster preparedness and response plans of these schools were completed and the CLPIU (Education) had begun tendering for construction of the schools in Kaski, Lamjung, Tanahun and Syangja districts in July 2020. The reconstruction was expected to start in 2021.

Government of India grant aid to school reconstruction: The Indian government provided US \$50 million (NRs. 5 billion) for rebuilding 70 schools and two libraries. The project was launched in August 2017. One school had been completed and handed over, eight other schools were in the final stage of completion in January 2021, and 56 schools were under construction. The bidding for the construction of the Central Library at Tribhuvan University had begun, and the disaster preparedness and response plan of the remaining six schools was being prepared.

Reconstruction of Tribhuvan University (TU) and constituent campuses

This project is financed by the Government of India and the Exim Bank of India through a loan to the GoN for reconstruction of infrastructures in TU and its constituent campuses, which includes 38 college buildings. The work was in the inception phase when this report was prepared. The list of campuses to be reconstructed has been confirmed by TU, the soil test reports and the disaster preparedness and response plans of four campuses have been submitted to the NRA for approval, and the designs of 38 campus buildings are under preparation (Figure 117).

FIGURE 117: OVERALL PROJECT WISE PROGRESS



Source: NRA, 2020

5.3.2 Approach and institutional arrangement (educational buildings)

The following main approaches were used for the reconstruction of educational buildings:

1. Through SMCs for projects funded by the internal GoN sources
2. Through contractors for projects funded by donor agencies including the ADB, JICA, Government of India, USAID,
3. Through NGOs, and
4. Turnkey projects undertaken by government of the People's Republic of China (PRC), the USAID and with Norwegian support.

In addition to the above, some colleges under the Tribhuvan University were reconstructed with the loan assistance.

Approach for reconstruction of school buildings

1. Through School Management Committees

Every school in Nepal has a management committee. All decisions related to school management are taken by the SMC. One of the main approaches taken was to allow the SMCs to make decisions and handle the day-to-day management of reconstruction. This modality was adopted especially in reconstruction of small schools, and about 80 percent of school buildings were constructed in this approach. The School Reconstruction Guideline, 2016 and the School Reconstruction Working Procedure, 2017 were prepared to guide and regulate the reconstruction. The SMCs received the budget for reconstruction through the DLPIU (Education), which also supervised reconstruction to ensure the use of quality materials and adherence to the building code. Community participation was also encouraged during the reconstruction.

2. Through contractors

This modality was adopted to rebuild damaged schools with the support of development partners like the ADB, JICA, USAID and GoI. The GoN signed separate agreements with the partners, outlining the criteria for selecting construction companies to the rebuild schools. Consultants were hired to design the schools and supervise construction. The procurement was done as per the provisions of the GoN or the procurement guidelines of donor agencies. Apart from rebuilding damaged classrooms, these projects also built educational infrastructure like laboratories, library, computer lab, music room, teachers' rooms, kitchen, separate toilets for boys and girls, toilets for physically-disabled students, water tap, furniture, solar backup, electrical wiring, fencing, footpath and gates. Large school buildings were constructed under this modality. About 10 percent of damaged school buildings were under construction at the time of reporting.

3. Through NGOs

Before the CLPIU (Education) was formed, as many as 70 NGOs had already started the process to rebuild 350 schools by securing permission from the DoE. After its formation, the NRA passed a guideline on the mobilization of NGOs in post-earthquake recovery. As per the guideline, NGOs could rebuild classrooms after a tripartite agreement between them, the NRA and the CLPIU (Education). Their proposals are first endorsed by the DLPIUs, then by the CLPIU. The final decision on each proposal was made by the NRA. All designs required approval of the DUDBC. Under this modality, NGOs bore the cost for rebuilding these schools most of which were small. About 10 percent of damaged school buildings were constructed under this modality.

A Terms of Reference developed by the NRA for the consulting services included:

- n Review of GESI responsive retrofit designs developed by the design supervision consultant for retrofitting unsafe schools as a part of on-the-job training program,
- n Implementation of GESI responsive retrofit designs for three pilot unsafe schools,
- n Formulation of GESI responsive and disaster risk management (DRM) plans,
- n Training female teachers and students on menstrual health and hygiene in consultation with GESI specialist of CLPIU,
- n Training engineers and mason on disaster resilient construction,
- n Training school communities in operation and maintenance of schools,

- n Preparing a manual for community driven implementation of DRM action plans, and
- n Preparing guidelines for scaling up of community driven retrofitting of schools.

5.3.3 Case study

Durbar High School

Durbar High School also known as Bhanu Secondary School is Nepal's first public school that was established in 1854 by the then prime minister Jung Bahadur Rana for educating the children of the Rana family. The school was opened for other children in 1901. The school was severely damaged by the 2015 earthquake.

The Chinese government completed the reconstruction of the school in April 2019. The governments of Nepal and China had signed the MoU for reconstruction of this and 24 other post-disaster reconstruction projects on July 23, 2015. The reconstruction started late due to a debate among stakeholders on whether to the school should be retrofitted or rebuilt.

The school is built on 4200 square meters of land; the new building has four floors with 46 rooms and was rebuilt in the original architectural style (Photo 41, 42).



Photo 41: Durbar High School after the earthquake
(Source: The Himalayan times published on Aug 20, 2016)

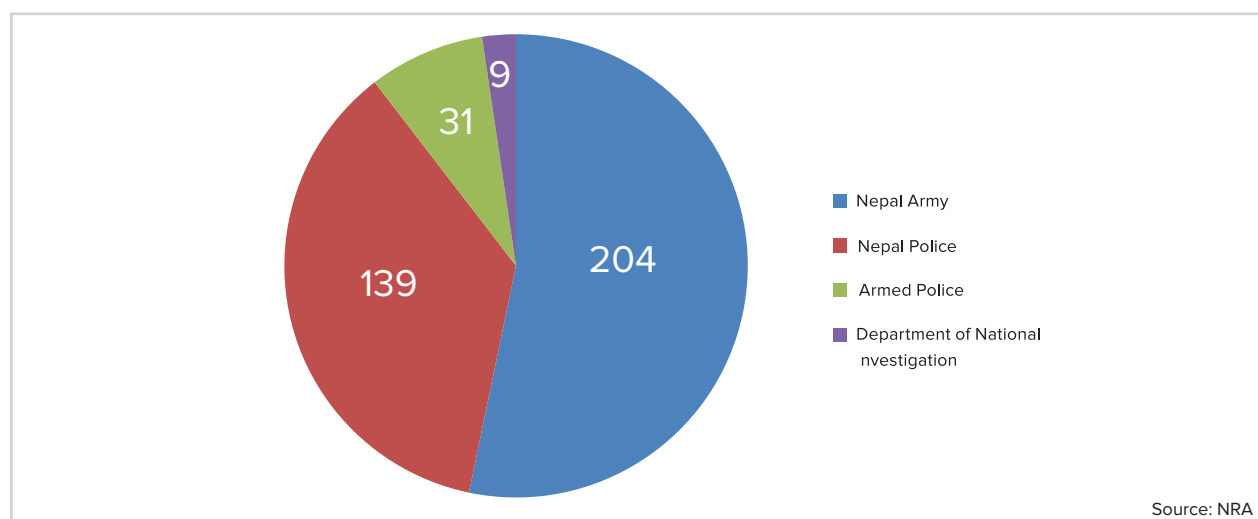


Photo 42: Reconstructed Durbar High School
(Source: The Himalayan times published on Jan 19, 2020)

5.3.4 Reconstruction of buildings security forces

A total of 383 security-services related buildings owned by Nepal Army, Nepal Police, and the Armed Police Force were damaged by the 2015 earthquake and required reconstruction. Among these, 204 buildings belonged to the Nepal Army, 139 were owned by the Nepal Police, 31 buildings by the Armed Police Force and nine buildings by the Department of National Investigation (Figure 118).

FIGURE 118: DISTRIBUTION OF THE 383 DAMAGED BUILDINGS ACROSS DIFFERENT SECURITY INSTITUTIONS

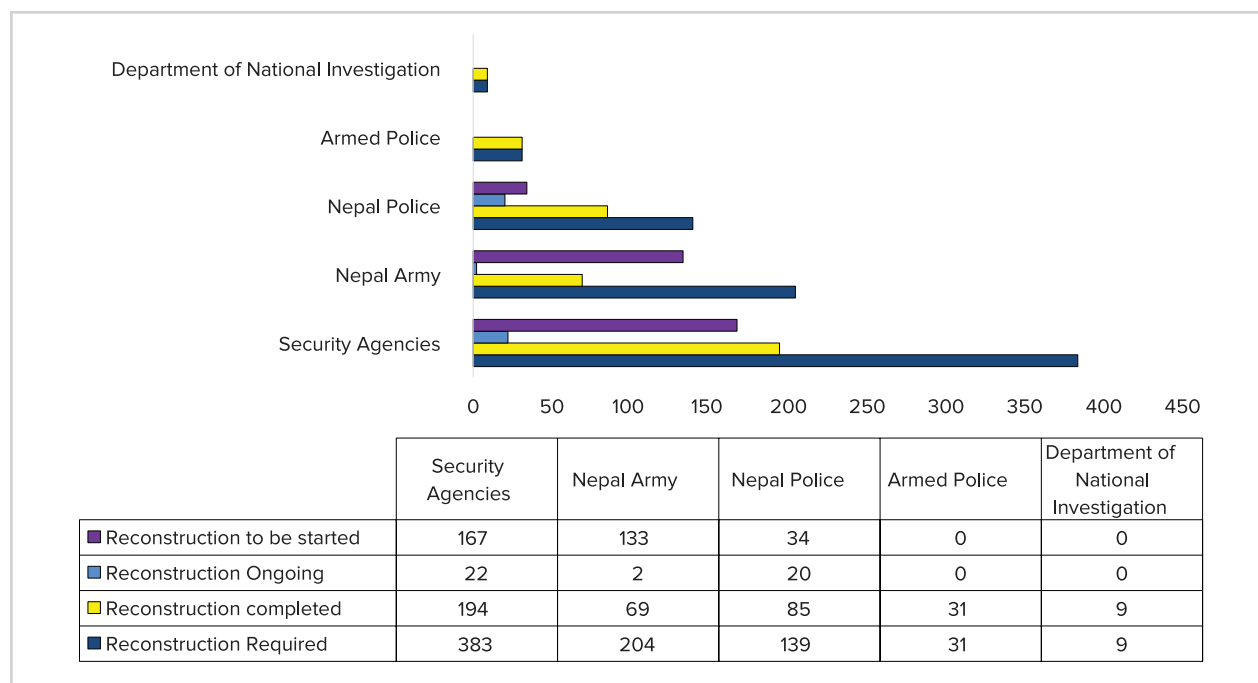


The reconstruction of the damaged security-services buildings was done by the concerned agency with the funding from the GoN. The NRA provided funding for the reconstruction of 216 buildings, among which 214 had been completed and two were under construction in January 2021.

1. Target and achievement

The security service agencies reconstructed their own buildings in consideration of the sensitivity. The progress in reconstruction as of January 2020 is given in Figure 119:

FIGURE 119: RECONSTRUCTION STATUS OF SECURITY AGENCY BUILDINGS



(Source: NRA)

As of January 2020, 194 buildings had been reconstructed of which 69, 85, 31, and nine belonged to the Nepal Army, the Nepal Police, the Armed Police and the Department of National Investigation, respectively. Twenty-two buildings (2 of the Nepal Army and 20 of the Nepal police) were under construction and 167 buildings (133 of the Nepal Army and 34 of the Nepal police) had yet to begin reconstruction.

2. Case Study:

Reconstruction of Nepal Army Headquarters

The new building of the Nepal Army Headquarters was constructed by employing modern technology. It was the biggest project approved by the NRA. The construction began on June 6, 2016 and 400 workers worked in the project everyday to complete it in two years and 10 months. The government had allocated NRs. 3.44 billion (US \$ 34.4 million) through the NRA for the reconstruction. The seven-story structure with earthquake resistant features has 430 rooms. Forty-seven offices including the Nepal Army Directorate General and other directorates operate from the building, which was built by integrating seven separate blocks. The new building has capacity to hold 1,000 Nepal Army human resources to work at a time.

The NRA with the technical support from CLPIU (Building) provided necessary support in the reconstruction. The modern building is compliant with NBC105 (Photo 43).



Photo 43: Army Headquarter after reconstruction

(Source: <https://kathmandupost.com/national/2020/04/03>)

5.3.5 Reconstruction of roads and bridges

The roads in Nepal are broadly classified into national highways (NH), feeder roads (FR), middle-hill roads and postal roads. These roads grouped as the strategic road network (SNR). The total length of the SNR is about 13,447.62 km (DoR, 2018), out of which 6979.33 km are bitumen roads, 2276.87 km gravel roads and 4191.42 km earthen roads. In 2018, Nepal had 3506.85 km of national highway, 8008.06 km of feeder roads, 1231 km middle-hill roads and 701 km postal roads.

The 2015 earthquake had damaged 7.5 percent of the SNR; some examples, are shown in photo 44.



Photo 44: Example of damaged road in Kathmandu (Photo: Rama Mohan Pokhrel, 31 May 2015) and road bridge connections

(Source: DOR)

3. Target and achievement

The earthquake had damaged 1,020 kms of 77 different roads, including 89 bridges.

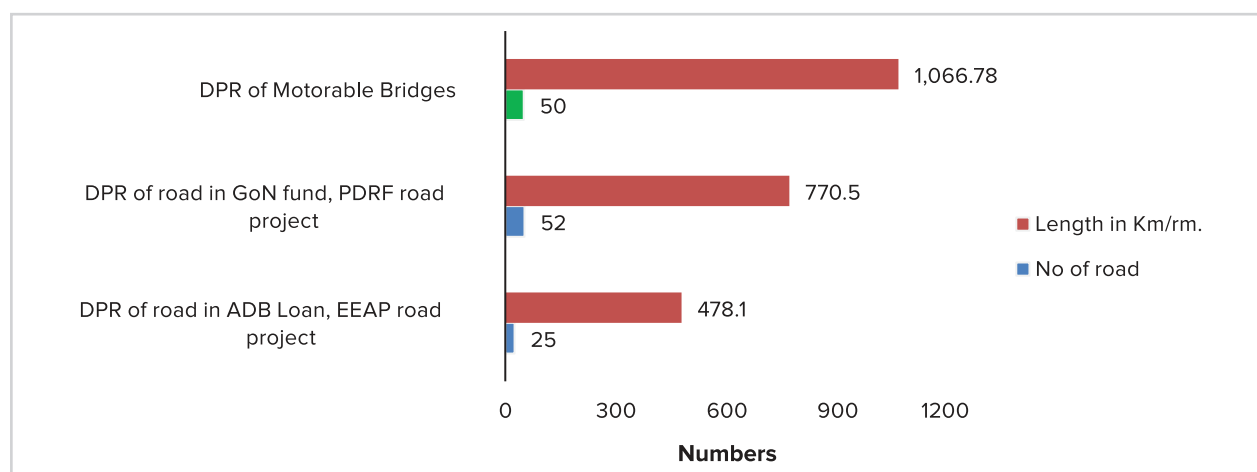
CLPIU (GMaLI) prepared the DPR and awarded the contracts for reconstruction and rehabilitation of district roads and bridges in 22 districts. It had also established DLPIUs (GMaLI) in these districts. The CLPIU (GMaLI) was supported at the centre by one consultant (a monitoring and evaluation expert) and DLPIUs (GMaLI) were supported technically and socially by the District Implementation Support Consultants (DISC) in the 22 districts.

The GoN funded the reconstruction of 25 district roads (a total stretch of 362.6 km) in the 22 districts, which were under construction. As of December 2020, CLPIU (GMaLI) had awarded construction contracts for 10 motorable bridges, and four more bridges were in bidding stage. The CLPIU (GMaLI) project directorate was supported by the DLPIUs to supervise and implement the approved activities.

4. Detail project reports (DPR)

A summary of the bridges and roads reconstructed under different funding schemes is shown in Figure 120. In the ADB (loan) funded EEAP road sub-project, 450 km of district roads were originally planned for reconstruction. Eventually, 25 potential road stretches with 478.1 km total length were selected and subsequently DPRs were prepared and approved by CLPIU (GMaLI). Under GoN funding through the PDRF road sub-project, the DPR of 52 potential road subprojects (770.5 km) were prepared and approved by the NRA, CLPIU (GMaLI).

FIGURE 120: STATUS OF DPR PREPARATION FOR RECONSTRUCTION OF ROADS AND BRIDGES



Source: NRA

5. Projectwise progress

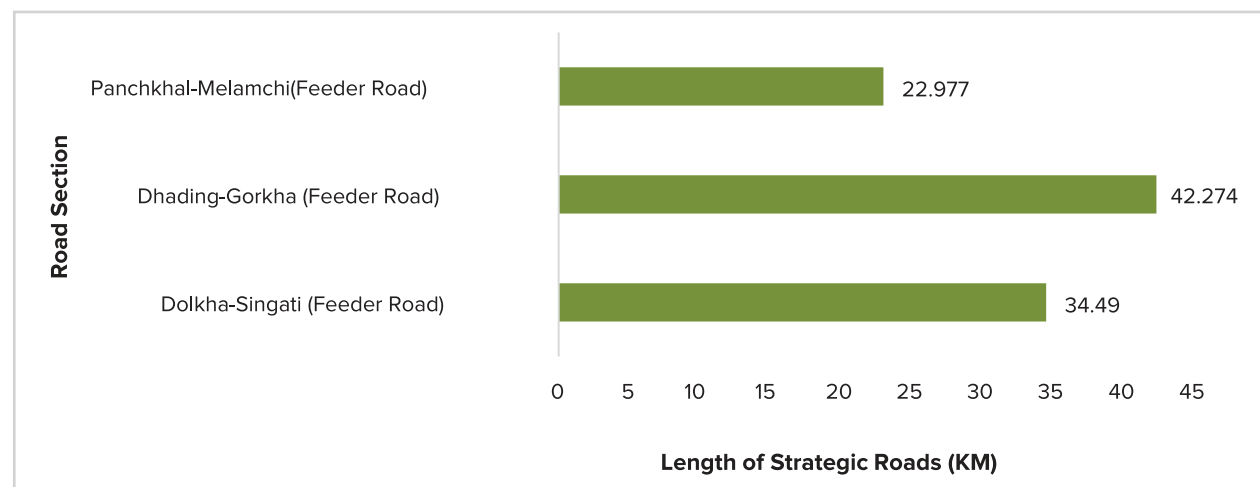
1. ADB EEAP road project

The road reconstruction project came under Output 2 of the EEAP and was titled Reconstruction and upgrading of roads and bridges. According to the Environmental Compliance Monitoring Report of the ADB, around 135 km of strategic roads, 450 km of rural roads, 123.9 km of strategic roads and 525 km of district roads were planned for reconstruction under EEAP. The district roads components had received technical assistance grant support from the Swiss Agency for Development and Cooperation (SDC). Later, within the allocated project funds for district roads, it was planned and agreed to build 17 (of the 25 roads, for which the DPR had been prepared) road subprojects, including 301 km of the District Road Core Network (DRCN). The original original target was built 450 km of roads with fund allocated for district roads (ADB, 2020).

National competitive bidding approach was applied in the EEAP. Initial environmental examination (IEE) reports of the 17 road sub-projects have been approved by the GoN (ADB, 2020).

In the central and western regions of Nepal, the EEAP financed three more feeder roads (total stretch, 99.741 km) as a part of the SRN. The project roads, as shown in Figure 121, are: (i) Dolakha–Singati Road (34.49 km), (ii) Dhading-Gorkha Road (42.274 km) and (iii) Panchkhal–Melamchi Road (22.977 km). These roads were selected based on environment, resettlement, social and economic impacts and project readiness. Institutional capacity for road safety and road maintenance was assessed as a part of the capacity development program and GESI was planned through a livelihood program. The DoR will maintain these roads at all-weather bituminous Feeder Road Standard (ADB, 2020).

FIGURE 121: LIST OF SRN ROADS UNDER THE EEAP

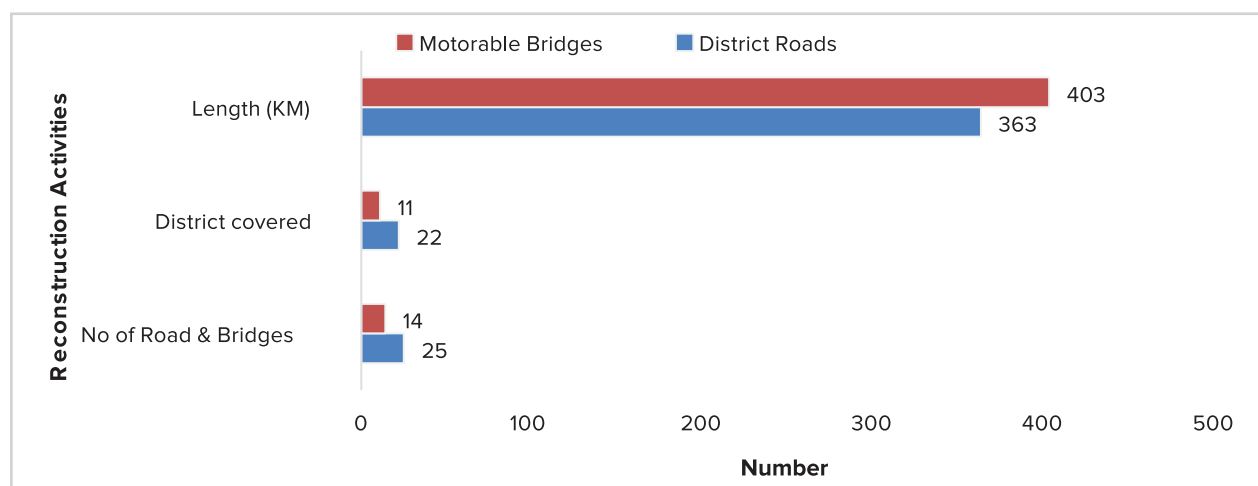


Source: Environmental compliance Monitoring Report: Earthquake Emergency Assistance Project (ADB, 2020)

2. GoN-funded PDRF road and bridge project:

Of the 52 road sub-projects for which DPRs were prepared by CLPIU (GMALI) with GoN funding, 25 road sub-projects (363 km) in 22 earthquake-affected districts were under construction when this report was prepared. Likewise, of the 50 DPRs prepared for motorable bridges, 14 were under construction in 11 earthquake-affected districts (Figure 122).

FIGURE 122: LIST OF DISTRICT ROADS AND MOTORABLE BRIDGES UNDER CONSTRUCTION FROM THE GON PDRF FUND



Source: NRA

Of the 363 km road sub-projects, six had been completed with gravel standard. Most of the blacktop standard road sub-projects were under progress. However, the COVID-19 pandemic affected road and bridge construction from March to June 2020, the main construction period for road work.

Safeguards frameworks were prepared in accordance with the ADB's Safeguards Policy Statement 2009. The EEAP's environment assessment and review framework, resettlement framework, initial environmental examinations (IEEs) and resettlement plans (RPs) have been prepared and implemented in the ADB funded EEAP as well in the PDRF project.

All outputs will be disaster resilient and standard engineering parameters were used as per standard specifications during the DPR preparation as well as implementation.

3. DPR handover to provincial and local governments

A total of 301 km of roads have been reconstructed under the ADB loan. In the GoN funded PDRF project, 363 km district roads with 14 motorable bridges were under construction. The draft final DPRs for the remaining sub-projects (35 roads of 584.60 km and 36 motorable bridges of 781.8 m total length), have been handed over to the respective provinces and local governments for implementation.

6. Approach of reconstruction

The sub-projects were selected based on the criteria agreed during project preparation and further prioritized considering the impacts of the earthquake in the districts, need of reconstruction and rehabilitation and the availability of budget. The DPRs for these subprojects were prepared and submitted to CLPIU (GMAI) and the ADB for review and approval. The selected 17 sub-projects (301.6 km) located in 12 most severely affected districts were funded under the EEAP. The road sub-projects requiring rehabilitation and reconstruction and motorable bridges in other districts were considered for GoN funding under the PDRF project. In all the PDRF project was to rebuild 25 roads (363.0 km) and 14 motorable bridges.

Approaches for roads in the Village Road Core Network (VRCN) were different because they were mostly non-engineered and non-climate resilient and required significant improvements. These roads were typically for low volume of traffic and therefore those that served as lifelines to communities were built with improved climate resilience design. This included 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. The structures damaged or likely to be damaged were rehabilitated/ reconstructed.

The roads were reconstructed following the existing road alignment combining civil, structural and bioengineering techniques. To make the roads disaster resilient, stable retaining and relevant structures were provided at landslide and rock fall sections. Adequate retaining and breast walls were constructed as designed. More stable slopes were used by adjusting the road alignment, in collaboration with private and public landowners and the local governments. Gabion and masonry structures were constructed for protection from landslides. District roads were upgraded with water bound macadam (gravel standard) and relatively stable pavements (Double Bituminous Surface Treatment and asphalt concrete). In relatively high-grade areas, roads were designed and built using RC pavement.

Incorporation of the features described above led to increase in construction cost per kilometre over what was envisaged during project design. For the purpose of slope protection and soil stabilization, retaining walls with geogrid was introduced as per the site conditions. Existing earthen and weak side drains and cross drainage structures were replaced by masonry and RC slabs and RC causeway structures. In addition, several batches of social safeguard trainings were conducted where climate change and environment protection related topics were covered. Roadside bio-engineering works were done at most of the reconstructed roads. Geological and hydrological studies were also carried out for landslide prone areas during the DPR preparation and construction phases.

The reconstructed roads will contribute to increasing economic activities (including agricultural production) in rural communities and also facilitate technology transfers from urban to rural areas. Better transport can also contribute to the development of social sectors. During the DPR preparation, it was estimated that about 500,000 people would benefit from the reconstructed roads.

Economic analysis

Economic analysis was not undertaken during the EEAP project preparation because of the emergency nature of the project. One analysis was done in 2019 when the sub-projects were completed or had substantially progressed. Few representative sub-projects were selected for economic analysis in the EEAP and in the PDRF road sub-projects, and the analysis was carried out during DPR preparation. For the EEAP, the analysis showed that the Economic Internal Rate of Return (EIRR) for the sub-projects varied between 4.06 percent and 22.61 percent, whereas the average EIRR remained 11.09 percent. The investments were efficient considering the nine percent EIRR threshold normally applied for transport sector projects.

Achievements

The design and construction of damaged roads and bridges were fully aligned with the recovery program and the strategy adopted for the transport sector in the PDNA and the PDRF. Road components were designed by prioritizing earthquake damaged district roads using objective criteria. The design adopted for reconstruction of roads and bridges considered the effect of climate change, and the new sections were upgraded following proper design to meet the goal of the BBB principle. Some examples of roads being reconstructed with sustainable slope stability measures are shown in Photo 45.

The roads were appropriately selected in a limited number of districts considering the available funds (ADB, GoN). The projects under EEAP were revised by reducing the length of roads to be covered from 450 km to 301 km. This compromise in quantity was done to accommodate the increased cost of building more road sections with bituminous pavement and robust structures (better than originally planned). The adopted sector modality was also relevant as it provided flexibility to identify and select priority sub-projects with changes in the rehabilitation cost per km during project implementation.



Photo 45: Civil and bio-engineering structures for slope protection (a. Lamjung Road; b. Kavre Road; c. Khurkhure Highway-Samitar-Thakuri Bhanjhyang Road)

(Source: DOR)

7. Case study

Five bridges were completed along the *Barhakilo-Barpak* road in Gorkha district in July 2018 under Japanese grant assistance (Photo 46). This was one of the three sub-projects (Daraudi Khola bridge, Ghatte Khola bridge, and Rangrung Khola bridge) under the umbrella grant provided by Japan for rehabilitation and recovery. The project cost was 930 million Japanese Yen. In addition, two reinforced concrete bridges (Khahare Khola bridge and Jhyalla Khola bridge) were also built under another JICA-supported technical cooperation project (Spotlight, 2020).



Photo 46: Reconstruction of bridges



(Source: Spotlight, 2020)

Source: Water, Sanitation and Hygiene (WASH) Sector Status Report, 2016, DWSS (GoN, 2016)

5.3.6 Water supply and sanitation

According to the WASH Sector Status Report 2016, the DWSS had carried out a detailed assessment after the earthquake and found the sector had been affected in 62 districts. The different components of the sectoral damage are shown in Figure 123. Around 95 percent of the damaged water supply systems were in the 14 most affected districts (Figure 124). These districts had a total of 11,318 water supply systems, which was 26.92 percent of all (42,039) water supply systems in Nepal. Among these, only 937 (~8%) systems were in operation after the earthquake; 3,123 systems were partially damaged and 844 were almost destroyed. There were changes in the source flow: 23 percent of the sources had increased flow, and the remaining were intact. Among 220,000 toilets in the most affected districts, 46 percent were partially damaged and 26 percent were fully damaged. It was reported that about 330,000 toilets had been affected nationwide (GoN, 2016).

With a budget of NRs. 8 billion (US \$80M), the DWSS had prepared a recovery plan of 4,904 projects in water supply and sanitation. Only three percent of this budget was allocated to the less affected 17 districts. The BBB concept was followed for the most affected 14 districts and an estimated budget of NRs. 21 billion (US \$210M) was allocated for water supply and sanitation. Based on assurance of various donors, a five-year plan was prepared with 25 percent on-budget and 75 percent off-budget funding. The fund was channelized through the NRA (GoN, 2016).

A separate rehabilitation and reconstruction unit was established under the DWSS for the recovery of damaged water supply and sanitation systems. About 851 schemes had been restored in 2017-18. The disaster risk management section of the DWSS also assisted in the recovery process with emergency supplies of materials (GoN, 2016).

FIGURE 123: DISTRIBUTION OF DAMAGE VALUE IN THE VARIOUS COMPONENTS OF THE WATER SUPPLY SYSTEM

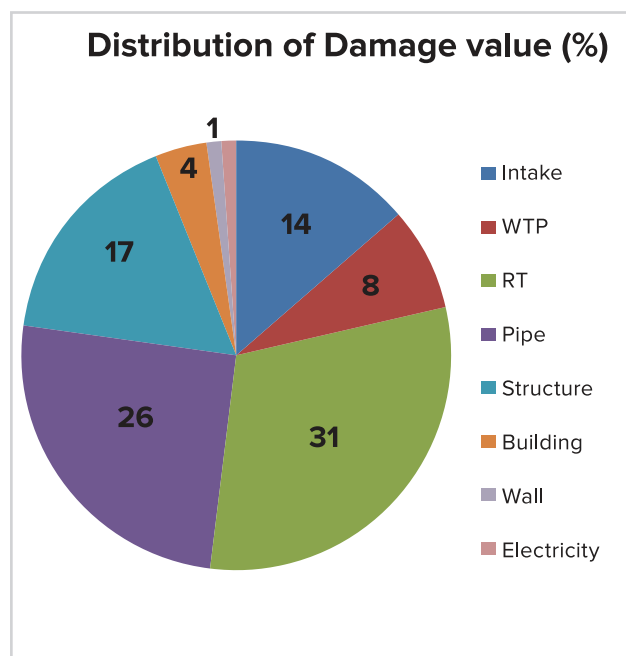
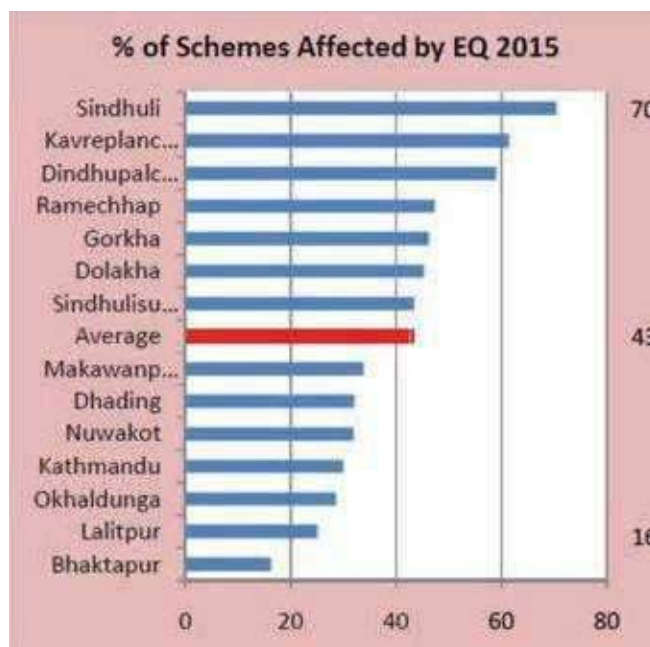


FIGURE 124: RANKING OF THE 14 MOST AFFECTED DISTRICTS IN TERM OF MONETARY VALUE (IN MILLION \$) IN WASH SECTOR



Source: NRA

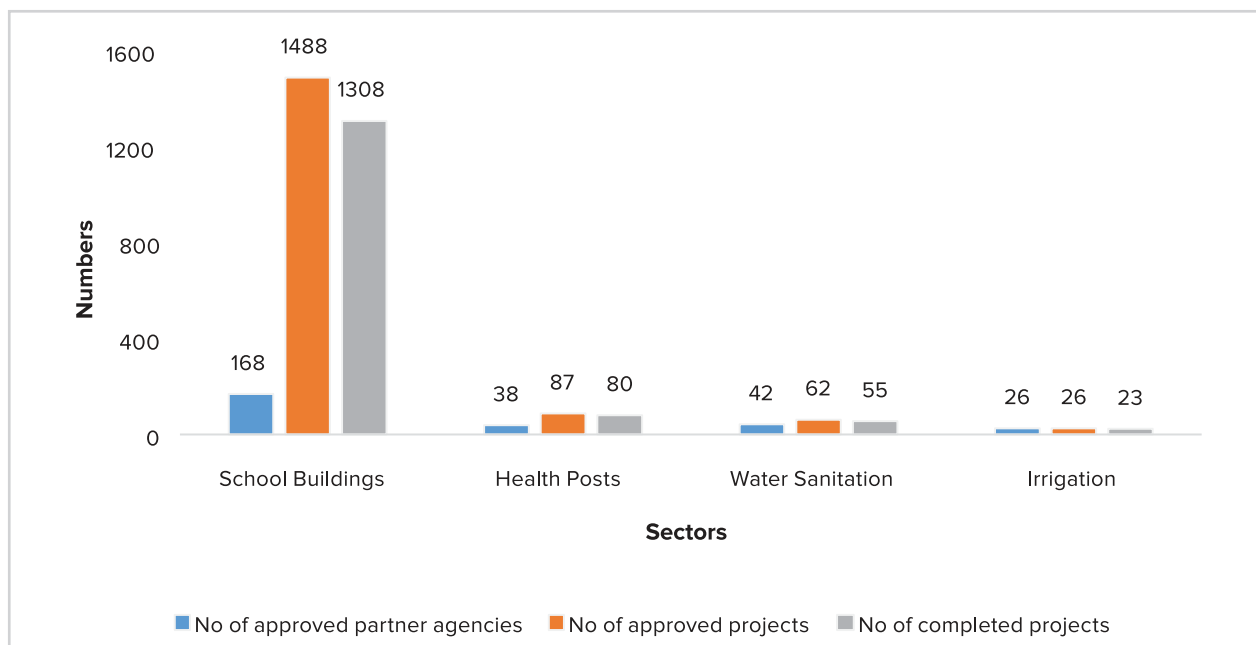
1. Target and achievement

GoN fund of NRs. 1,100 million (US \$ 11 million) was made available for reconstruction of earthquake damaged water supply structures. In four years, 791 of 3,212 damaged water supply structures had been rebuilt and another 670 projects were underway in 2018/19.

Additionally, many NGOs were involved in rebuilding in the water supply and sanitation systems. In all 241 NGOs had been permitted to undertake 412 projects. Their commitment to these projects was NRs. 90.12 billion (US \$ 901 million). As of January 2021, NRs 72.29 billion had been spent on these projects. Based on the NGO Mobilization Guidelines, NGOs were required to limit the administrative/management costs to a maximum of 20 percent of project cost and to build only projects recommended by the local community or local governments.

The contribution of different partner agencies in reconstruction projects within the PBI sector is shown in Figure 125 below. The school sector had the largest involvement of partner agencies and projects.

FIGURE 125: PUBLIC BUILDINGS AND INFRASTRUCTURE RECONSTRUCTION BY NGOS



2. Case study

Lekhnath Small Town Water Supply System

Photo 47 shows a plan and some photographs of the Lekhnath small town water supply system. The main source of the system is Guinje Khola, water from which is treated through sedimentation and pressure filters. Water is circulated from four locations through a network of 260 km of pipeline.

The system is managed by the Lekhnath Water User and Sanitation Committee (WUSC). The system was expanded as part of the ADB assisted small town-I project. The project had cost NRs. 252 million (US \$ 2.5 million), of which 20 percent was contributed by the community through labor during construction, 30 percent was provided as a loan through the Town Development Fund (TDF) and the remaining 50 percent was covered by the GoN. The WUSC had paid back 62 percent of the loan at the time of writing.

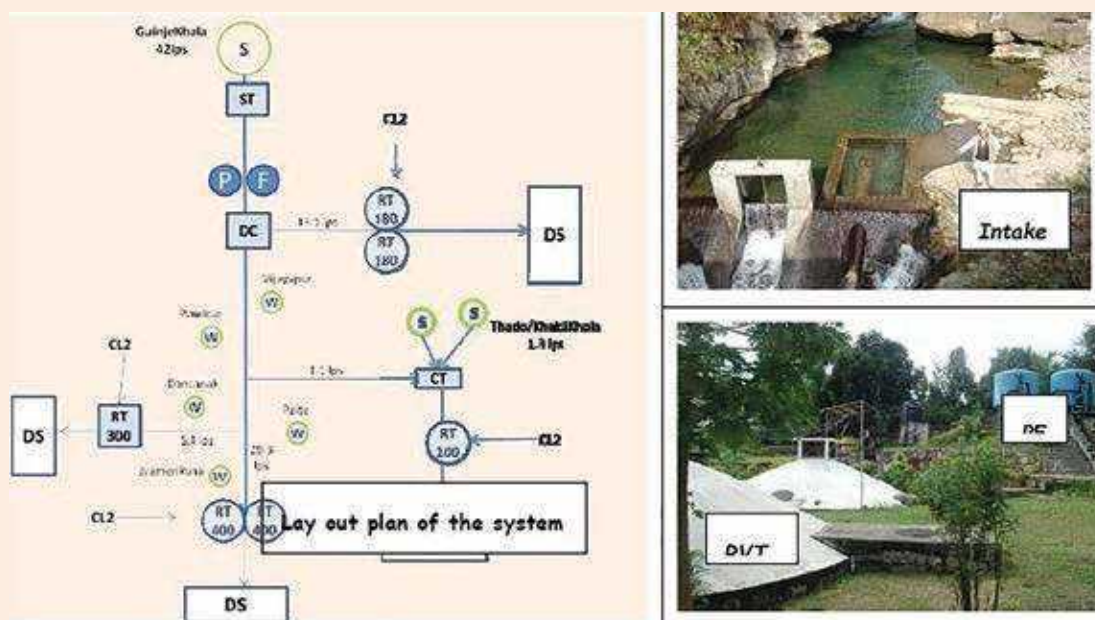


Photo 47: Lekhnath Small Town Water Supply System

Source: Water, Sanitation and Hygiene (WASH) Sector Status Report, 2016. DWSS (GoN, 2016)

5.3.7 Power stations

The Nepal Electricity Authority manages the integrated national power system (INPS) that includes hydropower, thermal and solar power plants connected to the national supply grid. The independent power producers (IPP) produce electricity and supply to the grid and the NEA also has its own generation systems. All energy produced is distributed through the national grid. The maximum energy available from the NEA INPS network was 782.55 MW, which was much lower than the national power demand (6422 GWh, as per NEA annual report 2020). Nepal had a power deficit before the 2015 earthquake when Nepal had regular blackouts.

The non-grid supply of electricity comprises of local generation and distribution usually done by communities and companies in rural settings. Some power houses which are operated and maintained by communities and NGOs. The record of damage of such infrastructure was not properly documented. Depending on the limited maintenance strength of developers or operators, many power plants experienced significant capacity reduction after the 2015 earthquake.

The earthquake had damaged 14 hydropower dams, including the 45-megawatt Upper Bhotekoshi. The NEA had to increase electricity imports from India to meet shortfall. The damages were distributed in all components of the electric systems; i.e., energy production, generation, transmission, and supply. Earthquake-triggered fire was not recorded in the 2015 earthquake.

Some access roads to hydropower projects (including those under construction) were severely damaged and it took about three years to rebuild them. This caused to delays and cost escalation of projects under construction. For example, the Upper Trishuli-3A (60 MW) access road was reconstructed after two years following decision of the government to deploy the Nepal Army for reconstruction (photo 48) to account for security issues and the need to use explosives.

NEA's electric infrastructure reconstruction plan was almost complete as mentioned in its annual report for 2015. The routine repair, maintenance and inspection of different infrastructure is a continuous process and was carried out annually.



Photo 48: Trishuli 3A Hub (Under Construction)

(Source: NEA)

According to NEA, the country's generating capacity from hydropower fell from more than 500 MW before the earthquake to 354 MW after the earthquake, resulting in a loss of 150 MW. The electricity system has been completely recovered through repair/ maintenance and reconstruction.

5.4 Key issues and recommendations

Reconstruction of damaged public buildings and infrastructure included different sub-sectors including government buildings, school buildings, roads and bridges, water supply and sanitation, etc. Challenges faces in each subsector was unique and therefore it is difficult to generalize. Some of the major common issues are discussed below.

5.4.1 Making buildings and infrastructure earthquake resilient

All buildings built before 1994 when the building code was introduced were likely to be noncompliant to the building code. All Rana palaces built before the 1950s, and used as government offices, fell in this category. A number of such seismically-deficient buildings still remain to be strengthened.

Recommendation: Take necessary steps for seismic strengthening and retrofitting of such structures. All such structures in Kathmandu Valley should be thoroughly investigated for assessing seismic safety for undertaking appropriate retrofitting measures. Based on the retrofitting experience at Singha Durbar and other old Rana palaces, the retrofitting approach needs to be replicated in other structures taking lessons from the experience in the work done at Singha Durbar and other Rana palaces.

5.4.2 Right retrofit approach and technology to preserve heritage value

There are two goals in the repair/ retrofitting of heritage buildings: firstly, enhancing seismic performance and secondly, conserving their heritage value. Therefore, the selected retrofit technology and materials need to be compatible with the principles of conservation. However, sometimes it was observed that excessive use of modern materials such as cement and reinforcing bars to jacket exposed walls can provide the desired strength and earthquake-resistance, but is not compatible to the conservation of heritage value.

Recommendation: The DoA has to develop a methodology and guidelines for repair/ retrofitting heritage structures and monuments.

5.4.3 Shortage of human resources

The stock of human resources in normal circumstances is determined by the market demand. The demand for human resources increases during reconstruction and needs to be planned systematically. NPC (2015) had estimated that reconstruction would require some 20,000 skilled human resources including engineers, foremen, masons, and carpenters; and another 40,000 semi-skilled/unskilled workers. The NRA trained a large number of engineers, masons and other artisans which helped fill the human resource gap but the trainings delayed the reconstruction and conservation process. There is a shortage of artisans to produce traditional building materials such as bricks, and wood and stone carvings. Such craftsmanship had lacked government support and many of such professions had almost vanished.

Recommendation: The Council of Technical Education and Vocational Training (CTEVT) needs to expedite the training and accreditation of such skills in collaboration with local governments. Ultimately, workers should be required to have basic qualifications for their occupations. Secondly, there is need for a strategy for coping with the sudden surge in demand of workers after disasters. This could be achieved through pooling human resources from the non-disaster affected regions and another way would be to develop agreements with neighbouring countries for exchanging labor to meet sudden increases in demand. A provision of construction-related security personnel could be another option. There is also need to make traditional craftsmanship a dignified profession. The support to craftspersons can be provided through local heritage activists, NGOs, professional associations, and the local governments.

5.4.4 Inaccessibility and use of construction materials

Due to limited experience and knowledge of indigenous technology and construction materials, engineering consultants usually included bricks, cement and reinforcement for most reconstruction in remote settlements. Such modern construction materials had to be transported from a market centre. For example, bricks for several rural school buildings had to be transported to construction sites from more than 50 km away and often the roads were in poor condition that increased losses and also delayed reconstruction. Resolving this issue will require a paradigm shift in the overall thinking process to make room for introducing location-specific appropriate construction technology and use of local materials in the reconstruction planning.

Recommendations: The Ministry of Education, Science and Technology (MoEST), the Ministry of Health, and the MoUD need to come up with mandatory provisions for the use of local construction materials such as stone and local timber. Together with this there is a need to promote appropriate technology for sawing boulder, crushing stones for aggregate and manufacturing of compressed cement earth bricks. Formal standards for regulating non-conventional construction materials need to be prepared and enforced. The DUDBC can play a leading role in this.

5.4.5 Knowledge gap and building construction

The construction workforce in Nepal lacks knowledge on earthquake-resistant technology. In general, traditional technologies and practices are not considered an essential part of engineering education in Nepal. Besides, construction artisans are also not formally trained. Without formal training, newer techniques for using modern materials cannot be introduced.

Recommendation: The NRA needs to share its best practices with all academic institutions for promoting earthquake-resistant construction technologies. The students also need to be required to learn about traditional construction technologies used in Nepal.

5.4.6 Design standard and monitoring mechanism

Both effective construction monitoring and quality control for buildings are weak in both urban and rural areas. The Building Act (GoN, 1998) envisions enforcement of the building code only in municipal areas and has no provisions for promoting safer buildings in rural areas. However, a large majority of the municipalities lack technical knowledge, skills, capability and infrastructure to enforce the building code.

Recommendation: The National Disaster Risk Reduction and Management Authority (NDRRMA) needs to create a conducive environment for the enforcement of the building code in all urban and rural municipalities. In addition, a strategy is also required for diffusing and retaining building technologies at the local level.

5.4.7 Uniformity and consistency in design standards

There are significant variations between the design standards used for various public structures built by different agencies. Most of the public structures designed and implemented by government agencies followed the NNBC and other applicable codes. However, the structures designed and implemented with the support from bilateral agencies were designed following the codes of the respective countries. Therefore, some structures were designed and built with higher safety standards compared to others.

Recommendation: All international agencies need to be persuaded to follow the code prevailing in Nepal (e.g., NNBC).

5.4.8 Availability of land

Availability of land for reconstruction was a major challenge. The earthquake caused thousands of landslides that destroyed or threatened many houses, settlements and livelihoods. In hills and mountains, flat lands are scarce and, wherever available, were prioritized for use in agriculture. Apart from this, most sites for reconstruction of social infrastructures like schools and hospitals were donated, and as such, were in unfavourable locations in terms of accessibility and terrain. Such locations increased the cost for transport and the infrastructure built at such locations also required extra measures to ensure structural safety and stability.

Recommendation: The health and education ministries need to reconsider the policy of obtaining donated land for infrastructure.

5.4.9 Maintenance of public infrastructure

Most of the public structures damaged by the earthquake clearly lacked proper and timely maintenance. The normal practice of budgetary allocation in Nepal is primarily focused on construction of new infrastructures rather than maintenance of existing facilities. The idea of Infrastructure Asset Management was never considered as a priority for the government and its ministries/departments. It rendered most of the existing public infrastructures more vulnerable.

Recommendation: All line agencies need to establish measures to ensure routine and periodic maintenance of their buildings and infrastructure. For new buildings, the provision of mandatory maintenance requirements for at least a couple of years can strengthen overall construction quality and also establish a culture of maintenance. Introducing a practice of having maintenance contracts could be a way to assure this.

5.5 Way forward

The following are some immediate facilitation and interventions that the NRA could undertake for the medium-term for line agencies:

1. The GoN needs to synthesize best practices in government buildings, schools and health related buildings and initiate discussion with the MoUD, and ministries of health, education and science and technology and outline a reform agenda.
2. The GoN needs to implement immediate action points and prepare strategies for implementing medium- and long-term plans in conjunction with the concerned line agencies.
3. The GoN needs to facilitate diagnostics of existing public buildings with respect to earthquake

resilience. The concerned agencies will then need to take forward the resilience tests to the remaining building stock.

4. The line agencies including MoUD, MoH, MoEST need to develop building strengthening intervention plans and implement them on a priority basis, and
5. The line agencies need to introduce regular maintenance for increasing the life of infrastructure.

5.6 References

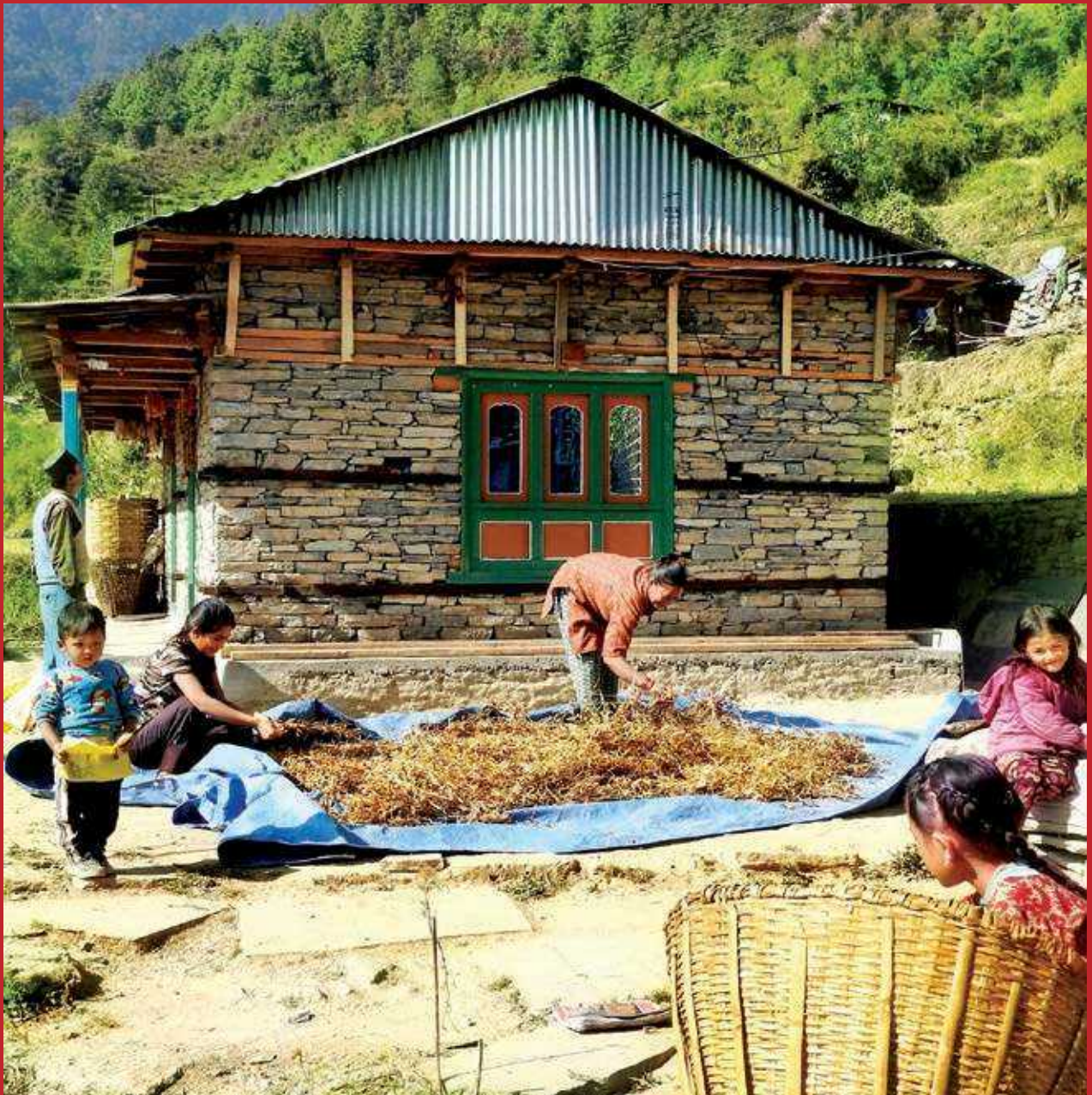
- ADB. (2018). *Nepal: Disaster Resilience of Schools Project (RRP NEP 51190)*. Kathmandu: ADB.
- ADB. (2018). *Proposed Loan, Grant and Administration of Grant Nepal : Disaster Resilience of Schools Project*. Nepal: Asian Development Bank.
- ADB. (2020). *Environmental compliance Monitoring Report : Semi Annual Report 7 (Loan Number: L3260 NEP, Project Number: 49215-001), NEP: Earthquake Emergency Assistance Project*. Kathmandu: Government of Nepal.
- Adhikari, R. K., Bhagat, S., & Wijeyewickrema, A. (2015). Damage scenario of reinforced concrete buildings in the 2015 Nepal earthquakes. *New Technologies for Urban Safety of Mega Cities in Asia, Research Gate*, pp. 29-31.
- DDNews. (2020, 10 02). *School built with Govt of India assistance inaugurated in Nepal* . Retrieved from DD News: <http://ddnews.gov.in/international/school-built-govt-india-assistanc-inaugurated-nepal%C2%A0>
- Dhungel, R., Guragain, R., Joshi, N., & Pradhan, D. (2012). Seismic vulnerability assessment of public school buildings in Nawalparasi and Lamjung District of Nepal. *15th World Conference on Earthquake Engineering*. Lisbon, Portugal.
- DoR. (2001). *Standard Specification for Road and Bridge work* . Kathmandu: DoR, GoN.
- DoR. (2002). *Road Board Act*. Kathmandu: GoN.
- DUDBC. (2007). *National Urban Policy* . Kathmandu: Department of Urban Development and Building Construction.
- GoN. (1956). *Ancient Monument Preservation Act*. Kathmandu: Government of Nepal.
- GoN. (2015). *Post Disaster Needs Assessment Vol.B Sector Reports*. Kathmandu: National Planning Commission.
- GoN. (2015). *The Constitution of Nepal*. Kathmandu: Government of Nepal.
- GoN. (2016). *Inclusive Cities: Resilient Communities, Third United Nations Conference on Housing and Sustainable Urban Development (Habitat III)*. Kathmandu: Ministry of Urban Development.
- GoN. (2016). *Post Disaster Recovery Framework 2016-2020*. Kathmandu: National Reconstruction Authority.
- GoN. (2016). *Water, Sanitation and Hygiene (WASH) Sector Status Report*. Kathmandu: Ministry of Water Supply and Sanitation, Sector Efficiency Improvement Unit.
- GoN. (2017). *Education in Figures 2017 (At a Glance)*. Kathmandu: Ministry of Education, Science and Technology.
- JICA. (2016, February 17). *Press Release*. Retrieved from Japan International Cooperation Agency: https://www.jica.go.jp/nepal/english/office/topics/press160217_01.html
- Kuraoka, S., Paudyal, Y. R., & Razak, K. A. (2020). Transdisciplinary Approach for Building Societal Resilience to Disasters – Interpreting the Processes of Creating New Knowledge in the Context

- of Knowledge Management. *Journal of Disaster Research* Vol.15 No.7, 868-877.
- KVDA. (1988). *Kathmandu Valley Development Authority Act*. Kathmandu: Kathmandu Valley Development Authority.
- MoE. (2016). *Education Act*. Kathmandu: Government of Nepal, Ministry of Education.
- MoE. (2016). *School Sector Development Plan 2016/17-2022/23*. Kathmandu: Government of Nepal, Ministry of Education.
- MoFAGA. (2015). *Basic guidelines for settlement development, urban planning and building construction*. Kathmandu: Ministry of Federal Affair and General Administration.
- MoFAGA. (2017). *Local Government Operation Act*. Kathmandu: Ministry of Federal Affair and General Administration.
- MoFE. (2019). *Environment Protection Act*. Kathmandu: Ministry of Forests and Environment.
- MoHA. (2017). *Disaster Risk Reduction and Management Act*. Kathmandu: Ministry of Home Affairs.
- MoHP. (2017). *Nepal Health Infrastructure Development Standards Volume 4*. Kathmandu: Ministry of Health, GoN.
- MoLCPA. (2015). *Land Use Policy*. Kathmandu: Ministry of Land Management, Cooperatives and Poverty Alleviation.
- MoLCPA. (2015). *Land Use Policy*. Kathmandu: Ministry of Land Management, Cooperatives and Poverty Alleviation.
- MoPIT. (1974). *Public Roads Act*. Kathmandu: GoN.
- MoPIT. (1993). *Motor Vehicle and Transport Management Act*. Kathmandu: GoN.
- MoUD. (1988). *Town Development Act*. Kathmandu: Ministry of Urban Development.
- MoUD. (1998). *Building Act*. Kathmandu: Ministry of Urban Development.
- MoUD. (2015). *Basic Building Byelaws for Settlement Development, Urban Planning and Building Construction*. Kathmandu: Ministry of Urban Development.
- MoUD. (2016). *National Plan of Action for Safer Building Construction (NaPA)*. Kathmandu: Ministry of Urban Development.
- MoUD. (2017). *National Urban Development Strategy*. Kathmandu: Ministry of Urban Development.
- NepaliSansar. (2019, February 11). Nepali Sansar. Retrieved from Google.com: <https://www.nepalisansar.com/tourism/april-2015-earthquake-restoration-of-nepal-heritage-sites-begin/>
- NRA. (2019, 05 02). *National Reconstruction Authority*. Retrieved from Reconstruction of Maternity Hospital and Bir Hospital in Final Stage: http://nra.gov.np/en/news/details/fqftfXsS1T78VhzxEiQVnz90FJkZ9RVv_GTx9rng2JE
- Pandey, B. H., Dixit, A. M., & Kandel, R. C. (2004). Investing in Future Generation: The School Earthquake Safety Program of Nepal. *13th World Conference on Earthquake Engineering (p. 10)*. Vancouver, B.C., Canada: 13th World Conference on Earthquake Engineering.
- Rana, B. J. (1985). *The Great 1990 Earthquake of Nepal (Nepal ko Mahabhukampa)*. Kathmandu: Tripureshwor Press.
- Sharma, K., KC, A., Subedi, M., & Pokharel, B. (2018). Challenges for reconstruction after Mw7.8 Gorkha earthquake: a study on a devastated area of Nepal. *tandfonline*, (pp. 760-790).

- Spotlight. (2020, December 17). *Japan Hands Over Five Newly Constructed Bridges to Nepal*. Retrieved from New Spotlight Online: <https://www.spotlightnepal.com/2018/12/03/japan-hands-over-five-newly-constructed-bridges-nepal/>
- WaterAid. (2005). *Water Laws in Nepal : Laws Relating to Drinking water, Sanitation, Irrigation, Hydropower and Water Pollution*. Kathmandu: Water Aid Nepal.
- Westoby, L., Dunn, S., & Wilkinson, S. (2020). The Road to Recovery- Understanding Challenges Affecting School Reconstruction in Nepal. *Research Gate* (p. 11). Greenwich, London: Research Gate.

CHAPTER 6

SOCIO-ECONOMIC RECOVERY AND LIVELIHOOD





SOCIO-ECONOMIC RECOVERY AND LIVELIHOOD

6.1 Setting the agenda

6.1.1 Introduction

The Livelihood Support Program dealt with providing basic necessities to the affected people. Its overall purpose was to improve the quality of life of the people living in the affected areas. The program had the following specific objectives.

1. Meet immediate basic needs of the victims such as securing food items (food & water) and non-food items (fodder, medicines, healthcare and clothes)
2. Rebuild assets essential for the recovery of livelihoods
3. Stimulate local economy through economic grant, housing and occupational loans, cash-for-work, financial services, and
4. Enhance the employability of those affected by the earthquake.

During four and a half years, the NRA with the support of line ministries, development partners and local governments employed different strategies, approaches and arrangements to reach out to the communities affected by the earthquake. Over 1000 livelihood support activities were implemented by 10 ministries and over 47 partner organizations (including donors) singly or jointly.

This chapter summarizes the activities, methods and results of the interventions. Also, included are concrete achievements, lessons learned and major issues related to replicability and scaling. The document aims to answer the following key questions:

1. What was the extent of damage in livelihood?
2. What were the policies, plans and strategies?
3. What were the interventions (summaries)? and
4. What were the major contributions to the local economy?

6.1.2 Methodology

A quick review of the policy documents was undertaken and a tentative template was developed and discussed at the first meeting of the Livelihood and Economic Recovery Sub-Committee at NRA. The meeting approved the timeline and the study team members were asked to prepare their reports according to the approved template. However, the lockdown from 25 March 2021 affected the timeline. The budget allocated to line ministries for the implementation of livelihood programs were collected by the Livelihood Section at the NRA. It also collected budget allocated by the NRA to different ministries and prepared data on livelihood activities undertaken by the NRA directly. Quarterly reviews, presentations and brief reports of all CLPIUs were collected through emails and telephone calls.

With regard to the information from the development partners, 47 NGOs were contacted with requests to submit their activity reports. Only 11 had submitted their reports as per the template. In addition, three reports of the private sector (The Chaudhary Foundation, Minergy Initiatives and Dwarikas Foundation) were also reviewed. The 17 papers presented in the Relay Symposium held on November of 2019 were also reviewed. Therefore, this document is the summary of activities of 10 government agencies and 23 development partners.

6.1.3 Limitations

Since the data and information presented here were derived only from the papers, reports and summary briefs submitted to the NRA, and a few documents published by the concerned partners, the paper does not represent all government agencies and partner organizations engaged in livelihood interventions. All documents reviewed for this purpose were one-time activities. They are limited, focused and intensive in terms of resources, manpower, time and geography and therefore do not represent the entire earthquake-affected areas. Secondly, the report is not an analysis of their activities but only a documentation with brief descriptions of activities and methods. Thirdly, the study provides only the results of the activities and do not speak about the outcome, except for some lessons and experiences. Therefore, the readers are advised to cautiously interpret the results.

6.2 Extent of damage

The 2015 earthquake had not only destroyed physical assets but also the very foundations of the people on which their life, livelihoods and socio-economic services depended. The loss included 8,790 human casualties, 22,300 injuries, and the total loss of nearly 765,603 physical structures. The damage in socio-economic services and their impact on livelihoods and economic activities was also huge (NPC, 2015a). Data on some selected sectors are given in Box A.

Box A: Selected statistics on livelihood damage

Employment

1. Household affected = 2.79 million
2. Workers affected = 5.6 million
3. Working days = 94 million

Agriculture

1. Household affected = 1.4 million
2. Working days = 46 million (ICIMOD, 2015)
3. Large animals = 17,900 (ICIMOD, 2015)
4. Small animals = 40, 976 (ICIMOD, 2015)
5. Bird = 507,665

Industries & Commerce

1. Workplace damaged = 74,500
2. Working days = 17 million

Tourism

1. Workers affected = 869,500
2. Working days = 15 million

Total districts = 32

1. Severely affected = 14
2. Moderately affected = 11
3. Slightly affected = 7

Source: All data taken from the PDNA (NPC 2015a) unless otherwise indicated.

- n Of the 32 affected districts, 14 were severely affected.
- n The per capita disaster effect was highest in Dolkha and was about NRs. 255,860 (US\$ 2559). The second and the third were Sindhupalchok (NRs. 233,370) (US\$ 2334) and Nuwakot (NRs. 204,930) (US\$ 2049), respectively (NPC 2015a).
- n The severity index was highest (0.78) in Sindupalchok district. The second and third were Rasuwa (0.76) and Kavre and Nuwakot districts (0.73), respectively (NPC 2015a).

6.2.1 Loss of workdays and income

The earthquake had a major impact on employment and livelihood affecting about 2.29 million households and 5.6 million workers across 32 districts, resulting in the loss of 94 million workdays (NPC 2015a). The PDNA (NRA, 2015: Vol. A Key Findings) said that the most affected sector was agriculture, which lost 49 percent workdays, followed by tourism with 31 percent, industry 12 percent and commerce eight percent. (Also presented in Thapa, 2019).

TABLE 27: LOSS OF WORKDAYS AND INCOME BY SECTORS

Sector	Loss of work days (Million)				Loss of income (Million)	
	Total	Women	Men	Percent	NRs.	US
Agriculture	46	28	18	49%	4,603	46
Commerce	8	3	5	31	2,667	27
Industry	11	4	7	12	3,655	36
Tourism	29	15	14	8	6200	62
Total	94	50	44	100	17,125	171
Percent	100	53%	47%			

Source: NPC (2015a)

Although the personal income loss was only about two percent of the total disaster effect, it is important to note that annual labor earnings in Nepal are extremely low. Against this backdrop, even a minor income loss has serious implications for poverty and livelihoods.

NPC (2015a) had provided the picture of the losses of workdays and incomes for the 14 seriously affected districts. According to data in Table 28, Kathmandu had lost (12 million workdays), which was followed by Sindhupalchowk (8.5 million) and Nuwakot (7.2 million). The lowest loss had occurred in Rasuwa (about 1 million workdays)

TABLE 28: LOSS OF WORKDAYS AND INCOME BY DISTRICT

SN	District	Lost Work Days	Loss of personal income (in million)	
			NRS	US\$
1	Bhaktapur	3,288,579	594.0	5.9
2	Dhading	6,466,268	1,167.9	11.7
3	Dolakha	6,011,318	1,085.7	10.9
4	Gorkha	6,859,487	1,289.9	12.4
5	Kathmandu	12,153,573	2,195.1	22.0
6	Kavrepalanchowk	5,855,575	1,057.6	10.6
7	Lalitpur	3,399,321	674.0	6.1
8	Makwanpur	2,410,099	435.3	4.4
9	Nuwakot	7,260,420	1,311.3	13.1
10	Okhaldhunga	1,400,633	253.0	2.5
11	Ramechhap	2,909,959	525.6	5.3
12	Rasuwa	995,447	179.8	1.8
13	Sindhuli	2,301,064	397.5	4.0
14	Sindhupalchowk	8,258,389	1,540.4	15.4
	Sub= total (14 districts)	68,740,172	412,596	126.0
	Others (17 districts)	25,074,666	4,529	45
	Total (31 districts)	94,814,836	17,125.3	171.3

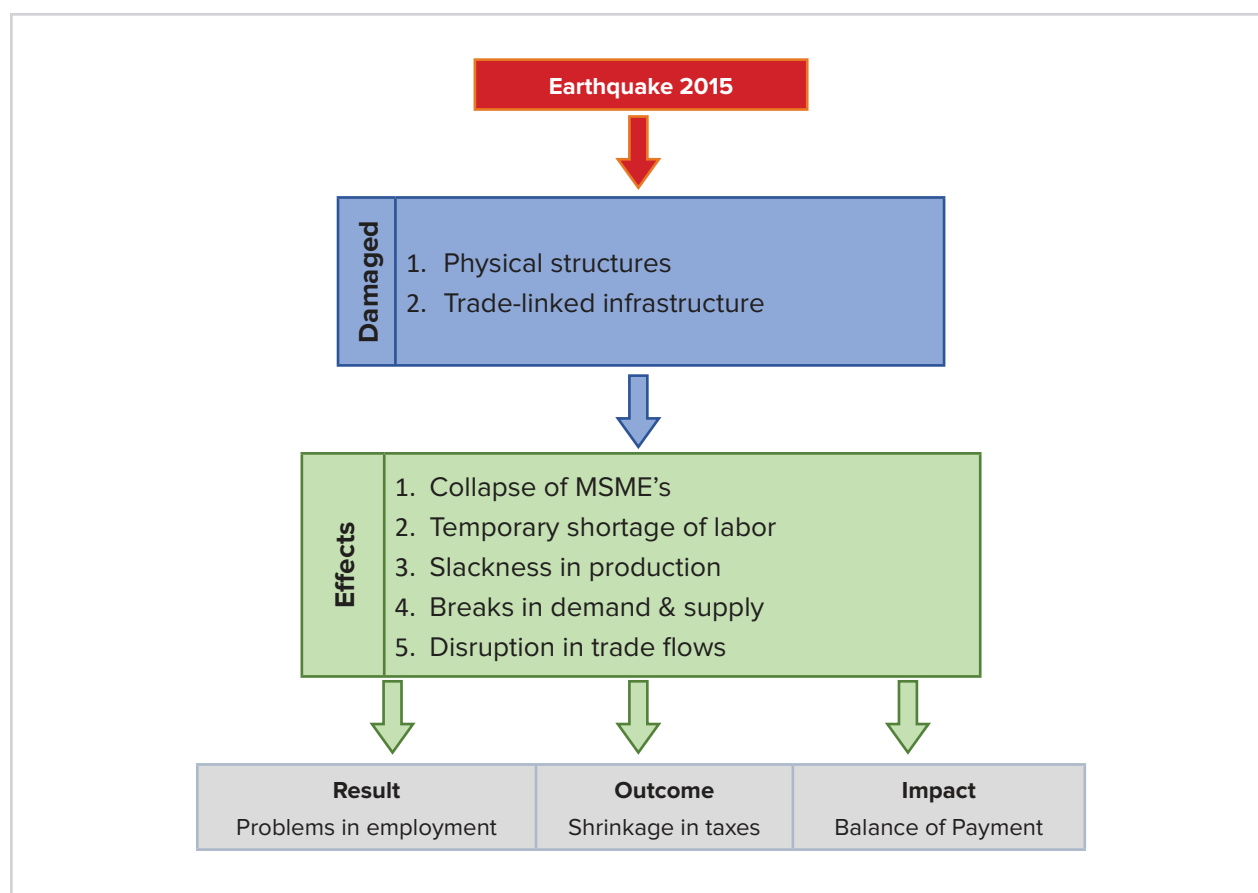
Source: NPC (2015a)

6.2.2 Effects on livelihoods

The PDNA provided an indicative quantification of the impact of the earthquake on livelihoods. The direct impact on livelihoods related to commerce and industry is given in Figure 126. It had affected employment, collection of corporate tax and in the balance of payments. Based on data from NPC (2015a), the impact of the earthquake on commerce and industry is summarized Figure 126.

About 74,500 home-based work places were permanently lost (PDNA, 2016) affecting 886,000 workers in 14 districts only (PDNA, 2015a). There was no account of partially damaged structures. In 14 districts alone, 57,308 small & cottage industries¹⁶ were affected. Even a greater number of microenterprises may have been affected as a result of the damaged infrastructure (PDNA, 2015a).

FIGURE 126: EFFECTS OF THE EARTHQUAKE ON LIVELIHOODS (COMMERCE & INDUSTRY)



In 32 districts, the earthquake had affected the livelihoods of some 2.29 million households and 5.6 million workers. About 94 million working days were lost (NRA, 2015a). The large-scale housing reconstruction was expected to generate up to 352 million workdays over the next five years (NRA, 2015a). About one million agricultural households were affected by the loss of 46 million working days.

According to ICIMOD (2015) about 58,876 animals and 507,665 poultry were lost when the buildings had collapsed in the 14 most affected districts. The impacts were estimated by the PDNA:

¹⁶ Cottage industries are small scale investments, labor intensive, out of home, and use traditional tools and machinery, whereas microenterprises are small-scale activities, supported by microcredit. They are family-based and employ 1-2 people. The cottage industries include (1) weaving cloth, (2) carpet making, (3) carpentry, (4) shawl making, (5) spinning, (6) embroidery, (7) wood carving, (8) pottery, (9) utensil making, (10) basket making, (11) shoe making, (12) paper making, (13) street vending (Ghumpti Pasal), (14) machine shop, etc.

1. Nearly 3.5 million people were considered vulnerable and had immediate food needs; 1.4 million people were highly vulnerable (NRA 2015a).
2. The earthquake had affected the employment of some 2.29 million households, 5.6 million workers and 94 million working days in the productive sectors, and
3. About 869,000 workers had been affected in commerce and industry with the expected loss of about 17 million working days.

6.3 Review of policy documents

6.3.1 Post Disaster Needs Assessment

Immediately after the earthquake, the GoN mobilized resources and partners to prepare the Post Disaster Needs Assessment (PDNA) that provided an indicative the impact of the damages. It has analyzed the detailed impact on employment and livelihoods in terms of short-term impact (2015-16), medium-term impact (2016-2017) and long-term impact (2018-20). While the short-term impact focussed on agriculture and household enterprises, the medium-term and long-term impacts are concerned with the employment generated by the construction of buildings and infrastructures and macro-economic aspects, respectively. The PDNA had identified employment and livelihoods as a cross-cutting area and had made policy suggestions on (1) relief, reconstruction and recovery, (2) remittance flow, and (3) poor & vulnerable households to support rebuilding livelihoods in all affected areas. The short-term response was to provide income opportunities and attending to immediate livelihood recovery needs. The medium-term response was to provide employment recovery by means of building the capacity of people and institutions. The long-term response was to assist job recovery and promoting resilient livelihoods.

6.3.2 Reconstruction Act, 2071

The GoN enacted the Reconstruction Act 2072 to begin reconstruction. Its overall objective was reconstruction of damaged structures along with the economic, social and physical development and new constructions in a sustainable, resilient and planned manner. A new institution, the NRA, was also established with the Prime Minister as Chairperson of its high-powered Steering Committee, which led, guided and advised the Executive Committee and the Chief Executive Officer.

6.3.3 Reconstruction and Rehabilitation Policy, 2072

The NRA prepared the National Reconstruction and Rehabilitation Policy as a priority undertaking after it was formed. The policy clearly stipulated that one of its objectives was “to explore new options for economic opportunities and livelihoods by restoring the productive sector.” It suggested a focus on productive livelihoods, restoration of tourist infrastructures and services, financial assistance and relief to entrepreneurs and businesses and creation of the opportunities of self-employment.

6.3.4 Post Disaster Recovery Framework

The Post Disaster Recovery Framework (PDRF) was a five-year plan based on the PDNA. It had set five strategic recovery objectives one of which related to livelihoods. It said: “Develop and restore economic opportunities and livelihoods and re-establish productive sectors” (NRA, 2016a: 9). It had two volumes, Key Findings and Sector Plans and Financial Projections. The Key Findings (Volume I) provided an overview of strategic recovery objectives, institutional and policy framework and listed 512 projects under 19 thematic areas.

The details of each 19 Sector Action Plans are presented in the Volume II. The list of 512 projects helped in the identification of 56 projects directly related to the livelihood and employment program, which are summarized in Box B. The total budget required for the 56 projects was NRs 88.8 billion. However, many of them were directly implemented by the line agencies.

Strategic Recovery Vision for the Employment and Livelihoods aimed to enable households and workers to recover employment opportunities, engage in productive and income-generating activities, and ensure a stable and resilient asset base.

The Sector Plans and Financial Projections of the PDRF Sector Plan strategized livelihood for three phased support – short-term, medium term and long-term.

LIVELIHOOD PROJECTS IN PDRF

1. Special support programs
2. Skill development
3. Capacity building and training
4. Developing marketing network
5. Support to specific activities
6. Program related to resilience
7. Employment program
8. Replacement package
9. Others (business, food storage, animal shed, material, psycho-social counseling)

Source: NRA (2016 a & b)

1. The short-term strategy focused on skill development, training and targeted interventions in productive sectors.
2. The medium-term strategy attempted to leverage opportunities (especially in targeted interventions) from the recovery & reconstruction process and was used to identify potential opportunities. This strategy emphasized the promotion of the private sector.
3. The long-term strategy aimed to support communities in diversifying livelihoods and employment opportunities to ensure resilience so that households, workers and communities have the ability to recover and adapt to future stress, shocks and risks.

The major objectives were broken down into the following:

- n Revive and restore people's livelihood activities to the pre-earthquake state
- n Diversify options & opportunities for income generating activities
- n Integrate livelihood issues in all components of the reconstruction process
- n Support gender equality and social exclusion, and
- n Provide special support to the vulnerable groups affected by the earthquake.

In order to achieve these objectives, the NRA had adopted "the Affected First" approach

6.4 Summary of interventions

6.4.1 Line agencies

The overall summary of the government line agencies and of specific development partners who participated in the information collection are presented in this section. There were 10-line agencies and 47 partner organizations.

The livelihood programs under the guidance of the CLPIUs of the NRA, with the support of the 10 government ministries and over two dozen departments and districts offices. These agencies covered almost all the affected districts thorough their district arms. These agencies were:

1. Ministry of Agriculture & Livestock Development (in the first two ministries)
2. Ministry of Forests and Environment
3. Ministry of Culture, Tourism & Civil Aviation
4. Ministry of Education, Science and Technology

5. Ministry of Energy, Water Resources and Irrigation
6. Ministry of Health and Population
7. Ministry of Industry, Commerce and Supplies
8. Ministry of Land Management, Cooperatives & Poverty Alleviation
9. Ministries of Water Supply (Department of Water Supply & Sanitation Management)
10. Ministries of Urban Development (Department of Urban Development & Building Construction), and
11. National Reconstruction Authority: Central Level Project Implementation Units (CLPIUs)

The fund for livelihood support activities was provided under the Reconstruction Fund. Their activities are categorized under (1) material distribution, (2) skill training, and (3) targeted intervention.

a. Material distribution: The Ministry of Agriculture Development distributed 774 threshers, 736 mini-tillers and 1500 corn shellers, 1500 dip irrigation gears, 300,000 zero-energy bags, 300 hermetic bags and distributed improved seeds to affected people through the district agricultural offices. The distribution of machinery helped to mechanize farming activities and growing crops in the off-season. Rainwater harvesting techniques that were disseminated were also adopted by those affected.

Likewise, the Ministry of Livestock Development distributed to 500 litre chilling vats, 2800 milking cans, 5000 hybrid goats, Thumas and local goats, 1600 piglets, fodder and grass seeds to farmers of 32 districts. The animal health programs that were organized and distribution of mineral blocks also assisted the farmers. The distribution of chilling vats helped the farmers preserve 12.7 litres of milk and the distribution of chicks, breeding goats and improved fodder helped to increase their incomes. Farmer-centered nutrition and education programs helped to add value to the nutrition of affected families.

The Ministry of Forests and Environment had established four wood treatment centers and distributed portable sawmills to community forest groups in the severely affected districts. The ministry also distributed some 789,163-cu. ft. of timber to the affected through the Timber Corporation and Community Forestry Groups in the affected districts.

The records show the NRs. 85 million (US \$ 8.5 million) was allocated to the Department of Water Supply & Sanitation Management (DWSSM) for the restoration and conservation of 1317 sites.

b. Skill Training: The DLPIUs, DUDBC and the Poverty Alleviation Fund (PAF) provided special earthquake-related training 9,229 masons, carpenters, electricians, bar-benders and plumbers. Other ministries organized gap-in-skill-trainings for farmers in affected districts. The training durations varied from seven days (short) to 50 days (long). Income-generating activities such as distribution of seed packets and trainings were provided to earthquake victims in 32 districts, and special training programs with material support for commercial farming of medicinal and aromatic plants were organized in Dolakha, Sindhupalchok and Ramechhap districts.

c. Targeted interventions

- n The construction of 1500 plastic ponds (1000 liters capacity for rainwater harvesting by the Ministry of Agriculture Development; The Ministry of Livestock Development built sheds for 3000 goat and poultry, and 3100 buffalo sheds in different districts.
- n Restoration and retrofitting were carried out of greenhouses, sheds, water tanks, poly houses of the National Herbarium and Botanical Laboratory in Kathmandu, Lalitpur & Makawanpur districts under the Ministry of Forests and Environment. The repair and maintenance of trails, training for homestay were also organized in tourist areas of the affected districts by the Ministry of Tourism, Culture & Civil Aviation.

- n The Department of Water-induced Disaster Prevention carried out reconstruction works in irrigation. It carried out 112 projects in the 14 earthquake-affected districts on river training, landslide management, repair and maintenance of irrigation systems and preventing water-induced disaster. The control and mitigation measures of over 84 landslides, conservation of water sources, canal repair and river training programs were also carried out in the earthquake-affected districts.
- n The DSWM restored 2447 water sources, GMALI restored 42 roads (665 km), the Department of Mines and Geology restored 32 access road. Similarly, the Ministry of Agriculture Development had built 1500 plastic ponds and 3100 goat and cattle sheds.
- n Other special activities included learning-by-doing training (Box C), traditional wood carving training on a cost-sharing basis, organic insecticides, goat farming and training on off-season and new vegetable cultivation. It also provided participants with seeds and other inputs.

Refresher training for skilled artisans

The DoA carried out a pilot project to provide skill-in-gap training for people working on wood craft, stone sculpture and brick-making. The trainings were carried over several years and were organized to support the restoration of damaged heritage structures. The structures were identified by the communities in consultation with artisans, where they learnt and refreshed skills while also restoring the structures. The trainings also allowed participants to learn from each other. The participants are selected by the communities from among those working in the area of choice in three areas: stone sculpture, wood crafts and brick-making. At the trainings the participants are asked to prepare drawings and discussed them under the guidance of an instructor (or Naike) and later restored the structures based on the selected drawing. The communities were handed over the restored structures at the end of the seven-days trainings.

At the Gorkha Durbar area, there was a pati – Pandit Pati – that had been destroyed by the earthquake. The trainees prepared the drawing and worked on it for seven days and completed the 6 x 8 feet structure. The participants included men and women from different social groups, and also personnel from the Nepal Army and Nepal Police.

The DoA organized several trainings in Kavrepalanchowk, Kathmandu, Nuwakot, Gorkha, Sindhuli and Tanahu districts. Forty-five artisans were trained in Kathmandu Valley. The trainings were conducted in collaboration with local municipalities and other organizations. The DoA department provided materials for the restoration along with daily allowances to the participants whereas the municipalities were responsible for food and accommodation. The DoA has prepared a roster of trained artisans and some of them have contractors, while others are working with the contractors and earn up to NRs. 5,000 a day.

Source: Manju Sing Bhandari, Senior Archeologist, Department of Archeology

6.4.2 Partner organizations

According to the records available at the NRA, 241 NGOs spent NRs 58 billion (US \$ 5.8 billion) under 298 projects. These NGOs implemented activities in all 32 earthquake-affected districts. They had implemented 364 activities of which 273 (75%) had been completed and the remaining are heading towards completion. Their work in the earthquake-affected areas were guided by the Operational Guidelines for NGO Mobilization.

Operational Guideline for NGO Mobilization

The operational guideline for mobilizing NGOs had the following provisions:

1. Agreement between the NRA, line agency and partner organization.
2. DLPIU to issue work order to the partner organizations.
3. NGOs were required to mandatorily organize public hearing and social audits.
4. All materials and human resources used to be from Nepal.
5. Remuneration of the staff at par with other partners.
6. Overheads not to exceed 20 percent of project cost.
7. International NGOs required to work with at least with one local NGO, and
8. Final report to be submitted to the NRA for obtaining completion certificate.

Source: Operational Guidelines related to the mobilization of NGOs for Reconstruction & Rehabilitation (2072)

The activities under livelihood interventions undertaken by the partner organizations are presented in Table 29. Eighty-two percent activities were construction-related such as building of schools, private houses, health posts and other community infrastructure. Eighteen percent were livelihood, DRR and WASH related. Further analysis of data showed that only 47 partners were fully or partially involved in livelihood activities. These partners covered some 56 activities. The synopsis of their activities is presented below.

1. The partners were successful to reach out to 456,446 households in the earthquake-affected areas. This number would be higher if the households contacted by another 24 NGOs are also taken into consideration. The summary reports available show that OXFAM alone had successfully reached out to 217,200 households for which it had mobilized NRs. 1.3 billion (US \$ 130 million) for different purposes. The Nepal Red Cross Society supported 110,000 families with relief packages including warm cloth, blankets and materials for the cold weather.
2. The partners collaborated with 119 grassroot organizations and self-help groups including cooperatives and local governments. The average number of grassroot organizations that had worked with one NGO was about seven. If this average is taken to be constant, then the grassroot organizations that worked with the 47 partners would be 329. If all 241 NGOs are accounted for, then the number of grassroot organizations engaged would be 1687.
3. The NGOs implemented diverse activities from providing warm clothes to nutrition support and care for mental sickness to income generating activities. The I/NGOs had not only worked by themselves but had worked with the affected populations and had also collaborated with grassroot NGOs and community-based organizations

TABLE 29: GROUPINGS OF NGO INTERVENTION (NGOS =238)

Activities	No.	Percent
Building construction		
1. Schools	185	51
2. Private houses	81	22
3. Health posts	27	7
4. Others (Community Infrastructure & Heritage)	5	2
Livelihood-related activities		
4. Livelihoods	32	9
5. Disaster risk reduction	19	5
6. Water, sanitation & hygiene	15	4
Total	364	100

Note: Papers presented at Relay Symposium (2019)

6.5 Activities on gender equality & social inclusion

The joint programming initiatives with local governments in mainstreaming Gender Equality & Social Inclusion (GESI) in livelihoods programs was one entry point for the NRA's GESI work at the local level. The first leg of the joint programming began with GESI/ livelihoods consultations with, and trainings in municipalities at nine earthquake-affected districts in 2017-2018. This was followed by GESI-focused livelihoods trainings and material support in municipalities of six districts in 2018-2019. The targeted GESI-focused livelihood engagements were based on NRA's vulnerability criteria. The GESI/ livelihoods section also supported the vulnerable households in reconstruction by staying connected with the processes led by the Housing Reconstruction and Recovery Platform (HRRP) and others. The GESI/ livelihoods section held several discussions to explore partnerships on GESI-focused resilient livelihoods and vulnerability-focused disaster risk reduction and management (DRRM) with local level governments; women, vulnerable and disadvantaged communities; and potential partners in Fiscal Year 2019/20.

Support to persons with disability

Suku Maya Maji, 70, of Bhotetar, Kavre district, is a person with physical disability. She lost her left hand in an accident at home about 40 years ago. She helped her daughter-in-law in running a local shop and a goat farm started after the earthquake with support from the Handicap International. Her daughter-in-law has a back injury caused by the Earthquake. Suku Maya has one daughter with visual impairment. Three members of the family had some form of disability. This family had received a special needs package and multipurpose cash grant to run their shop and add goats to their farm with the support of a project implemented by Handicap International.



Source: Summary Report, Handicap International (2020)

Livelihood support for the elderly

Ganesh Maya Dannekh, a 72-years-old widow from Jhaukhel, Bhaktapur had lost her home in the earthquake. Her neighbours had provided her shelter until she was able to build a small hut on her own. She depended on what neighbors and visitors gave her for livelihood.

Her situation changed when she received cash assistance of NRs. 19000 from the Nepal Red Cross Society as livelihood support, which she used to purchase a cow. Several months later the cow gave birth to a calf after which her life began changing. Her day then began early in the morning to clean the shed, feed the cow, milk the cow and sell the milk at the local dairy. She was selling nine liters of milk every day and earned about NRs. 8,000 (US \$ 80) each month. She said, "My days of happiness began with this cow. I do not have to beg for survival any more."



Source: Story of Smile (Nepal Red Cross Society, 2018:38)

The GESI/ livelihoods section conducted a capacity development on GESI Compliance in Reconstruction and Disaster Risk Reduction and Management (DRRM) in May 2019. This exercise brought together DLPIU officials from 14 Districts, the NRA central office and the CLPIU.

Building on NRA's GESI/ livelihoods work in Reconstruction, the GoN's Strategic Plan on DRRM had included much of the the NRA's work. The NRA's draft GESI/ livelihoods work plan had the following features:

1. Formation of GESI Concerned Interest Group (GESICIG): Some 24 meetings were held.
2. GESI analysis of the NRA's reconstruction and recovery work
3. Review of the NRA's policy documents from a GESI perspective
4. GESI in livelihoods partnerships and facilitation of interlinkages
5. Cross fertilization with line ministries; statutory bodies; development partners' GESI working group; USAID GESI working group; HRRP; INGOs; NGOs, youth and DRR networks. (Participation in drafting of the National DRRM Strategic Plan 2018-30)
6. Development of the GESI/ livelihoods work plan
7. Implementation of the NRA's GESI focused vulnerability criteria: The vulnerability criteria included senior citizens 70+ years; single women 65+ years; persons living with disabilities (Red and blue card holders) and child-headed households (18505 such were identified for housing, social, technical and livelihoods support), and
8. Training and livelihoods material support to 240 persons in six districts.

Further, some partners were involved in drinking water restoration, road construction, construction of irrigation canals, restoration of small plants and business, development of alternative construction materials, training of masons, working on domestic violence and psycho-social counselling.

Addressing domestic violence

Parvati, 55, from Sunkoshi Gaopalika of Sindulpalchowk District had faced domestic violence for almost 35 years. She said she accepted the treatment fearing that speaking out would affect the family's reputation. But the situation did not improve.

She was a participant at an orientation on Protection and Feedback Mechanism after which she confided to a protection social volunteer who had visited her house. The orientation had motivated her to speak out about abuse she had been facing. Later, with the support of a psychosocial volunteer, she developed courage and filed a case against her husband at the local government office. She said, "The government officials have warned my husband not to commit any violence, he has changed since".

Source: Earthquake Affected Communities Realize a Holistic Recovery (Caritas 2019:80)

Counselling with Grant Support was a relief to Suku Tamang

Suku Tamang had developed psychological problems after the earthquake. The 30-years-old lived with her husband and two children in Baseswor, Sindhuli District. Her hands and feet had trembled and she cried and screamed. Her husband took her to healers (*Jhakris and Janne*) but it was not helpful. Her husband spent NRs.45,000 (US \$ 450) for her treatment and even quit his job to look after her. The Trans-cultural Psychosocial Organization (TPO) diagnosed her condition to be a psychiatric problem and was provided NRs. 4000 (US \$ 40) for her treatment under regular medication.

Suku's condition improved and she now lives a normal life. After the recovery, the husband has opened a small shop in the village and now earns around NRs. 1000-1500 per day.

Source: Earthquake Affected Communities Realize a Holistic Recovery (Caritas 2019:82)

6.6 Contributions to the local economy

The direct support provided by the government (both from internal and external sources) is summarized below.

1. Economic package (housing grants NRs. 300,000 for each beneficiary)
2. Housing loan: In the beginning, 1,592 beneficiaries had received housing loans of NRs. 1.5 million (for rural areas) and NRs. 2.5 million (for urban areas). This provision was replaced by the Unified Procedure for Interest Subsidy on Concessional Loan, 2075, collateral-free housing loans. About 200 beneficiaries had used this facility.
3. Commercial agriculture and livestock loan: According to the information from the Heritage Conservation, Public Buildings & Infrastructure Division of NRA, 5,250 beneficiaries had received this loan. Under the Unified Procedure for Interest Subsidy on Concessional Loan, 2075, each beneficiary was entitled to receive up to NRs. 300,000 as concessional loan.
4. Cash support of NRs. 200,000 was provided to each landless earthquake-affected beneficiary to purchase land.
5. Top up support of NRs. 50,000 (US \$ 500) was provided to each beneficiary identified as vulnerable (elderly, people with disability, single women beneficiaries).
6. Support for development of infrastructure in new settlements
7. Special programs for the restoration of strategic roads affected by the earthquake

The GoN intervention on livelihood support was about NRs. 2 billion (US \$ 200 million) and the partner organizations had spent about NRs. 58 billion (US \$ 580 million). The type of support provided by all agencies were employment generation, training of masons and other human resources, cash-for-work, material support and direct interventions. The sections below provide short description of the contributions.

6.6.1 Employment generation

According to the Sector Plan and Financial Projection (NRA, 2016: 209) "The earthquakes of 25 April and 12 May affected the livelihoods of an estimated 2.287 million households. An estimated 148 million workdays (equivalent to NRs. 27.5 billion) (US \$ 2.75 billion) were lost in districts affected by the earthquakes." The loss of workdays in agriculture was substantial i.e., 102 million workdays. It was 35 million workdays in tourism and 11 million workdays in commerce & industry.

The preliminary analysis of data received from different agencies shows that 166 million workdays of employment was generated in the livelihood sector during the reconstruction and recovery period, which is equivalent to the employment of 6,91,666 persons for a year.

Data on roads built after the earthquake in the affected areas are presented in Table 30 and is based on the information from the EEAP. The 42 road sections (total 665 km) were spread across 45 municipalities of 29 districts, crossing or touching some 18 rural municipalities.

TABLE 30: ROAD CONSTRUCTION IN THE AFFECTED AREAS

Parameters	ADB-funded road	Government-funded Road	Total	Remarks
1. Total length of roads	302 km	363 km	665	Gravel =302 km Black Top = 303 km
2. Total budget	4,371,488	3,939,866	8,311,354	(In 000)
3. Total No. of roads	17	25	42	
4. Districts covered	12	25	29	Overlap in some districts
5. Municipalities covered	16	29	45	18 Rural municipalities

Source: EEAP, GMALI, 2020

The roads have improved the general welfare of the people due to high mobility, easy access to health services, markets and other services. The road construction work generated 2.1 million workdays of employment.

Similarly, the total number of monasteries that needed to be restored was 402. The budget allocated for the purpose was NRs. 5.76. million (US \$577 million). The employment generated by the monastery restoration was 0.18 million workdays. Other work areas such as reconstruction of buildings of security agencies generated 22 million workdays, public buildings (57.7 million workdays) and health facilities (750,000 workdays). The integrated settlements and heritage settlement restoration generated 1.1 million workdays and the education sector, 308,750 workdays.

In all 2447 drinking water projects were identified for priority reconstruction. Ramechhap district topped the list of damaged water systems (119 sites), which were completed within three years. The remaining water systems were left to the DWSSM for restoration. The targets were as follows – 670, 960 and 817 respectively in the first, second and third year.

TABLE 31: DAMAGED WATER SUPPLY SYSTEMS

Districts	Water supply			Toilets damaged
	Major damage	Moderate damage	Total	
14 Districts	570	3,663	5,233	2,20,000
18 Districts	747	1,761	2,508	1,68,000
Total	1,317	5,424	7,741	3,88,000

Source: DWSSM, 2074 (As quoted in PDNA)

The reconstruction of water supply and sanitation systems generated 1.76 million workdays in 32 districts. Other benefits from provided direct the drinking water supply projects were,

- n Access to water to 1.2 million people in 32 districts. The number of households covered was 227,794.
- n The projects have eased the time spent by women to fetch water, facilitated the general sanitation, hygiene and health of the population.

The Ministry of Industries built 31 access roads to mines of cement factories in 31 districts, which is estimated to have generated 0.1 million workdays.

The earthquake had damaged 920 heritage structures (Table 32).

TABLE 32: DISTRIBUTION OF DAMAGED HERITAGE SITES

Distribution of the Structure	No.	Percent
Kathmandu Valley	460	50%
Within 14 districts	277	30
18 districts	183	20
Total	920	100%

Source: Department of Archaeology, 2020

The overall status of the restoration of heritage structures is presented in Table 33. Accordingly, 387 sites had been restored at the time of reporting. The restoration of 410 sites had not begun.

TABLE 33: RESTORATION STATUS OF HERITAGE SITES

Status of the Structures	No.	Percent
Restoration completed	387	42%
Structure under restoration	123	13
Structures to be completed	410	45
Total	920	100%

Source: Department of Archaeology, 2020

The restoration of heritage sites also generated employment. With a budget of NRs. 9.2 billion (US \$ 920 million) for reconstruction, it was estimated that the work generated 2.8 million workdays.

6.6.2 Mason training

The second important output of the NRA during the past five years was transfer of skills to some 76,523 masons. The overall objective of the skill transfer effort was:

1. Empower local communities economically through learning-by-doing
2. Disseminate earthquake resistant technology in the communities
3. Demonstrate the methods and result of the earthquake resistant structure
4. Enhance community knowledge and skills to minimize people's vulnerability to disaster risks, and
5. Make available trained full-time masons in the affected areas.

Masons are the frontline workers in any construction project. In Nepal, masonry was largely a male vocation before the earthquake. This category of workers included masons, carpenters, electrical fitters, plumbers and others. The NRA provided mason training on different skills in all 32 earthquake-affected districts. The trained masons were also women, and contributed to also breaking the gender-stereotype.

During past five years, the NRA with the support from line ministries and partner organizations trained 76,523 masons. There were two types of trainings: short seven-days training was provided to 52,205 masons, and vocational training (on-the-job training) to was provided to 23,655. The details are given in Table 34. A rough estimate shows that at least additional 33,000 masons were trained through the housing reconstruction process itself. If this is also added then the total no of skilled workers trained would come to about 100,000.

Mason training: breaking a job stereotype

Site = Sangla, Sankhu, Shankarapur Municipality, Kathmandu District

Huma Sathighare and her husband had moved to Sangla to work as laborers with a head mason there. Huma wanted to learn construction but had ended up with supporting the mason with tasks such as passing bricks, iron rods and cement mortar.

Both Huma and her husband applied to be included in mason training and Huma was selected for a week-long training.

She learnt how to build houses but it was difficult to find work. She said, "Although I know how to construct and mobilize other semi-skilled masons, as a woman it has been difficult to get the lead role in construction."

It was her neighbors who knew her trusted her who offered her the first job as lead in construction. She and her husband worked together, hired laborers and completed the job. Thereafter, it became easier for find work and Huma has managed to keep working.

Source: Story of Smile. Nepal Red Cross Society (2018:6)

TABLE 34: STATUS OF SKILL-TRANSFER BY TYPE

Type of Training	Number	Percent
1. Short training	52,205	68%
Mason	49,490	
Carpenter	1720	
Electrician	194	
Plumber	164	
Bar bender	50	
Basic engineering	51	
Retrofitting	536	
2. Vocational training	23,655	31%
Mason	22,442	
Carpenter	817	
Electrician	310	
Plumber	86	
3. Others (Social mobilizer = 645, TOT = 18)	663	1%
Grand Total (1+2+3)	76523	100

Source: Information Management & Communication Section (2020)

A total of 182 partner organizations were involved in providing training to masons. These included government agencies, donors, INGOs, NGOs, and private and professional organizations. The most trained masons were (1) NSET = 13,268, (2) HELVETAS = 11,074, (3) Government of Nepal (DLPIUs, DUDBC, PAF) = 9229, (4) NRCS = 5,704, (5) CRS = 3,168, (6) OXFAM-B = 2,825, (7) SCI = 2,221, (8) JICA = 1,940, (9) CSIBD = 1695, (10) CARE-Nepal = 1608.

The analysis of training data from training of 50,880 masons showed that 11 percent trainees were women (Table 35). More women opted for vocational rather than short training.

TABLE 35: TYPE OF TRAINING BY SEX

Type of training	Female	Male	Total
Short Training	1,998 Carpenter =27 Electrician= 15 Mason =1,937 Retrofitting = 6 Thanka =13	33,903 Carpenter =694 Electrician= 75 Mason =33,082 Retrofitting = 45 Thanka =7	35,901
Vocational training	3,550	11,429	14,979
Total	5,548	45,332	50,880

Source: Information Management & Communication Section (2020)

6.6.3 Cash-for-work

The different partners of the NRA had different approaches to supported earthquake-affected people. These have been categorized as (1) cash transfer scheme, (2) material support, and (3) direct interventions.

- 1. Cash transfer scheme:** The scheme provided cash directly to the affected people. The scheme helped beneficiaries to reduce their hardships, add momentum to the recovery efforts, and enhance their confidence. For cash transfers except for those who worked in road maintenance, cleaning debris and other infrastructures, the beneficiaries or their groups were required to have bank accounts. The cash transfer scheme included direct cash support, conditional cash and seed money. Many partners reported that cash was disbursed in two tranches.
- 2. Direct cash:** Cash was given directly to those victims who needed cash to cope with the difficulties arising from the earthquake. Nepal Red Cross Society distributed NRs. 5000 (US \$ 500) to 5,100 families to assist them to purchase agricultural tools, seeds, pesticides, sprayers and other materials. Another direct cash scheme was wages paid to those in need of money work in road repair, repair and maintenance of irrigation systems, clearing debris, foot trails, or community infrastructure repair and maintenance. The Red Cross spent NRs. 1 billion under this scheme. The type of work that needed to be done was generally decided by the community in consultation with local leaders and participating NGOs. Other partners who had provided cash support were CARE Nepal, Caritas, CRS Oxfam, DEPROSC, Handicap Nepal.
- 3. Conditional cash scheme:** This scheme, also known as conditional grant support, was given to people who had been trained by the participating NGOs. At the end of the training, the trainees were required to prepare a business plan and were supported on the basis of their plans. The supported was provided in two tranches, the second after verification. Organizations CARE Nepal, Catholic Relief Services (CRS), Red Cross and others used this model. These organizations had distributed cash to 22,713 families. The CRS had used this modality in the construction of goat shelters. The first tranche was of NRs. 6000 (US \$ 60) in the second tranche was of NRs. 6000 (US \$ 60).

Some partners had also supported some cooperatives and in other cases informal self-help groups engaged in the productive sector. These groups were also encouraged to save money in the group or cooperatives.

Conditional cash-for-work scheme is hundred percent successful

The CRS implemented a conditional cash transfer program for vulnerable households for use to rebuild goatshelters. The participants were selected using participatory process. There were two conditions for participants – join an orientation program on improved sheds and follow the improved design. The improved design had two simple, cost-effective principles:

- n A platform raised to about 2.5 feet from the ground
- n Adequate ventilation to address hygiene and respiratory diseases.
- n The households were encouraged to use local materials stones, bamboo, wood and salvaged materials. They could choose their own size based on their needs. In addition to illustrated educational materials, the CRS also built demonstration goat shelters to help communities visualize the new design. The support provided was US \$ 100 in two modalities:
 - n **Modality 1:** US \$100 cash in two tranches of US \$50 each: the first tranche upon selection, and the second one upon completion of the shelter and its verification by project staff to ensure that the improved design was used.
 - n **Modality 2:** A one-off payment of US \$100 upon completion of the shelter and its verification by project staff. This modality was available only in remote locations.
 - n The CRS had adopted two cash delivery mechanisms (1) through a remittance agency for families in remote locations, and (2) the other through project partners, for locations not served by remittance agencies. In both cases, cash was received at the community level. In all 3304 households had constructed the goat shelters in Gorkha.



Source: Relay Symposium, CRS (2019)

(iii) Seed money: Some partners provided cash as seed money for livelihood activities. For example, the INF provided seed money to 1,350 families in selected municipalities in Gorkha district. This project was basically for the people with disabilities. The INF provided trainings on micro-businesses, accounting, beekeeping, etc. to earthquake-affected people. The support was then provided to the trained group. Another modality of seed money distribution was through a small saving and credit cycle, where the beneficiaries formed groups and started regular savings to a fund, which was used to provide credit to group members. The NGO provided seed money to create the revolving fund. This was successfully done by the Handicap International, the INF and MCC for promoting income-generating activities.

6.6.4 Material support

Materials were directly distributed to affected people also using a voucher system, using which the beneficiaries were supposed to pick up the materials from a designated point. The materials include seeds, agricultural tools, support to goat sheds, veterinary medicines, drip irrigation, plastic sheets for tunnel farming, ponds, etc. The line ministries provided support like threshers, mini-tillers, corn shellers, hermetic bags, seeds, hybrid goats, chilling vats, fodder and grass species, machinery and tools.

Women-based Activities in Beekeeping

IsraAID promoted beekeeping only for women affected by the earthquake. Through its HoneyAID Nepal, in 2015 IsraAID taught women to tend the bees, provided bees and beehives, and equipped them with tools and support. The bee-keepers were also supervised regularly. HoneyAID Nepal taught the women to rise and and self-reliant and self-confident by building their capacity and strengthening their vocation.

HoneyAID Nepal also has established bee keeping school in Chature village in Kavre, where 50 women learned how to become beekeepers. A cooperative was also formed to sell the honey they produced. Each woman had received one beehive stacked with a colony of local bee species to start the venture. One year later, they were provided with one bee keeping jacket each to protect them from their stings.

(<https://www.israaid.org/news/honeyaid-women-beekeepers-promote-growth-nepals-recovery>)

6.6.5 Direct intervention

Direct interventions included (1) target-oriented interventions for supporting people living with disability, single women, elderly, and orphans, (2) support in productive sectors like agriculture, livestock, commercial farming, and industries, and (3) site-based restoration aimed at revival or revitalization of the lost livelihood means, especially for community and social infrastructure. The site of restoration was identified by community members and the people who worked on the tasks were paid in cash. Some of these workers used money earned this way for building houses and paying school fees of children. The workers were provided with safety and protective gears. The sites restored included collection centers, black cardamom dryers, grinding mills, plastic tunnels, commercial farming for the disabled people, etc. The line ministries and partner organizations had invested in productive sectors like agriculture, livestock, tourism and cottage industries and microenterprises.

6.7 Lessons learned

About 10-line ministries and 47 I/NGOs have spent about NRs. 20 billion (US \$ 2 billion) on the livelihood interventions. It included both “hardware” and “soft” support in affected areas of all 32 districts. The following lessons have been derived from efforts to provide livelihood support to people affected by the 2015 earthquake.

6.7.1 Lessons

1. The trainings with material support were effective. Short training was suitable for the earthquake victims because they were busy with rebuilding houses and other livelihood activities.
2. Women leadership was encouraged by promoting their involvement while resolving issues of related to their household chores and time pressures. Having women in leadership roles was essential for changing gender stereotypes.
3. A mechanism of hearing victim's voices, their needs, grievances and suggestions established in the process helped improve the capacity of the concerned to address the issues resulting from the disaster.
4. Transparency and accountability go beyond formal sharing of information and include active and constructive participation and engagement of stakeholders in the processes. This approach was encouraged by the NRA.
5. Direct involvement of local governments in livelihood recovery interventions contributed building local ownership required for sustainability.

6. Cooperatives were among the best platforms to promote access to finance and markets. They were effective means to empower the vulnerable people, households and communities.
7. Livelihood recovery is about supporting the basic necessities of people, which should focus on the economic recovery of entire households.
8. Most of persons with disabilities were willing to be independent and self-reliant but the existing practices of over-protection and over-rejection, and barriers to their participation had hindered efforts to help these people explore their potentials.
9. The private sector should be encouraged, promoted and even supported to develop the access to markets. Demand aggregation centers had proved to be successful in rural areas.
10. Relocating disaster-affected populations from their original place of residence was complex and the least preferred options because the livelihood of the relocated people was a major concern.
11. The community perceived most of the interventions as relief support and not as development activities, which indicated an increasing dependency syndrome. Therefore, the future interventions should guide communities towards development rather than increasing dependency.
12. The Cash-for-work scheme was appreciated by the communities. The schemes not only helped the communities to embrace working in groups that also ensured sustainability of activities after support ended. The local stakeholders said that the debris collected after earthquake would not have cleared up as quickly if there had been no cash-for work-schemes.

6.7.2 Issues

The livelihood interventions both by the government agencies and partner organizations were diverse and scattered across the affected areas and did not address to the needs of specific target groups. They were implemented in a specific geography for a specific purpose. This made it difficult to synthesize the interventions and draw conclusions. Further, such projects were practically “free gifts” to the earthquake-affected people and were accepted outright as there was no reason to refuse something that came for free. The funding mechanism, methods, objectives and modality were different and were not very transparent. Most of the activities were one-off and addressed a specific purpose. A few of the partners either did not exist anymore or had already left Nepal after completion of their projects, which is why the information is not complete. Despite high success the livelihood recovery interventions also raised some issues, which are briefly discussed below.

1. Continuity: Continuity of activities supported was uncertain, and the government was also not in a position to follow up on all cases. Thus, there was the question of sustainability. There is also no provision to evaluate usefulness and effectiveness of support provided to communities. A comprehensive evaluation can benefit planning and interventions.
2. Replicability: Since there were reviews or evaluations of the projects, it is difficult for both the NRA and line ministries to determine if they were adoptable in a new context or situation, and if they would be acceptable to the people. Due to lack of enough evidence, it was difficult to foresee possible upscaling of the successful efforts.
3. Linkage to market: The beneficiaries of livelihood interventions had successfully implemented projects and were marketing their produce through cooperatives and other mechanisms. Scaling up similar interventions could result in issues about market availability in the long run.
4. Outcome of the interventions: The results of livelihood activities were and effective on a small scale. But the outcomes of the efforts are not known at the community level. This can be assured through a series of activities over longer periods and not through one-time support.
5. Employability of the training graduates: Since most private houses have already been constructed there will be few construction jobs at the community level. This would mean a lower possibility of the

training graduates to find work. Therefore, there is a need to devise alternative ways to support the employment of trained workers to ensure that the skills are preserved.

6.8 References

- Bhandari, Bishnu B. (2017) The Changing Role of the NRA in Reconstruction & Recovery Processes. A paper presented at the National Conference on Governance in Disaster Risk Reduction in the Federal Context, Kathmandu, Nepal 31st December, 2017.
- HoneyAID: Women Beekeepers Promote Growth in Nepal's Recovery. Available at <https://www.israaid.org/news/honeyaid-women-beekeepers-promote-growth-nepals-recovery>. Accessed on 4 March 2020
- ICIMOD (2015). Strategic Framework for Resilient Livelihoods in Earthquake Affected Area of Nepal. ICIMOD Working Paper 2015/6, Kathmandu, Nepal.
- NPC (2015a). Post Disaster Needs Assessment (PDNA). Volume A : Key Findings. Kathmandu: National Planning Commission (NPC)
- NPC (2015b). Post Disaster Needs Assessment (PDNA). Volume B: Sector Reports. Kathmandu: National Planning Commission (NPC)
- NRA (2016a). *Post Disaster Recovery Framework 2016-2020*. Kathmandu: National Planning Commission (NPC)
- NRA (2016b). *Sector Plans and Financial Projections. 2016 Working Document*. Kathmandu: National Planning Commission (NPC)
- Nepal Red Cross Society (2018). *Story of Smile: Earthquake Response Operation*. Red Cross Society.
- The Asia Foundation (2017). *Aid and Recovery in Post-Earthquake Nepal*. The Asia Foundation.
- NDRI (2016). *A Study on the Impact of Nepal's Earthquake on Women's Livelihood, Housing, Land and Property Rights and Citizenship Rights*. NDRI, Nepal
- CRS (2016). *Livelihood Assessment Report: Gorkha Recovery and Resilience Programme, Nepal*. CRS & TU/IAAS
- Caritas, Nepal (2019). *Earthquake Affected Communities Realize A Holistic Recovery*. Caritas, Nepal.
- Thapa Jeeban (2019). Report on Consulting Services for the Livelihood Support. Submitted to Earthquake Housing Reconstruction Project, National Reconstruction Authority.
- AIN (2019). *Documentation of Good Practices on Livelihood Improvement: Livelihood Working Group 2019*. Association of International NGOs in Nepal (AIN) Gyawali, Sushil (2016).
- ज्ञवाली, सुशील (२०७६) पुनर्निर्माणको वर्तमान अवस्था, विस्तृत कार्ययोजना एवं वित्तीय आंकलन, निर्देशक समितिको सोही बैठकमा (२०७६। ०१।२८), प्रस्तुत कार्यपत्र, राष्ट्रिय पुनर्निर्माण प्राधिकरण
- राष्ट्रिय पुनर्निर्माण प्राधिकरण (२०७६), राष्ट्रिय पुनर्निर्माण प्राधिकरणसंग सम्बन्धित कार्यविधि निर्देशिका तथा मापदण्ड भाग २

CHAPTER 7

EXIT STRATEGY



EXIT STRATEGY

The NRA's tenure as an institution ends in January 2022, for which it has prepared an exit strategy. This chapter discusses the exit strategy.

7.1 NRA's Exit Strategy

The 20th Steering Committee meeting of NRA decided to handover the remaining works to concerned GoN ministries, departments and agencies. Based on this decision the NRA has been handing over its work to entities that were responsible for implementation in the reconstruction period. The Central Level Project Implementation Unit (CLPIU) – Building & Housing has been formed after merging the CLPIU-GMaLland Building that will facilitate and administer private housing reconstruction. This entity will also handle public buildings and heritage settlements. The DoA will continue overseeing reconstruction of heritage monuments. The CLPIU Education has been aligned with the Ministry of Education, Science & Technology (MoEST) to complete reconstruction of all schools and buildings of academic institutions. The livelihood and recovery interventions will be delivered through local governments under the auspices of Ministry of Federal Affairs and General Administration (MoFAGA). The Department of Local Infrastructure (DoLI) is responsible for local infrastructure. The National Disaster Risk Reduction and Management Authority (NDRRMA) has been conceived as the NRA's successor for ensuring delivery.

7.2 Sustainability of intervention

Some work will be required for operationalizing the NRA by the successor institutions. This would depend on the ability of NDRRMA to take on the NRA's role. Formed under the Office of the Prime Minister, the NRA enjoyed sweeping authority including that to acquire land which otherwise requires a cabinet decision. The NRA also had authority to implement all required interventions. In contrast, the Minister of Home Affairs is the ex-officio chair of the NDRRMA's Executive Committee, which in practical terms means that it is one of 51 activities of the Ministry of Home Affairs (MoHA). The NDRRMA's Executive Committee includes three other ministers, secretaries of all ministries and the chiefs of security agencies and other institutional heads.

Having no dedicated reconstruction authority after the NRA is dissolved, it will be in the national interest to widen the NDRRMA's scope for reconstruction as well. If the institutional home is upgraded to the Office of Prime Minister, the NDRRMA can be able to acquire additional authority. However, this would require amending the law that can be time consuming. Therefore, some mitigating measures would be required in the transitional period such as a cabinet decision for enabling the NDRRMA to undertake reconstruction. This arrangement can point to further reform that can be incorporated when the Disaster Risk Reduction and Management Act – 2074 is amended.

The idea of forming CLPIUs under generic line agencies was conceived for addressing sustainability. The assumption behind this arrangement was that the experience-based knowledge will be retained at

these organizations. The institutional initiative which had been introduced at the beginning of the NRA's tenure was found to be rather idealistic as it did not appreciate the requirement of a chain of command for reconstruction delivery that had impeded progress. Later, after the NRA brought all CLPIUs under its command and that had boosted delivery significantly. Under the NRA's exit strategy, it is proposed that the CLPIUs continue to carry forward the implementation of the activities that remained to be completed. Such an arrangement can ensure uninterrupted delivery.

7.3 Ensuring sustainability

There are clear indications that the NRA's exit strategy will lead to a professional wrap up of all reconstruction activities. However, mainstreaming the NRA's lessons for ensuring resilience during natural disasters, will require relevant ministries and departments to undertake additional legal, institutional and operational reforms. One of the crucial issues to grapple with is whether or not the NDRRMA should confine itself only in rescue and relief operations or should its mandate to be broadened to include reconstruction as well. The tacit assumption seems to be that the relevant line agencies will take care of post-disaster reconstruction. However, given the administrative environment they operate under, it is almost impossible for them to deliver results efficiently, which points to the need for a high-powered reconstruction organization. In addition, as part of resilience initiative, the organizational structures, procedures and competence of human resources at line agencies such as MoUD, MoEST, MoFAGA, and DoA need to be enhanced.

Annex 1: NRA timeline

2015	
11 February 2014	Sushil Koirala sworn in as Prime Minister
25 April	Gorkha earthquake
12 May	Largest aftershock (Mw 7.3)
15 May	National Planning Commission sent letter to the EU, UNDP and World Bank request support to conduct PDNA
June	Temporary shelter support with cash grant (NRs. 15,000)
20 June	Executive summary of PDNA released
25 June	ICNR held
13 August	NRA established with Dr. Govinda Pokharel as CEO
16 September	Constitution promulgated; 26 new municipalities added (total: 217)
September	1430 masons trained by partner organizations
10 September	Shelter Cluster Recovery and Reconstruction Working Group (RRWG) launched
October	DUDBC Design Catalogue Vol.1 published
12 October	Sushil Koirala-led government replaced by KP Sharma Oli as prime minister
15 October	Central Level Project Implementation Unit (CLPIU) established under the Ministry of Urban Development
4 November	Central Level Project Implementation Unit (CLPIU) established under the Ministry of Federal Affairs and Local Development
7 Dec.	National Consultation Workshop on the draft National Plan of Action for Safer Building Construction
21 Dec.	Reconstruction Act 2072 enacted
25 Dec.	NRA established, with Sushil Gyewali as CEO
27 Dec.	Madhu Sudan Adhikari appointed as Acting Secretary
2016	
2 Jan	Earthquake Housing Damage Characteristics Survey (EHDC) begins in Dolakha district.
05 Jan.	Appointment of Executive Members: C.B. Shrestha, D.P. Sharma, B. Bhandari
15 Jan.	CBS Detail Damage Assessment Survey begins (15 Jan. 20 June in 11 most affected districts)
22 Jan.	Appointment of Executive Member: H. Parajuli
13 March	Pilot enrolment in Singati, Dolakha
31 March	NGO Mobilization Guidelines approved by the Cabinet
04 April	Madhu Sudan Adhikari confirmed as Secretary
Mid-April	NRA begins signing reconstruction grant agreements in 10 districts
12 May	PDRF launched
June	2500 engineers, sub-engineers and assistant sub-engineers deployed in 14 most-affected districts
24 June	Steering Committee decides housing retrofitting grant of NRs. 50,000
24 July	K.P. Oli resigns
03 August	P.K. Dahal assumes responsibility as prime minister and chair of the NRA Steering Committee
August	Procedure for handling grievances published
26 September	Steering Committee decides to increase housing grant from NRs. 200,000 to NRs. 300,000 and grant for retrofitting from NRs. 50,000 to NRs. 100,000
October	Community Reconstruction Committee Directives published
16 October	Madhu Sudan Adhikari transferred from NRA
November	Inspection guidelines and forms published
07 November	Sanjaya Sharma appointed as Secretary
19 December	475,000 participation agreements concluded, 450,000 received the first grant tranche

25 December	First phase of geo-hazard survey begins
29 December	Grant distribution procedure approved
2017	
10 January	Dr. Govinda Raj Pokharel reappointed as new CEO
31 January	GoN approves first amendment of NGO Mobilization Act
March	DUDBC publishes Design Catalogue 2
	46 new municipalities declared totaling to 263
14 May	First phase of local election
7 April	Cabinet approves second revision of the NGO Guidelines
13 April	Sanjaya Sharma, Secretary, transferred
03 May	Sarvajeet Mahato appointed as Secretary
24 May	Prime minister P. K. Dahal resigns
May	PSA begins in 28 moderately affected districts
15 May	Correction and exception manual published
	NRA Toll free number launched
	Procedure for interest free loans to earthquake victims based on collective guarantee published
07 June	Sher B. Deuba declared as the new prime minister
23 June	Criteria for purchasing habitable lands for earthquake victims
28 June	Second phase of local election
	Federal restructuring: 6 metropolitan cities, 11 sub-metropolitan cities, 276 municipalities, 460 rural municipalities
July	Deadlines set by NRA: Grant agreement signing – 16 November 2017, First Tranche – 13 January 2018, Third Tranche - 15 July 2018.
August	Relocation of Hazard-prone Settlement procedures issued
10 August 16 September	Resurvey and verification to address grievances with detailed damage assessment
18 September	Third phase of local election
25 September	Repair and retrofitting manual for masonry and RCC structures and hybrid structures issued
22 October	GoN approves Disaster Risk Reduction and Management Act – 2074
23 October	Yubaraj Bhusal appointed as NRA CEO
07 November	Inspection form for houses constructed with sundried bricks published
12 November	Sarvajeet Mahato, Secretary, retires
13 November	Madhusudan Adhikari appointed as NRA Secretary
26 November	First phase of Federal and Provincial elections
7 December	Second phase of Federal and Provincial elections
December	450 Engineers, sub-engineers and assistant sub-engineers deployed in 18 districts
2018	
9 February	Deadlines extended, second tranche disbursement to 13 April 2018
15 February	KP Oli elected as the new prime minister
March	Light timber, steel frame structure manual published
3 April	Deadlines extended – second tranche extended to 18 July
3 April	CLPIUs brought under the NRA
09 April	Madhusudan Adhikari, Secretary, transferred
19 April	Arjun Kumar Karki appointed as Secretary
15 May	List of vulnerable households published
14 Aug.	Sushil Gyewali appointed as CEO

6 Sep.	Deadline for the second tranche disbursement extended to 15 January; third tranche, to 14 May 2019
26 Nov.	District level reconstruction orientation and review workshops launched
25 Sep.	Interest subsidy on subsidized loan policy guidelines 2075 issued
20 Dec.	GoN approves the NDRRMA's regulations
21 Dec.	Donor meeting on supporting vulnerable households
25 Dec.	Prime minister lays foundation stone of Dharahara
2019	
4 Feb.	Grant Disbursement Procedures for Private Houses amended
7 Feb.	Hollow concrete block manual published
17 March	DLPIU technical staff go on strike
29 March	Final round of reverification and resurvey launched
12 April	Retrofitting work begins in Kavrepalanchok.
23 April	Completion and inauguration of Nepal Army Headquarters
29 May	Tatopani border reopens
11 June	Tembathan integrated settlement incorporating traditional Hyolmo culture completed at Helambu, Sindhupalchok.
2 July	Steering Committee approves guidelines to provide NRs. 300,000 in bulk to households that had completed reconstruction immediately after earthquake and prior to the deployment of engineers
23 July	NRA removes the names of 57309 beneficiaries who had not signed participatory agreements or had signed but had not taken Tranche I from the beneficiary list
06 August	Arjun Karki, Secretary, retires
20 August	Government decides to provide land ownership certificates to the 573 beneficiaries of Gupsipakha Integrated Settlement of Laprak, Gorkha with the clause that the beneficiaries would not be able to sell their houses for 10 years
6 September	MOU signed between NRA, Kathmandu Valley Development Authority and Seoul Housing for the reconstruction of the archaeologically important heritage settlements at Sankhu, Bungmati, Khokana and surrounding areas
13 September	Shiva Hari Sharma appointed as Secretary
2 October	Tripartite MOU signed between the Norwegian Embassy, the NRA and UNOPS to reconstruct 24 schools in Sindhuli, Ramechhap, Bhaktapur and Kathmandu with funding support of US\$ 8 million from the Government of Norway
11. October	Agreement signed between Saudi Fund for Development and GoN for reconstruction (US\$ 112.5 million) as concessional loan for damaged private housing, schools and health centres
25 October	MOU signed between Rastriya Banijya Bank and UKAid: Sakshyam to finance concessional loans to earthquake victims of Gorkha and Dhading
4 November	Retrofitting of Babar Mahal begins
15 November	Organizing Committee's first meeting for International Conference on Nepal's recovery and reconstruction ICNR2020 held at the NRA, Singha Durbar
28 November	Tranche deadlines extended with conditions
2 December	The NRA addressed grievances of 42742 beneficiaries and added 4644 new beneficiaries
17 December	Implementation of Steering Committee decision (dated: 6 September 2018) to provide lump sum NRs 300,000 to households that had completed construction of their houses prior to the deployment of engineers accelerates to reach 10,702 beneficiaries.
2020	
2 January	84 landless of Dhading receive land ownership certificates. Out of the 84, NRA had purchased land for 34 households and 46 obtained land ownership for the public land they had been using
8 January	21,600 grievances addressed out of which 841 RCB (Reconstruction beneficiaries) beneficiaries, 836 RTB (Retrofitting beneficiaries) and 18002 non-beneficiaries decided.
13 January	NRA forms working group to assess the need to extend its tenure
16 January	World Bank approves loan of US \$ 200 million taking the total reconstruction loan to US \$ 700 million

20 January	Prime minister KP Sharma Oli and Indian prime minister Modi jointly inaugurate reconstructed houses with Indian grant aid (50000 houses in Gorkha and Nuwakot) and Integrated Check Post at Birgunj
	Amendment of the procurement procedure to allow purchase up to NRs 100 million by user committees and to ensure public participation in reconstruction of heritage structures
17 March	13385 grievances addressed adding 1705 beneficiaries. Total grievances addressed so far: 182,301 out of 189,000 filed. Out of which 17106 are RCB and 8308 RTB.
16 March	Shiva Hari Sharma, Secretary, retires
24 March	Nationwide lockdown due to COVID-19 (Coronavirus) global pandemic
14 April	Ramkrishna Sapkota appointed as Secretary
8 May	Working procedure for additional NRs. 50,000 top up grants to the vulnerable households approved
10 May	Large infrastructure reconstruction begins despite lockdown with necessary precautions
14 May	Webinar on housing reconstruction in Covid19 Context organized
21 May	Urban Recovery Strategy Workshop to collectively brainstorm on urban housing recovery issues and recommendations
25 May	Nationwide lockdown extended to June 2
29 May	NRA Executive Committee approves COVID19 Safety Protocol
	NRA announces Appellate Committee proceedings
1 June	All 634973 grievances addressed adding 84146 beneficiaries of which 16465 are RCB and 67681 are RTB
09 August	Revised National Building Code approved
24 August	Four-day national symposium on post-earthquake reconstruction begins (NSNR-2020)
21 September	11th Steering Committee recommends NRA's extension by one year
27-29 November	Webinar on the NRA's Compendium
30 November	Cabinet approves NRAs extension for a year
29 November	Ram Krishna Sapkota, Secretary retires
13 December	Suresh Acharya appointed as Secretary
20 December	Prime minister recommends dissolution of parliament, parliament dissolved
2021	
15 February	Prime minister inaugurates Singhdurbar
22 February	Mani Ram Gelal appointed as Secretary
23 February	Supreme Court reinstates parliament
07 March	Supreme Court invalidates Nepal Communist Party (NCP) led by KP Sharma Oli and P.K Dahal
13 April	18th Steering Committee meeting
19 April	Inauguration of Patan Secondary School
22 April	Laprak settlement handed over to beneficiaries
24 April	Prime minister K.P. Oli inaugurates Dharahara and releases 2 Journals: Progress in Disaster Science and Vikas
25 April	Sixth Memorial Day; Interaction on Compendium Part A; CEO Sushil Gyewali releases 4 retrofitting documents
29 April	Valley District Administration imposes lock down to curb spread of Covid-19
10 May	Prime minister fails to secure vote of confidence in parliament
14 May	Prime minister KP Oli sworn in office for third time
25 May	Transfer of secretary Mani Ram Gelal
29 May	Finance Minister defines exit strategy and announces ICNR in annual budget speech
7 July	Sushil Chandra Tiwari appointed Secretary
13 July	KP Oli resigns as prime minister

13 July	Sher Bahadur Deuba appointed prime minister following a decision of the Supreme Court.
25 August	20th Steering Committee meeting decided that NRA would handover its operation to relevant agencies.
15 September	Operational authority handed over to concerned line agencies.

Source: Compiled from NRA, HRRP and Various Newspapers (Compiled by: C.B. Shrestha)

Annex 2: Updated data as of July 15, 2021

TABLE 1: PROGRESS STATUS: PRIVATE HOUSING RECONSTRUCTION (END OF F.Y. 2077/78)

S.N.	Particulars	Up to 31 Asar 2078 (July 15 2021)	%
1	Total beneficiaries	8,66,207	
2	Grant agreement	8,29,667	95.78
3	First installment payment	8,28,763	99.89
4	Second installment payment	7,50,459	90.45
5	Third installment payment	7,03,307	84.77

Source: NRA

RECONSTRUCTION OF PUBLIC BUILDINGS, SOCIAL INFRASTRUCTURES AND HERITAGE MONUMENTS (AS OF JULY 15, 2021)

S.N.	Sector	Planned	Completed		Under construction		To be started	
			Number	%	Number	%	Number	%
1	School building	7,583	6,647	87.66	936	12.34	0	0.00
2	University and affiliated college buildings	70	10	14.28	27	38.57	33	47.15
3	Health institutions	1,164	751	64.52	413	35.48	0	0.00
4	Government buildings	414	388	93.72	26	6.2	0	0.00
5	Security body buildings	216	216	100	0	0	0	0.00
6	Heritage structures	920	586	63.70	219	23.80	115	12.50
7	Monasteries	1,297	373	28.76	266	20.50	658	50.73
8	Roads (km)	764	657	85.99	107	14	0	0.00
9	Road bridges	15	9	60	6	40	0	0.00
10	Integrated settlements	106	62	58.49	44	41.50	0	0

Source: NRA

SECTORAL FINANCIAL ALLOCATION

NRs. 00,000

Sectors	Total requirement	Expenditure up to 2077 / 78 (July 15, 2021)	Budget 2078 / 79 (in LMBIS)	Additional budget from the 19th Steering Committee (Revised Estimates)	Other requirements
Private housing grant	2315800	2223279	11681	80840	0
Integrated Settlement	14620	10474	4146	0	0
Reconstruction of educational institutions	1101393	737226	132209	13124	218833
Reconstruction of health institutions	159111	25351	59806	42500	31454
Government building and security body buildings	409310	290231	38580	0	80500
Heritage monuments, Monasteries	500694	240181	78641	31872	150000
Roads, drinking water and local infrastructure	169849	163550	3799	2500	0
Irrigation, landslide, agriculture, income generation	17531	17531	0	0	0
Earthquake Memorial Park construction, handover	1256	63	1193	0	0
EHRP (PMU)-NRA	12939	7482	5457	0	0
Total	4702503	3715367	335513	170836	480787

Source: NRA

BUDGET ALLOCATION BY SOURCES

NPR 00,000

Source	Allocation	Expenditure up to 2077 / 78 (July 15, 2021)	Budget 2078 / 79 (in LMBIS)	Additional budget from 19th Steering Committee meeting (Revised Estimate)	Additional requirements
IDA	625339	549809	27195		48335
IDA / DPC	2096	2096			0
ADB	349216	275858	69285		4073
China	5337	5337			0
ADB / PBL	15975	15975			0
Japan – KR 2	3300	50	2200		1050
Japan – JICA	246360	230355	14445		1560
JFPR	5971	5971			0
GoN	2794796	2337260	114049	170836	172650
India	242585	125497	74079		43009
India – Exim Bank	278184	50060	25324		202800
EU	85272	85272			0
WB – Trust Fund	13200	9862	2560		778
Saudi Fund	34872	21965	6376		6531
Total	470,25,03	371,53,67	33,55,13	17,08,36	48,07,87

Source: NRA

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