



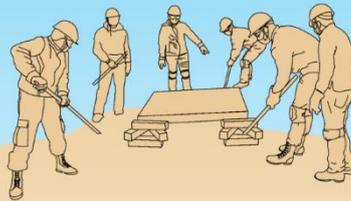
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NSET
Disaster Resilient Communities in Nepal

Baliyo Ghar Program A Contribution Towards Disaster Resilient Nepal

Report on socio-technical assistance for housing reconstruction
after 2015 Gorkha Earthquake



Enhancing Skills of Existing
Masons through 7 Days Training



Training New Masons on
Earthquake Resistant
Construction Technology

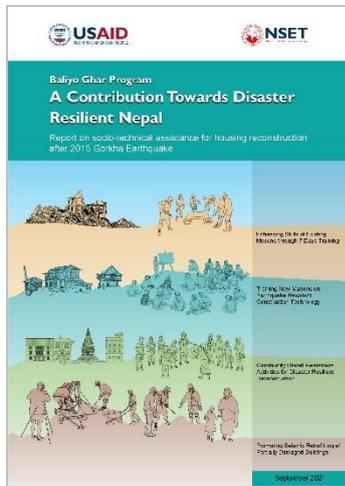


Community Based Awareness
Activities for Disaster Resilient
Reconstruction



Promoting Seismic Retrofitting of
Partially Damaged Buildings

September 2021



Baliyo Ghar Program

Contributing to Disaster Resilience in Nepal

A report on socio-technical assistance in 2015 Gorkha Earthquake housing reconstruction (2015-2021)

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FOREWORD

National Reconstruction Authority Put forward a recovery vision allowing all the partners to align their actions with Nepal government plan and policy to build social harmony as a basis of resilience. National Society for Earthquake Technology-Nepal (NSET) found active on supporting Gorkha earthquake Reconstruction and Recovery prior to the establishment of NRA with National Planning commission. NRA is getting continuous support from NSET from the beginning of reconstruction and the technical support provided by NSET through its programme is commendable/ highly acknowledged.

Housing reconstruction program is one of the biggest challenges for NRA due to its sensitivity that it is directly related to the shelter need of affected families damaged by earthquake. The damaged was not limited to the physical losses of houses it's also impacted on socio-economic aspect of each family. The worriedness among the earthquake affected people was heightening. In such circumstances providing technical support and bringing hope to the individual family to stand with earthquake resistance house is supposed to be a nightmare which was converted into the reality now. And support of partners to the NRA is high.

NSET through USAID supported “Baliyo Ghar” program enlighten hope to about 60 thousand household with its socio-technical assistantship during house reconstruction. The capacity building trainings to masons, engineers and the policy makers are major deliverables that NSET complement on government efforts. On awareness raising component the utilization of mass media is remarkable. In specific the television program creates the opportunity to discuss the local challenges and reconstruction and recovery issues which is remains as a strong platform on advocacy as well as decisions dissemination. The technical research for innovative technology on retrofitting of houses is vital for enhancing the building resilience with minimum interventions on buildings are unique works done by NSET. The support provided by Baliyo Ghar program to draft the different type of training curricula, manuals and technical guidelines and standards are remarkable.

NRA acknowledge the technical support received during six years on reconstruction has high value and would like to express my gratitude for the NSET leadership and the working team and thankful to USAID for their support to NSET for implementation of Baliyo Ghar program.

Sushil Gyewali

Chief Executive Officer

National Reconstruction Authority

REMARKS

The housing reconstruction technical support program in a name of Baliyo Ghar designed for Gorkha earthquake housing reconstruction is strongly rooted on the NSET learnings and work experience on Pakistan housing reconstruction after 2005 earthquake. NSET engaged in **Training Support for Earthquake Resistant Reconstruction in Pakistan (TSERR)** for Earthquake Reconstruction and Rehabilitation Authority (ERRA) of the government of Pakistan for housing reconstruction. The experience of Gujrat reconstruction through the mason exchange program and the experiences working after Iran earthquake enrich the institutional experiences which is well reflected on Gorkha earthquake reconstruction and recovery through NSET different efforts. Before Gorkha earthquake NSET is engaged in different type of earthquake preparedness activities which may help to save many lives and property during gorkha earthquake. Unfortunately, the quantification of preparedness efforts and its contribution on saving life and property is not well studied so far.

Baliyo Ghar program is a one of the priority programs of NSET for housing reconstruction and recovery through which the institutional learnings and experience of NSET from around the world were systematically feed into the Nepal government reconstruction and recovery efforts. Being a professional organization the contribution of preparing PDNA with National Planning commission and engagement during preparation of PDRF are key involvement to shape the Nepal reconstruction and recovery. The technical support on development of Inspection mechanism, functions of enrollment camps and the support on developing institutional arrangement through the assign role of NRA-CEO technical advisor and the subject matter experts in a later course of NRA actions is a contribution of NSET as an institution.

Baliyo Ghar program at the field reaches to provide the socio technical support at household level. The training and capacity building of construction workforces are key contribution to create the reconstruction environment. The mass media mobilization helps NRA to understand the challenges raised during housing reconstruction which helps NRA to take a corrective measure. The local F.M stations brings the issues from the ground and discussed. The national and district level interaction conducted through the program brings synergy in reconstruction to resolve the issue at the different level of existing governance system making DLPIUs and district office more credible and accountable to the reconstruction beneficiaries.

I expressed my gratitude to the municipalities who support for the reconstruction efforts and thankful to NRA, CLPIU-Building, DLPIUs for their trust and providing us a working environment and providing the guidance. The partner organizations, HRRP and civil societies help us to be active and engaged us in different forum for discussion on reconstruction, thankful for their efforts. I acknowledge the support from USAID for providing funding and necessary guidance during program designing and implementation. And appreciate the dedication and professional work demonstrated by NSET staff during this reconstruction period.

Surya Narayan Shrestha

Executive Director

NSET-Nepal

PREFACE

Gorkha earthquake housing reconstruction is one of the successful efforts that Nepal deliberates to ensure the resilient reconstruction of private houses. Owner driven housing reconstruction adopted by Government of Nepal for such a large scale of housing reconstruction probably the largest owner driven reconstruction in the world so far. The topographical challenge of access road to supply construction materials at mountainous region is itself a complicated task. Despite all in a leadership of National Reconstruction Authority (NRA) is support from government, Nepalese people donors, I/NGO and civil societies the reconstruction of more than eight hundred thousand houses is about its completion within seven years after 2015 earthquake. However, the reconstruction of few urban settlements still has many issues and remaining reconstruction need to be completed.

The technical support provided by the partner organization is significant as mentioned by the NRA. NSET implemented Baliyo Ghar program to provide technical support to government efforts aligning with the government plan, policy, and procedures for reconstruction. The six-year Housing reconstruction technical support program begins on 1st October 2015 and ended on 30 September 2021 with the support from USAID. Most probably Baliyo Ghar program is one of the programs having longer program period almost similar life span of NRA effective life. Program support NRA in multitude of activities in three major aspects on technical support; policy, capacity building training and awareness raising for resilient reconstruction.

Baliyo Ghar program has a twofold of actions. On one aspect it has a direct reach to the reconstruction beneficiaries at household level to provide require socio-technical support on housing reconstruction through its program activities. On the other hand, the support on policy drafting and mass media activities its indirectly support to the entire beneficiaries among the earthquake affected district.

The mobilization of social mobilizers with engineers and construction technicians as a one mobile team for one ward of municipalities for about forty wards directly supported for the reconstruction of about sixty thousand houses which helps about thirty million people to assure the safe permanent shelter. The door-to-door technical support provided by the mobile teams remains instrumental to drive the result on physical reconstruction of houses at the initial days of reconstruction when in many areas people were completely unaware and confused about the rebuild of houses, reviving settlements from the ruins is a big challenge foreseen.

During reconstruction period, Baliyo Ghar program constructed 910 technology demonstration houses which trained 5,430 new masons where 26% percentage of participants were female. Similarly, the retrofitting technology demonstration on 74 houses trained 444 masons who were capable to retrofit the houses independently. The practicing masons were trained on earthquake resistant technology of houses, about 13,474 masons were trained. 2,554 engineers and architect trained in different professional skills. The elected local representatives were trained on Disaster Risk reduction and management. The television and radio program provided the platform of reconstruction, discussion information dissemination advocacy and policy decision which realize that the concept that the mobilization of mass media is equally important to support the reconstruction and recovery efforts.

I express my gratitude to all the housing reconstruction beneficiaries, local people, municipalities, CLPIU-building, GMALI, DLPIU; Dhading, Nuwakot and Kathmandu for their guidance and support during the program implementation. My sincere acknowledgement to USAID for continuous funding and supports, the program team who employed their tireless efforts on program implementation and thankful to the NSET-Board, executive director, NSET's divisions and experts at NSET for their contribution on program to make it successful.

Dr. Ramesh Guragain

Program Director and Deputy Executive Director
NSET-Nepal

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AIN	Association of International Nongovernmental Organizations in Nepal
BCRAC	Building Code Revision Advisory Committee
CBOs	Community-Based Organizations
CDO	Chief District Officer
CLPIU	Central Project Implementation Unit
CSO	Civil Society Organizations
DACFC	Development Assistance Coordination and Facilitation Committee
DCC	District Coordination Committees
DFID	Department for International Development
DLPIU	District Level Project Implementation Unit
DOR	Department of Roads
DOLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DPR	Detail Project Report
DRCN	District Road Core Network
DRRM	Disaster Risk Reduction and Management
DRSP	Disaster Resilience of Schools Project
DUDBC	Department of Urban Development and Building Construction
DWSS	Department of Water Supply and Sewerage
ECED	Early Childhood Education and Development
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
GESI	Gender Equity and Social Inclusion
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit / German Corporation for International Cooperation GmbH
GMaLI	Grant Management and Local Infrastructure
GoI	Government of India
GoN	Government of Nepal
IEE	Initial Environmental Examinations
IDA	International Development Association
INGO	International Non-Governmental Organization
JFPR	Japan Fund for Poverty Reduction
JICA	Japan International Cooperation Agency
KOICA	Korean International Cooperation Agency
KVDA	Kathmandu Valley Development Authority
LRN	Local Road Network
MDTF	Multi-Donor Trust Fund
MoE	Ministry of Education
MoFALD	Ministry of Federal Affairs and Local Development
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoUD	Ministry of Urban Development
NEA	Nepal Electricity Authority
NFN	NGO Federation of Nepal
NGO	Non-Governmental Organization
NNBC	Nepal National Building Code
NPC	National Planning Commission
NPR	Nepalese Rupee
NRA	National Reconstruction Authority
PCU	Project Co –Ordination Unit
PDNA	Post-Disaster Needs 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
SEANep	Structural Engineers' Association Nepal

SDC	Swiss Agency for Development and Cooperation
SFD	Saudi Fund for Development
SMC	School Management Committees
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Education Fund
USAID	United States Agency for International Development
VRCN	Village Road Core Network
WASH	Water, Sanitation & Hygiene

EXECUTIVE SUMMARY

This is a final report of Baliyo Ghar program to consolidate the learnings of socio technical assistant for housing reconstruction after gorkha earthquake 2015. National Society for Earthquake Technology-Nepal (NSET) with the funding from USAID implemented the Baliyo Ghar program from october1, 2015 until September 30, 2021, to provide the socio technical assistant on housing reconstruction in coordination with National Reconstruction Authority (NRA). Baliyo Ghar program has three-fold of actions for socio technical assistance. The policy support to prepare the technical guidelines, manuals, training Curriculum and other relevant policy document related to the housing reconstruction, Training, capacity building of construction workforce and the awareness raising for the resilient reconstruction of houses. The policy document supported Nepal government to prepare the standard policy document related to housing for all earthquake affected area. Through the policy documents, mass awareness activities aired and broadcasted from radio and television program contributed for entire housing reconstruction efforts. However, capacity building efforts and technical support for household level was focused on four districts: Dhading, Nuwakot, Dolakha and Kathmandu named as program implemented districts. Within the program coverage districts one third the housing reconstruction beneficiaries were directly taken care off. In other area different partners provided the technical support. However, in technical aspect through the district reconstruction technology center formed by Baliyo Ghar program provided support to enhance the partners capacity on technical aspect of housing reconstruction. Training to the partners technical professionals, technical discussion and sharing were the key area of collaboration among the partners.

Similarly at the national level with the Center Level Program Implementation Unit (CLPIU-Building) the National Reconstruction Technology Center (NRTC) formed by the Baliyo Ghar program contributed to develop the different technical manual, curriculum, and policy documents. The training curriculum for masons, engineers, social mobilizers, correction manuals for houses, extension guidelines are few examples of policy document developed with the involvement of experts deployed by the Baliyo Ghar program.

At the end users' level, the mobile team consisting social mobilizer, engineer, and construction technician known as a mobile team provided the door-to-door technical support at household level to provide information related to the housing reconstruction such as government grant provisions, process etc. as a part of social mobilization and provided the technical supervision of houses by the engineers and construction technician during the construction of houses, for the planning and cost-estimate of the houses engineers work with the houseowner to meet the requirement and to plan the material and budget prior to the construction of house. This process of consulting individual beneficiaries helped a lot on timely completion of reconstruction at program areas. About 63000 household were benefited from this direct approach of intervention.

In this connection, the awareness raising activities conducted by the program at program implemented areas helps to prepare a reconstruction environment at the starting period when almost all of the stakeholders including government were not clear on steps of grant disbursement, housing inspection and interlink. The campaign of social mobilization to disseminate government decisions at local level remains instrumental to rollout the grant disbursement process. This is how NRA came to start the grant agreement with beneficiaries from the Baliyo Ghar program implemented area. The rural market center of former VDC's- Singati bazar at Dolakha was chosen and grant agreement camp was first formed and tested. The learnings of which helps NRA to take the decision that the grant agreement must be done at former VDC office intending to decrease the challenges faced by the beneficiaries. The first enrollment camp was also chosen at Baliyo Ghar program district at Dhading where program mobile team were mobilized beforehand and certain level of awareness activities were conducted by the program. Both enrollment camp provided many learnings to the NRA and involved partner organizations. Enrollment processes were revisited, standardized on procedure, and scaled up to the other part of the reconstruction areas.

Baliyo Ghar program consider the theory of change (TOC) that if guidelines are standardized, local capacity and awareness increased the house owner will be able to reconstruct their houses to be disaster resilient. TOC further defined through the program goals which is to contribute to sustainable earthquake reconstruction. The program objectives to support disaster-resilient reconstruction of houses through standardized training, awareness, and demonstration in built with three intermediate results (IR) with its clear output level activities. The IR-1 improved policy and standardization of training, guidelines, and manuals for disaster-resilient construction technologies priorities its output level activities as curricula for awareness and training (including instructor development). The IR-2 Enhanced local capacity to apply disaster resilient construction methods and techniques designed with instructors' development trainings, construction workforce training, social mobilizers training, training to the government officers and support made for engaging local authorities in a process of institutionalization of safer building practices. The IR-3 increased awareness on disaster resilience construction in Nepal designed with the formal orientation sessions, Door-to-Door technical support, construction of demonstration models, Information Education and Communication (IEC) material designing and printing, radio program and dedicated television program on reconstruction are the key activities for achieve the attainment of desire outcomes under IR-3.

Targeting to the end users most of the activities were focused on program implemented districts which is one third part of Dhading, Nuwakot and Dolakha district were considered as a focused program areas where each house owners receive the technical support for their reconstruction not limiting to the reconstruction beneficiaries only. The provision of blanket technical support to each homeowner who were constructing their houses were the target groups.

Table of Contents

Foreword	i
Remarks	ii
Preface	iii
List of Abbreviations	iv
Executive Summary	vi
Chapter - 1: Background	1
1.1 Seismic Hazard and Risk in Nepal	1
1.2 Initiatives on Earthquake Risk Management in Nepal (1994-2014)	2
1.2.1 Experience of Nepalese organizations in post-earthquake reconstruction and recovery	4
1.3 Gorkha Earthquake & Need for Socio-Technical Assistance	9
1.3.1 Loss and Damages	10
1.3.2 National Reconstruction and Recovery Framework	11
1.3.3 NRA Housing Reconstruction Program	12
1.3.4 Need for Socio-Technical Assistance	13
Chapter - 2: Baliyo Ghar Program	15
2.1 TSESHR – Piloting Housing Reconstruction Assistance	16
2.2 Theory of Change	16
2.3 Goal and Objectives	16
2.4 Geographic Focus	19
2.5 Program Implementation Principles and Approaches	20
2.6 Target Groups	25
2.7 Baliyo Ghar’s Socio-Technical Assistance Activities	25
Chapter - 3: Contribution in standardization of policies for disaster resilient reconstruction	27
3.1 Strategic support for development of reconstruction policies	28
3.2 Development of Guidelines and Manuals	29
3.3 Support for the standardization and consistency in delivery of socio-technical assistance	34
Chapter - 4: Strengthening National Capacity in Disaster Resilient Construction and Build Back Better	37
4.1 Strengthening capacities of local communities in disaster resilient construction	38
4.1.1 Enhancing skills of existing masons and developing new masons	38
4.1.2 Enhancing knowledge and skills of technical professionals in disaster resilient design, construction and technical assistance	41
4.2 Strengthening capacity and understanding of decision makers and reconstruction actors	44
4.2.1 Dissemination of reconstruction information and discourse on issues, success and challenges through workshops and seminars.	45

4.2.2	Training and capacity building events for local stakeholders to enhance knowledge on reconstruction policies and provisions and in disaster risk reduction and management.....	46
4.2.3	Enhancing awareness and understanding of media on safer reconstruction.....	47
Chapter - 5: Enhancement of awareness on disaster resilience		51
5.1	Community Engagement	52
5.1.1	Community based orientation events	52
5.1.2	Door to Door to Technical Assistance and Social Mobilization	54
5.1.3	Mass awareness activities	56
5.1.4	Demonstration of disaster resilient construction.....	59
5.2	Awareness through media	60
5.2.1	Baliyo Ghar Television and Radio Programs.....	61
5.2.2	Printed Media for Communication in Reconstruction	64
Chapter - 6: Promoting Retrofitting of Partially Damaged Buildings		67
6.1	Support in Preparation of Manuals, Curricula and Guidelines	68
6.2	Training local masons on retrofitting of partially damaged masonry buildings.....	69
6.3	Community awareness campaigns through construction of demonstration models	70
6.4	Training engineers on design, construction and supervision of retrofitting	71
6.5	Generating mass awareness through digital and printed media channels.....	72
6.6	Develop national consensus through discourse and sharing of learnings	73
6.7	Market Facilitation.....	73
Chapter - 7: Efforts for ensuring sustainability of disaster resilient construction practices.		75
Chapter - 8: Outcomes and impacts		81
8.1	Support in enhancing housing reconstruction process.....	82
8.2	Trained masons' engagement in construction.....	84
8.3	Contribution to change of perception towards disaster risks and reduction	84
8.4	Baliyo Ghar's Contribution in National Reconstruction.....	86
8.4.1	Community engagement and awareness activities	86
8.4.2	Contribution to enhanced capacity in safer construction.....	87
8.4.3	Contribution in promotion of retrofitting	88
Chapter - 9: Baliyo Ghar's Contribution to Gender Equality and Social Inclusion		91
9.1	GESI Action Plan to ensure equal participation.....	92
9.2	Ensuring female inclusion in reconstruction process.....	94
9.3	Supporting vulnerable and marginalized communities in reconstruction process.....	97
9.3.1	Construction of demonstration model houses of vulnerable beneficiaries through On the Job Training programs.....	98
9.3.2	Special Technical Support for Vulnerable Housing Reconstruction	100
Chapter - 10: Lessons for effective housing reconstruction assistance		103
Chapter - 11: Way Forward		113

List of Tables

Table 1:	Major metadata of 2015 Gorkha Nepal Earthquake	10
Table 2:	Geographical coverage of Baliyo Ghar Program	19
Table 3:	List of reconstruction policy documents Baliyo Ghar Program contributed in development	28
Table 4:	List of guidelines and manuals developed through contribution of Baliyo Ghar Program (in chronological order of date)	31
Table 5:	Various national workshops conducted by Baliyo Ghar Program and their contribution to reconstruction	45
Table 6:	Comparison of Course Content in Training for Local Government Stakeholders	47
Table 7:	Key content and modes of delivery of orientation programs	53
Table 8:	Different activities conducted as part of Earthquake Safety Day Commemoration	59
Table 9:	Activities performed as technical assistance for sustainability of safer construction practices in municipalities through building regulation process.	78
Table 10:	Gender and Ethnic Proportion of Population in Baliyo Ghar Program coverage areas.....	93
Table 11:	Number of female construction workers and distribution of average wages in Baliyo Ghar Program areas in three districts (2016).....	94
Table 12:	Demonstration Model House Owners as per NRA Vulnerability Criteria	99

List of Figures:

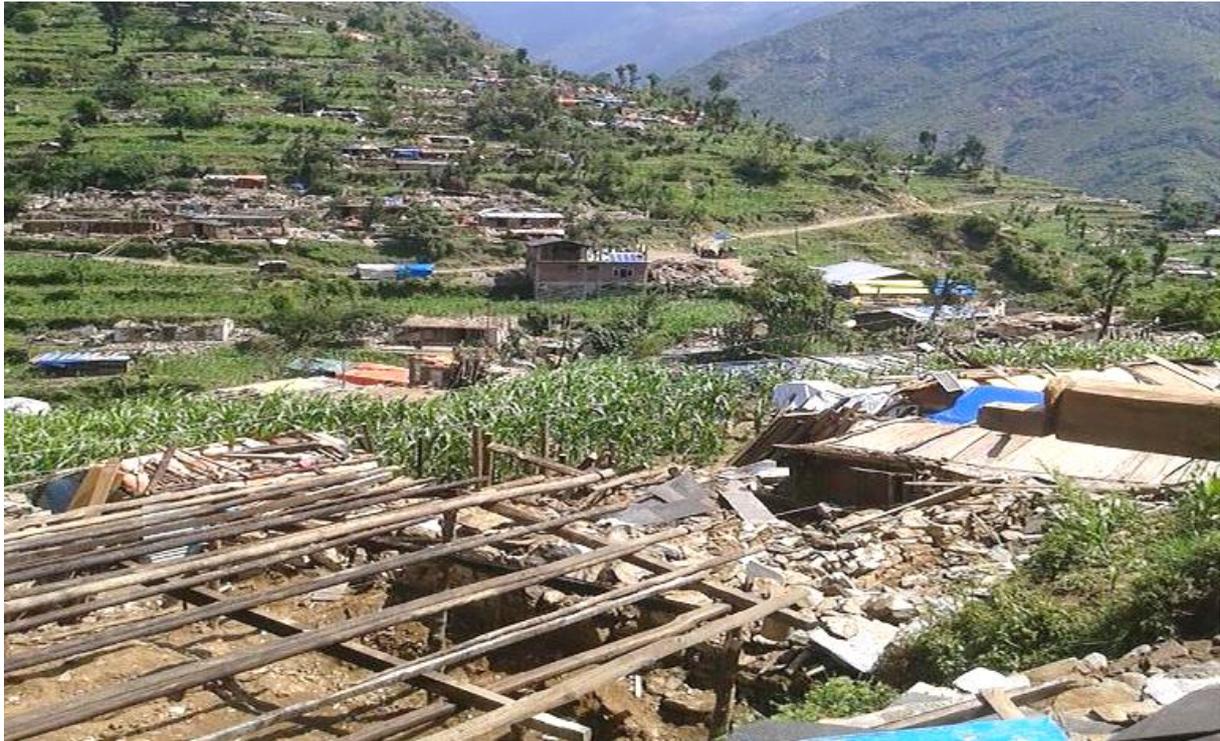
Figure 1.	Results Framework of Baliyo Ghar Program.....	18
Figure 2.	Earthquake affected areas and Baliyo Ghar program districts	19
Figure 3.	Baliyo Ghar Program districts and coverage in terms of beneficiaries	20
Figure 4.	Baliyo Ghar Program strategy, key areas of interventions and relevant stakeholders	21
Figure 5.	Framework for relation between technical and financial support and compliance check for safety.	23
Figure 6.	Hierarchical structure of Baliyo Ghar Program Implementation	24
Figure 7.	Number of events and new masons trained through 7 Day Training (Rural & Urban) and 50 Day On the Job Training implemented through Baliyo Ghar Program.....	40
Figure 8.	Various training events conducted under Baliyo Ghar Program for capacity building of technical personnel	44
Figure 9.	Professional retention (%) of masons at least one year after the training	48
Figure 10.	Average coverage of socio-technical assistance by each engineer trained through TOT training program.	49
Figure 11.	Average number of door-to-door visits conducted in each house in Baliyo Ghar Program wards	56
Figure 12.	Number of mobile information desks placed and total homeowners benefitted through information desks in Baliyo Ghar Program	58
Figure 13.	The promo poster of Baliyo Ghar Radio (left) and Television (right) programs	62
Figure 14.	Distribution of “Baliyo Ghar TV Program” episodes	64
Figure 15.	Local community people including house owners, local government representatives and others visiting a demonstration construction site on	

	retrofitting to learn about the technique. Such demonstration visits were facilitated by Baliyo Ghar Program through awareness campaigns or trainings.....	70
Figure 16.	Number of retrofit demonstration models constructed in different program wards	71
Figure 17.	Engineers participating in training on design of retrofitting (left) and a field demonstration on construction process of retrofitting for participating engineers (right)	72
Figure 18.	Progress Comparison of Fully Compliant Houses in Pakistan, Gujarat and Nepal Earthquake	82
Figure 19.	Comparative cumulative second tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)	83
Figure 20.	Comparative cumulative third tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)	83
Figure 21.	Proportion of reconstructed houses that utilized at least one trained mason during construction	84
Figure 22.	Knowledge, Attitude, Practice score of beneficiaries in Baliyo Ghar Program	85
Figure 23.	Comparison of National Outputs (POs) of Orientation activities with Baliyo Ghar Program.....	87
Figure 24.	Comparison of National Outputs (POs) of Door-to-Door Technical Assistance with Baliyo Ghar Program.....	87
Figure 25.	Comparison of national outputs (POs) of people supported through Information Desks with Baliyo Ghar	87
Figure 26.	Comparison of national outputs of demonstration houses construction with Baliyo Ghar.....	87
Figure 27.	Comparison of National outputs (GoN+POs) of existing masons trained with Baliyo Ghar.....	88
Figure 28.	Comparison of National outputs (GoN+POs) of new masons trained with Baliyo Ghar.....	88
Figure 29.	Comparison of national and BG outputs of masons and engineers trained in retrofitting.....	89
Figure 30.	Comparison of national and BG outputs of retrofit demonstration models constructed for awareness.	89
Figure 31.	Female participation in various Baliyo Ghar Program interventions and outputs	95
Figure 32.	Distribution of demonstration model house-owners as per NRA priority order	99



Houses in rural areas were constructed without any earthquake resistant elements. (Above: Sertung, Below: Jyamrung)





The village of Alampu in northern Dolakha shattered by the Gorkha earthquake.

CHAPTER - I: BACKGROUND

1.1 Seismic Hazard and Risk in Nepal

Nepal is recognized as highly vulnerable to a range of seismic and hydro-meteorological hazards. All of Nepal is exposed to significant earthquake hazard, The Himalayan Mountain range is an area of intense seismic activity resulting from the tectonic collision of the Indian and Eurasian plates. This plate convergence also drives the uplift of the Himalayan Mountain range. Additionally, much of the country is drought prone as well as susceptible to floods and landslides.

Nepal is ranked as the 11th most vulnerable country in the world to earthquakes and 30th to flood risks. Based on this high level of vulnerability to both hazards, the country is ranked second in the world to mortality risk from two or more hazards. Approximately 80 percent of Nepal's geographic area is at risk from multiple natural hazards, with the vast majority of the population inhabiting these high-risk areas. This high exposure and high susceptibility to natural hazards makes the country vulnerable to significant losses from disaster, both in terms of mortality as well as percent GDP loss. During the 1934 M8.3 Nepal-Bihar earthquake, which had an epicenter 175 km from Kathmandu, almost all buildings collapsed in Kathmandu, Bhaktapur, and Patan, and casualties were estimated to be as high as 12,000. Other major earthquakes were recorded in 1897, 1905, 1950 and 1988. Seismic experts estimated in 2005 that at least four

M8.6 events would need to occur in the Himalayas to release the tectonic strain accumulated by the plate collision over recent centuries.

The earthquakes on April 25, and subsequent aftershocks have thus not released all of the accumulated energy in the plate boundary, and the region may therefore experience further large magnitude earthquakes in the coming years or decades. Hence, the need to safer housing construction and enhanced disaster preparedness are of paramount importance for Nepal. However, the structural damage to housing in rural and urban areas has highlighted the underlying vulnerabilities in Nepal, including: 1) a lack of capacity among masons and carpenters on earthquake resilient construction; 2) a low level of community awareness of the importance of disaster resilient construction; 3) the absence of a widespread curricula, standards, guidelines and manuals for training individuals involved in housing construction; and 4) inadequate compliance of buildings with the standards specified in the Nepal National Building Code.

1.2 Initiatives on Earthquake Risk Management in Nepal (1994-2014)

The Government of Nepal developed the National Building Codes in 1994, in an effort to curb down the increasing seismic risks in the country. The codes were a significant milestone in reducing earthquake risks of the country, developed with enhanced conscience, awareness and political will in the aftermath of the 1988 Udayapur earthquake. Owing to the high levels of seismic risk and vulnerability, the National Society for Earthquake Technology-Nepal (NSET) was founded in 1994 to work in the implementation of these codes through a wide range of community engagement and capacity building activities and advocacy with all forms and levels of stakeholders. The subsequent period of two decades from 1994 to 2014 witnessed an enhanced understanding and consensus among the stakeholders on the increasing risks and vulnerabilities due to unregulated construction practices across the country, let alone the risks associated with the non-engineered construction that had already taken place in absence of a regulating mechanism. Novel actions were undertaken to work towards decreasing seismic risks.

The first of such actions was the implementation of the Kathmandu Valley Earthquake Risk Management Project (KVERMP) in 1997-1999 by NSET and Geo Hazards International (GHI) under the Asian Urban Disaster Mitigation Program (AUDMP) of the Asian Disaster Preparedness Center (ADPC) with core funding from the USAID Office of Foreign Disaster Assistance. The project implemented a wide variety of activities aimed at beginning a self-sustaining earthquake risk management program for the Kathmandu Valley and included components such as development of earthquake risk management action plan, school earthquake safety programs, enhancing awareness among the public, government officials and international organizations regarding earthquake risk in Kathmandu and strengthening local and national institutions for sustainable actions. The project prepared a loss estimation for the Kathmandu Valley in event of an earthquake of intensity similar to the 1934 earthquake which was widely used as awareness tools for general public as well as institutions. Similarly, a risk management action plan was developed to assist

the Government of Nepal in coordinating and implementing risk management activities and actions to improve emergency response, awareness and increase seismic safety of existing buildings and new construction. The project was instrumental in shaping the earthquake risk management initiatives of NSET and Government of Nepal in the future, especially in the integration of awareness raising as an integral component of all risk management projects and engagement of community level actors in the process. The project also successfully implemented a national-international partnership model for risk management, which has since been implemented largely in various projects across the world.

In the subsequent years since the successful implementation of the KVERMP, several projects were conceptualized and implemented to support the Government of Nepal's endeavor in regulating building construction. The Nepal Earthquake Risk Management Program (NERMP), Community Based Disaster Risk Management Program-Nepal (CBDRM-N) and School Earthquake Safety Program (SESP) among other utilized similar principles in earthquake risk management through institutional engagement, awareness and capacity building which helped further enhance the effectiveness of these actions.

With lessons and experience in earthquake risk management gained through the implementation of the aforementioned projects and programs, NSET further enhanced its coverage through the implementation of the Building Code Implementation Program (BCIPN) in 2012-2017. The project was a major milestone in earthquake risk management in Nepal, as it directly engaged with local municipalities across the country in regulating building construction through the enforcement of the National Building Code. The project also helped NSET realize the immense needs of technical assistance to support local governments and communities in earthquake resistant construction, which formed the backbone of the socio-technical assistance approach during the post-earthquake reconstruction as well. Over the period of five years, the project was able to contribute significantly in enhancing awareness, capacity and institutional strengths of more than 30 municipalities in building code implementation, with an overall increase in compliance of buildings from 16% to 81% in drawings and 14% to 74% in construction. The successful approach of the program has since been adopted by several other municipalities, who have institutionalized similar actions as part of their regular process.

Hazard and risk assessment studies and scenario development supported in awareness and advocacy. Development of curricula and training for masons and engineers helped enhance local capacities in earthquake resistant design and construction. Local municipalities initiated implementing building codes and started regulating the process of building construction. Demonstrative construction, most notably, of retrofitting and earthquake resistant construction of school buildings helped penetrate the philosophy and notion of earthquake risks and mitigation measures in the communities. By 2014, more than 30 municipalities across the country had already begun implementing the codes and around 300 schools were already retrofitted.

NSET, in all these efforts, was at the forefront in supporting the Government of Nepal in conceptualizing, planning and implementing awareness and capacity building activities across the country, and in development of key policies to drive the process. NSET had been working for the past two decades prior to the Gorkha earthquake, with many stakeholders including government ministries and departments in raising awareness and capacity building towards earthquake risk reduction through various USAID funded programs. Its programs were focused not only on the technical aspects of shelter and housing, but also on socio-economic and cultural vulnerabilities, and risk reduction measures with good understanding of people's perceptions.

1.2.1 Experience of Nepalese organizations in post-earthquake reconstruction and recovery

Nepal holds the national capacity to act on post-earthquake reconstruction and recovery due to the continuous efforts of NSET on the earthquake risk management since its establishment in 1994. The major lessons from the different programs on reconstruction and recovery program where NSET engaged contribute to shape the housing reconstruction program in Nepal. The lessons from the following few programs were instrumental to perform on Gorkha earthquake housing reconstruction. There are specific lessons that was strongly learned from the implementation of these programs which was incorporated while designing the housing reconstruction and recovery program in Nepal. However, Gorkha earthquake housing reconstruction also have further learnings.

Earthquake vulnerability reduction and preparedness program Muzaffarabad and Mansehra municipalities - Pakistan

NSET provided technical support to National Disaster Management Authority (NDMA) of the Islamic Republic of Pakistan under the project “Earthquake Vulnerability Reduction and Preparedness Program in Muzaffarabad and Mansehra Municipalities.” This project was implemented during November 2007 to August 2009 in the support of United Nations Development Program (UNDP).

The project aimed at building institutional structures, policies, and systems to integrate earthquake vulnerability reduction in the two municipalities. The main objective of the technical support was to develop local capacity on risk assessment, earthquake scenario development and action planning.

The project was built around a partnership approach where it brought together a range of different stakeholders like technical agencies, academic and research institutions, local governments, line agencies and civil society, while placing vulnerable communities in the middle, so as to demonstrate participation, partnership and use of local wisdom to promote context specific solutions to challenges posed to sustainable development, through a blend of structural and non-structural components of earthquake vulnerability reduction.

Further, a separate project consisting of similar objectives and activities was initiated for Quetta City in Balochistan Province of Pakistan. Training for local professionals on methodologies of earthquake risk assessment was conducted by NSET professionals in September 2008 later the trained professionals collected, compiled and analyzed information and data required for the risk assessment.

Up-streaming Community Based Approaches for Promoting Safer Building Construction in Lorestan, Iran

The project was implemented during December 2006 to October 2007 after an Institutional Contract between UNDP/Iran and NSET was made. The overall objective of the program was up-streaming community-based approaches for promoting safer building construction specifically:

- To discuss on community-based approaches for promoting safer building construction and explore potentials of the use of such approaches in Iran,
- To select/localize/customize different available tools and developing new tools for promoting safer building construction through mobilizing community and capacity development of end users,
- To discuss on possible modes of implementation and the role of different stakeholders, and
- To identify the related policies for supporting these activities and to suggest for favorable policy if felt necessary by the stakeholders.

The activities performed under project include organization of a series of consultation meetings with all concerned stakeholders to understand, discuss the prevailing community-based methods, tools and programs, and to develop the same for possible collaboration between different stakeholders for safer building construction. The other activities were organizing final workshop by inviting all concerned stakeholders to consolidate ideas raised during consultation meetings; to select best tool/s to pilot/scale-up; to build consensus on the roles of stakeholders.

Finally, the learnings of this program is that policy support component is essential to implement post disaster reconstruction and recovery in a country where the strong policy on reconstruction and recovery is not clearly envisioned.

Program for Strengthening Capacities for Disaster Risk Management in Iran

This was a five-year Joint National Program of UNDP-Government of Iran implemented for Strengthening Capacities for Disaster Risk Management. NSET provided technical assistance to Asian Disaster Preparedness Center (ADPC)/Thailand. The program was implemented in Kerman and Gorgan during September 2006 to December 2007.

The goal of the program was to reduce disaster vulnerability and prevention of loss of lives and damages to properties human settlements, infrastructure, and critical facilities in the Islamic Republic of Iran. The learnings from this

program to continue the retrofitting of infrastructure is an important in a pre and post disaster situation. This is why the reconstruction authority envision the possibility of retrofitting of houses for gorkha earthquake housing reconstruction despite its less satisfying results.

Training Support for Earthquake Resistant Reconstruction in Pakistan (TSERR)

This project was implemented during March 2006 to July 2007. NSET assisted the Earthquake Reconstruction and Rehabilitation Authority (ERRA) of the government of Pakistan by providing technical assistance in designing capacity building strategy for housing reconstruction and by imparting training to various construction stakeholders under the program. With financial support from OFDA of USAID, NSET provided technical support working in close co-ordination with UN-HABITAT.

The basic objective of the program was to assist the UN-HABITAT Chief Technical Advisor in Pakistan to implement the Training Strategy in close collaboration with the Emergency Shelter Project Manager and staff of ERRA. The specific objectives were.

- To provide training on earthquake resistant construction for masons and other stakeholders of building industry
- To assist in the development of training policies and in enhancing capacity of technical and non-technical personnel involved in earthquake reconstruction of houses
- To develop suitable training curricula and training materials for various target groups

The scope of work for NSET were, 1. Review and updating existing guidelines on earthquake resistant housing reconstruction, 2. Development of training curricula and training materials, 3. Assist in development of training strategy and compliance strategy, 4. Implementing a training of trainers (ToT), 5. Assisting the development of an operational manual for urban housing reconstruction, and 6. Supporting the implementation of a public awareness campaign.

As part of the project, NSET trained technicians of the HRC and Partnering Organizations (PO) to become trainers in earthquake resistant reconstruction and supervised and monitored the training programs conducted by the potential master trainers and mobile team members. NSET developed training curricula and training materials for various target groups based on its experience in conducting similar training programs in Nepal and elsewhere. NSET also provided training on damage assessment and earthquake-resistant construction to the engineering unit of the Pakistan Army that had been assigned to undertake damage assessment and provide technical inputs for reconstruction in several Union Councils, especially in the remote areas of northern Pakistan.

Under this support, series of end-user training programs for masons, technicians, engineers and house-owners, Training of Trainers for potential master trainers have been conducted; construction guidelines, checklists and

posters have been published. A total of 5,505 people comprising of technical professionals, construction workers and the army officers of Pakistan were trained by NSET- or NSET-trained local trainers in around 130 training events conducted between February and August 2006. A total of 28 master instructors and 850 other trainers were developed during the project. The training curricula developed were adapted to match the socioeconomic realities of the earthquake-affected areas. The similarities of topography, geology and building typologies in Nepal and Pakistan helped NSET to develop the training materials. The ability of Nepali technicians to communicate in Urdu added to the effectiveness of the training programs.

From the implementation of this project NSET learned that the housing reconstruction program in south Asia region must complement with the socio-technical assistant where many INGO can be a part of it to work closely with government. Owner driven housing reconstruction is sustainable for housing reconstruction program in south Asia region which allow flexibility on plan and provisions to address the multitude of problems that may come up due to socio cultural values and norms of the society.

Technical Support for Earthquake Resistant Housing Reconstruction in Pakistan

With financial support from OFDA of USAID, NSET provided technical support to Earthquake Reconstruction and Rehabilitation Authority (ERRA) of Pakistan working in close co-ordination with UN-HABITAT since February 2006.

As part of the project, various tasks were accomplished. They were policy support in developing strategies for Earthquake Reconstruction and Capacity Building for Earthquake-resistant reconstruction, technical support in capacity building including development of training curricula and training of partnering organization and their Master Trainers, Mobile Teams for reconstruction as well as monitoring of the training activities throughout the earthquake-affected areas of the October 2005 South Asian Earthquake in Pakistan. Training of Engineers in earthquake-resistant design, refreshers training to engineers, training of masons and development of earthquake awareness materials, provision of assistance in the development of an operation manual for urban housing reconstruction; support implementation of a public awareness campaign etc., were some other tasks that were undertaken.

Capacity Building for Reconstruction of Earthquake-Affected Areas of Pakistan (Bagh and Muzaffarabad)

The 7.6 Magnitude 2005 earthquake that jolted northern Pakistan caused death of over 73,000 people and injured another 83,000 rendering more than 3.3 million people homeless. This is a project implemented during November 2005 to March 2006 where NSET provided technical assistance to UNDP/Pakistan to demonstrate people-centered, cost-effective, environment-friendly rubble removal and emergency housing strategy that facilitate incorporation of earthquake-resistance in transitional as well as permanent reconstruction of the

building to ensure sustainable livelihoods and habitats for the earthquake-affected communities.

The main objective of the project was to provide technical assistance sought to transfer knowledge on earthquake resistant construction to builders and the industry and assisting in confidence-building processes by taking these techniques to rural communities. The specific objectives were: Training construction industry stakeholders on earthquake-resistant techniques of building new houses and on safe repair and retrofitting of damaged buildings and Shake Table demonstration for earthquake awareness and construction of model buildings for demonstration, awareness and technology transfer.

UNDP/Pakistan sought technical assistance from NSET to demonstrate people-centered, cost-effective, environment-friendly rubble removal and emergency housing strategy that facilitate incorporation of earthquake-resistance in transitional as well as permanent reconstruction of the building, and to ensure sustainable livelihoods and habitats for the earthquake-affected communities.

The program covered building two model houses and two Shake Table demonstrations. The training was conducted in two tiers. First NSET resource persons conducted end-user training on earthquake-resistant construction for engineers and technicians. Trainees with potentials of serving as trainers were identified and given a follow up Training of Trainers (TOT). Subsequently, the local trainers were given the responsibility of conducting classes under the guidance, supervision and facilitation of NSET instructors. Out of 90 graduates of the TOT, seven were involved in training in rural areas and others continued training activities at their organizations.

The scale of damage urged for a massive intervention in terms of capacity building and training against popular expectations for immediate relief, rather than know-how on earthquake-resistant reconstruction. Therefore, much of the time was spent in confidence-building and reassuring people on the need of safe reconstruction. Despite the apparent mismatch between the people's expectations and services NSET offered, the project received full acceptance and was able to attain all training targets. Towards the end of the project, a Nepalese team of senior government officials visited the earthquake affected area in Pakistan and participated in various events and activities related to capacity building for safer construction conducted by NSET. The visit provided a great learning opportunity to the delegates. The key learnings are that the development of master instructors for capacity building and the technology demonstration center should be there in housing reconstruction technical assistant program so that people will get most reliable information on technology and encouraged to adopt the resilient reconstruction. These learnings were well accompanied while designing Gorkha earthquake housing reconstruction and recovery program in Nepal.

Public Awareness Programs

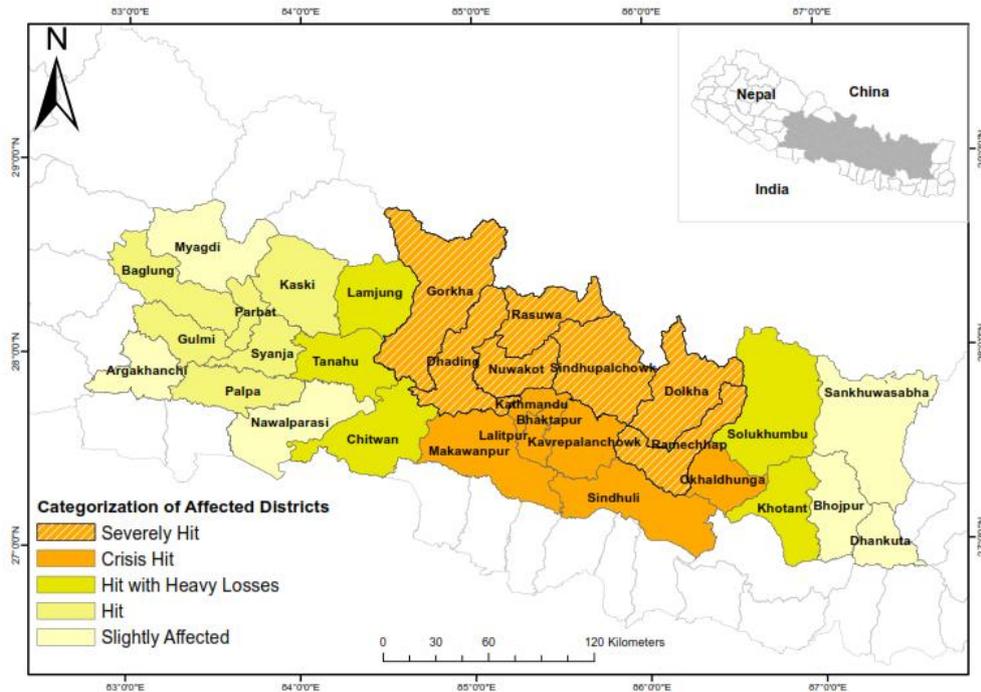
Most of the programs consist of public awareness-raising components and that has helped raise significant awareness and disaster literacy among commoner

people, policy makers and implementers. The target groups of NSET's awareness activities are not people at rural settings the educated urban elite, not only the 'community people' but also the top-level officials, policy and decision makers including professional of allied disciplines.

Utilization of all the possible and available media for raising awareness on disaster risk and earthquake related issues is important in a post disaster situation. The awareness raising messages are scientifically proven (in the country and abroad) and the drafting organization must take responsibility for the contents. The reconstruction program proposed for gorkha earthquake housing reconstruction packaged the content in such a way that it is well understood, accepted, internalized and that helps changing the people's behaviors. This is a third component of reconstruction program proposed for gorkha earthquake housing reconstruction from the learnings of different program implemented by NSET in past few decades.

1.3 Gorkha Earthquake & Need for Socio-Technical Assistance

On the Saturday afternoon of April 25, 2015, at 11:56 local time, a 7.6 magnitude earthquake struck the village of Barpak in the district of Gorkha, located about 75 kms west of Kathmandu. The region had not experienced such a large earthquake for more than 80 years since the 1934 Great Nepal Bihar earthquake.



The catastrophic earthquake was followed by numerous aftershocks, at least four aftershocks were greater than magnitude 6.0. The largest of these aftershocks, in May 12 in Sunkhani of Dolakha district has been attributed to the widespread damages in the central and eastern regions of the country. The earthquake affected thirty one of the seventy-seven districts of the country. An

estimated eight million, or one third of the entire population of the country were directly impacted by the earthquake, while repercussions were immense on a national scale. The earthquake resulted in the deaths of more than 8700 people and caused around 22,300 injuries. In economic terms, the total loss and damages were estimated at around NRP 706 billion (US \$ 7 billion), one third of the country’s GDP in FY 2013-2014.

1.3.1 Loss and Damages

Considering the widescale reported loss and damages to almost one-third of the country, the government formally called for needs assessment in a meeting convened with development partners within three days of the largest aftershock in May 12. The Post Disaster Needs Assessment (PDNA) was carried out under the leadership of the National Planning Commission (NPC) to assess the impact of the disaster and define a recovery strategy, including funding implications in restoring livelihoods, economy and services and rehabilitation and reconstruction of housing and infrastructure to ensure a resilient recovery.

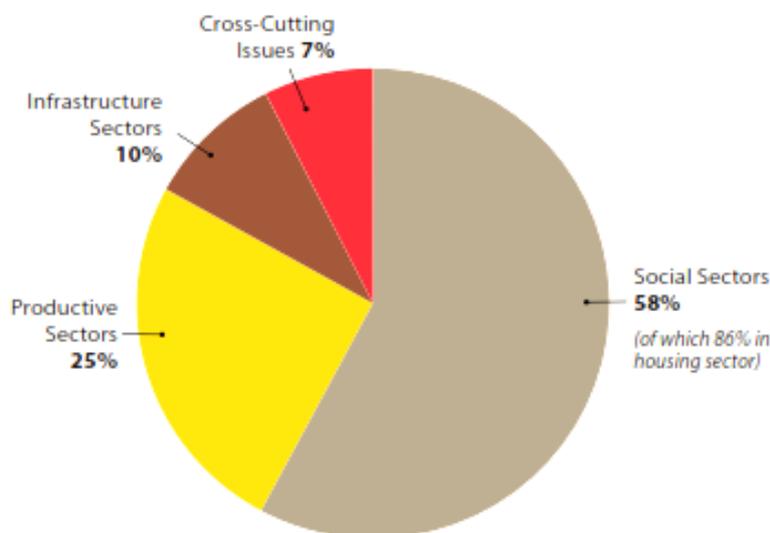
The assessment followed methodologies developed by EU, World Bank and UN system and incorporated the collection of analytical methods, tools and techniques developed for post-disaster assessments and recovery planning. Sector to sector comparability and homogeneity were ensured in defining the concepts of loss and damages as well the post-disaster recovery needs.

More than 250 government officials and experts and 30 development partner agencies were involved in the process, divided into 23 thematic groups. NSET also provided key inputs in the assessment. The sectoral assessment of disaster impacts, and the estimation of the recovery needs were documented through intensive field observation and reports. The PDNA report, published in July 2015 was crucial in identifying the losses and damages incurred during the disasters, as well as the estimated financial, administrative and resource requirements for the recovery process. The report and its findings shaped the reconstruction and recovery planning process, including humanitarian assistance from various donor and multilateral agencies during the International Conference on Nepal’s Reconstruction held in June 2015. The table below highlights the major metadata of the disaster impacts as presented in the PDNA report.

Table 1: Major metadata of 2015 Gorkha Nepal Earthquake

Parameter	Description	Category	Damage	Unit
Date	25 April 2015	1. Private Housing		
Time	NST 11:56:25 (UTC+05:45)	a. Fully damaged	498,852	Nos
Magnitude	7.8 (Mw)	b. Partially damaged	256,697	Nos
Epicenter	Barpak, Gorkha	2. Health facilities		
Depth	8.2 km	3. Schools		
Death	8,790	4. Public buildings		

Parameter	Description	Category	Damage	Unit
Injuries	22,300	5. Security buildings	216	Nos
Affected districts	32	6. Heritage monuments	920	Nos
Popⁿ Affected	8 million	7. Roads	964	Km
Disaster effect	\$ 7.065 billion	8. Road bridges	14	Nos



The total value of damage and losses resulting from the earthquake sequence amounted to about US\$7 billion, and reconstruction needs amounted to about US\$6.7 billion. The earthquake sequence destroyed 490,000 houses - mostly traditional mudbrick and mudstone houses built and occupied by the rural poor; and rendered another 265,000 houses at least temporarily uninhabitable. The largest single need identified in the PDNA is housing and human settlements, accounting for \$3.27 billion in reconstruction costs, or almost half of the total needs.

1.3.2 National Reconstruction and Recovery Framework

Following the immense financial, administrative and logistics needs required for the post-earthquake recovery highlighted in the needs assessment report, the Government of Nepal established a system to coordinate and finance the medium- and long-term recovery through the establishment of the National Reconstruction Authority in December 2015. Subsequently, the NRA prepared the Post Disaster Recovery Framework (PDRF) in consultation with key stakeholder to provide a systematic, structured and prioritized framework for implementing recovery and reconstruction. The PDRF was meant to serve and direct all stakeholders, including government, national and international partners and affected population in the recovery process.

The PDRF laid the recovery vision, strategic objectives of the recovery program as well as the integrated summary of the policies, institutional arrangements, financial management, implementation and monitoring systems to plan and

manage recovery and reconstruction. The framework helped ensure that the post-earthquake recovery actions were resilient and supported the sustainable development goals and agenda of the country. It also allowed national and international partners identify the opportunities for their support and assistance and emphasized on the need to align the priorities of various humanitarian programs towards fulfilling the objectives of the recovery process.

Recovery Vision	
Well planned, resilient settlements and a prosperous society	
Strategic Objectives for the Reconstruction Programme	
Strategic Objective 1:	Restore and improve disaster resilient housing, government buildings and cultural heritage, in rural areas and cities.
Strategic Objective 2:	Strengthen the capacity of the people and communities to reduce their risk and vulnerability and to enhance social cohesion
Strategic Objective 3:	Restore and improve access to services and improve environmental resilience
Strategic Objective 4:	Develop and restore economic opportunities and livelihoods and re-establish productive sectors
Strategic Objective 5:	Strengthen capacity and effectiveness of the state to respond to the people’s needs and to effectively recover from future disasters.

I.3.3 NRA Housing Reconstruction Program

With more than half of the total losses and damages incurred during the 2015 Gorkha earthquake, the private housing sector was the most affected, and evidently became the most prioritized sector during the Gorkha earthquake reconstruction campaign. The National Reconstruction Authority led the reconstruction program through an owner driven approach and facilitated through financial and technical assistance to ensure Build Back Better. Together with the restoration of disaster resilient housing, the private housing reconstruction program also focused on strengthening the capacity of the people, communities and the state to reduce risks and vulnerabilities and response towards future disasters.

The housing reconstruction program asserted the use of local human resources and materials in rebuilding of the damaged private houses according to the local culture and preferences of the house owners but ensuring a build back better approach. Similarly, affected beneficiaries would be provided with necessary financial means, capacity, knowledge and information to build safely, following policies developed at the central level and implemented through a decentralized mechanism at district and local level units.

Guiding Principles of NRA Post-Disaster Housing Reconstruction Program

- Utilizing the capacity and skill of the Nepalese people to a maximum possible degree in planning and implementing reconstruction.
- Central policies to provide basis for decentralized implementation of reconstruction that encourages local materials, furnishing, knowledge, skills, labor and traditional architecture.
- Principle of Build Back Better to be adopted in reconstruction of all private and public infrastructure and services, and people provided with necessary means and information to build safely, but according to their own preferences avoiding pre-fabricated housing solutions.
- Transparency to be maintained while aiding the affected families, without any discrimination. Specialized assistance for affected families with special needs, vulnerable and marginalized groups.
- Reconstruction and recovery, where possible, will be done in-situ. Relocation of villages avoided or kept to a minimum and with respect to the local livelihoods, culture and traditions.
- Public buildings should be constructed using local materials, resources and labor as much as possible and all public and private infrastructure should be accessible to children and people with disabilities.

I.3.4 Need for Socio-Technical Assistance

The National Building Code of Nepal was developed in 1994 and its implementation formally started in 2004 when the Government of Nepal decreed all municipalities to enforce regulation in building construction. However, a lack of abundant technical resources, local capacity and awareness on the provisions in both general public and the implementing institutions resulted in a fairly poor implementation of the building code and regulations. Except for a few municipalities such as Kathmandu, Lalitpur and Dharan, municipalities across the country failed to effectively implement the regulations; in 2012, on average, 84% of the buildings constructed in 30 municipalities across Nepal were not compliant to codes. On the other hand, construction of buildings in the rural areas, particularly the Village Development Committees were unregulated. And with low levels of knowledge, skills and awareness on earthquake risks and earthquake resistant construction techniques, almost all of buildings constructed in the rural areas were unsafe, partly evident by the huge amount of loss and damages incurred in the rural housing sector in the 2015 Gorkha earthquake. It was fairly evident that without adequate support and assistance, communities and local

governments would not be able to monitor and regulate the earthquake resistant reconstruction of the damaged private and public buildings.

Hence, a Build Back Better approach in the post-earthquake housing would not just require the development of technical requirements and inspection mechanisms, but also adequate technical assistance to the homeowners, masons, contractors, engineers and local authorities to implement such regulations. Following the post disaster needs assessment conducted by the Government of Nepal and the high levels of damage and recovery needs projected in private housing reconstruction, the major debate revolved around the capacity of the state and the communities in engaging in reconstruction and recovery.

The immense numbers were already daunting and was further exacerbated by the absence of reconstruction and recovery policies and a lack of national experience in post-disaster recovery of such a large scale. In private housing itself, over the reconstruction period of 5 years, 50,000 – 60,000 trained masons were estimated to be required; nearly 2000 mason training courses were needed to be implemented in the earthquake affected areas. Similarly, nearly 5000 engineers, social mobilizers and other professionals would be required in the field to facilitate, assist, supervise and inspect the reconstruction process. Along with this, there was need for massive undertaking in raising public awareness and socio-political consensus to smoothly implement the reconstruction activities. Hence, apart from mere financial grant support, socio-technical assistance to the earthquake affected beneficiaries, communities and stakeholders was identified as an integral component of the reconstruction and recovery program.



CHAPTER - 2: BALIYO GHAR PROGRAM

With an aim of supporting the Government of Nepal’s owner driven approach for the reconstruction of private houses damaged during the 2015 Gorkha Earthquake, the Housing Reconstruction Technical Assistance Project “Baliyo Ghar Program” was conceptualized, developed and implemented by the National Society for Earthquake Technology Nepal (NSET) as a key part of the reconstruction portfolio of the United States Agency for International Development (USAID/Nepal) under the cooperative agreement AID-367-A-15-00005. The program planned and implemented its activities under the leadership of the National Reconstruction Authority (NRA) of the Government of Nepal through a tri-partite agreement between the NRA, GoN Ministry of Urban Development and NSET.

Baliyo Ghar Program provided comprehensive technical support to the GoN’s reconstruction project, by empowering and supporting communities to “Build Back Better”. The program primarily imparted knowledge, skills and awareness regarding disaster resilient construction techniques to earthquake affected communities in four of the most affected districts in Nepal. Further, the program assisted the government in developing policies, guidelines, norms and training curricula to standardize the entire process of reconstruction under the leadership of the Government of Nepal (GoN) National Reconstruction Authority (NRA) and its project implementation units.

The initial program duration was from October 1, 2015 to September 30, 2020. Following the successful implementation of program activities at the end of Year 5, further need was realized on development of appropriate mechanisms for the institutionalization of the reconstruction efforts at local and national levels. The program period was subsequently extended for a year, where it largely focused on providing support to national and local governments in institutionalizing achievements of reconstruction towards a sustainable disaster resilient construction practice.

The program built on the achievements and lessons of the past initiatives by NSET and the Government of Nepal in earthquake risk management; and continued the accomplishments by promoting owner-driven reconstruction by providing technical assistance to the government and to masons and engineers. It primarily focused on developing a system to ensure: a) availability of know-how on earthquake-resistant reconstruction in every household of the target area, b) assistance to the government in compliance to the requirements of standards and quality control, and thereby, c) assisting the government in overall governance of reconstruction by enhancing awareness, improving understanding, engaging people and assisting in improving existing systems.

2.1 TSESHR – Piloting Housing Reconstruction Assistance

In the immediate aftermath of the earthquake, there were no absolute approaches to undertake the reconstruction and recovery process. Moreover, national level policies and mechanisms were still in discussion. A consensus on the need for technical assistance model in housing reconstruction was established, however, its mode of implementation, interventions and coverage were widely unstipulated.

With past experiences in post-disaster housing reconstruction and recovery, NSET implemented the four month long Technical Support for Earthquake Housing Reconstruction (TSESHR) program during July-October 2015 with support from USAID/OFDA. The program, primarily implemented in Dolakha district in collaboration with Bhimeshwar Municipality conducted training, orientation and interaction with the key stakeholders such as government officials, engineers, masons and earthquake affected homeowners. It put forward the concept of District and Local Reconstruction Technology Centers (RTCs), and a District level RTC was established with all training facilities in Bhimeshwar Municipality in Dolakha.

The program not only helped in understanding the needs and perception of the affected communities but also identify the most effective interventions for socio-technical assistance. In a way, the program became a pilot testing of socio-technical assistance for housing reconstruction, not only through the Baliyo Ghar Program, but also through learning dissemination to the National Reconstruction Authority.

2.2 Theory of Change

If guidelines are standardized, local capacity and awareness increased then house owners will be able to reconstruct their houses to be disaster resilient.

2.3 Goal and Objectives

The program had two-fold goals:

1. In shorter-term, the program aimed at ensuring earthquake safer construction of all houses being reconstructed.
2. In longer-term, the program aimed at establishing a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal.

The goal was achieved through the following three Intermediate Results (IRs):

- IR 1: Improved government guidelines for housing reconstruction and multi-hazard resilient housing construction
- IR 2: Increased numbers of masons, engineers, and other craftsmen trained in earthquake-resistant construction methods and techniques
- IR 3: Improved awareness of disaster-resilient construction in Nepal



A brick-in-mud house in Bidur Municipality, Nuwakot that suffered damage during the earthquake.

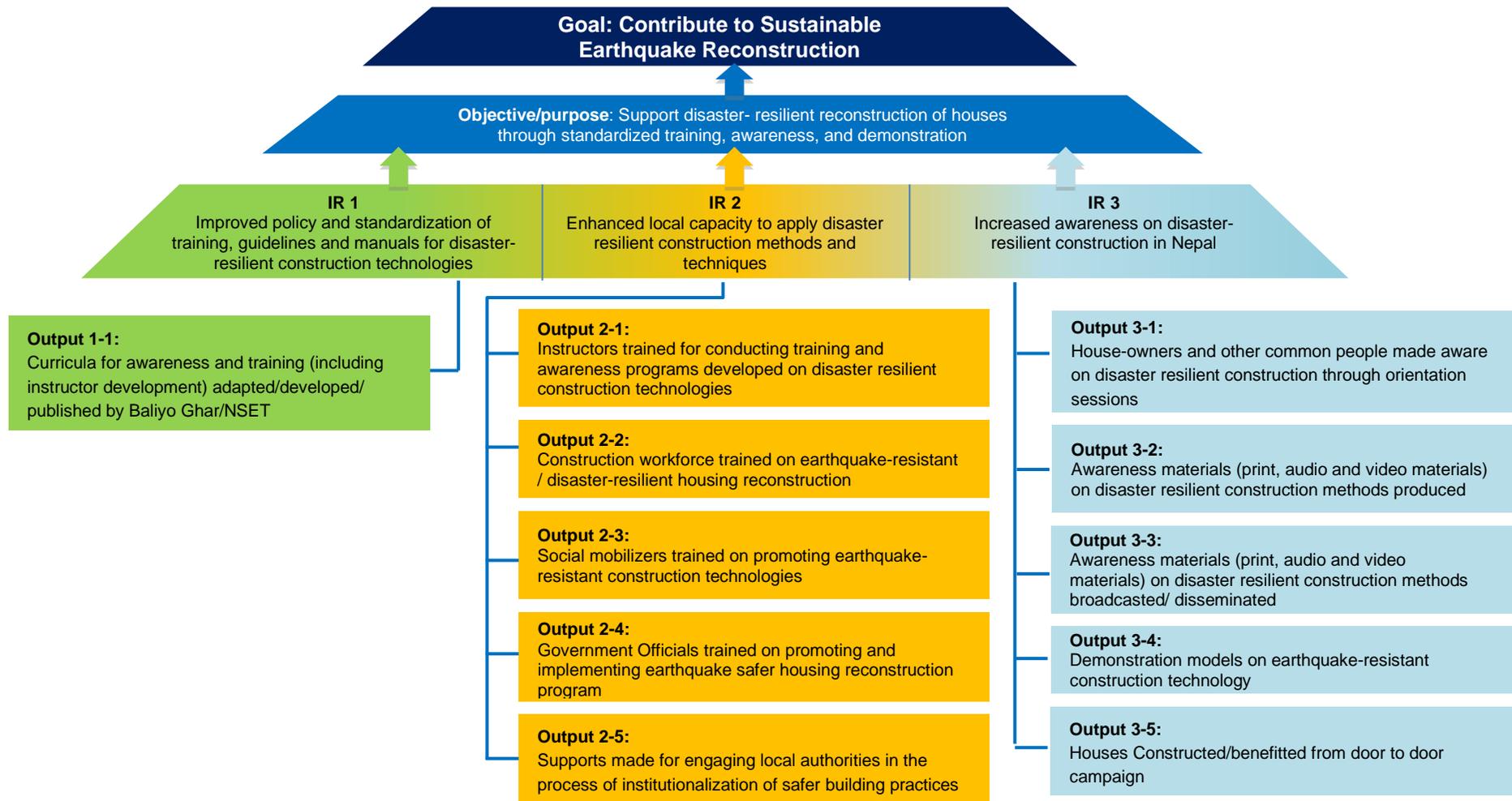


Figure 1. Results Framework of Baliyo Ghar Program

2.4 Geographic Focus

Baliyo Ghar program implemented activities in four districts namely; Dhading, Dolakha, Nuwakot, and Kathmandu. **Figures 2-6** show the coverage of Baliyo Ghar Program.

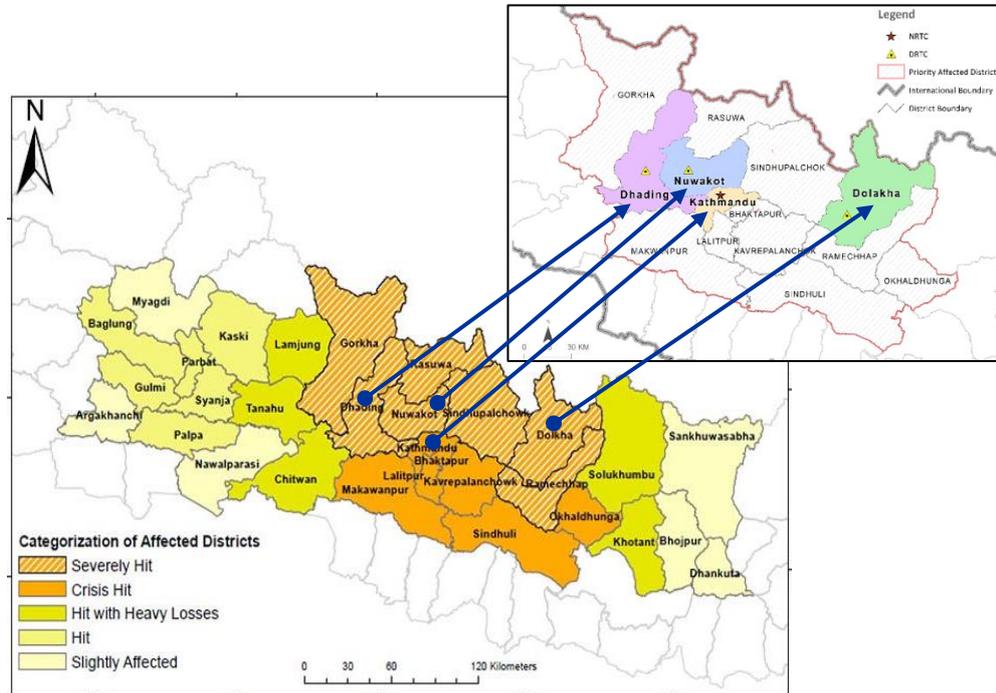


Figure 2. Earthquake affected areas and Baliyo Ghar program districts

In these four districts, Baliyo Ghar program covered 23 wards of 3 Urban Municipalities (UM) and 43 wards of 12 Rural Municipalities (RM). In total, 11.7% of the wards of the four districts have been covered with blanket technical support through Baliyo Ghar Program. The **Table 1** below highlights the geographical coverage of the program in terms of wards of Rural Municipalities and Urban Municipalities within the four program districts.

Table 2: Geographical coverage of Baliyo Ghar Program

SN	Program District	District Total		BG Coverage		% Coverage	
		RM (wards)	UM (wards)	RM (wards)	UM (wards)	RM	UM
1	Dhading	12 (90)	1 (14)	5 (17)	1 (14)	18.8%	100%
2	Dolakha	6 (49)	2 (18)	4 (15)	1 (6)	30.6%	33.33%
3	Nuwakot	10 (62)	2 (26)	3 (11)		17.7%	
4	Kathmandu		11 (138)		1 (3)		2.17%
Total		28 (201)	16 (196)	12 (43)	3 (23)	21.4%	11.7%

Similarly, in terms of number of earthquake housing reconstruction beneficiaries, Baliyo Ghar, in average provided direct technical support to

22.23% of the enlisted beneficiaries (both reconstruction as well as retrofitting) in the four districts through its socio-technical assistance activities.

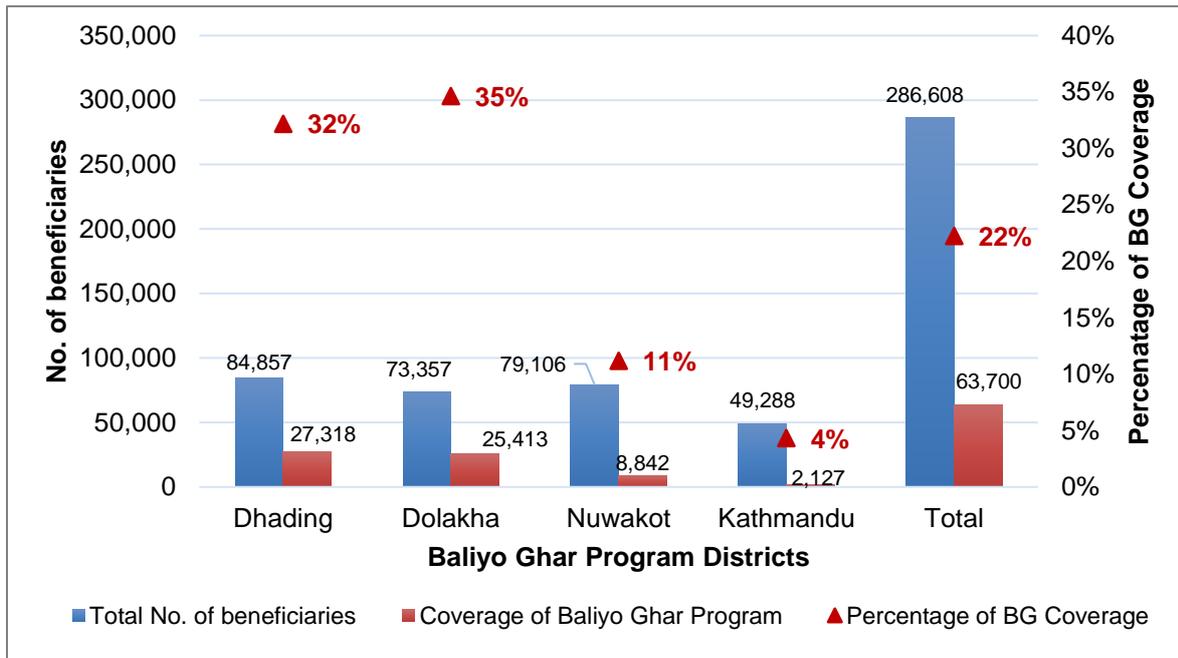


Figure 3. Baliyo Ghar Program districts and coverage in terms of beneficiaries

2.5 Program Implementation Principles and Approaches

Following the program goals, result framework and guiding principles, Baliyo Ghar Program was implemented through comprehensive blanket technical assistance approach to promote appropriate disaster resilient construction technologies and in close coordination with various stakeholders at national, district and local levels. The following section discusses the program implementation principles and approaches.

Comprehensiveness in assistance

The owner driven model of housing reconstruction was implemented through financial and technical support by the government stakeholders and various partner organizations. Similarly, the reconstruction process was also undertaken as an opportunity to enhance capacity and strength of the state and communities towards disaster resilience. For these, mere building earthquake resistant houses would not suffice, it required interventions at various levels and with different stakeholders.

Hence, a successful housing reconstruction would only be achieved through a comprehensive mode of assistance. For this, Baliyo Ghar Program implemented various activities and interventions, targeted at different levels of beneficiaries as part of comprehensive socio-technical assistance model. Primarily, the program focused on three major levels of interventions

- a. Institutional support in developing policies such as reconstruction mechanisms, guidelines, manuals and checklists for reconstruction,
- b. Capacity Building to homeowners, masons, engineers and other relevant stakeholders to undertake disaster resilient reconstruction in the affected communities and,
- c. Awareness raising to homeowners, local authorities, social leaders and communities to enhance knowledge on disaster risk and mitigation measures.

These interventions were carried out through a multitude of activities ranging from formal methods such as trainings, orientations, workshops, seminars and meetings to informal methods such as household interaction, community engagement and mass awareness activities.

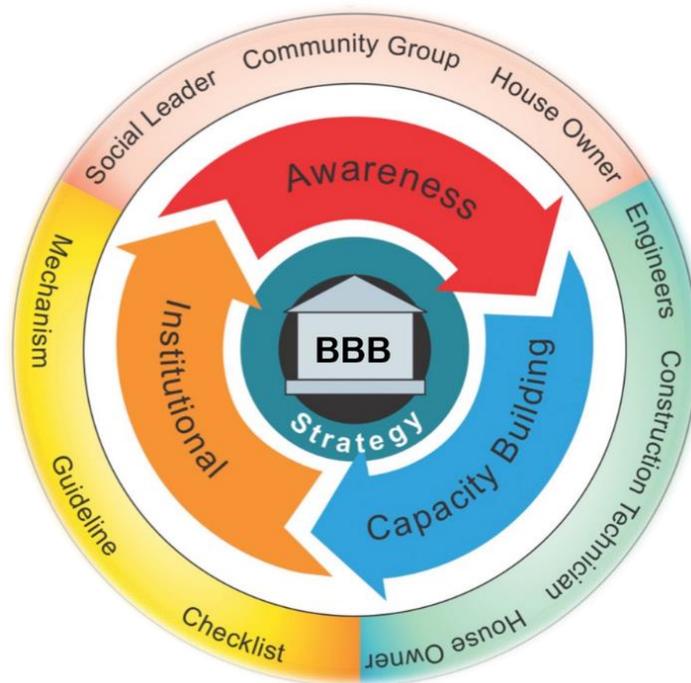


Figure 4. Baliyo Ghar Program strategy, key areas of interventions and relevant stakeholders

Promoting appropriate technologies

At the onset of the reconstruction campaign, the most critical challenges foreseen was the confusion and indecision among homeowners regarding earthquake resistant technologies in the reconstruction process. In many communities, homeowners had started piling up and discarding stones and timber from their damaged houses, with the misapprehension that these materials would not be earthquake resistant. Hence, promotion of appropriate technologies during the reconstruction process was not only crucial in ensuring disaster resilient reconstruction but also for the sustainability of safer construction practices in the future. Baliyo Ghar, through research in-built and

field-based learning approaches focused on the promotion of appropriate technologies with the following key principles.

- **Technically Feasible:** That promoted construction technology should be technical feasible in the affected areas, that can be easily implemented with the use of local human resources following the disaster resilience requirements of the National Building Codes.
- **Economically Affordable:** In an already fragile economy due to loss and damages incurred during the earthquake, construction technologies must be economically affordable, especially for the socio-economically vulnerable and backward beneficiaries to be able to undergo the reconstruction process.
- **Culturally Acceptable:** In a culturally diverse country like Nepal, where building construction, architecture and functionality are directly related to the vernacular culture and social norms, it is important that construction technologies, practices and technical requirements are developed to be culturally acceptable in the affected communities.
- **Locally Available:** Promote and emphasize on the use of locally available materials, tools and human resources to undertake the construction process.
- **Sustainable:** Promote technologies that the community can easily accept and replicate in the future, to ensure that skills, knowledge and technology transferred are sustainably implemented.

Complimenting national reconstruction policies and processes

The housing reconstruction model in Nepal primarily consisted of three main facets: socio-technical assistance, financial support and compliance check mechanism. Baliyo Ghar Program strongly advocated for a complementation between the three facets to ensure safety and disaster resilience of the construction practices. Baliyo Ghar primarily focused on providing socio-technical assistance to homeowners, while NRA engineers and local governments conducted the necessary compliance check mechanisms of the reconstructed households and the financial support was delivered through the national government framework. However, close coordination between the program and the other relevant stakeholders did help enhance the quality of assistance delivery from all stakeholders. For instance, NRA inspection engineers frequently used Baliyo Ghar Program's orientation and household visits as platforms to engage with beneficiaries and provide information on compliance check and inspection mechanisms. Local and district level authorities were facilitated for field visits, observations and interaction with the beneficiaries to help them better understand the local issues in housing reconstruction.



Figure 5. Framework for relation between technical and financial support and compliance check for safety.

Ensuring inclusion and access through blanket socio-technical assistance

The housing reconstruction program in Nepal was taken as a means to enhance disaster resilience of the affected communities. The earthquake damaged houses and affected the lives and livelihoods of beneficiaries of diverse socio-economic conditions. This diversity had a significant challenge in the reconstruction process, in that vulnerable and marginalized groups of beneficiaries would not be able to access the required support from the government and other stakeholders to undertake the reconstruction process. To avert this, the program implemented a blanket technical assistance approach to encapsulate all beneficiaries in the assistance activities. Disadvantaged groups were especially targeted through household level interaction and door-to-door technical support.

In several communities, especially rural, almost all of the houses were completely damaged, and thus, went under the reconstruction process. Regulation of these houses were directed by socio-technical assistance as well as the inspection and financial support model. In some communities, however, reconstruction of damaged houses went alongside the construction of new buildings. This was particularly evident in urban municipalities and rapidly urbanizing centers such as Thansing in Nuwakot and Singati in Dolakha. In such places, Baliyo Ghar's assistance was also provided to these homeowners, regardless of whether or not they received the government grant or were enlisted as beneficiaries. This form of blanket assistance not only helped rebuild the damaged houses safely, but also ensured that other forms of construction were also adequately regulated and conformed to safe construction norms.

Strategic and uniform implementation with all stakeholders through hierarchical structure comprising of Reconstruction Technology Centers (RTCs) and Mobile Teams

A key element of socio-technical assistance delivered through Baliyo Ghar Program is the hierarchical system of Reconstruction Technology Centers (RTCs) at national, district and local levels. The program implemented its activities through an umbrella structure. At the national level, the program

supported the National Reconstruction Authority, the Department of Urban Development and Building Construction and other government institutions, partner organizations and stakeholders through support in policy development and advocacy, capacity building of instructors and research and study in earthquake resistant construction and retrofitting. At the district levels, through the District Reconstruction Technology Center (DRTC), the program further worked closely with communities, the government institutions and partner organization in training engineers and social mobilizers as trainers and providing strategic input and support for consistent and uniform delivery of assistance. The DRTC also functioned as a resource center for dissemination of information; through mass media platforms, demonstrative and mass awareness events or through information centers placed at strategic locations. Along with this, the district level engagement of the program helped better understand the pertinent issues of reconstruction at a much wider scale, disseminate such issues at the national level and provide appropriate resolutions.

At the local level, the program primarily imparted awareness and capacity to the communities, earthquake affected homeowners, masons, local government representatives and social and political leaders through the Local Reconstruction Technology Center (LRTC) and the mobilization of mobile teams in each village. The mobile teams in particular, comprising of one engineer, one social mobilizer and one construction technician were mobilized for approximately every 1000 households at rural areas and 3000 households in urban areas to deliver door-to-door technical assistance and psycho-social counselling to support the beneficiaries in their reconstruction process. This was done through activities such as trainings, orientation, demonstration construction and household engagement.



Figure 6. Hierarchical structure of Baliyo Ghar Program Implementation

Monitoring and evaluation

Baliyo Ghar program envision the monitoring and evaluation of all its output, outcomes, and impact level indicators. Output level data and information were managed as guided by the data assurance guideline and monitored through the Data Quality Assessment (DQA) guideline. The DQA document were

developed based on the program monitoring and evaluation documents and data controlled through the PIRS as explained annex of M&E document.

Qualitative evaluations were conducted through monitoring visit from different layer of program management and M&E team. Focus group discussion, interaction with different stakeholders, meetings, learning workshop are the part of monitoring and evaluation of program activities in a different year of program implementation. Annual national level workshop was the event to disseminate the learnings and sharing to the national stakeholders.

2.6 Target Groups

To enhance the local, district and national capacity to undertake the reconstruction process, the program targeted mainly six groups of beneficiaries at different levels:

1. **Construction workers** – masons (brick layers, stone layers, concrete workers), carpenters, bar benders, contractors; termed "mason" in general
2. **Social Mobilizers** – community mobilizers, social activists
3. **Technical professionals** – Structural and Earthquake Engineers, Civil Engineers, Architects, Sub Engineers, Assistant Sub Engineers deployed in earthquake affected areas by GON, local governments and partner organizations.
4. **Common People** – house owners, beneficiaries, consumer groups, clubs, and community-based committees.
5. **Policy and decision makers** – elected representatives and officials at local (rural and urban municipalities), provincial and central level governments, district and central level NRA officials and PIUs, political leaders, officials at ministries and departments.
6. **Partner Organizations** involved in reconstruction and platforms.

2.7 Baliyo Ghar's Socio-Technical Assistance Activities

The program primarily imparted knowledge, skills and awareness regarding disaster resilient construction techniques to earthquake-affected communities in four of the most affected districts in Nepal. Further, the program assisted the government in developing policies, guidelines, norms and training curricula to standardize the entire process of reconstruction under the leadership of the Government of Nepal (GoN) National Reconstruction Authority (NRA) and its project implementation units. The program covered a wide range of stakeholders targeted through its comprehensive technical assistance for awareness, capacity building and institutional improvements.

Given the scale of the reconstruction, vast numbers of trained and skilled human resources were required to undertake the massive campaign. Similarly, owing to the low level of existing knowledge on earthquake risks and mitigation, awareness raising through different approaches was also incorporated in the program. As such, Baliyo Ghar Program stipulated socio-technical assistance to

the earthquake affected communities in six major themes, as categorized by the National Reconstruction Authority.

1. **Community Based Orientations:** In order to make the house owners aware on the need of earthquake resistant construction, massive level of awareness campaign consisting of closed classroom-based sessions on earthquake risks, mitigation measures and the technical and administrative provisions of reconstruction were conducted in program areas.
2. **Short Trainings:** Short-term trainings (typically between 3 to 7 days) for engineers, masons and social mobilizers on different aspects of reconstruction and earthquake resistant construction. Moreover, engineers and social mobilizers trained as part of these trainings further developed into instructors.
3. **On the Job Trainings:** Vocational trainings targeted towards developing new skilled masons to support the demand of human resources during surge of reconstruction activity.
4. **Door-to-Door assistance:** Household level assistance provided to earthquake affected beneficiaries to support their decision-making as well as supervise their construction in order to attain compliance.
5. **Demonstration Construction:** Construction of small and large-scale demonstration models to aid house owners, masons, engineers and other stakeholders adequately visualize earthquake resistant construction techniques.
6. **Information Desks:** Mobile outlet aimed at providing information to a large group of beneficiaries in quick time and increasing outreach.



NRA CEO along with local political representatives and government officials handing over the participation agreement to the first beneficiary undergoing the process during the pilot enrollment camp organized in Singati of Doalkha district in April 2016



Baliyo Ghar Program team discuss with earthquake affected families in Tipling in northern Dhading regarding the housing designs. These field observations and discussions were vital in the program's support in developing technical manuals and guidelines.

CHAPTER - 3: CONTRIBUTION IN STANDARDIZATION OF POLICIES FOR DISASTER RESILIENT RECONSTRUCTION

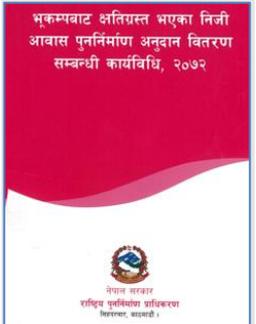
The government, civil society and the international community responded swiftly to provide relief support to the affected communities. This usually happens immediately after disaster happen. However, the long-term recovery and reconstruction of permanent shelter in bigger scale with the principle of Build back better is challenging and need different plan, procedures, guidelines, manuals, checklist etc. as a policy document for the governance mechanism to function appropriately. The dearth of experience and expertise is required to develop the conceptual framework and design the post disaster housing reconstruction program in such a big scale. NSET through Baliyo Ghar program complement National reconstruction Authority (NRA) to draft the policy document as per its expertise.

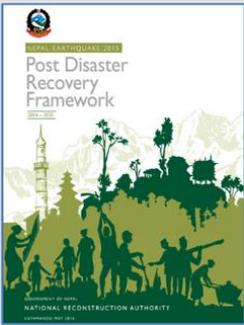
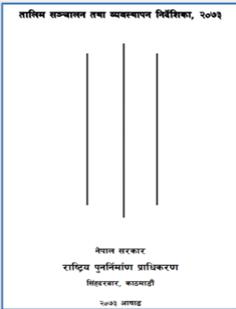
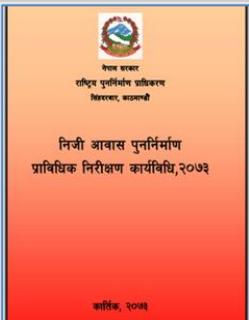
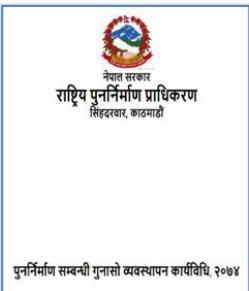
3.1 Strategic support for development of reconstruction policies

Baliyo Ghar program policies support is largely based on need based and demand driven to address the challenged by the NRA. The contribution on drafting enrollment and housing grant distribution SOP, inspection guideline, multiple ownership guideline for housing grant for traditional settlements are few examples of policy support largely based on the need felt by NRA. This support was delivered by deploying expert’s advisor to the NRA chief executive officer upon their request. Similarly, the technical guidelines, training curricula were developed based on the requirement of beneficiaries such as correction and exceptional technical manual, retrofitting manual, curriculum on the job training for retrofitting of houses etc. These documents directly resolve the housing reconstruction technical issues and facilitate the inspection process and standardized the training courses.

Among the contributed policy documents, training curriculum developed for 7 Days mason training were widely adopted and applied in overall reconstruction process. Likewise, NRA functions were guided by the housing enrollment and housing grant distribution SOP, technical inspection guideline during the entire reconstruction process.

Table 3: List of reconstruction policy documents Baliyo Ghar Program contributed in development

#	Details of Reconstruction Policy	Contribution to Disaster Resilient Reconstruction
1	<p>GoN Policy for reconstruction and rehabilitation Publish Date: 2015</p> 	<p>This is the overall policy document adopted by Nepal Government for the reconstruction and rehabilitation efforts after the 2015 Gorkha Earthquake.</p>
2	<p>SOP for Enrollment and Housing Grant Distribution Publish Date: 2015</p> 	<p>This document explains the standard procedure for beneficiary enrollment and tranche distribution. It includes standard forms and formats for beneficiary enrollment and tranche distribution. Based on this SOP, NRA perform grant distribution activities. This SOP guides linkage between housing grant disbursement system and inspection mechanism. This is a parent document to many other SOP and guidelines. Different aspect of housing reconstruction such as grant distribution, grievance handling mechanism, inspection, institutional linkage etc. are rooted with this SOP.</p>

#	Details of Reconstruction Policy	Contribution to Disaster Resilient Reconstruction
3	<p>Nepal Earthquake 2015 Post Disaster Recovery Framework (2016-2020) Publish Date: May 2016</p> 	<p>Post Disaster Recovery Framework (PDRF) endorsed by Government of Nepal has been the guiding document for the post-earthquake recovery and reconstruction in Nepal. The overall reconstruction now ongoing is basically within and as guided by this framework.</p>
4	<p>Guidelines for Training Conduction and Management, 2073 Publish Date: June 2016</p> 	<p>This document has been a key document to practice uniformity in capacity building activities from different stakeholders. This directive guide to manage training and ensure the quality of training to transfer knowledge and skills. The process and provision of facility are clearly mention in the directive that assist reconstruction stakeholders to implement training. Also, support GON to regulate the training.</p>
5	<p>Technical Inspection Guidelines for Housing Reconstruction Publish Date: November 2016</p> 	<p>The NRA engineers inspect house construction as per this document and recommend for tranche release. It contains technical checklist in standard formats that should be checked during inspection of building. The standard checklist format developed for inspection of three stage of building construction. For any anomalies, Engineers can recommend for any correction measures or for retrofitting based on this SOP. This policy document able to create uniform/standardized inspection procedure all over the reconstruction area though practice differ.</p>
6	<p>SOP for management of Grievances related to Reconstruction Publish Date: 2017</p> 	<p>“No one left behind” should be the program principle adopted by Nepal Government while during earthquake reconstruction. This document is for addressing the grievance if any earthquake victim was left out during listing of eligible beneficiary. Following this SOP, NRA collect grievance and take action.</p>

3.2 Development of Guidelines and Manuals

Guidelines and manuals play a significant role in streamlining the process of implementation of any disaster management activity, let alone the mega campaign of post-earthquake recovery of the scale of the Gorkha earthquake. Following the strategic objectives outlined by the Post Disaster Recovery Framework and the principles set in place in reconstruction policies, the National Reconstruction Authority developed and disseminated various

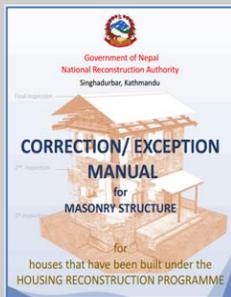
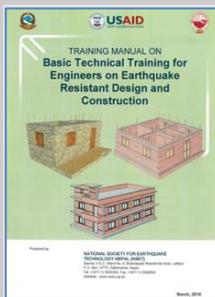
guidelines and manuals to direct the reconstruction process, including technical and financial assistance, mobilization of support and communication.

With vast experiences in the field of earthquake resistant construction, retrofitting and disaster risk management in Nepal and the region, NSET supported the NRA through direct and indirect, partial and full contributions in developing several key technical guidelines and manuals to aid the reconstruction and recovery process. Baliyo Ghar Program was especially instrumental in ensuring that developed guidelines were innovative and suitable for implementation in the field.

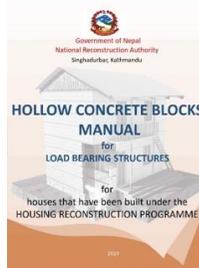
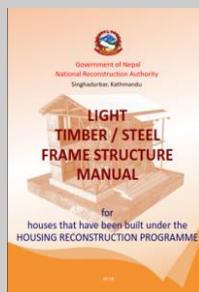


Table 4: List of guidelines and manuals developed through contribution of Baliyo Ghar Program (in chronological order of date)

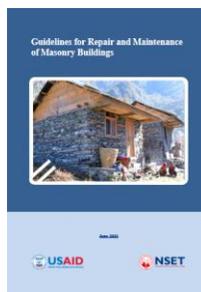
SN	Details of Guideline/Manual Developed	Contribution to Disaster Resilient Reconstruction
1	<p>Training Manual on Basic Technical Training for Engineers on Earthquake Resistant Design and Construction</p> <p>Publish Date: March 2016</p> <p>Stage: Approved</p> <p>Level of contribution: Full</p>	<p>It has provided a way forward to have uniform practice as well as to disseminate all the essential technical knowledges required for reconstruction. Following this document, engineers were trained for basic technical on earthquake resistant design and construction following National Building Code.</p> <p>This training capacitates engineers on practical exposure to design and construction of earthquake resistant building. The first lot of NRA hired engineers were trained based on this manual and capacitated to supervise the earthquake resistant building reconstruction.</p>
2	<p>7 Days Mason training manual on earthquake resistant building construction technology (Rural/Urban)</p> <p>Publish Date: July 2016</p> <p>Stage: Approved</p> <p>Level of contribution: Full</p>	<p>This document is as per standard set by government and is in use by all stakeholders for conduction of mason training. This mason training curricula ensure minimum knowledge and skill required for masons working in rural building technology that is widely practiced in Nepal. This curriculum incorporates the details of stone masonry building construction techniques considering different hazard mainly earthquake. This is a mandatory course for Mason Training whoever conduct the training endorsed by GON.</p>
3	<p>Correction/Exception Manual for Masonry Structures</p> <p>Publish Date: May 2017</p> <p>Stage: Approved</p> <p>Level of contribution: Significant</p>	<p>This is for houses that built before any STA deployment from NRA or any agency and do not compliant for tranche recommendation. This manual describes how to correct the non-compliant and exception that can be considered during inspection of reconstruction by technical persons.</p>



SN	Details of Guideline/Manual Developed	Contribution to Disaster Resilient Reconstruction
4	<p>Repair and Retrofitting Manual for Masonry and RCC Structures</p> <p>Publish Date: June 2017</p> <p>Stage: Approved</p> <p>Level of contribution: Significant</p>	<p>The manual discusses two levels of intervention works which are necessary for damaged buildings and that ensure a life safety level of performance under the standards set out in the Nepal National Building Code, NBC 105: 1994. This manual supports the engineers responsible for the compliance inspection process. The engineers use this manual to provide advice and guidance to households for the implementation of required repair and retrofitting strategies. The BRT and ART trainings for engineers were designed based on this manual.</p>
5	<p>Light Timber / Steel Frame Structure Manual</p> <p>Publish Date: March 2018</p> <p>Stage: Approved</p> <p>Level of contribution: Significant</p>	<p>To ease the inspection of traditionally built wooden/steel frame buildings because of their prevalence. This manual consists inspection sheet and detailed evaluation methods. This manual educate engineers/technical staff in inspection process.</p>
6	<p>Hollow Concrete Blocks Manual for Load Bearing Structures for houses that have been built under the Housing Reconstruction Programme</p> <p>Publish Date: February 2019</p> <p>Stage: Approved</p> <p>Level of contribution: Significant</p>	<p>To provide technical guidance for construction and to ease the process of inspection of houses that have been built with hollow concrete blocks, one of the prominent alternative construction materials prevalent in Nepal. The manual also provide technical suggestions to correct the houses that have already been built using such blocks but do not comply with the minimum requirements.</p>



SN	Details of Guideline/Manual Developed	Contribution to Disaster Resilient Reconstruction
7	<p>Guidelines for extension of masonry buildings for houses that have been built under the Housing Reconstruction Program</p> <p>Publish Date: March 2021</p> <p>Stage: Approved</p> <p>Level of contribution: Full</p>	<p>The guideline provides technical knowledge and expertise to technical personnel (engineers and architects) working in the earthquake affected regions to provide technical support for house owners that have completed the reconstruction process (third tranche) and are willing to expand their houses in horizontal or vertical directions.</p>
8	<p>Guidelines for Repair and Maintenance of Masonry Buildings</p> <p>Stage: Drafted</p> <p>Level of contribution: Full</p>	<p>The guideline aims to provide technical knowledge to house owners, masons and engineers in undertaking the regular repair and maintenance required to maintain the quality of building materials used in masonry buildings across the country.</p>



3.3 Support for the standardization and consistency in delivery of socio-technical assistance

A consistent and uniform delivery of socio-technical assistance and information is an integral component of a successful post disaster recovery, especially of the scale of the 2015 Gorkha earthquake. Owing to huge needs in post-disaster recovery, the diversity among the affected population and large number of organizations supporting the recovery process, it was important for the National Reconstruction Authority to outline the minimum quality of socio-technical assistance activities. For this, standardization of various actions and activities such as training events, awareness campaigns, information dissemination channels and tools and community engagement activities were done.

Among these, the standardization of approach, tools, techniques and delivery of trainings for various stakeholders was highly prioritized, as nearly 75,000 human resources of different capacities were directly involved in the reconstruction process. Of these, the highest proportion of human resources were masons followed by engineers and social mobilizers. Thus, Baliyo Ghar Program supported the National Reconstruction Authority in the standardization of the capacity building process for these actors, including training curricula, mechanism and methods. The program provided significant contribution to the development of training curricula for masons, engineers and social mobilizers and in the development of the NRA's "Training Conduction and Management Guidelines 2016". The program also supported in consistency of information to the earthquake affected areas by conducting numerous training events for engineers and social mobilizers from the NRA as well as various other partner organizations.



"USAID funded Baliyo Ghar Program implemented by NSET Nepal is one of the programs supporting disaster resilient reconstruction after 2015 Gorkha Earthquake. As NSET had been previously working in the sector of earthquake resistant construction and promoting awareness on safer construction technologies and practices, we believed that their support would be crucial. One of the Baliyo Ghar Program's objectives was to provide support in development and implementation of national level policy documents, training manuals and guidelines. For that, we took technical support at an advisory level for the formulation of different policy documents and also took the institutional support for field level implementation. These contributions were one of the most important assistance received from Baliyo Ghar Program for the campaign of national reconstruction program."

- Sushil Gyewali, Chief Executive Officer, NRA



“My three brothers and I lived with our families in different floors of the same house. This is a social norm in our community. When the earthquake damaged the house in 2015, we were all enlisted as beneficiaries separately, but were not allowed to build a single house like before, and we didn’t have any other land to build in too. We continuously requested NSET (Baliyo Ghar Program), the municipality and DLPIU office to resolve our issue. After more than two and a half years of wait, the government finally brought the multiple ownership policy in implementation. Through the policy, families like ours were able to independently receive grant amounts for building separate floors for ourselves. We are now constructing our house following the technical norms of the government and the municipality.”

- Ram Bahadur Shrestha, Reconstruction Beneficiary, Bhimeshwar Municipality, Dolakha

WHAT WORKED

Need based, flexible and adaptive policies and processes.

- Development of policies adapting to the socio-economic, cultural and administrative strengths and constraints of the earthquake affected communities. Eg. Multiple-ownership reconstruction, land management for Guthi etc.
- Research in-built in policy development and implementation to accommodate the diversity in houseowner. Eg. Incorporation of hybrid and hollow block manuals, alternative technologies in design catalogue etc.
- Need based policy development, field issues were adequately identified, discussed and policies developed to ensure house owners were provided with adequate support in the reconstruction process. Eg. Correction Exception Manual

WHAT DID NOT WORK

Assistance models were effective in rural, but not in urban areas.

- Policies were developed and implemented in a uniform approach covering all rural and urban areas.
- Wrong notion that “urban beneficiaries require lesser support due to better socio-economic status” turned out false
- While rural reconstruction progressed well with the socio-technical and financial support, urban reconstruction plagued with multiple issues such as land-management, demolition, urban development norms, financial limitations etc.
- Socio-technical assistance models did not work adequately to address the issues. Policies development was slow, owing to the multiple challenges and stakeholders involved.





CHAPTER - 4: STRENGTHENING NATIONAL CAPACITY IN DISASTER RESILIENT CONSTRUCTION AND BUILD BACK BETTER

Capacity building of the affected communities and of the state was identified as an integral component of the post-earthquake reconstruction and recovery program in Nepal. This was primarily highlighted as the strategic objectives and focused on the strengthening of capacity of the communities, community based, governmental and non-governmental organizations, local, district and national level institutions, political spectrum and departments and ministries in reduction of risk and vulnerability and enhance the ability to cope with future disasters.

To achieve this objective, the NRA prioritized the capacity building of various stakeholders through specialized training strategies and programs. These activities were holistically included as part of socio-technical assistance components of reconstruction and recovery. Baliyo Ghar Program contributed significantly in this endeavor, through the implementation of various types of trainings for a wide range of stakeholders as discussed in the following sections.

4.1 Strengthening capacities of local communities in disaster resilient construction

The training and capacity building of local construction workforce; masons and engineers and the auxiliary support systems such as social mobilizers and social activists was one of the core socio-technical assistance components of Baliyo Ghar Program. These capacity building trainings not only had direct impact on the disaster resilient construction to expedite the reconstruction process but also aided in enhancing awareness through community mobilization, identification and resolution of key reconstruction issues, developing synergy and harmony in the earthquake affected communities and ensuring the sustainability of disaster resilient construction practices. With these objectives, Baliyo Ghar Program trained a total of 19,865 professionals from various groups and expertise to support the reconstruction of its program areas, and beyond. The following section briefly discusses the various capacity building trainings conducted and their achievements.

4.1.1 Enhancing skills of existing masons and developing new masons

The massive scale of reconstruction required in the earthquake-affected areas prompted the need for huge number of skilled masons. Across the country, the National Reconstruction Authority estimated the requirement of more than 60,000 construction workers to complete the reconstruction of more than 825,000 fully damaged and retrofitting of another 70,000 houses. Preliminary data and information collected from different sources from the earthquake affected districts, and from the PDNA report showed that the existing masons in the earthquake affected areas covered 50% of the total needs for reconstruction. Thus, it was very important that skill enhancement of local masons would be a crucial step in the reconstruction process.

One of the key activities of Baliyo Ghar Program was to enhance local capacity to apply disaster resilient construction methods and techniques. Baliyo Ghar Program conducted various capacity building activities targeted to homeowners, masons, engineers, social mobilizers and government officials. These trainings formed the backbone of socio-technical assistance in the earthquake-affected communities. Among these, capacity enhancement of local masons was done via two approaches; for existing masons working in the field of construction, Masons' Trainings (7 days) were conducted, whereas, for construction workforce who had no experience in construction or only worked as apprentices, 50-day On the Job trainings were conducted to develop skills as a mason.

Masons' Training refers to the short-term (7 days) training that Baliyo Ghar Program conducted in its program implementation areas to enhance local capacity. The trainings were specifically targeted for local construction workforce to undertake construction of rural and urban buildings following the technical standards as guided by the National Building Code of Nepal and the Minimum Requirements (MRs) and other technical guidelines developed by the

National Reconstruction Authority. Trainee masons followed a standard training procedure and curriculum with theoretical sessions and practical hands-on skills for knowledge and skill enhancement in earthquake resistant construction. Hands-on skills were developed among the trainee masons through the construction of small-scale models, typically demonstrating the critical components of earthquake resistance in the buildings. Since the trainees were already working in the field of construction in their communities, they were able to quickly apply the skills in construction immediately after the training.

On the Job Training refers to the long term (50 days) vocational training that Baliyo Ghar Program conducted in its program implementation districts to in a bid to fulfill the growing demand of trained and skilled masons for earthquake resistant construction of buildings and support the reconstruction process. The trainings were specifically targeted for local new construction workforce to undertake construction of rural masonry buildings following the technical standards as guided by the National Building Code of Nepal, Minimum Requirements (MRs) and other technical guidelines developed by the National Reconstruction Authority. Along with theoretical knowledge on earthquake resistant construction, the trainee masons, typically consisting of a group of six, applied these knowledge into hands-on exercises during the construction of a full-scale masonry building in their own communities. This on-the-job training approach had three-fold benefits; (i) trainees were able to learn the actual construction procedure for an entire building from foundation to the roof, (ii) the house constructed as part of the training program served as model for demonstration of earthquake resistant construction in the local communities and (iii) houses selected for demonstration typically belonged to vulnerable families, thus indirectly supporting in their construction as well.

To fulfill the ever growing demand for skilled masons, On the Job Training programs were conducted in each of the wards of previous VDCs that Baliyo Ghar Program was implemented as well as covering an additional 77 VDCs through an extension program. In the current federal structure, about 50-55 new masons were trained in each ward of the program implemented municipality and each ward has nine full scale demonstration models contributing to the sustainability of awareness on disaster resilient construction.

The following bar graph highlights the major achievements in training local masons through different training programs and modules.

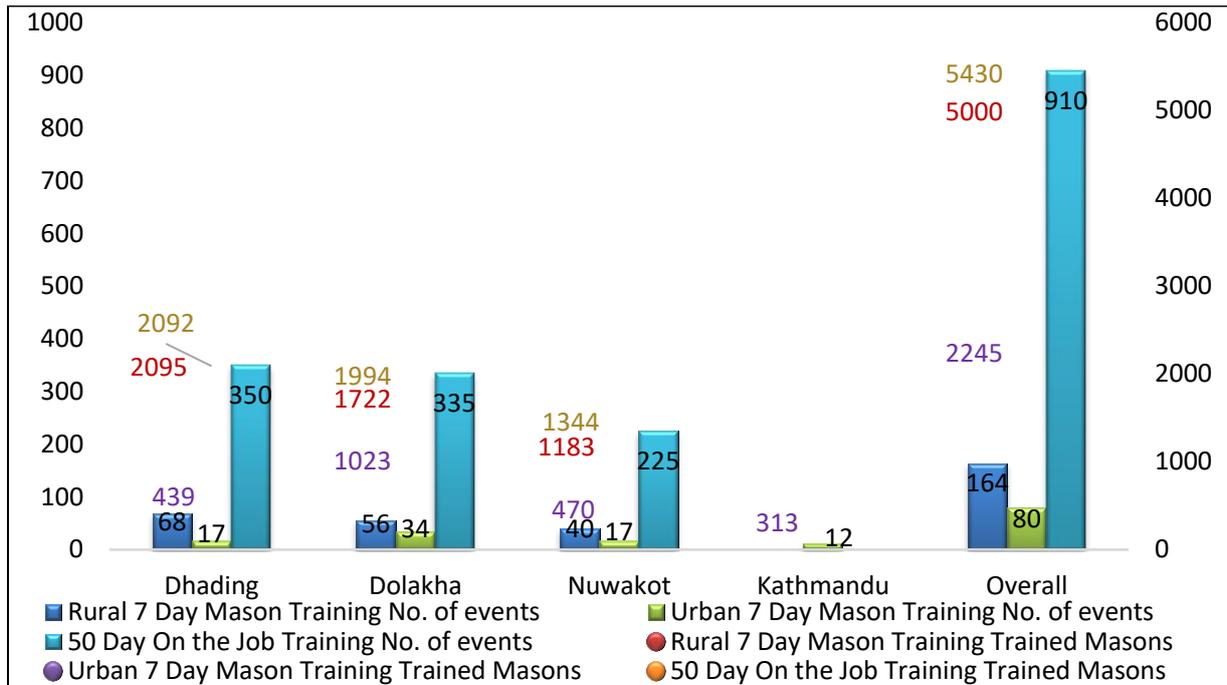


Figure 7. Number of events and new masons trained through 7 Day Training (Rural & Urban) and 50 Day On the Job Training implemented through Baliyo Ghar Program

In total, Baliyo Ghar Program trained 12,675 masons through a total of 244 7-day and 910 50-Day training events. Of these, 7,245 existing masons were trained in earthquake resistant construction through the 7-day training program whereas 5,430 new skilled masons were developed through the On the Job training program. Additionally, through these programs, 910 full scale demonstration model houses and more than 400 small scale demonstration models were constructed throughout the Baliyo Ghar Program areas, that significantly contributed to enhancing awareness in the communities.

With respect to type of training module for 7-day trainings, it can be seen that two-thirds of the training events were conducted in rural construction. This was done because the prominent building typology in Baliyo Ghar Program areas was typically rural, constructed using stone and mud mortar. In Kathmandu however, since only one urban municipality was covered by the program, only urban trainings were conducted that included construction of RC frame or Brick Masonry buildings.

The immense need of skilled masons in the reconstruction program was aptly recognized by Baliyo Ghar Program. The program’s comprehensive assistance to the national reconstruction campaign through the support in development of curricula and guidelines for conducting these trainings and the implementation of more than 1100 training events covering major portions of three most affected districts; Dhading, Dolakha and Nuwakot is testament of the huge importance placed by the program towards the role of capacity building in disaster resilient construction.

4.1.2 Enhancing knowledge and skills of technical professionals in disaster resilient design, construction and technical assistance

Along with masons, technical professionals such as engineers, architects and designers also had an important role during the housing reconstruction program. Owing to the huge numbers of damaged buildings to be reconstructed, the National Reconstruction Authority planned and deployed more than 2500 technical personnel in the earthquake affected areas to provide technical assistance and carry out inspections of the reconstructed houses for grant disbursement process. Additionally, almost all partner organizations deployed a number of technical personnel to provide technical support to the reconstructing houseowners in a number of different thematic areas and through various approaches and modes of assistance. Apart from these, there were several designers and consultants who provided technical services in design and construction of buildings of the affected houseowners, most particularly in the urban areas. In total, more than 3000 technical personnel were directly involved in aiding the house owners through the NRA and various partner organizations.

However, mere deployment of technical manpower to the earthquake affected areas would not ensure the adequate and appropriate dissemination of information in the communities. One key reason for this, is that research and study in the field of earthquake resistant construction, especially in rural construction is not included as a core component of the curriculum of technical education. Additionally, as the rural construction was seldom regulated prior to the Gorkha earthquake, experience in construction among the technical manpower was very less. Hence, it was deemed important to adequately train and orient the technical manpower being deployed in the earthquake affected areas so as to ensure effective dissemination of information and delivery of technical assistance in the communities. In this regard too, Baliyo Ghar Program contributed significantly, not only in its program areas but to the national reconstruction campaign as a whole.

For this, Baliyo Ghar Program supported the National Reconstruction Authority and the then Central Level Project Implementation Unit under the Ministry of Urban Development to conduct three mass orientation events for a total of 2,759 engineers, sub engineers and architects.

In March 2016, the National Reconstruction Authority hired more than 2800 engineers and architects to assist the earthquake affected houseowners in the reconstruction process. These engineers were to be deployed in all earthquake affected communities to deliver technical assistance through supervision, trainings and awareness activities and conduct inspection of the reconstructed houses for grant disbursements process. The engineers were also mandated with the key role in disseminating information on housing reconstruction to the beneficiaries. Hence, it was of paramount importance that these engineers were aptly oriented on the policies of reconstruction including the administrative, financial and technical provisions. Along with that, they needed the basic information on earthquake resistant housing construction, as they would be the primary source of information for the houseowners. For this, Baliyo Ghar Program supported the

National Reconstruction Authority and the then Central Level Project Implementation Unit under the Ministry of Urban Development to conduct three mass orientation events for a total of 2,759 engineers, sub engineers and architects. These technical personnel were then deployed to the 14 most affected districts. The training helped orient the engineers about the basic knowledge and information on several policy and procedural aspects of reconstruction as well as safer construction technology.



Following the deployment of technical personnel from the NRA and various other partner organizations in the field for reconstruction assistance and technical inspection, further capacity building trainings were deemed necessary to enhance their capacity, knowledge and skills in earthquake resistant construction technology. Since these personnel were not only involved in construction supervision and inspection but also in aiding through trainings and orientation activities, it was necessary to develop their training delivery skills alongside practical skills. Hence, Training of Trainers were widely implemented across all earthquake affected areas to train these engineers in earthquake resistant construction technology as well as in planning, managing and delivering trainings to local masons and house owners. Baliyo Ghar Program subsequently conducted a number of “Training of Trainers on Earthquake Resistant Construction Technology”, a 7-day training focused on earthquake resistant construction of rural and urban buildings, hands-on exercise and demonstration on the construction process as well as platform and training management skills. These trainings were also particularly essential to ensure that technical personnel deployed in different regions and through various organizations provided uniform and consistent technical information to the beneficiaries to avoid confusion and conflict. Across the four program districts,

Baliyo Ghar Program trained a total of 1,339 technical personnel through 43 Training of Trainers events.



To fulfill the demand for specialized technical capacity in design of complex structures as well as in assessing the compliance of the built structures to the provisions of the Nepal National Building Code and the Minimum Requirements of the National Reconstruction Authority, Baliyo Ghar Program also conducted trainings for engineers on the design of earthquake resistant structures, especially focused on RC frame residential buildings. The trainings were delivered to help building technical capacity and confidence of various partners to implement the practice of earthquake resistant construction and earthquake risk mitigation through the implementation of the National Building Codes. A total of 56 engineers and designers were trained on earthquake resistant design through two training events conducted by Baliyo Ghar Program.

In total, Baliyo Ghar Program trained 3,995 technical personnel (engineers, sub engineers and architects) in earthquake resistant design, construction, supervision and technical assistance during the housing reconstruction program through the various capacity building and training events. As an indirect outcome, Baliyo Ghar Program was able to provide support through these trained technical personnel to thousands of earthquake-affected beneficiaries and subsequently contributed to the national reconstruction campaign on a much wider scale.

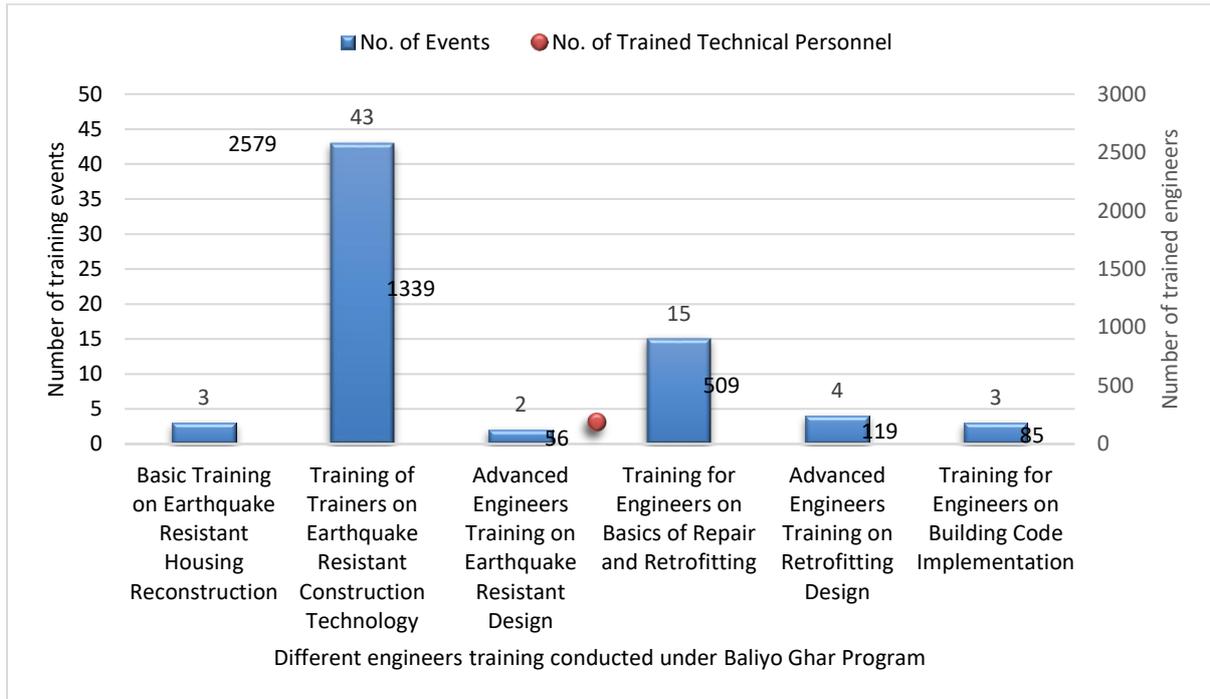


Figure 8. Various training events conducted under Baliyo Ghar Program for capacity building of technical personnel

The Training of Trainers was an integral component of the comprehensive approach of socio-technical assistance of the program and consistent with the program’s goal of supporting national reconstruction. While Baliyo Ghar Program itself was only able to train the masons or provide technical assistance within its own program areas, the trainers developed through this process helped permeate the philosophy and practice of earthquake resistant construction in a much larger geographical area. Even though the trainings were conducted in the four program districts, Dhading, Dolakha, Nuwakot and Kathmandu, engineers from the neighboring districts of Rasuwa, Gorkha, Ramechhap, Kavre, Sindhupalchok, Bhaktapur and Lalitpur were also trained through these events, further assisting to expedite the reconstruction process of these districts as well.

4.2 Strengthening capacity and understanding of decision makers and reconstruction actors

One of the key principles of Baliyo Ghar Program’s socio-technical assistance was the advocacy and engagement with decision makers at local, district and national levels. This was an important aspect to enhance the quality and effectiveness of the post-disaster reconstruction assistance delivery. Baliyo Ghar Program focused on assisting the national government stakeholders, most particularly the National Reconstruction Authority and the Central Level Project Implementation Units to best understand the issues and challenges of reconstruction and promulgate appropriate strategies and policies to overcome them. At the local and district levels, engagement and advocacy with the local government representatives and officials was done to ascertain that information

on reconstruction was uniformly and consistently disseminated to the earthquake affected communities. The engagement with the local and district level stakeholders also helped identify many of the field level issues of reconstruction and supported in decisions and development of various need-based policies to address such issues. In summary, Baliyo Ghar Program’s engagement in strengthening capacity and understanding of national and local level decision makers was primarily done through three major aspects discussed below.

4.2.1 Dissemination of reconstruction information and discourse on issues, success and challenges through workshops and seminars.

The reconstruction campaign was a huge endeavor for the Government of Nepal and its development partners and presented unique opportunities and challenges that had not been dealt with before. A successful reconstruction and recovery campaign, hence, was greatly dependent on development and implementation of policies, strategies and action plans to resolve issues and accommodate the diverse socio-economic, cultural and topographical virtues of the earthquake affected communities. This, during the reconstruction campaign, was primarily done through various formal and informal engagements, discourse and discussions among the concerned stakeholders. Among these, workshops were conducted at different levels, in different themes and with different participants to discuss issues, share learnings and put forward ideas for resolution to enhance implementation for reconstruction.

After the restructuring of the country into federal structure, local governments too had major roles for the implementation of reconstruction activities and thus have gained tremendous experience regarding reconstruction. Sharing of these learnings provided better introspection on the pertinent issues of reconstruction and an insight into the impacts of the program interventions in socio-technical assistance. To facilitate this discourse among stakeholders, Baliyo Ghar Program has organized numerous workshops during its program period, at local as well as national levels and with multiple stakeholders. The discussions held in such workshops not only helped streamline the program’s interventions and activities but also significantly contributed to the national reconstruction campaign through policy advocacy at the national level.

Table 5: Various national workshops conducted by Baliyo Ghar Program and their contribution to reconstruction

Description of Workshop	Way Forward Discussed	Key Outcome(s)
'Lessons from Gorkha Earthquake and Status, Issues and Challenges for Reconstruction: Rural and Urban Housing' (January 2017)	Addressing the issues of non-compliance of buildings constructed by the earthquake affected beneficiaries in absence of technical assistance or supervision through the development of manuals and guidelines.	Development of Correction-Exception Manual for addressing the issues of non-compliance buildings
“Gorkha Earthquake Housing Reconstruction in Changed Context of	Addressing the critical issues regarding the land ownership certification hindering the reconstruction of thousands of beneficiaries	Revision of the grant disbursement criteria to accommodate the

Description of Workshop	Way Forward Discussed	Key Outcome(s)
Federalism; Status, Issues and Challenges” (January 2018)	residing in public land or land owned by guthis. Increasing the role of local governments in the resolution of various local issues hindering reconstruction of beneficiaries.	landless (or guthi) beneficiaries in the reconstruction process. Agreement between the NRA and local governments regarding distribution of roles and responsibilities
Need, Possibilities and Challenges for Seismic Retrofit of Non-Engineered Buildings (January 2019)	Addressing the critical issues hindering the expedition of retrofitting of partially damaged buildings in housing reconstruction through comprehensive approach in technical assistance and formation of working groups at the national level to support the NRA.	Formation of Task Forces and Technical Working Group to share experiences and resources and support the NRA in expediting the retrofitting process.
Post-earthquake Reconstruction: Current Status, Challenges and Potentials (January 2020)	Need for a specialized framework to address the issues hindering the reconstruction in urban areas. Need for the development of guidelines and manuals to provide technical assistance to homeowners, masons and engineers in the extension of buildings that have already been constructed during the reconstruction program.	NRA conducted a study on urban reconstruction issues and developed an urban recovery strategy. Guidelines for Extension of Masonry Buildings developed and published by the NRA for technical assistance in such cases.
Learning sharing workshop on safer reconstruction and role of local governments (Series)	Identification of critical local issues in reconstruction and role of local governments in addressing such issues.	Local governments proactive role in addressing reconstruction issues such as mobilization of trained masons, support to vulnerable beneficiaries etc.

4.2.2 Training and capacity building events for local stakeholders to enhance knowledge on reconstruction policies and provisions and in disaster risk reduction and management.

Various Acts and Policies have been formulated by the Government of Nepal to implement disaster risk management in a strong and effective manner. In 2017, after the federal restructuring of the country and the election of local representatives in the municipalities, local governments came at the forefront of socio-economic development, including disaster risk management. The Disaster Risk Management Act and the Local Government Operation Act have delegated powers to the local government for disaster risk management and mitigation. Therefore, the role of local government representatives and officials is crucial in advancing sustainable development with a focus on disaster risk management. Furthermore, local governments, especially the elected representatives played a significant role in the reconstruction and recovery process, most importantly for the flow of information to the beneficiaries. The local governments also played significant role in mobilizing assistance and addressing grievances and issue.

Hence, trainings for capacity building of local stakeholders, especially the locally elected representatives were conducted through Baliyo Ghar Program with the objective of contributing to the safer reconstruction process and sustainable disaster management practices. For this, the trainings did not only focus on enhancing understanding and capacities in the reconstruction process, but also in disaster mitigation principles and practical applications. The

trainings were conducted in different phases, progressively covering a multitude of topics and discussing on the relevant issues. The following table highlights the various topics and course contents delivered in the trainings in various phases.

Table 6: Comparison of Course Content in Training for Local Government Stakeholders

Course Content	Year 2018	Year 2019	Year 2020
Introduction to disaster risk reduction and management Act 2017	★	★	★
Reason of Earthquake and affect	★		
Introduction to building construction code and standards	★		
Introduction of Housing Reconstruction and Policies	★		
Role of Local Government in reconstruction	★		
Introduction to Baliyo Ghar Program and activities	★		
Building construction code implementation process		★	★
Promotion of retrofit housing and field exposure		★	
Role of Local Government in sustainability of reconstruction efforts		★	★
Simulation of Building construction permit system		★	
Learnings of Reconstruction			★
DRR Policy			★
Local Disaster and Environment Resilience Plan			★

4.2.3 Enhancing awareness and understanding of media on safer reconstruction

Various information channels including mass media have a significant role in achieving the objective of Build Back Better, especially to inform the affected communities, raise the level of awareness and circulate right information at the right time. Mass media also play a significant role in covering and raising the pertinent issues, driving national discourse through advocacy and in monitoring and evaluation of the efforts and their impacts. In Gorkha earthquake housing reconstruction too, mass media, especially local radio stations, TV networks and printed and digital media channels were identified as key actors in the successful implementation of the reconstruction program. Hence, efforts to enhance their awareness and understanding of the process as well as documenting their feedbacks was important, not just for Baliyo Ghar Program but for the national reconstruction campaign as a whole.

For this, Baliyo Ghar Program conducted thematic workshops focused on media engagement and roles in the housing reconstruction campaign. The workshops focused on a wide range of topics pertinent in housing reconstruction, such as role of various stakeholders including the media in reconstruction as well as in

sustainable disaster management. The following table highlights the different workshops held for media engagement through Baliyo Ghar Program and their key outputs.

Description of Workshop	Key Outputs
Workshop on “Role of Mass Media in Promoting Safer Reconstruction”	<ul style="list-style-type: none"> Developed understanding on the NRA Communication and Outreach Strategy and the role of mass media. Enhanced understanding of the media persons on reconstruction policies and provisions. Develop framework for effective coverage and dissemination of reconstruction issues.
Workshop on “Media Engagement on Reconstruction and Retrofitting” (February 2019)	<ul style="list-style-type: none"> Developed understanding among media personnel on various technical aspects of reconstruction and retrofitting. Exerted on the need to focus on awareness for the promotion of retrofitting through construction of demonstration models.
Workshop on “Roles of Mass Media in Institutionalizing the Reconstruction Efforts and Promoting Resilient Communities” (September 2019)	<ul style="list-style-type: none"> Discussions on the positive and negative outcomes, challenges and issues in post-earthquake reconstruction and recovery in Nepal. Emphasis on the need to appropriately disseminate the reconstruction learnings on a wider scale. Develop understanding on the role of mass media in promoting disaster resilient communities through the continued engagement and information dissemination to the communities.

Trained masons directly contributed to the reconstruction campaign

The masons trained have had a direct impact on the post-earthquake reconstruction and recovery process of their communities. The major reason for this is that masons were already working in their communities, had previously constructed a number of buildings, and were the prime source of information on technology and construction process for the house owners. Hence, with enhanced knowledge and skills gained through the different training programs, masons were able to immediately apply them in the field, as well as become influencers in propagating information on disaster resilient construction across their communities.

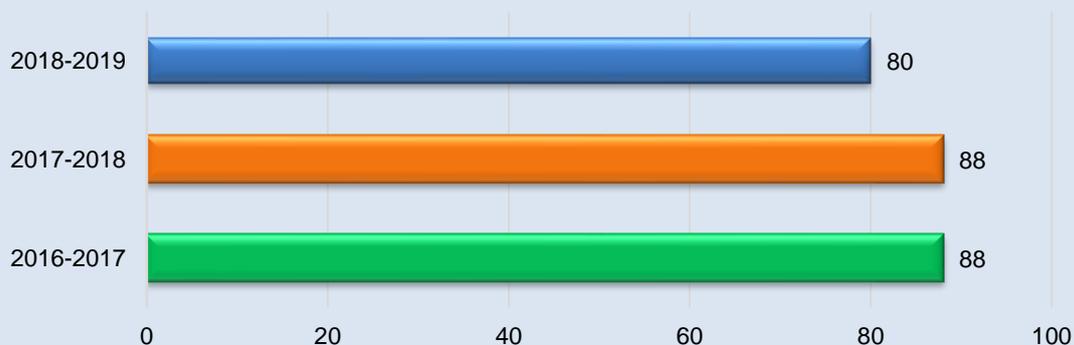


Figure 9. Professional retention (%) of masons at least one year after the training

The continuous engagement of trained masons is one of the key factors contributing to the escalation of reconstruction and compliance. The bar chart in the figure shows the proportion of trained masons who continued professional engagement in construction over a period of at-least

one year since the trainings among surveyed masons over the course of the program period from 2016-2019 where majority of the trainings were conducted. In 2016-2017 and 2017-2018, when the reconstruction progress was at its peak, 88% of the trained masons were involved in construction after the trainings. In the subsequent period in 2018-2019, 80% of the trained mason continued working.

Trained engineers further enhanced coverage of socio-technical assistance

Similar to the masons trained by Baliyo Ghar Program, the engineers that underwent various training and capacity building activities conducted by the Program further enhanced the coverage of a uniform and consistent delivery of socio-technical assistance in housing reconstruction.

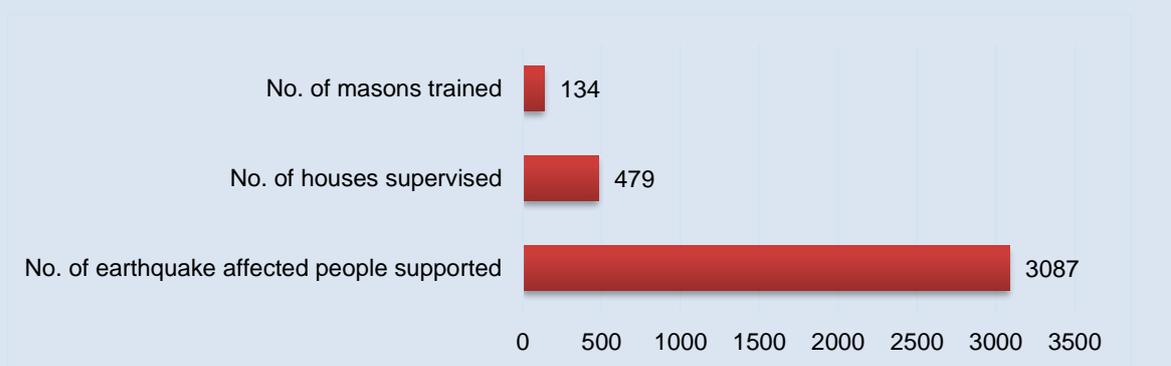


Figure 10. Average coverage of socio-technical assistance by each engineer trained through TOT training program.

The graph above shows the direct involvement of the engineers trained through the TOT program in the reconstruction process. On average, an engineer trained by Baliyo Ghar Program provided trainings to an additional 134 masons through mason training events. Similarly, the engineers provided supervision and technical support to an average of 479 houses and more than 3000 earthquake affected people. In summary, through the capacity building and training of engineers, Baliyo Ghar Program was able to contribute to a larger demographic and has thus helped enhance the quality as well as progress of the national reconstruction campaign.

“I have received various trainings such as Training of Trainers and Training for Instructors from Baliyo Ghar Program. These trainings have helped to enhance my knowledge and increase my confidence. The knowledge and skills gained during these trainings surely helped me during my work in providing technical support and conducting inspection of the reconstructed houses. I also provided trainings to hundreds of masons during the reconstruction campaign in my municipality”

- Ms. Biju Dhakal, NRA Field Engineer, Kageshwari Manohara Municipality, Kathmandu

WHAT WORKED

- Abundant trainings helped fulfill increasing demand of skilled manpower, also contributed in limiting the surge in market prices.
- Trained masons further imparted knowledge and skills to a number of people, who have also taken up safer construction as a trade.
- On the job trainings for new masons' development increased women participation and women's contribution on reconstruction of houses was significant.
- On the Job training at beneficiaries' houses was successful efforts to demonstration of earthquake resistant technology and provide the safe house for the concern family.
- Training to the local authority on DRR support for smooth function of municipality for creating conducive environment for reconstruction process.

WHAT DID NOT WORK

- Continuous engagement of trained masons and promoting entrepreneurship among the masons were remain as a gap.
- There isn't any clear plan for the utilizing Master instructors developed through the reconstruction process from different education stream engineers, social mobilizers were less prioritized.
- Retrofitting trained masons were not sufficient and retrofitting work was not replicated in compared to the need of retrofitting.





CHAPTER - 5: ENHANCEMENT OF AWARENESS ON DISASTER RESILIENCE

Homeowner knowledge of earthquake-resistant construction techniques and their adoption of these techniques in the construction of their own homes is an important contributor to reducing seismic risk in low- and middle-income countries with high levels of informal construction. Nepal, a country with high seismic risk and a rapid urbanization process that has occurred primarily through informal construction is a prime example of a society where homeowner awareness of earthquake-resistant construction techniques and use of these construction techniques can directly reduce seismic risk at the household and community scale.

Even prior to the 2015 Gorkha earthquake, various efforts were made to enhance awareness among homeowners and stakeholders in the earthquake risk management process. The most notable of these is through systematic orientation programs at various municipalities across the country during the building permit and regulation process, supported largely by NSET implemented Building Code Implementation Program (BCIPN) funded by USAID. What started as an external intervention as part of the program's activity is now a standard procedure in the program municipalities and has significantly contributed to the municipal actions in enforcing the building codes and other building regulatory norms. Apart from this, awareness raising through demonstration was also prominently used, going as back as late 1990s when retrofitting techniques in demonstrated in several school buildings across

the Kathmandu Valley, and where people in the communities witnessed these interventions firsthand. NSET had also widely collaborated with various media partners through various programs to develop and broadcast information on earthquake risk mitigation measures. The lessons and experiences gained in these efforts were crucial in shaping the activities on awareness raising during the post-earthquake housing reconstruction program as well.

Adequate communication of information and awareness among the earthquake affected households was recognized as one of the important aspects of a successful reconstruction campaign. The motive: in an owner driven approach, house owners must be capable of accessing information, processing them and utilizing them in the reconstruction of their houses. Hence, one of the major objectives of Baliyo Ghar program was to raise awareness among the residents, professionals and practitioners of the need for disaster- resilient construction technology. To achieve this different program activities like orientations, door to door technical assistance, information desk, demonstration model, media campaign was conducted. Baliyo Ghar program also assisted Government of Nepal for the formulation of reconstruction related policies and its field implementation. Baliyo Ghar Program conducted large number of orientation and interaction programs targeted towards a wide range of stakeholders, house owners, masons, engineers, local authorities etc. The purpose of the program was to enhance awareness of earthquake affected beneficiaries regarding reconstruction policies and earthquake resistant construction technologies. The following section highlights the different awareness activities conducted by Baliyo Ghar Program to aid the housing reconstruction process.

5.1 Community Engagement

To support the owner driven model of housing reconstruction, it was imperative that affected homeowners are provided with required information and psycho-social support to enhance their capacity to undertake the reconstruction process. Similarly, many of the economic activities such as agriculture, construction, infrastructure development in rural communities in Nepal is driven by community participation, most typically through the engagement of groups in an “Arma Parma” (Trade Barter) system. Hence, along with homeowners, engagement with community as a whole was also equally important to expedite the reconstruction process. Baliyo Ghar Program emphasized on enhancing awareness and increasing participation of affected homeowners and communities through various approaches and activities as discussed below.

5.1.1 Community based orientation events

Community based orientation programs are collectively referred to the activities conducted in the earthquake affected areas, where beneficiaries were provided information on administrative and technical policies, guidelines and provisions and knowledge on earthquake resistant construction in a class-room based setting. Typically, orientation program consisted of up to half a day of structured

presentations, either by the use of multimedia, printed materials or demonstration models and interactive lecturing methods.

Baliyo Ghar Program conducted large number of orientation and interaction programs targeted towards a wide range of stakeholders; house owners, masons, engineers, local authorities etc. The purpose of the program was to enhance awareness of earthquake affected beneficiaries regarding reconstruction policies and earthquake resistant construction. Specifically, orientation programs served the following objectives:

1. Enhance knowledge and understanding of stakeholders to undertake earthquake resistant construction of rural and urban buildings owing to standards prescribed in the National Building Code and the Minimum Requirements set forth by the NRA.
2. Disseminate information regarding various administrative, legal and technical provisions of reconstruction.
3. Maintain uniform understanding and confidence among different stakeholders regarding reconstruction policies and technical provisions.
4. Discuss challenges and solutions to key issues of reconstruction amidst a wide range of audience to support reconstruction activities.
5. Develop outreach of Baliyo Ghar Program and provide information regarding its activities in its implementation areas.

Baliyo Ghar Program covered 66 wards in 15 different municipalities across the four program districts. As such, a wide diversity in the socio-economic and demographic distribution can be seen among the earthquake affected households in these program areas. The diversity required program activities, although under the same alias, be conducted in different modes depending upon the needs of the community as well as the availability of resources. Similarly, as the reconstruction was a fairly dynamic process with new information on technical and administrative provisions being produced on a regular basis, orientation events were also synchronized and remodeled with updates on reconstruction policies, technical norms and other information from the National Reconstruction Authority. Thus, orientation program across the program areas were diversified in terms of content, mode of delivery etc. The following table 6 highlights the key content of orientation programs across the program duration.

Table 7: Key content and modes of delivery of orientation programs

Period	Key Contents
Year I (Oct 2015 – Sep 2016)	<ul style="list-style-type: none"> • Introduction to Nepal's reconstruction program • Introduction to Baliyo Ghar Program • Administrative policies for participation agreement • Theoretical concepts of earthquake risk management and earthquake resistant construction. • Housing designs and construction as per Government of Nepal

Period	Key Contents
Year 2 (Oct 2016 – Sep 2017)	<ul style="list-style-type: none"> • Theoretical concepts of earthquake risk management • Earthquake resistant construction as per NRA technical requirements. • NRA Inspection and grant disbursement • Correction of non-compliant houses as per NRA correction manual
Year 3 (Oct 2017 – Sep 2018)	<ul style="list-style-type: none"> • Theoretical concepts of earthquake risk management • Earthquake resistant construction as per NRA technical requirements. • NRA Inspection and grant disbursement • Correction of non-compliant houses as per NRA correction manual
Year 4 (Oct 2018 – Sep 2019)	<ul style="list-style-type: none"> • Theoretical concepts of earthquake risk management • Earthquake resistant construction as per NRA technical requirements. • NRA Inspection and grant disbursement • Retrofitting of partially damaged buildings.
Year 5 (Oct 2019 – Sep 2020)	<ul style="list-style-type: none"> • Theoretical concepts of earthquake risk management • Earthquake resistant construction as per NRA technical requirements. • NRA Inspection and grant disbursement • Retrofitting of partially damaged buildings. • Building Code Implementation and Building Permit Process • Non-structural earthquake risk mitigation.
Year 6 (Oct 2020 – Sep 2021)	<ul style="list-style-type: none"> • Theoretical concepts of earthquake risk management. • Building Code Implementation and Building Permit Process • Non-structural earthquake risk mitigation. • Extension of reconstructed households

5.1.2 Door to Door to Technical Assistance and Social Mobilization

One of the key challenges in the housing reconstruction program was the application of disaster resilient construction techniques in the reconstruction of damaged houses to ensure Build Back Better. There were primarily two issues related to this challenge: (i) the lack of knowledge and skills in disaster resilient construction techniques and (ii) individual socio-economic constraints of the houseowners hindering decision making process.

Prior to the 2015 Gorkha earthquake, knowledge, awareness and capacity of the communities in this regard was very low, owing to the absence of any building regulation or monitoring mechanism or awareness and capacity building activities, especially in the rural areas. Even with adequate information, houseowners and masons would not be able to apply the information in the construction. Moreover, as the technical compliance of the buildings was directly related to the grant disbursement, it was important to ensure that houses rebuilt conformed to the technical norms to avoid unwarranted stress.

Similarly, owing to the socio-economic diversity of the earthquake affected areas, beneficiaries had different constraints in their reconstruction process, largely hindering their decisions. These constraints included low levels of awareness on the reconstruction policies and mechanism, lack of adequate funds, unavailability of human resources and absence of credible information. With these constraints, housing reconstruction would be severely hindered without appropriate support to the houseowners. Thus, social mobilization

approach was included as a component of assistance through Baliyo Ghar Program to the earthquake affected households. Social mobilizers trained in public relationship, crisis and conflict management, community mobilization and psychosocial counselling were deployed in the affected areas alongside technical professionals to support homeowners in their decision-making process.

Baliyo Ghar Program thus combined technical assistance and social mobilization through a unique approach; mobile teams comprising of technical personnel, social mobilizer and a trained mason were deployed in the earthquake affected communities to deliver door-to-door technical assistance and social facilitation to the homeowners. The teams conducted household visits, interacting with the beneficiaries, gathering information regarding the issues of reconstruction and providing necessary information to aid the decision-making process of the homeowners to start the reconstruction process. Where house owners were about to start the construction, the team supported in the selection of trained masons, and throughout the construction process by multiple visits at critical points to ensure that technical norms and quality were met. House owners with various constraints were provided social support, most commonly, by bringing the issues into discourse at the community level among the community members and local authorities for adequate resolution.

To ensure blanket coverage and adequate support to the homeowners, multiple household visits were conducted in all Baliyo Ghar Program wards during the reconstruction period. Especially, the program targeted to visit households at the four major construction steps: (i) laying of foundation, (ii) construction of plinth bands, (iii) after construction of walls up to lintel level and (iv) during the laying of the roofing structure. Figure ... below shows the average number of door-to-door visits per house in Baliyo Ghar Program wards in Nuwakot, Dolakha and Dhading districts. Overall, in average, Baliyo Ghar Mobile Teams visited each house in its program areas a total of **2.7 times** during the reconstruction process. This average is also approximately similar to the number of inspection visits mandated by the National Reconstruction Authority for compliance assessment of the buildings. Such visits were higher during the initial period of reconstruction, when trained masons required ample on-site support to apply their knowledge and skills in the construction process. As the reconstruction pace sped up, the frequency of the visits decreased, due to the higher number of houses to be catered within the same time period and also because trained masons involved in the construction process were aptly skilled and well aware of technical norms. Similarly, homeowners too, in the later phases of reconstruction were aptly aware of the reconstruction policies and technical provisions to be met for compliance and grant approval.

The number of visits per house varied in different program areas, mostly with respect to the topography, accessibility, number of earthquake-affected households, density of houses and the pace of reconstruction. The highest average number of visits was seen in Chhap and Talakhu in Nuwakot and in Tipling of Dhading where the mobile team visited each house an average of 4 times during the reconstruction process. The lowest average was found to be in

Thansing, a peri-urban ward in Nuwakot where the team visited each house an average of 1.82 times.

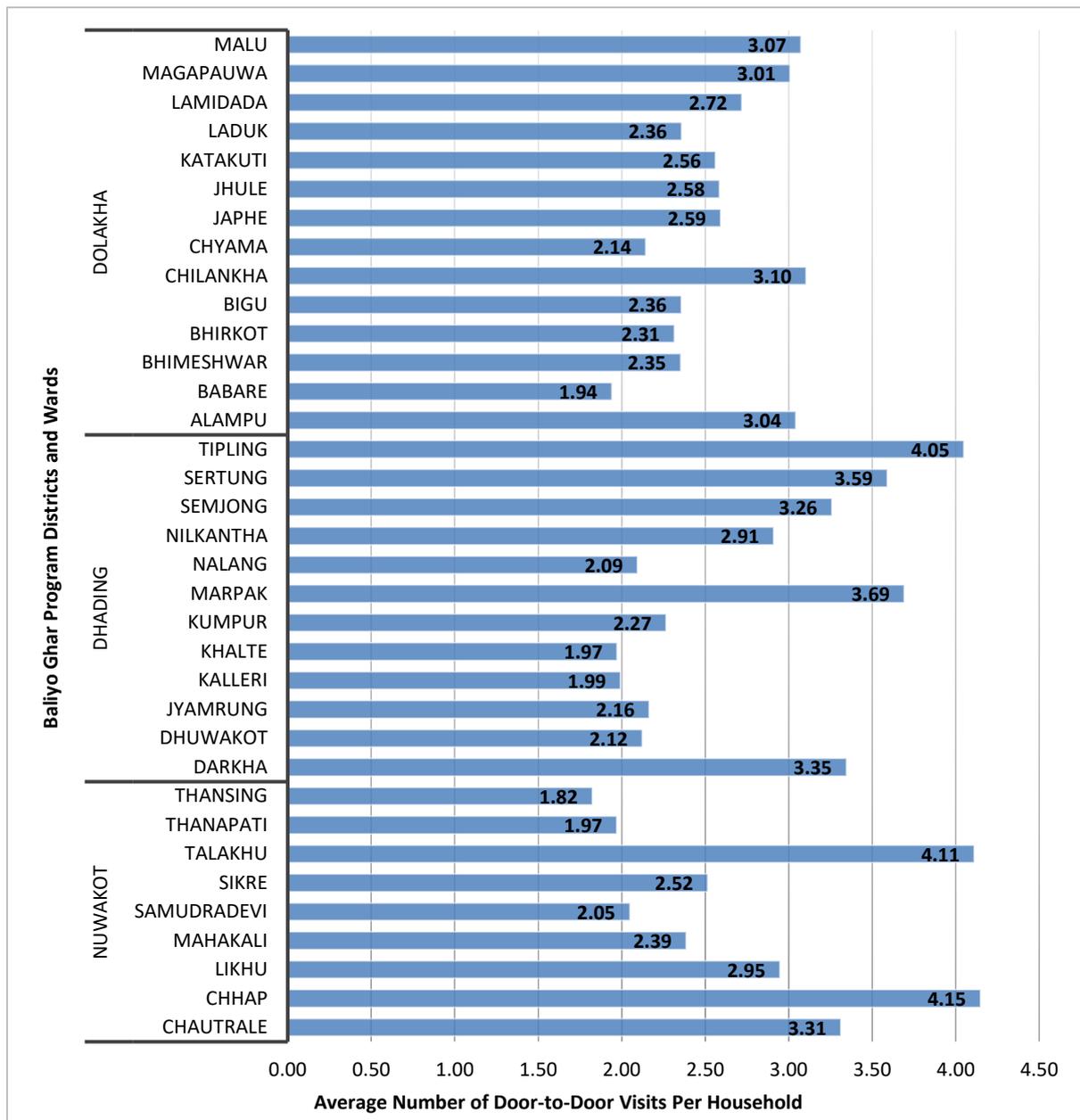


Figure 11. Average number of door-to-door visits conducted in each house in Baliyo Ghar Program wards

5.1.3 Mass awareness activities

To disseminate information to a large number of people in a single time, apart from community orientation events, Baliyo Ghar also conducted several mass awareness activities at frequent intervals. These awareness activities were generally conducted during special events such as Earthquake Safety Day, Earthquake Commemoration Day, various local festivals and gatherings etc. These awareness activities provided Baliyo Ghar Program with unique

approaches to gather public attention towards earthquake risks and mitigation measures and helped spread the information on safer reconstruction in a creative and effective way.

a. Information Desks

To disseminate reconstruction related information on a wider scale, information desks were placed to provide beneficiaries with information on NRA policy updates, construction technologies as well as address their queries and concerns regarding the policies and the reconstruction process. Information desks were very useful in distributing the publications and the IEC materials produced by the Program. Permanent information desks were placed in the district and local reconstruction technology centers of Baliyo Ghar Program where beneficiaries came to receive information. Additionally, mobile information desks were placed in several strategic locations throughout the district, at different intervals and during certain events to cater to a large number of homeowners and beneficiaries, not just from the Baliyo Ghar Program areas but from across the district.

Similarly, information desks were also placed in municipal offices in Bhimeshwar Municipality, Dolakha and Kageshwari Manohara Municipality in Kathmandu upon request from the municipality offices. Apart from information regarding the reconstruction process, these information desks also provided homeowners and beneficiaries information regarding the municipal building permit process and regulations.

In total, 7,787 homeowners and beneficiaries were benefitted from the permanent information desks at Baliyo Ghar Program offices and municipal offices and around 263 mobile information desks placed at different locations. The figure below shows the disaggregation of the number of mobile information desks and the total number of homeowners benefitted in the four program districts.

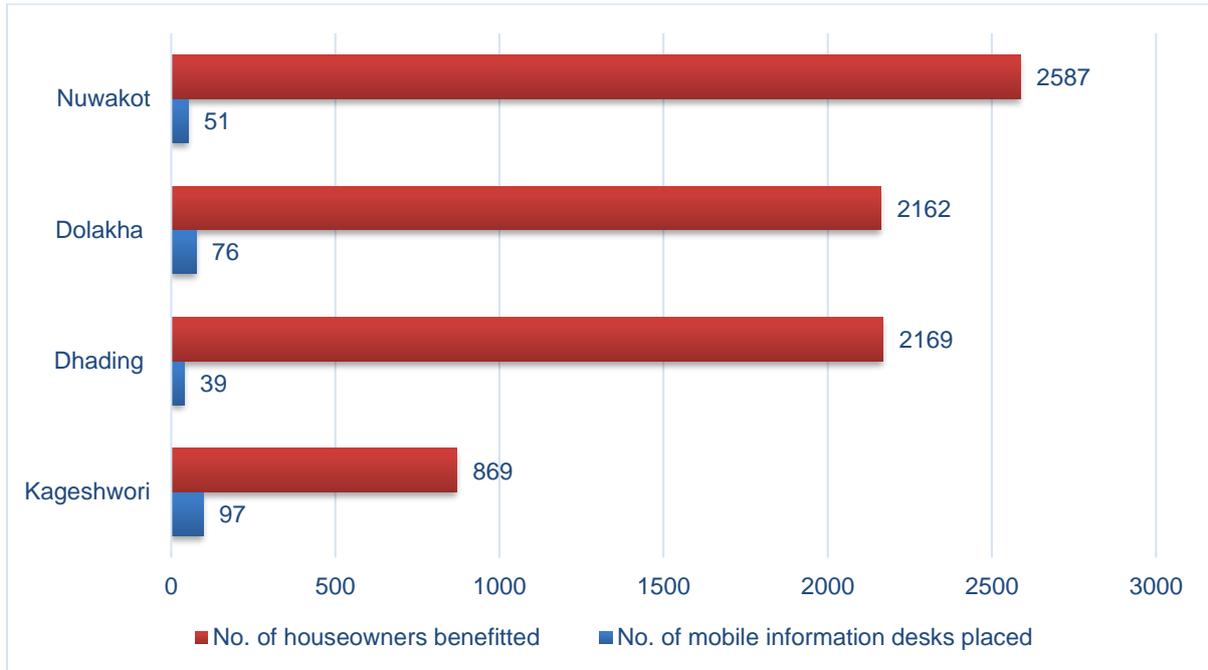


Figure 12. Number of mobile information desks placed and total houseowners benefitted through information desks in Baliyo Ghar Program

b. Earthquake Safety Day

Raising awareness among people and authorities on forthcoming earthquake risk and techniques to mitigate the risks is a key for reducing the risk. Realizing this, Government of Nepal has declared the 2nd of Magh in Bikram Sambat Calendar (January 15 or 16) as Earthquake Safety Day in commemoration of the 1934 Great Nepal Bihar Earthquake. The event has been widely commemorated through various activities and events on earthquake risk management awareness and discourses at the national, district and local levels. Baliyo Ghar Program also took the opportunity of the event to widen its mass awareness activities involving a wide range of stakeholders and conducting various programs. The commemoration of Earthquake Safety Day also provided Baliyo Ghar Program with opportunity to conduct various awareness programs in a creative approach which were not done as part of the program’s core components.

Different activities like information desk, documentary shows, speech competition, drawing competition, folk song competition, media interaction etc. were conducted in Baliyo Ghar program area.

Overall, Baliyo Ghar Program conducted 313 different mass awareness events from which 5286 people, including national, district and local stakeholders were engaged. The following table highlights the different activities and the participants.

Table 8: Different activities conducted as part of Earthquake Safety Day Commemoration

SN	Activities	Number of Events	Participants
1	Rally	11	330
2	Media Interaction	2	50
3	Singing & Dancing Competition	3	36
4	Video/Documentary Show	52	936
5	Speech Competition	14	112
6	Essay Writing	8	56
7	Drawing Competition	9	135
8	Publication Distribution Desks	29	870
9	Community Interaction Programs	143	2,288
10	Ward Stakeholder Meeting	18	144
11	Focused Group Discussion	11	77
12	Quiz competition	1	8
13	Poem Competition	2	16
14	Interaction with trained masons	8	48
15	Street Drama	1	120
16	Photo Exhibition	5	300
	Total	313	5,286

5.1.4 Demonstration of disaster resilient construction

Without practical demonstration, even the best idea remains only an elusive theory. Demonstration of the earthquake resistant construction techniques at the community level was of paramount importance to help the affected homeowners visualize the different components, understand the technical provisions and its application in the construction. Hence, as part of awareness raising, Baliyo Ghar Program constructed various small scale and full-scale demonstration models to demonstrate the earthquake resistant construction technologies in its program areas.

a. Small Scale Demonstration Models

Although, the existing masons had basic knowledge and skills required for the construction of a house, they lack specific knowledge and skills on earthquake resistant technology. So, in order to fill the gap, Baliyo Ghar Program conducted short-term training courses targeting the existing local masons in its program areas. Through these trainings two types of small-scale models were constructed Urban Model and Rural Model. These types of model were constructed during mason trainings within training days.

The main purpose of small-scale demonstration model was to provide hands on skills of the technology of resilient construction. The masons in the training learned the proper way of construction using the same materials that were used before. It helps in easy understanding of technology.

As the training models were constructed during the training of mason, each training had one to two models as per the necessity. About 437 small scale models have been constructed so far. Among them 267 models were rural type model whereas only 170 models were urban type.

b. Full Scale Demonstration Model Houses

To enhance local awareness through physical demonstration of earthquake resistant construction technology, houses constructed during the 50 Day On the Job Training Program were developed as full scale demonstration model houses. The demonstration models were able to impart crucial knowledge regarding the importance and construction techniques for earthquake resistant components of a masonry building, from the foundation to the roof. Additionally, such model houses were constructed for socially vulnerable beneficiaries identified and recommended by the local community and authorities, which further helped them in reconstruction.

Through the Baliyo Ghar Program, nine demonstration models were constructed in each previous VDC where the On the Job Training program was conducted. Apart from the comprehensive coverage wards of Baliyo Ghar Program, such demonstration models were also constructed in an additional 77 through the extension of the OJT program. Overall, across the three program districts, Dhading, Dolakha and Nuwakot, 910 demonstration model houses have been constructed by the program. These models will long serve as physical representation of earthquake resistant construction techniques in their communities, indirectly contributing to the sustainability of safer construction practices.

5.2 Awareness through media

The role of effective communication is paramount in all cycles of disaster management, preparedness, response, relief and recovery. It helps communicate information about preparedness, impact of disaster, rescue and relief efforts, vital reconstruction messages and more. Reconstruction of destroyed and damaged infrastructures is one of the key phases of disaster management cycle. Post-disaster reconstruction does not merely consist of rebuilding damaged houses but is also an opportunity for instigation of measures for increasing local capacity and knowledge on disaster risk reduction measures. Various studies and past experience in post-disaster housing reconstruction have identified 'information sharing' as a major component that fuels a recovery program. Mass communication, especially, supports a disaster recovery process not just as a tool for sharing information on policy, but also to increase public discourse, support the roles of authorities and advocate for risk reduction.

Therefore, any reconstruction campaign after the disaster can only be effective if activities, media and tools of communication and information sharing are appropriately utilized. Reliable and accessible communication and information systems also are key to a community's resilience. In order to make it sustainable, information regarding various aspects of post-disaster reconstruction need to be

communicated to the various reconstruction stakeholders. The task of rebuilding homes and communities is complex, challenging and apprehensive with various challenges and potential pitfalls. In a post-disaster scenario, the status quo shifts swiftly and regularly, a challenge that makes strategic communication a crucial element in the response and reconstruction program. Effective communication in a reconstruction is not about what governments and projects “say” but what beneficiaries “hear”. An effective communication means target group gets the information and messages as per expectation which was conveyed to them and it could be able to change their mindset, attitudes, behavior and views on particular issue. The National Reconstruction Authority itself recognized communication and outreach as a major component in post-disaster reconstruction and highlighted strategies and actions for effective communication in the NRA Communication and Outreach Strategy (2017-2020).

Hence, considering the immense importance of effective communication in aiding disaster resilient recovery, Baliyo Ghar Program implemented communication and outreach activities as a key component of socio-technical assistance. The program utilized multiple sources, from conventional channels such as national and local mass media, printed posters, pamphlets and booklets to innovative channels such as digital media, demonstrations, arts and creative activities etc. The following section discusses two major aspects of awareness through Radio and Television programs and Printed Media.

5.2.1 Baliyo Ghar Television and Radio Programs

To inform quake-affected families to rebuild damaged structures with seismic safety measures, promote safer construction practice, and support the reconstruction activities, a range of media activities were conducted through Baliyo Ghar Program. Hundreds of news media outlets produced and broadcasted news, features, articles and other content about reconstruction. National TV, radio and broadsheets disseminated news of reconstruction. Additionally, local mass media raised grassroots issues, highlighted problems in the reconstruction process, and documented activities and good practices carried out in the districts. But, those efforts were not enough to promote safer reconstruction. Dedicated programs in the mass media was the crucial need at the time reconstruction began and accelerated. There were no mass media or regular programs to deliver public information announcements and other information that government sought to disseminate basically on policy matters and updates. Almost all mass media houses focused their coverage on policy loopholes and highlighting merely the gaps and problems. The public was unclear about policies and the procedures that were to guide the rehabilitation and reconstruction of their shelters. Only they could hear the news and comments from mass media that target in criticizing the government or its agencies. At that time NSET started partnering with TV program production agency and radio stations from May 2016 and the partnership lasted till March 2021.

with local beneficiaries and bridge in between locals and district authorities in advocating safer construction practice. Also to dig out and discuss on the local issues, local radios are the best platforms. Baliyo Ghar partnered with 14 radio stations from Kathmandu Valley and districts to jointly produce and disseminate regular weekly magazine format programs focusing on various aspects of safer reconstruction. Radio programs started from May 2016 and lasted till March 2021.

The figure below shows the distribution of 156 Television Program episodes categorized into different groups with respect to type of episodes and issues covered in each episode. IN terms of the type of episodes developed and broadcasted, more than half (79) of the episodes covered issues from the field in reconstruction areas whereas remaining half were distributed between studio based discussion with prominent experts on either reconstruction policies or technical provisions and details of disaster resilient construction and retrofitting.

Similarly, in terms of the categorical coverage of issues in reconstruction, 60 episodes (38%) covered field level reports on the status, challenges, issues and successes of reconstruction interventions and activities. These field reports were highly valuable in reconstruction, not just in documenting the impacts of several policies and interventions but also for advocacy on resolution of critical issues at the national level. Similarly, 39 each of the episodes discussed on technical provisions and reconstruction policies, to provide information to the beneficiaries. Furthermore, while considerations were made to ensure inclusiveness on all the episodes, seven of the TV program episodes were fully dedicated to issues on gender and social inclusion, and contributed significantly in documenting and disseminating their challenges as well as impacts of the actions. Apart from housing reconstruction, the TV program also covered some aspects of reconstruction of cultural and heritage monuments, schools, health facilities and other public buildings and infrastructures.

Hence, the “Baliyo Ghar TV Program” has not only contributed to safer housing reconstruction but also serves as a national repository of the overall reconstruction program.

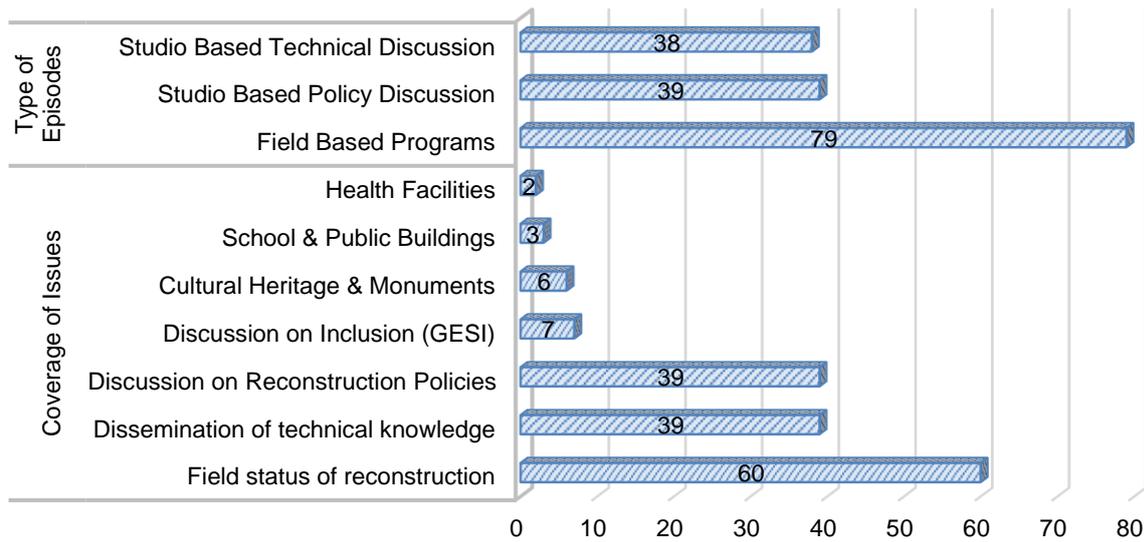


Figure 14. Distribution of “Baliyo Ghar TV Program” episodes

5.2.2 Printed Media for Communication in Reconstruction

To enhance the outreach and coverage of information in a large-scale activity such as post-disaster housing reconstruction, awareness activities such as orientation or door-to-door visits can be financially cumbersome and inefficient with respect to time. Mass media communication are useful in disseminating information to a large number of people at a single time, but it too has its limitations. For instance, radio programs are only audio communication, are suitable for sharing verbal information or knowledge but lack visual presentation to portray complex technical information. On the other hand, while TV programs provide much needed audio-visual aid and are effective in engaging beneficiaries, they are rather expensive and are one-off, they do not allow for repeated sharing of information. In such cases, various printed media collectively known as Information, Education and Communication (IEC) materials can be cost-effective and useful tools to disseminate information on a large scale and compliment the other information and communication tools. Following this principle, Baliyo Ghar Program too developed several IEC materials for a wide range of stakeholders for sharing information and disseminating knowledge on reconstruction policies, technical standards and norms. Overall, the program produced and disseminate over 66,986 copies of different types of IEC materials in the earthquake affected communities. These materials not only have significantly contributed to enhancement of awareness to support the housing reconstruction but will also remain in the communities for a long period of time, further contributing to sustained disaster resilience awareness. The following table highlights the key materials produced and disseminated through the program.

Type of IEC Materials:

- Posters
- Booklets,
- Flyers and
- Information Kits

66,986 copies Disseminated

WHAT WORKED

- The function of mobile team consisting of one engineer, one social mobilizer and one masons is very supportive for providing day to day technical support for the reconstruction which includes the technical services before and during the reconstruction of houses.
- Door-to-Door technical support provided by the engineers and construction masons to the ongoing reconstruction of houses during its construction process helps to mitigate the possible mistake prior to it happening.
- Help desk is effective to address the beneficiaries' questions related to the grant and inspection of houses.
- Local F.M radio reconstruction specific program is effective to raise the local issue for advocacy and finding possible solution form the local government system.
- National television program dedicated to the housing reconstruction is effective to disseminate policy decisions, information from top to bottom and helpful to raise the local issue from end users to the decision makers.

- Ten key messages on technical information to build resilient houses worked a lot to control the procedural mistake. The handbook was widely used by the homeowners for self-construction supervision of houses.
- The hoarding boards and poster were used as a guiding reference to the social mobilizer to propagate the safer construction practice to the homeowners.
- The technical handbooks were effective to the masons to referee during the construction process this helps them to implement the proper construction techniques.
- The correction manual, guidelines found effective for the engineers for guiding homeowner, masons, and decisions makers.

WHAT DID NOT WORK

- IEC materials without proper explanation are less useful and less effective, the IEC material distributed in mass events such as earthquake safety days and mass rally at local level were found less effective and recommend to use less in such situations or only poster and fliers need to be used.



CHAPTER - 6: PROMOTING RETROFITTING OF PARTIALLY DAMAGED BUILDINGS

Baliyo Ghar Program conducted various capacity building activities targeted to home owners, masons, engineers, social mobilizers and government officials which formed the backbone of socio-technical assistance in the earthquake-affected communities, enhancing the speed of recovery as well as ensuring the compliance of the constructed buildings to prescribed technical norms. In October 2018, three and a half years since the earthquake and three years into the implementation of Baliyo Ghar Program, 36% of the fully damaged houses had already completed their construction, and another 30% had started. Reconstruction was progressing at a satisfactory rate and was assumed to be completed within the NRA's mandated timeframe.

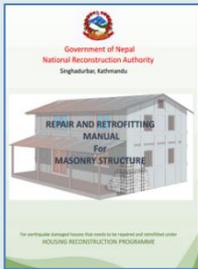
Contrary to this, partially damaged buildings, enlisted by the NRA as "retrofitting beneficiaries" in the housing reconstruction program were in a limbo. Of the 53,000 beneficiaries enlisted by NRA at that period, only about 360 (<1%) had completed the repair and retrofitting of their houses. Furthermore, where 90% of the reconstruction beneficiaries were already enrolled in the program, only 20% of the retrofitting beneficiaries had done so. Dissatisfaction, confusion, discontent and misinformation were rampant among the homeowners, masons, engineers, local representatives and government

officials alike. Despite the NRA having developed the retrofitting manual in 2017, implementation in the field was severely lacking. An intensive intervention was hence, of paramount importance to address the issues.

To address this issue, in its fourth year of implementation, Baliyo Ghar Program implemented several activities focused on the promotion of retrofitting. A comprehensive approach, with interventions at local, district as well as national levels in policy development, capacity building and awareness was utilized. Subsequently, the program provided capacity building trainings to 2,554 engineers, supervisors and designers and trained 444 local masons in retrofitting of masonry buildings. Additionally, 74 demonstration models were constructed where more than 3,500 stakeholders visited to observe retrofitting first-hand, and which has tremendously contributed to changing perceptions and enhance confidence on the technique and its benefits. These interventions fueled the national initiative in retrofitting, and a total of more than 2000 houses have been successfully retrofitting through the concerted efforts, a small but significant progress achieved considering the widespread challenges and issues.

6.1 Support in Preparation of Manuals, Curricula and Guidelines

To ascertain the uniform dissemination of knowledge and skills on retrofitting techniques, process and administrative provisions, the NRA led the process of formulating the technical guidelines, curricula and manuals. As such, in July 2017, with the aid of different partner organizations, the "Repair and Retrofit Manual" was published which included detail information on the philosophy and concept of repair and retrofit and detailed technical information on design and construction sequences of retrofitting masonry buildings using Splint and Bandage technique using reinforced concrete, welded wire mesh or wooden elements as reinforcements. The technique was selected based on its structural performance, suitability and cost effectiveness for rural masonry buildings. The manual is the key document to aid the engineers deployed in the earthquake affected communities to provide designs and supervise the retrofitting of the buildings. Similarly, NSET also worked in standardizing the training for masons and engineers on retrofitting, by developing modular curricula for on-site training for masons and engineers. As such, the following key policy documents have been developed with support from Baliyo Ghar Program.

SN	Document Title	Description
I	 <p>Repair and Retrofitting Manual for RC Frame and Masonry Buildings (June 2017)</p> <p>Stage: Approved and Published by NRA</p> <p>Contribution: Significant as part of technical team</p>	<ul style="list-style-type: none"> This manual supports the engineers responsible for the compliance inspection process. The engineers use this manual to provide advice and guidance to households for the implementation of required repair and retrofitting strategies. The design of retrofitting of masonry buildings implemented by Baliyo Ghar Program were primarily based on these guidelines.

2		<p>Curriculum for the 25 Day Training of Masons on Retrofitting of Masonry Buildings (November 2018)</p> <p>Stage: Endorsed (Provisional approval for implementation)</p> <p>Contribution Developed by Baliyo Ghar Program and submitted to NRA for endorsement</p>	<ul style="list-style-type: none"> • With lessons from implementing 50 day On the Job Training for new masons including curricula development, Baliyo Ghar Program also developed a standard curriculum for 25 Day Training on Retrofitting of Masonry Buildings. • The curriculum was not only developed to support the implementation of trainings in Baliyo Ghar Program but also to standardize the capacity building and information dissemination process across the earthquake affected areas and beyond. The curriculum was largely implemented by the program after provisional approval from NRA.
3		<p>Norms for Rate Analysis of Retrofitting Masonry Buildings</p> <p>Stage: Published by NRA as part of ICNR2021</p> <p>Contribution: Significant contribution as part of the technical working group</p>	<ul style="list-style-type: none"> • One of the key issues hindering the standardization of retrofitting of masonry buildings in Nepal was the absence of a formal government procedure for estimation of costs. This hindrance was largely felt by the Baliyo Ghar Program as well as other partner organizations supporting the NRA on retrofitting promotion during the housing reconstruction program. Hence, Baliyo Ghar Program contributed to the development and publishing of the norms for rate analysis of retrofitting in masonry buildings.

6.2 Training local masons on retrofitting of partially damaged masonry buildings

Even when the reconstruction of completely damaged buildings was booming, retrofitting was severely lagging behind in the housing reconstruction program. One of the major reasons for this delay was attributed to the fact that these communities did not have the required level of awareness and skills of communities to undertake retrofitting of houses. Although the short training for masons was in practice for more than a decade, a formal training program for retrofitting of masonry buildings was not practiced. Understanding the need for local skilled human resource to expedite the retrofitting process, Baliyo Ghar Program conceptualized, developed and implemented the “Training for Masons on Retrofitting of Masonry Buildings” in its program areas. The learnings gathered by the program during the implementation of the 7 Day Mason Training and the 50 Day On the Job Training provided crucial lessons during this implementation.

To enhance the transfer of knowledge and skills in the trainee masons, these trainings were conducted on a full-scale demonstration model houses, selected from among the partially damaged masonry houses within the same community that were enlisted as “retrofitting beneficiaries”. This approach in training masons not only helped the trainee masons in learning all the required skills and knowledge in retrofitting a full building, but also helped develop demonstration

models across the training implemented communities for awareness as discussed in later sections.

6.3 Community awareness campaigns through construction of demonstration models

To compliment the awareness campaigns and capacity building process, Baliyo Ghar Program also constructed demonstration models in the program implemented communities. Houses that were partially damaged by the 2015 Gorkha earthquake and enlisted by the National Reconstruction Authority as “retrofit beneficiaries” were prioritized in selection as demonstration model houses, in recommendation from the local governments. These model houses not only served as hands-on sites for the training of local masons, but also worked to demonstrate the procedure of retrofitting in the communities. House owners, masons, engineers, local and national stakeholders alike visited these demonstration model houses to observe the procedure of retrofitting and analyze the cost-benefits of the techniques. Baliyo Ghar Program focused on retrofitting a wide range of houses based on size, socio-economic condition of households and geographical locations to portray the suitability of the technique in different aspects.

In total, more than 1000 stakeholders; house owners, masons, engineers, local government representatives and officials from National Reconstruction Authority and other government institutions visited these demonstration model sites. The demonstration of the technique, and its subsequent impacts on the community further enhanced national confidence and consensus on the viability of the process, and helped ignite the national campaign in retrofitting the partially damaged buildings.



Figure 15. Local community people including house owners, local government representatives and others visiting a demonstration construction site on retrofitting to learn about the technique. Such demonstration visits were facilitated by Baliyo Ghar Program through awareness campaigns or trainings.

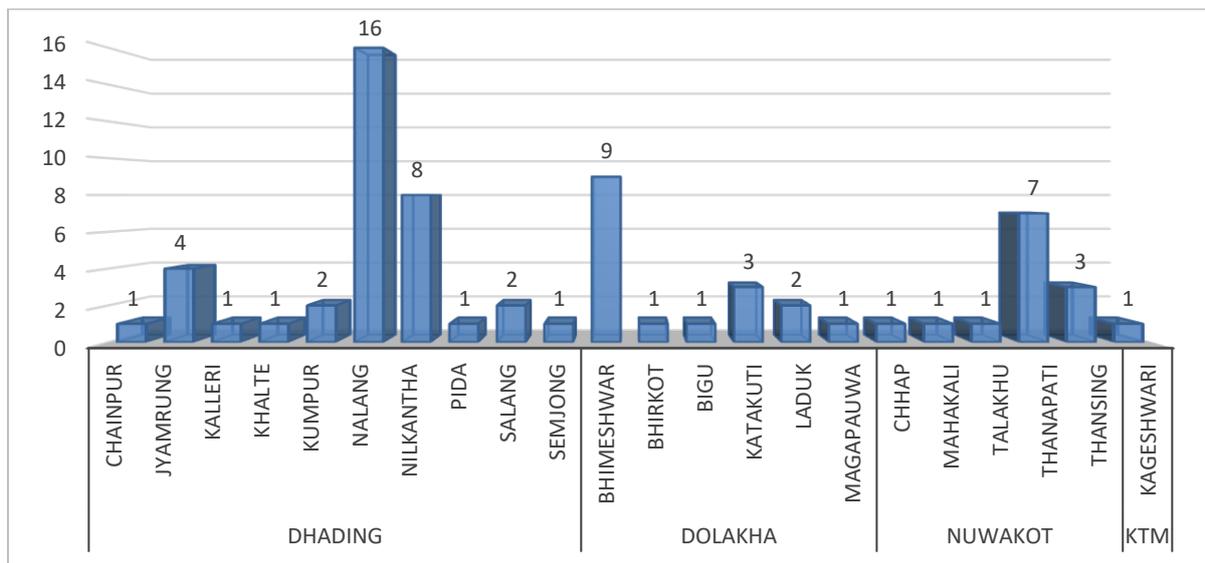


Figure 16. Number of retrofit demonstration models constructed in different program wards

6.4 Training engineers on design, construction and supervision of retrofitting

Although local masons were equipped with the hands-on implementation of retrofitting through the trainings, they required further technical support in design and supervision of the process to ensure that standards of quality construction were met. Although the guidelines on retrofitting published by the Government of Nepal were a major step in enhancing knowledge, the relative complexity of the technique with regards to various other technical factors in a building demanded that designers and supervising engineers were adequately trained on the process. Similarly, training engineers was also paramount to ensure that retrofitting beneficiaries were provided with ample technical assistance to implement the process.

Hence, as part of the comprehensive approach, Baliyo Ghar Program trained a total of engineers, architects and designers on the process of retrofitting design, construction, supervision and inspection through various training programs. The training programs were catered to the needs and level of expertise of the training participants and focused largely on hands-on skills through practical exercises and demonstrations. The following table highlights the major outputs of these trainings.

#	Description of Training	# Trained
1	Training on Basics of Repair and Retrofitting of Buildings: This training provided basic knowledge and skills in prevalent repair and retrofitting techniques in Masonry and RC Frame buildings. Theoretical knowledge were complimented with demonstration; participants observed the retrofitting of masonry buildings under construction at the demonstration model sites to enhance practical learning. The training also included use of NRA manuals and guidelines to provide technical assistance to house owners and masons on retrofitting.	239 Engineers trained from 9 events
2	Training on Inspection of Retrofitting of Masonry Buildings: Specifically targeted to the Inspection Engineers from National Reconstruction Authority, this training provided basic knowledge on repair and retrofitting as well as the use of the NRA manuals and guidelines to	186 Engineers trained from 7 Events

#	Description of Training	# Trained
	provide technical assistance and undertake inspection of the retrofitted houses for grant disbursement process.	
3	Training on Design of Retrofitting of Masonry Buildings: An advanced training course was implemented for designers and structural engineers to undertake the structural analysis and design of retrofitting of masonry buildings.	119 Designers trained from 4 Events.



Figure 17. Engineers participating in training on design of retrofitting (left) and a field demonstration on construction process of retrofitting for participating engineers (right)

6.5 Generating mass awareness through digital and printed media channels

In addition to various trainings and awareness programs, Baliyo Ghar Program comprehensively used the mass media platform; Local and National Radio and TV programs to cover, develop and broadcast awareness materials on retrofitting targeted to a wide coverage of audience.

The use of mass media was especially advantageous to create an atmosphere of curiosity among the beneficiaries regarding the process and disseminate important information regarding technical as well as administrative aspects of retrofitting and increase confidence among stakeholders through documentation of case stories depicting success of retrofit implementation. In the end, the TV program alone was able to motivate a number of beneficiaries to initiate the process of retrofitting. In the later stages of implementation by Baliyo Ghar, the TV programs largely focused on the successes of approaches and actions done by the program in promoting retrofitting across the earthquake affected areas. Similarly, testimonials from the beneficiaries, local government representatives, engineers and local and national stakeholders were broadcasted, in an attempt to increase confidence among other stakeholders. The coverage of the issues, challenges, approaches, strategies, actions and lessons will also be valuable for developing earthquake risk mitigation programs and actions in the future.

The following table highlight the program’s interventions in awareness raising in retrofitting through mass media channels.

SN	Description	Achievement
1	Number of Radio Programs developed and broadcasted through four local radio partners on retrofitting	1,720 programs developed and broadcasted 3,296 times
2	Number of TV episodes developed and broadcasted through Baliyo Ghar TV Program focused on retrofitting	156 episodes developed and broadcasted 1,370 times

6.6 Develop national consensus through discourse and sharing of learnings

Creating awareness among stakeholders is crucial for appropriate planning and prompt implementation. Keeping this in mind, NSET conducted numerous talk programs, seminars, workshops and conferences at local, district and central levels in collaboration with the government of Nepal. Such activities provided very good platform for sharing experiences among the professionals; local, provincial and central government officials, engineers, media personnel, academicians, partner organizations, donors etc. Sharing of challenges, successes, failures and learnings provided ample opportunity to develop appropriate solutions and strategies. Further, discourse on retrofitting also helped in developing national/ international linkages with similar agencies, improve coordination mechanism among the stakeholders and keeping updated with the recent global achievements in the field, enabling stakeholders to learn from local and global knowledge for effective strategy planning and implementation.

6.7 Market Facilitation

One of the key challenges during the implementation of retrofitting was the absence of retrofit materials, especially welded wire meshes in local markets in rural areas. As most retrofitting materials are not widely used for new construction, they are not locally available, even in district headquarters. Thus, market facilitation was seen as a crucial step towards supporting house owners in access to retrofit materials at a reasonable rate. Similarly, the facilitation also helped local vendors understand the scope of retrofitting in their communities and provided congenial atmosphere to increase stock of materials, thus helping in reducing the associated costs. This was altogether very essential as cost effectiveness was one of the primary concerns of the house owners.



CHAPTER - 7: EFFORTS FOR ENSURING SUSTAINABILITY OF DISASTER RESILIENT CONSTRUCTION PRACTICES.

The past earthquakes in Nepal, including the 2015 Gorkha earthquake and the immense damages have shed light on the risks and vulnerabilities of buildings, infrastructures and facilities. Earthquake risk management principles highlight the importance of ensuring earthquake resistant construction to minimize earthquake risks. The 1988 Udaypur earthquake and the subsequent damages had led to a national consensus on need for regulating building construction; the Nepal National Building Codes were developed and has been in implementation for the past two and half decades.

In another hand, Nepal is witnessing rapid urbanization. More and more residential and commercial buildings are constructed in urban and urbanizing centres within the country. With the establishment of federal structure of the country, the urbanization of rural villages is predicted to grow as local governments implement development activities. Unfortunately, a majority of the buildings are constructed in violation of the stipulations of the national building code and hence are extremely susceptible to earthquakes. The

vulnerability is additionally increasing due to lack of awareness among the overall population and authorities. Also, infrastructure development initiatives within the rapidly growing urban centres haven't been ready to adequately address the possible earthquake risk.

Furthermore, the government of Nepal has regulated to implement building permit system in all the municipalities, and this has been a challenge to the newly formed local government. The rural municipalities that came into existence after the division of the country into federalism have a huge task on hand to formulate and enact various policies and implement various activities regarding building code implementation as per the directive of the "Local Government Operations Act" and the "Disaster Management Act". However, these rural municipalities were a product of merger of various VDCs (Village Development Committees) that were existent prior to the local elections. As VDCs in Nepal did not have provisions or directive to instigate building permit systems, almost all rural municipalities are facing challenges in preparing adequate and appropriate policy documents, provisions and human resources for building code implementation.

The reconstruction after the 2015 Gorkha earthquake has significantly increased the awareness on safer reconstruction among house owners. The reconstructed houses are compliant to the building code without which the beneficiaries are not eligible to receive the government grant support for housing reconstruction. This has provided a congenial environment for local authorities to develop appropriate system to regulate and monitor new construction to meet minimum requirement desired by the NBC, thus enhancing the resilience of the communities. Hence, new municipalities formed after federal government system must be strategic to develop the check and balance of Building Permit System

The strengthening of local government institutions to undertake the regulation of building construction to ensure safer construction practices falls under one of Baliyo Ghar Program's long-term goal of establishing a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal. In the first four years of implementation, the program significantly contributed to the reconstruction and recovery campaign. Thousands of local masons and engineers were trained in disaster resilient construction methods and house owners were made aware on disaster risks and mitigation measures. Significant enhancement has been achieved in the local construction capacity and the public awareness on disaster resilience, while simultaneously, local government institutions have been continuously encouraged and are motivated to develop necessary systems and mechanisms to continue safer construction. Hence, in the final two years, the program focused on ensuring the sustainability of the disaster resilient construction practices by supporting the local governments in developing and enacting key policies in building regulation and disaster risk management. The Table 8 below discusses the key activities conducted and their outputs.

In summary, the program developed the capacity and understanding of its program municipalities in building code and regulation of building construction

through various trainings, meetings and discussions. Similarly, through cross learning and networking activities such as workshops and exposure visits, officials and elected representatives from Baliyo Ghar Program municipalities were able to observe the process in municipalities that have been implementing the building codes for more than a decade and learn from their challenges and strategies. Furthermore, with support from the program, three rural municipalities have developed the “Building Permit Process Standard Operating Procedure”, a key institutional policy to direct and guide the building regulation in the municipalities.

Table 9: Activities performed as technical assistance for sustainability of safer construction practices in municipalities through building regulation process.

SN	Name of Activity	Description	Achievements
1	Training to Local Authority on Building Code Implementation	<p>Objectives:</p> <ul style="list-style-type: none"> To sensitize local government representatives and officials on National Building Code and its implementation mechanism To enhance understanding of local governments for establishment of building permit system and, To strengthen coordination among BG team and local authorities for BCI development. <p>Target Participants:</p> <ul style="list-style-type: none"> Officials and elected representatives from BG program municipalities Social leaders and activists supporting municipalities in program development 	3,202 local government officials, representatives and social leaders trained in building code implementation and building regulation mechanisms and systems.
2	Technical Training to municipality engineers on building permit process and building code implementation	<p>Objectives:</p> <ul style="list-style-type: none"> To sensitize engineers working in local governments and consultancies on the need and necessity of BCI and BPS and enhance understanding of engineers regarding NBC. To train engineers to establish the building permit process in municipality. To capacitate engineers to carry out compliance check of drawings as well as field construction of houses. <p>Target Participants:</p> <ul style="list-style-type: none"> Municipal and Consultant engineers in Urban and Rural Municipalities in BG districts 	85 engineers from municipalities and consultant firms trained in earthquake resistant building design, construction and building regulation through building permit process.
3	Training on Safer Construction and Construction Management	<p>Objectives:</p> <ul style="list-style-type: none"> To enhance understanding of local contractors and masons on earthquake resistant building construction techniques. To provide knowledge to contractors on safer construction practices and site management. <p>Target Participants:</p> <ul style="list-style-type: none"> Local masons and building contractors that work in construction of private and public buildings. 	80 masons and petty contractors trained in earthquake resistant construction practices, municipal building permit process and construction management.
4	Technical Support for Building Permit System Development	<p>Objectives:</p> <ul style="list-style-type: none"> Conduct meetings with stakeholders To assess the status of municipalities (carry out SWOT analysis) to establish building permit system To assist municipalities in preparing required policy documents and mechanism for BCI and BPs 	Supported three rural municipalities in developing Building Permit Process Standard Operating Procedure. Bigu Rural Municipality endorsed and initiated implementation.
5	Support on BC system improvement	<p>Objectives:</p> <ul style="list-style-type: none"> Prepare type designs and drawings of buildings for typical typologies. Prepare database of existing building typologies, cost estimates and construction practices 	Four model drawings developed for typical houses in rural municipalities.

SN	Name of Activity	Description	Achievements
6	Workshop to exchange learnings in Building Code Implementation	<p>Objectives:</p> <ul style="list-style-type: none"> • Understand the perception, strengths and weaknesses of municipalities in BG program districts. • Share the learnings of BCI in municipalities that have established since long time. • Prepare action plans for establishment and development of BCI and BPS in rural municipalities. • Facilitate and promote networking of municipalities across the nation for exchange of resources and learnings on BCI. • Institutionalization of learnings for replication in program municipalities 	Two municipal level workshops conducted for discussion on need, challenges and strategies of building code implementation and permit process in municipalities.
7	Networking for Cross Learning and Collaboration	<p>Objectives:</p> <ul style="list-style-type: none"> • To provide platform for observation of best practices of BCI and BPS in municipalities. • To facilitate the exchange of knowledge and learnings. • To promote long term coordination and networking of municipalities. <p>Target:</p> <ul style="list-style-type: none"> • Officials and elected representatives from BG Program municipalities 	20 local government officials and representatives from 12 Urban and 3 Rural Baliyo Ghar program municipalities visited Vyas and Kawasoti municipalities for cross learning in building code implementation.





CHAPTER - 8: OUTCOMES AND IMPACTS

Gorkha earthquake housing reconstruction is biggest owner driven housing reconstruction having reconstruction case load of more than 800 thousand damaged houses. Nepal government adopt the owner driven housing reconstruction approach providing financial and technical support from the government. National reconstruction authority is the special institution formed by the government with the assignment to complete the reconstruction and recovery in five years period which was lately extended one year due to COVID-19 reason.

NRA was formed eight months after the earthquake and was a new authority. While reaching to the end of its effective life, NRA achieved significant progress on housing reconstruction. More than the 91.8% reconstruction beneficiaries who did their agreement to reconstruct their houses completed their reconstruction. The support of reconstruction beneficiaries, donors, government ministries, and I/NGOs remains exemplary to get the success on housing reconstruction in a stipulated time frame. Now, Nepal is setting the example that the physical reconstruction of houses is possible with in certain time frame according to its demonstrated success so far. However, the complex and special cases need to be addressed separately like urban reconstruction, reconstruction of vulnerable populations' houses and the reconstruction of traditional settlements.

The learnings of Pakistan reconstruction remain instrumental to shape the gorkha earthquake housing reconstruction and was well utilized in Nepal. The non-governmental organizations, UN agency, USAID supported to bring the learnings from Pakistan where few Nepalese NGO were involved. The data presented in chart below show that the momentum of housing reconstruction

was speed up after second year of earthquake. First two years were largely consumed on policy drafting and setting the institutional arrangement of NRA. The reconstruction progress was only 2.5% of agreement done with NRA by the beneficiaries which was reached to 68.5% in a fourth year after earthquake and finally reached to 91.8% completed cases by the end of fifth year. While comparing to Pakistan, the EERA was formed just after 2 week of earthquake and there were 60% progress in first year after earthquake and 95% by the end of fifth year. Similarly, the Gujrat earthquake reconstruction was about 30% in second year of earthquake and 94% by the end of fifth year. It was important to note that the Gorkha earthquake housing reconstruction being the biggest reconstruction and started in a huge gap of essential policy and institution arrangement achieved 91% progress by the end of fifth years after earthquake which is a successful example. However, the achievements on physical progress were not only the means of success and the remaining reconstruction must be completed to leave no one behind.

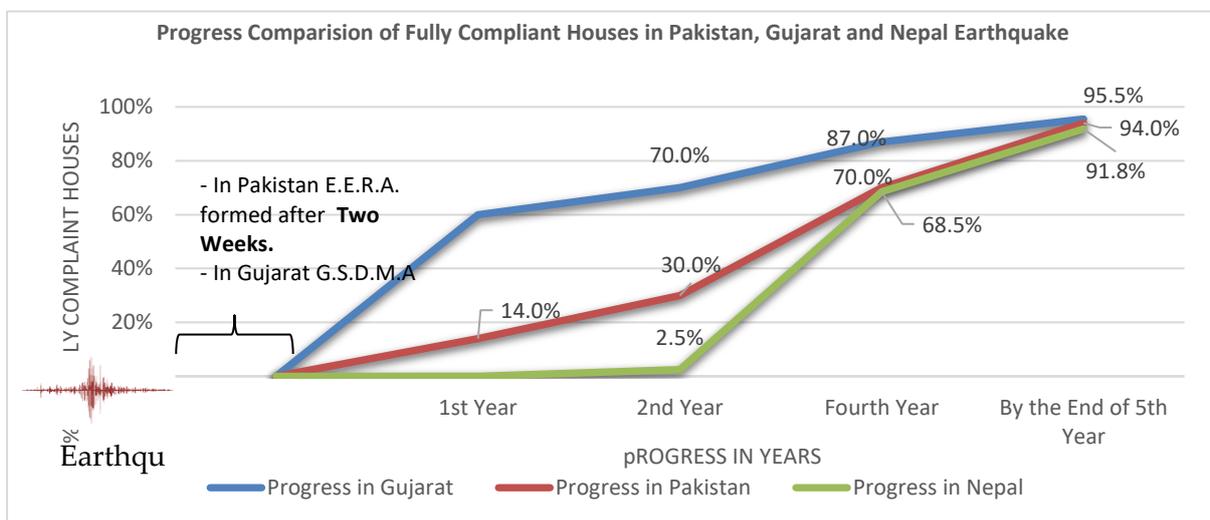


Figure 18. Progress Comparison of Fully Compliant Houses in Pakistan, Gujarat and Nepal Earthquake

8.1 Support in enhancing housing reconstruction process

The figure 18 shows the comparison of second tranche received by beneficiaries. The green line shows the average of second tranche received by beneficiaries of Baliyo Ghar area while blue line is the national average. There was no any significant difference in the tranche received but relatively the Baliyo Ghar program area have received the tranche faster by 3 months to 1 years than other areas. This indicates that socio technical assistance have provided support in Baliyo Ghar program.

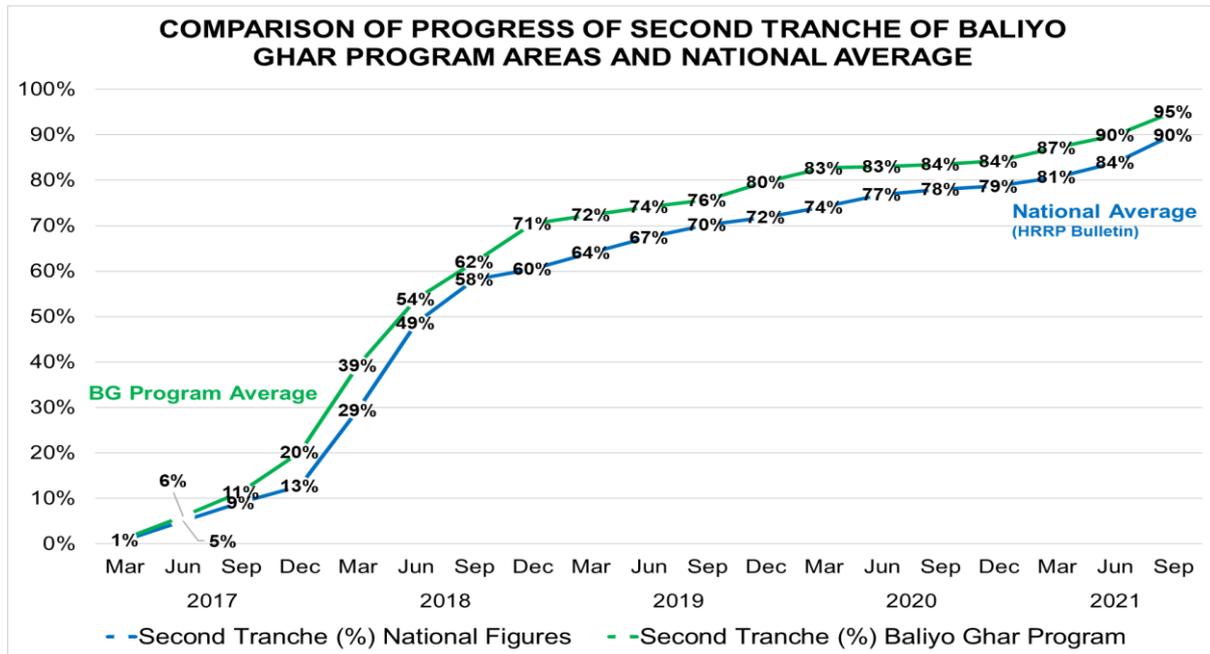


Figure 19. Comparative cumulative second tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)

Similarly, figure 19 shows the comparison of third tranche received by beneficiaries. There was no any significant difference in the tranche received but relatively the Baliyo Ghar program area have received the tranche faster by 3 months to 9 months than other areas. This also indicates the importance of socio technical assistance support along with the support in constructing the building compliance and providing the confidence to the house owners.

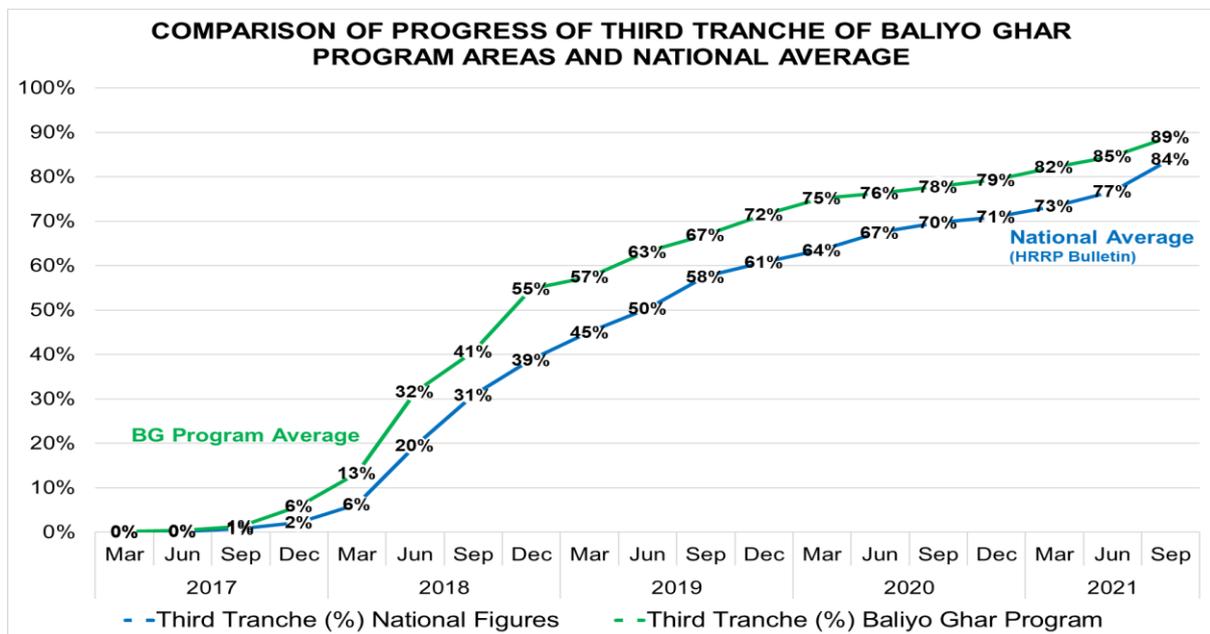


Figure 20. Comparative cumulative third tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)

8.2 Trained masons' engagement in construction

The capacity building of local masons and their involvement in the reconstruction process was one of the emphasis of the national reconstruction program and has also been mentioned in the post-disaster recovery policies. In this line, Baliyo Ghar Program also subsequently developed strategies to ensure that houseowners rebuilding their damaged houses utilized and employed trained masons in the process. This, in essence, had two benefits. First, engagement of trained masons in construction ensured that knowledge on earthquake resistant construction was directly applied in the field, which increases the compliance of buildings. Secondly, practice of disaster resilient construction further enhances the masons' confidence and helps instill the knowledge within the communities.

As a direct result of the capacity building activities for masons, a significant proportion of house owners in Baliyo Ghar Program areas were able to employ trained masons in construction. Overall, 86% of the houseowners employed trained masons in construction, the number much higher in Dhading (93%) followed by Dolakha and Nuwakot at about 80% each.

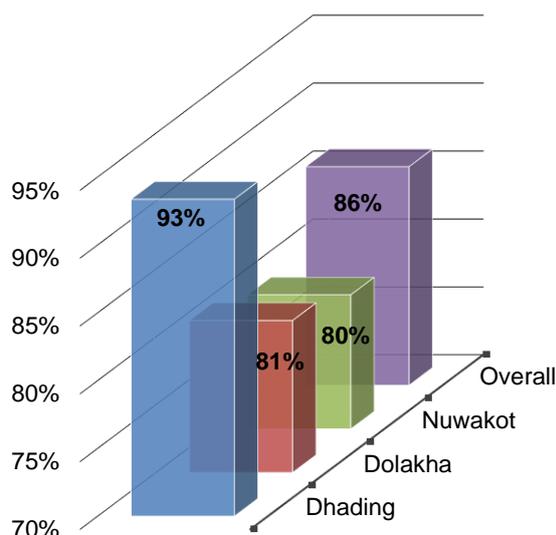


Figure 21. Proportion of reconstructed houses that utilized at least one trained mason during construction

8.3 Contribution to change of perception towards disaster risks and reduction

Baliyo Ghar Program's contribution to enhancement of public awareness in disaster resilient construction practices

One of the major objectives of the survey was to assess the change in the knowledge, attitude and practice of the people residing in the program communities. Baseline and Endline surveys were conducted to measure the change in the level of awareness of the people before and after the

implementation of the program. As per the Monitoring and Evaluation plan of Baliyo Ghar Program in five years period after the implementation of the program, the Endline KAP score was targeted to increase by 60 % from the Baseline KAP Score. Aggregate KAP score was computed by combining related knowledge, attitude, and practice items and reported as score out of 100. The questions of the KAP assessment were grouped into separate categories. The sum of the scores was taken as the participant's KAP score.

The average KAP score in the baseline survey was 30 (out of 100) and 60% of 30 is 18, which makes the targeted KAP score to be achieved is 48 in the endline. A number of capacity building and awareness raising activities, door to door technical assistance, and use of various media were done to raise the awareness of people under Baliyo Ghar program. These activities conducted in the Baliyo Ghar program districts were expected to contribute to the increase in the KAP scores of the respondents in the survey areas.

KAP score was computed from the endline study, and the results of the analysis showed that the KAP score increased to 50 during the endline survey which reflects that the set target in the M&E plan has been achieved. The figure below presents the mean KAP Scores of the respondents during the Baseline and End line surveys. Each component of KAP score i.e., knowledge, attitude and practice score were found to be increased during endline survey as compared to the baseline. The average knowledge score increased from 36 out of 100 to 48, attitude score from 41 out of 100 to 57, and practice score which was 11 out of 100 increased to 46 out of 100.

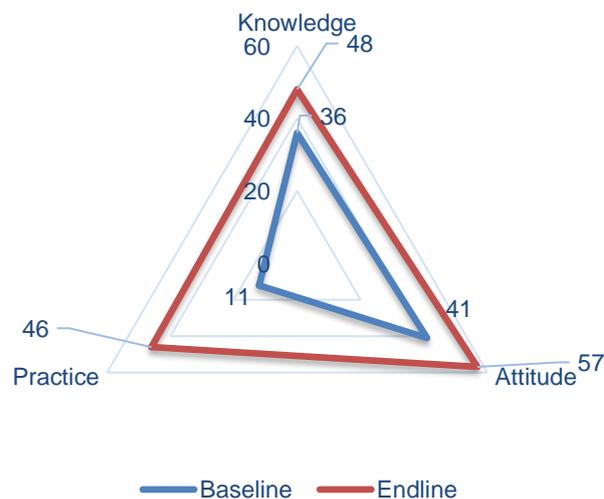


Figure 22. Knowledge, Attitude, Practice score of beneficiaries in Baliyo Ghar Program

One of the intermediate results of the Baliyo Ghar program was to increase awareness level of community people through different program activities like orientations, door to door technical assistance, information desk, demonstration model, media campaign. Baliyo Ghar program also assisted Government of Nepal for the formulation of reconstruction related policies and its field implementation. Baliyo Ghar Program conducted large number of orientation

and interaction programs targeted towards a wide range of stakeholders, house owners, masons, engineers, local authorities etc. The purpose of the program was to enhance awareness of earthquake affected beneficiaries regarding reconstruction policies and earthquake resistant construction technologies.

8.4 Baliyo Ghar's Contribution in National Reconstruction

Baliyo Ghar Program covered 66 wards in four earthquake affected districts, only 7% of the total listed beneficiaries were provided with direct socio-technical assistance. However, as discussed earlier, Baliyo Ghar's activities such as 50 days On the Job training, training for engineers and social mobilizers, training for local authorities and various other knowledge dissemination and discourse workshops covered a wide spectrum, supporting the national reconstruction campaign as a whole. In particular, Baliyo Ghar's comprehensive and blanket assistance approach has been crucial in the achievements of the program's outputs and impacts. On the other hand, despite smaller coverage, Baliyo Ghar emphasized on the extensive inputs in its program areas, to provide house owners, masons and reconstruction support actors with adequate knowledge, skills and capacity to undertake reconstruction in a swift manner.

8.4.1 Community engagement and awareness activities

Community engagement and awareness activities were conducted on a large scale through the program, to primarily assist the house-owner decision making process in safer reconstruction. Hence, compared to national outputs from various partner organizations, Baliyo Ghar has significant contribution in various community engagement and awareness activities.

As seen in the bar graphs in figure 23-26, Baliyo Ghar's outputs in community engagement and awareness were significantly higher in comparison with the national outputs. The program conducted orientation and awareness activities for more than 146,000 people (fig 23) and provided information to more than 17,000 beneficiaries (fig 25) through information desks, accounting for 38% and 24% of the national outputs respectively by all organizations. Similarly, more than 48,000 houses (fig 24) were supported for safer construction through Door-to-Door Technical Assistance, 23% of the national outputs. The program also constructed 910 demonstration model houses to disseminate safer construction knowledge, which constitutes of 30% of the total national outputs.

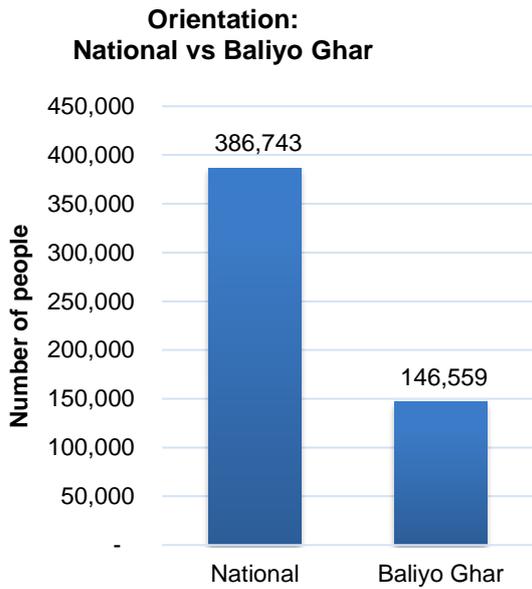


Figure 23. Comparison of National Outputs (POs) of Orientation activities with Baliyo Ghar Program

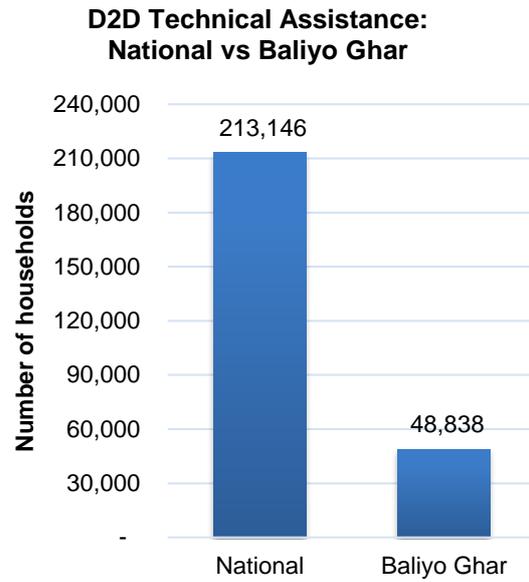


Figure 24. Comparison of National Outputs (POs) of Door-to-Door Technical Assistance with Baliyo Ghar Program

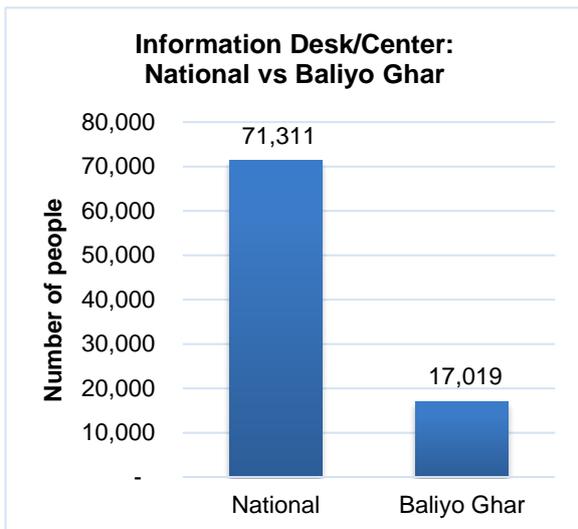


Figure 25. Comparison of national outputs (POs) of people supported through Information Desks with Baliyo Ghar

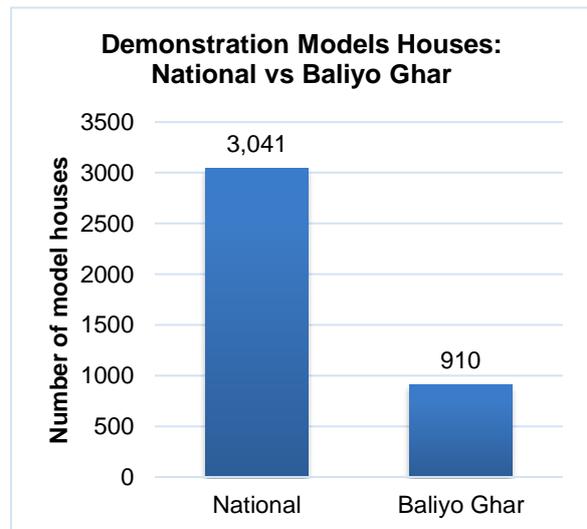


Figure 26. Comparison of national outputs of demonstration houses construction with Baliyo Ghar

8.4.2 Contribution to enhanced capacity in safer construction

As seen in the bar graphs in figure 27-28, Baliyo Ghar’s outputs in enhanced capacity in safer construction were significantly higher in comparison with the national outputs. The program conducted mason training activities for more than 7,300 working masons (fig 27) and on the job training activities for more than 5,500 new masons (fig 28) accounting for 15% and 24% of the national

outputs respectively by all organizations. On the job training was initiated as there were lack of masons and many interested people to work as new masons.



Figure 27. Comparison of National outputs (GoN+POs) of existing masons trained with Baliyo Ghar



Figure 28. Comparison of National outputs (GoN+POs) of new masons trained with Baliyo Ghar

8.4.3 Contribution in promotion of retrofitting

In the initial stage retrofitting was not in the program activities. NSET had long experience on retrofitting and after realizing that enough masons were been trained some of the OJT houses were cancelled and the fund was diverted to the retrofitting. Only 467 masons and 1053 engineers were trained in retrofitting technology i.e. about 21% and 40% respectively. This training has aware the people and developed the confidence of engineers on the concept of retrofitting of any type of houses. In the bar graphs below (fig 30) shows the contribution of Baliyo Ghar in construction of retrofit demonstration models i.e. 10%.

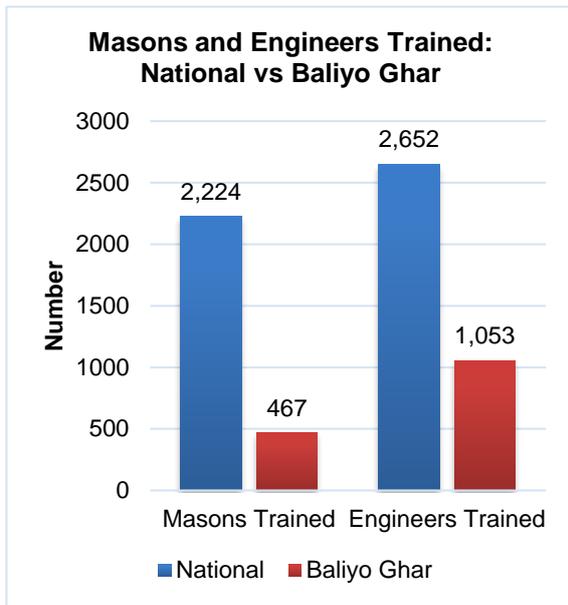


Figure 29. Comparison of national and BG outputs of masons and engineers trained in retrofitting

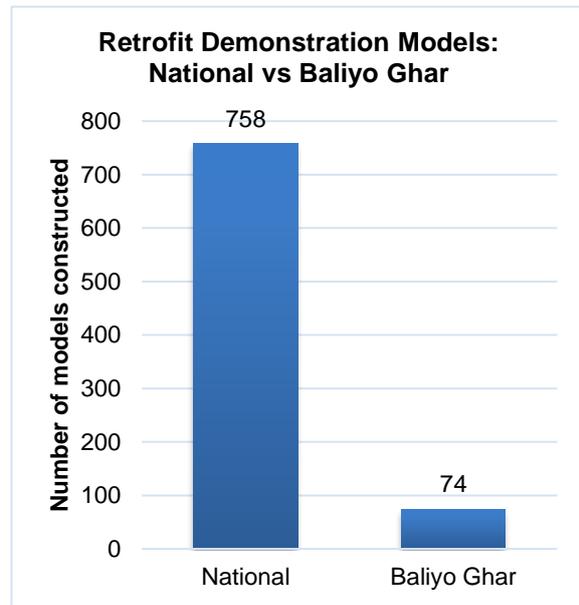


Figure 30. Comparison of national and BG outputs of retrofit demonstration models constructed for awareness.





CHAPTER - 9: BALIYO GHAR'S CONTRIBUTION TO GENDER EQUALITY AND SOCIAL INCLUSION

Although disasters effect every person alike, their impacts vary on a wide degree among different social groups. Women, senior citizens, people living with disabilities, children, marginalized social and ethnic groups such as Dalits were in fact disproportionately affected by the 2015 Gorkha earthquake. The social construct and widespread inequality among these social groups did not only increase the effect of the disaster, but also posed serious challenge in their path to recovery, further exacerbated by lesser capacity to cope and respond effectively to a disaster. Lack of house and land ownership, low levels of education, awareness and access to information, compounded by constrained access to economic resource meant that these groups could be marginalized from the coverage of the housing reconstruction program. Hence, it was of paramount importance for the National Reconstruction Authority and assistance program like Baliyo Ghar to adequately recognize this issue and incorporate special provisions to ensure an inclusive and equitable reconstruction campaign.

The Constitution of Nepal provides for the building of an egalitarian society based on the principles of women's rights and proportional inclusion and participation by effectively implementing the provisions, these rights include women and socially or culturally backward women, minatory group, senior citizen, differently able people and economically deprived population. Gender Equality and Social Inclusion (GESI) refers to a societal state where different

social groups including women and men enjoy the same status, have equal access to all resources, and benefit from all opportunities. Therefore, GESI is a concept, which addresses unequal power relations between women and men and between different social groups.

GESI actions focus on providing an equal opportunity, empowerment and participation of both women and men and between different social groups in all spheres of public and private life. This does not only mean providing an equal opportunity but recognizing their different needs, living conditions and position due to sex and gender role and ensure that these differences should not discriminate against them.

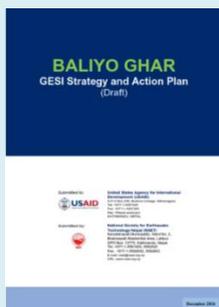
Social inclusion is the removal of institutional barriers and the enhancement of incentives to increase the access of excluded individuals and groups to development opportunities. Social inclusion is the process of outreach to include all sectors of society in planning and decision making which affects their lives and making space for them to improve their living standards and their overall well-being.

Development of any nation or society is not possible as long as women, children, vulnerable groups (elderly, disabled single women, blind and red and blue card holders with disabilities and minors under 16) are actively involved in development activities. Therefore, even in the current constitution of Nepal, gender equality and social inclusion, which came as a concept of inclusion in the society, has been taken as a strategy of development today. Therefore, gender equality and social inclusion are also important in reconstruction. For example, in our society, men still do all the work outside the house, including house building, and the belief that women's work is only the work inside the house is still alive. Accordingly, the provision and strategy for equal participation of men and women in reconstruction is limited to paper only. It is the responsibility of all of us to implement the concept of 'equal pay for equal work' in practice. It is important to make reconstruction effective by giving equal opportunities to people like women and various backward castes etc. Among them, Baliyo Ghar Program has added some activities to establish and implement gender equality and social inclusion in the society.

9.1 GESI Action Plan to ensure equal participation

Gender Equality and Social Inclusion (GESI) is regarded as an effective means and approach to ensure equal participation of all social groups in the mainstream process for the success of any development agenda. GESI has been envisioned in Baliyo Ghar Program to foster socially inclusive housing reconstruction in the country by addressing the special needs of disadvantaged groups, including women. Mainstreaming of GESI approaches forms the basis for the program activities and has been specifically highlighted in the GESI Strategy and Action Plan of the program.

The GESI Action Plan is rooted in three key principles to ensure inclusiveness and equal opportunity.



- (i) **All people**, irrespective of the ethnicity, gender and socio-economic status **will have equal opportunities** to the program activities and technical assistance delivered by the program.
- (ii) **All activities will use “equity” considerations** as a basis of promoting equality.
- (iii) **Integrating GESI perspective through mainstreaming** forms the basis for policy, design, approach and implementation to ensure enabling environment for different social groups.

These principles complement the overall program goals and objectives and guides the program in ensuring that different program activities are inclusive.

Table 10 below highlights the gender and ethnic proportion of the population in Baliyo Ghar Program coverage areas, in the three districts (Census 2011). It can be clearly seen that more than half of the total population in the program areas were female. Similarly, in terms of ethnic groups, Janajati were the most prevalent ethnic groups in the program areas, followed by Chhetri and Brahmin. Vulnerable social groups such as Dalits were also present in significant numbers across the three program districts.

Table 10: Gender and Ethnic Proportion of Population in Baliyo Ghar Program coverage areas.

District	Total Population	Gender Proportion		Ethnicity Proportion						
		Male	Female	Brahmin	Chhetri	Janajati	Newar	Muslim	Dalit	Others
Dhading	122,664	48.0%	52.0%	11.0%	9.5%	32.8%	10.4%	0.1%	5.8%	30.4%
Dolakha	71,152	49.0%	51.0%	13.3%	40.0%	24.8%	12.8%	0.1%	8.3%	0.7%
Nuwakot	45,697	47.4%	52.6%	16.9%	10.5%	49.2%	4.0%	0.3%	6.7%	12.3%

Similarly, the program also identified key vulnerable groups of households to better ascertain needs of socio-technical assistance and plan for relevant strategies and activities. Of these groups, single women constituted 1.4% of the total population, while senior citizens, people with disabilities and conflict affected people constituted 7%, 1.1% and 0.2% of the total population.

District	Single Women	Female Headed HHs	Senior Citizens	People with Disabilities	Conflict Affected People
Dhading	0.9%	27.8%	4.0%	1.1%	0.1%
Dolakha	1.6%	9.0%	6.0%	1.0%	0.0%
Nuwakot	2.3%	13.0%	11.0%	1.6%	0.7%
Overall	1.4%	16.6%	7.0%	1.1%	0.2%

Of these, the most direct attribute towards housing reconstruction was the proportion of female headed households in the program areas. Overall, 16% of the households in Baliyo Ghar Program areas were headed by females, the proportion much larger in Dhading (28%). This proportion was especially important in planning housing reconstruction activities, as the owner driven

model required that homeowners make the decisions and undertake the required financial and logistic arrangements for the reconstruction. With such a high proportion of female headed households, the program laid focus on the need for inclusive activities, especially in community orientation and door-to-door household visits to enhance their capacity in reconstruction.

The various strategies and actions undertaken by the program for gender and socially inclusive socio-technical assistance is discussed below.

9.2 Ensuring female inclusion in reconstruction process

In Nepal, females were largely left behind in the housing construction process. Social norms dictated women to be outcast in construction, even entering an under-construction house is considered as an omen in many culture and communities. Hence, very few women, especially in the rural areas were involved in construction as skilled masons, they were only allowed to assist the male masons as laborers carrying water, mud, stones and preparing lunches.

A preliminary study conducted by the program in 2016 stated that a total of 2173 female labor worked in the construction sector in the program area in three districts. Among them, only 240 females were working as skilled masons in the construction sector in Baliyo Ghar Program areas out of which only 31 had been trained in construction. Even when females worked in construction, their daily wages were much lower than their male counterparts. On average, female masons earned 14% less than their male counterparts.

Table 11: Number of female construction workers and distribution of average wages in Baliyo Ghar Program areas in three districts (2016)

District	Females Involved in Construction Sector			Average Daily Wage (NRs)		
	Total Female Labor	Skilled Masons	Trained skilled masons	Male	Female	Difference
Dhading	341	179	1	810	685	170
Dolakha	506	56	25	770	600	125
Nuwakot	1326	5	5	1000	925	75
Total	2173	240	31	860	737	123

However, in a large-scale reconstruction and recovery campaign, the involvement of females was paramount due to two major reasons. Firstly, it was important to engage women as much as men, if not more, so as to enhance the overall awareness and capacity of the communities and ensure sustainability of disaster resilient construction practices. Secondly, with the immense needs in skilled and unskilled human resources, merely male participation in the construction process would not suffice, women participation was important to fulfill the increasing demand for skilled and unskilled labor.

This notion was also, in some part, felt by the affected communities themselves. Especially in the past decade, the overwhelming migration of males from rural communities for employment within the country and abroad had already

increased women participation in multiple aspects; agriculture, business, local development etc. Thus, many communities had realized the importance of women participation, but did not have the right tools to engage women in construction.

This congenial environment was rightly utilized by Baliyo Ghar Program by advocating for the need of training female in construction. While unskilled female masons weren't able to participate in the short-term mason training, large number of females participated in the 50 Day On the Job Training. Many of the females participating in these trainings had not worked in the construction sector before, and even if they had, only worked as apprentices or laborers. The inclusion of female construction workers in the OJTs helped enhance their skills in construction, created a wave for female engagement and has brought about significant changes in their socio-economic status and community perception regarding female participation in construction.

The following bar chart highlights the female participation in different Baliyo Ghar Program activities.

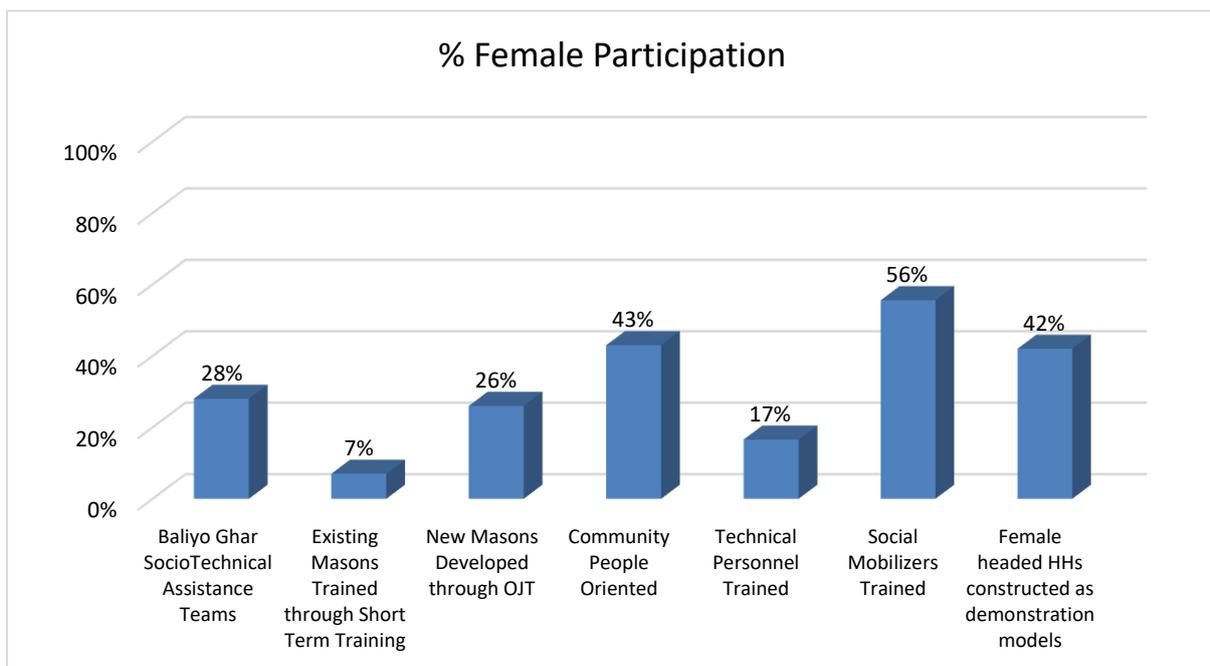


Figure 31. Female participation in various Baliyo Ghar Program interventions and outputs

As seen in the bar chart, the proportion of female participation varied in different program interventions and outputs. One of the key areas of female inclusion that Baliyo Ghar Program successfully managed was the diversity in its own program implementation, where 28 % of the socio-technical assistance team members were female. In terms of outputs of activities, various trainings had different proportions of female participation. While only 7% of the masons trained through short term trainings were female, 26% of the new masons developed through the On the Job Training programs were female. Similarly, 43% of female participation was ensured in the community-based orientation events. In other trainings, female participants constituted only about 17% in

technical trainings for engineers due to already lower proportion of female in the sector. Among the social mobilizers trained, however, as female are abundantly involved in the job sector, 56% of the trained social mobilizers were female. Finally, among the 910 houses constructed as demonstration models as part of the On the Job Training 42% % were of female headed households.

With these interventions and outputs, women participation was paramount in enhancing the pace of reconstruction as well as building community engagement in the process. Women, despite multiple challenges including social and individual constraints, lack of past experience and future assurance in the trade significantly engaged in the reconstruction process. This has not only helped the reconstruction and recovery but also change communal perception towards women participation. The opportunities received as an immediate need in reconstruction for gender inclusiveness must now be further developed by the local governments for sustainable livelihood, economic and social opportunities for females.

Within the program districts, a total of 7,245 masons were trained over the course of 244 seven-day mason training events. Male masons made up 6,773 (93%) of the total number of trained masons, while female masons made up 472 (7%). Through 910 fifty-day on-the-job training programs, a total of 5,430 new masons were trained. Male participants made up 4,034 percent of the total, while female participants made up 1396 percent. According to a 2019 mason retention survey, female retention rate was 60.4 percent (n=159), mean knowledge score was 77.52 (n=7210), and mean daily pay improved by NPR 274 after participating in training (Mean Daily wages before training was NPR 576 and after training was NPR 850).



“Even though my husband and father-in-law are masons themselves, I only helped in mixing mud or preparing lunches. I had never imagined that one day I would be working as a mason alongside them in my village. When they (Baliyo Ghar Program) inquired about my willingness to be trained as a mason, I was perplexed. I discussed with my family about the prospects, they happily agreed to allow me to take part in the training. Now I am working full time as a mason like anybody else, and no one has complained about my work until now. The training and further work also helped increase our family income,

so my family is very happy with the decision to join the training and letting me work in the construction sector.”

- Nirmala Shrestha, Female Mason working in Nilkantha Municipality, Dhading



“Females in our village did not work in construction before the earthquake. Baliyo Ghar Program taught us the importance of involving women in the reconstruction campaign, not just for faster reconstruction but also to enhance awareness and socio-economic status. So, we advocated within our community to engage all interested females in construction. With Baliyo Ghar’s support, we gave trainings to 54 female masons in this ward, 20% of the total masons trained. They have all significantly contributed to the reconstruction campaign. Now the ward is also using their skills in other construction works to ensure that they have a continued livelihood and economic opportunity.”

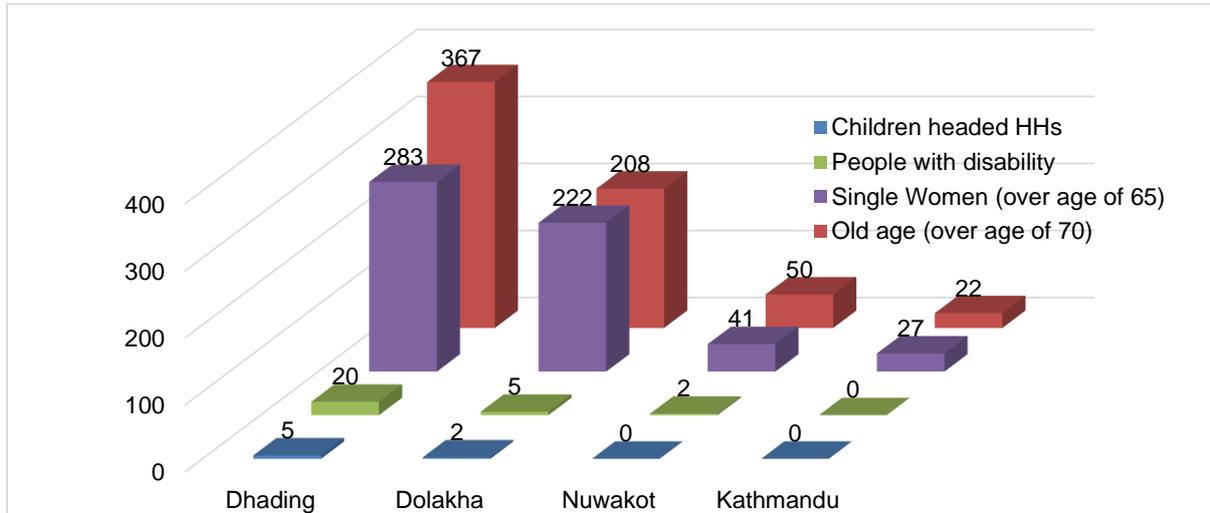
- Padam Bahadur Thami, Chairperson, Ward 7, Bigu Rural Municipality, Dolakha

9.3 Supporting vulnerable and marginalized communities in reconstruction process.

Vulnerable and marginalized social groups have long had multitude of challenges and barriers in the mainstream social and economic development. Lack of accessibility to information, education, awareness and socio-economic activities for a prolonged period of time has further exacerbated an already dire status. Due to this, not only were vulnerable groups affected disproportionately in a higher degree, but also faced multiple barriers in their housing recovery and reconstruction. Some of the major constraints associated with the vulnerable include economic constraints, lack of information, geographical remoteness, social barriers, and lack of family support among others. In this context, it was crucial for assistance programs to devise specific strategies to support the vulnerable groups in reconstruction and recovery, through the engagement of the local communities and stakeholders at local, district and national levels.

In the aftermath of the Gorkha earthquake, the NRA identified 18,505 vulnerable beneficiaries across the earthquake affected district. The identification was done based on specific criteria mentioned in the “the procedural guidelines for the identification of the vulnerable beneficiaries affected by earthquake, 2074” from the database of the eligible beneficiaries. Out of the 18,505 vulnerable beneficiaries, 49.4% are elderly (> 70 years), 48.8% are single women, 1.3% people with disability and 0.5% were minor beneficiaries below the age of 16.

Among these, 1,254 vulnerable beneficiaries were identified and listed in the four Baliyo Ghar Program districts. Program areas in Dhading had the highest proportion of beneficiaries, followed by Dolakha, Nuwakot and Kathmandu. Among the listed vulnerable groups, highest proportion were elderly citizen above 70 years of age followed by single women over the age of 65. Children and people with disability were fewer in number. The district wise and category wise distribution of listed vulnerable beneficiaries in Baliyo Ghar Program areas in the four districts is given in the graph below.



Apart from those listed by the NRA, there were several hundreds of beneficiaries in the program areas who were “vulnerable”, beneficiaries with various socio-economic constraints hindering their reconstruction and recovery.

One of the key principles and actions of Baliyo Ghar Program towards supporting vulnerable beneficiaries was the model of assistance itself; a blanket socio-technical assistance approach was implemented through the program which delivered support to the earthquake affected beneficiaries irrespective of their social status or economic strength. More specifically, homeowners with such constraints were given higher degree of assistance, with frequent door-to-door visits, specialized awareness programs and advocacy with the local stakeholders and community members. This approach in itself was able to support the reconstruction of a large number of vulnerable beneficiaries, including those in the NRA list. In January 2020, where 43% of the listed vulnerable beneficiaries had engaged in the reconstruction process nationwide, 80% of the beneficiaries in Baliyo Ghar Program areas had either started or already completed the construction. This shows that Baliyo Ghar Program’s socio-technical assistance approach was helpful for vulnerable beneficiaries in reconstruction. However, apart from the regular assistance, Baliyo Ghar Program also supported beneficiaries under the vulnerable and marginalized social groups through two main approaches activities discussed below.

9.3.1 Construction of demonstration model houses of vulnerable beneficiaries through On the Job Training programs

The 50 Days On the Job Training Program was primarily planned and implemented to fulfill the increasing demand of skilled masons in the earthquake affected areas. However, as the training entailed the construction of a full-scale residential masonry house, the National Reconstruction Authority strategized for the inclusion of vulnerable and marginalized beneficiaries in the process. The NRA prioritized four main categories of earthquake affected beneficiaries to be selected as homeowners for the demonstration construction. The selection was further done after discussion and upon recommendation of the local communities and stakeholders. Baliyo Ghar Program followed these

strategies and guidelines, and prioritized vulnerable and marginalized beneficiaries in the construction of the demonstration model houses during the conduction of 910 On the Job Training programs.

Priority Order	Description of Vulnerable Status of Beneficiary
Priority 1	Single women headed household from Dalit, Janajaties and Muslim Communities
Priority 2	Single women headed household from Newar, Brahmin/Chhetri Communities
Priority 3	Relatively poor family from Dalit, Janajaties and Muslim Communities
Priority 4	Relatively poor family from Newar, Brahmin/Chhetri Communities

With this mode, Baliyo Ghar Program was able to support vulnerable beneficiaries with in-kind support amounting to NRs. 115,000 in trainee mason wages and materials. Additionally, intangible support in technical assistance and supervision, market facilitation and advocacy for grant disbursement were also done. With this approach, not only were houseowners able to construct their houses within the government grant support, but approximately six new masons were developed, and earthquake resistant construction technology was proliferated into the communities. This three-tier impact was one of the most innovative and resourceful activities conducted through the program.

Figure 32 below highlights the output of the demonstration construction activity with categorization of the beneficiaries as per the priority order described in table above. Among the 910 house owners benefitted from the demonstration construction, 27% were in Priority 1, 16% in Priority 2, 34% in Priority 3 and 16% in Priority 4. With 93% of the beneficiaries falling under the prescribed priority as per the selection guideline, the demonstration construction activity was successful in engaging vulnerable groups of beneficiaries in reconstruction.

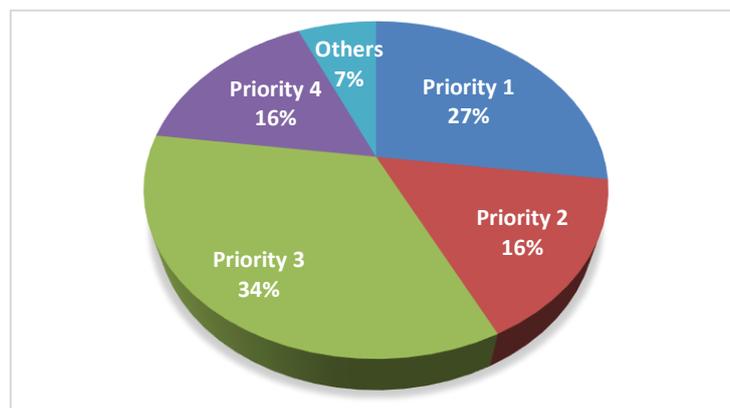


Figure 32. Distribution of demonstration model house-owners as per NRA priority order

Table 12: Demonstration Model House Owners as per NRA Vulnerability Criteria

S.N.	NRA Vulnerability Criteria	No.
1	House owner having age less than 16 year	1
2	Single women having age above 65 year	31
3	Elderly Citizen having age above 70 year	102
Total Vulnerable houses in OJT		134

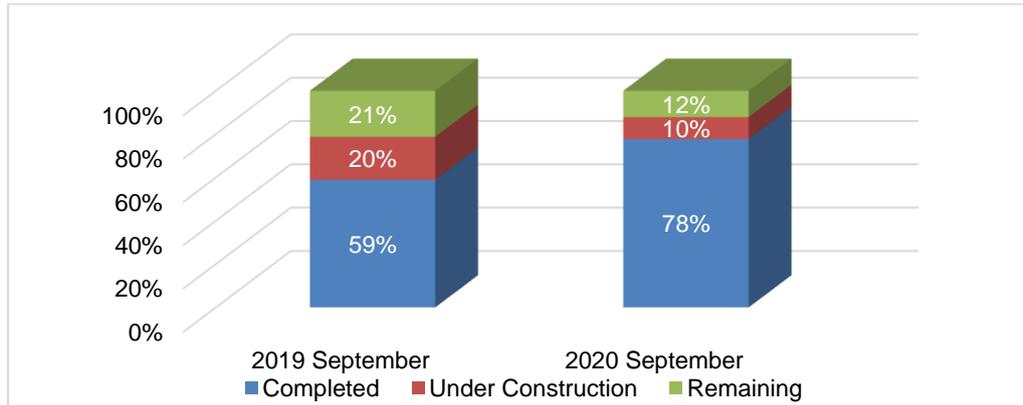
Similarly, table ... below highlights the number of beneficiaries selected as demonstration models that were listed in the NRA vulnerable list in different categories. As seen in the table, of the 910 model houses, 134 belonged to vulnerable beneficiaries of three different categories, 102 elderly citizens above 70 years, 31 beneficiaries were single women over the age of 65 and 1 beneficiary a minor household less than 16 years of age.

9.3.2 Special Technical Support for Vulnerable Housing Reconstruction

As Baliyo Ghar Program continued providing socio-technical assistance to earthquake affected beneficiaries, significant progress, especially in rural and semi-urban areas was achieved until the end of Year 4. During this time, however, the national reconstruction actors consistently pointed out that reconstruction of vulnerable beneficiaries was poor and that it required some specialized form of technical or financial assistance to facilitate them for reconstruction. Up until the end of Program Year 4, Baliyo Ghar had been providing blanket technical assistance to all beneficiaries. Although special considerations were being done for vulnerable groups, such as social mobilization, coordination with local authorities and construction of vulnerable groups' houses as demonstration models during the OJT activities, specialized support was not conceived or implemented. In Year 5 however, as Baliyo Ghar progressed towards completion and exit, it was deemed important to facilitate the reconstruction of these vulnerable beneficiaries.

As such, a "Special Technical Support for Vulnerable Households" activity was introduced in Year 5 primarily focusing on two major activities.

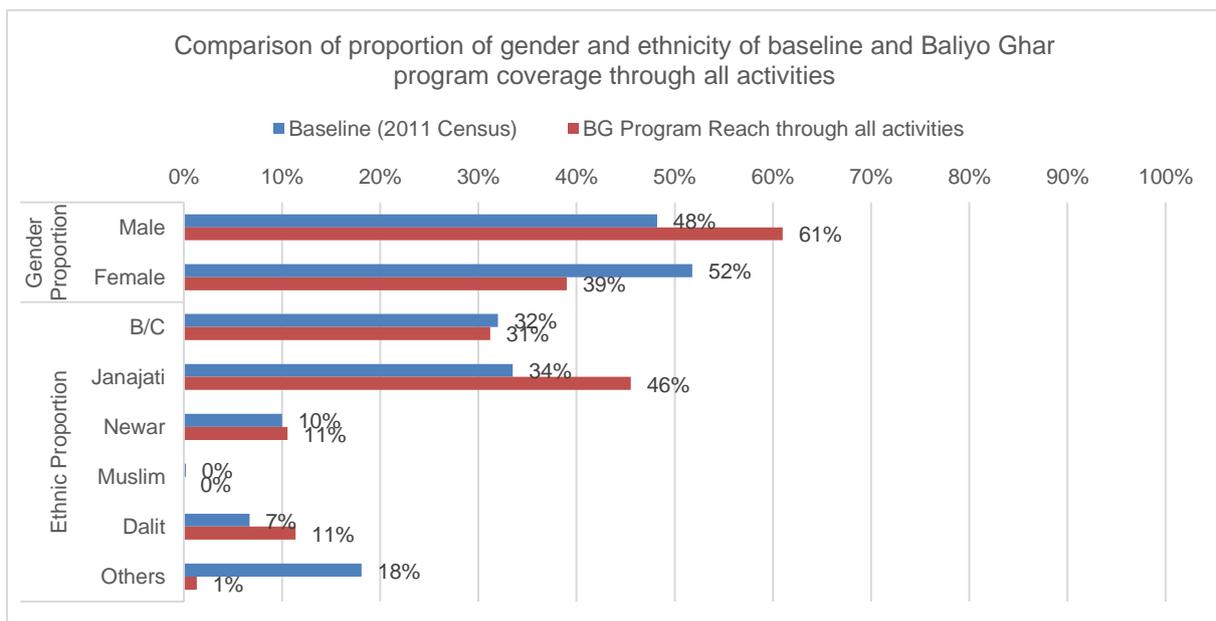
1. **Formation of Vulnerable Support Groups:** This group, either formal or informal in structure consisted of key relevant stakeholders such as the local government (ward officials and representatives), local community leaders and masons, hardware vendors, NRA field engineers, forest user's group, partner organizations and Baliyo Ghar Program staff among others. The group primarily discussed on the issues hindering the reconstruction of identified vulnerable beneficiaries in the local government unit and decides on actions and support by different stakeholders to facilitate the reconstruction process.
2. **Direct Socio-Technical Assistance for reconstruction:** Baliyo Ghar Program provided direct socio-technical assistance to the identified vulnerable beneficiaries to support the reconstruction. Such socio-technical assistance primarily comprises of collection and sharing of status and issues, facilitating discourse among stakeholders, on-site support on construction as well as facilitation for grant disbursement, material procurement and other administrative tasks.



In a year period between September 2019 and September 2020 (start and end of Year 5 of the program) when the program delivered this mode of special technical support for the vulnerable households, a significant progress in housing reconstruction of vulnerable beneficiaries were achieved.

In total, of the 1,254 vulnerable beneficiaries listed in the program areas, nearly 20% additional beneficiaries completed the construction while 9% started the construction process. This was largely facilitated by the engagement of the local governments and other stakeholders in the process.

Furthermore, Baliyo Ghar Program itself supported 15 vulnerable beneficiaries through direct socio-technical assistance, primarily in facilitation for labor and materials and in design, supervision and coordination with the NRA field engineers for swift inspection and grant disbursement. The remaining vulnerable households were then subsequently supported by the direct assistance from the Government; trained masons were recruited and deployed as mobile masons to the earthquake affected areas who built the houses of vulnerable beneficiaries with direct oversight of the local governments. With these efforts, reconstruction of vulnerable beneficiaries too has been successfully completed in the Baliyo Ghar Program areas.



WHAT WORKED

- To create the congenial working environment for the woman to increase the women's participation the special provisions and dedicated training event is required.
- More and more women masons attend the on-the-job training as a training event to develop new masons. On the job training is an attraction among the women participants who want to start their carrier as a skilled mason.
- Prior information and time planning for the women masons to increase their participation is important since women masons must engaged in household things on morning and evening and flexible training time must be envisioned to increase women masons' participation during on-the-job training.
- Engaging more with male family members is equally supportive to encourage female participants on mason trainings.
- Special meeting with ward and municipality is required to address the vulnerable population reconstruction, local guardian from ward office or from the community is required to support the material procurement, grant collection etc for the reconstruction of widow, children, and senior citizen houses. Hence, continuous social mobilization and engagement is required to create conducive environment at ward and municipality level.

WHAT DID NOT WORK

- The engagement opportunity for the women masons beyond their cluster is challenging and was happen very rare.
- Local municipalities need to think more for the utilization of trained workforce.



CHAPTER - 10: LESSONS FOR EFFECTIVE HOUSING RECONSTRUCTION ASSISTANCE

The key lessons in assistance that have been realized during the 2015 Gorkha earthquake housing reconstruction in Nepal are discussed in this section.

Strengthening local government units in managing and monitoring post-disaster response and recovery

The 2015 Gorkha earthquake posed unique challenges and opportunities in disaster risk management in Nepal. The country had never embarked upon such a huge scale of recovery. However, lessons adapted from post-disaster recoveries and the emerging principles in disaster risk management in Nepal bore fruit in the successful reconstruction campaign, especially in private housing reconstruction. Although frequent changes were made, the government systems and mechanisms were effective in delivering assistance to the houseowners for disaster resilient recovery despite social, cultural and topographic constraints.

One of the key challenges faced during the recovery program was the highly diverse socioeconomic, cultural and topographical features of the affected communities. Such diversity is a huge challenge in standardizing actions for uniform and consistent assistance. Diverse conditions require diverse, and specialized solutions, which can only be attained by significant involvement of local stakeholders in the recovery planning and implementation process. This was evident with the increase in intensity of the reconstruction and recovery after the election of representatives and officials in local governments, the urban

and rural municipalities in 2017. Local governments were evidently much more invested and effective in identifying and addressing local issues in reconstruction. Innovative approaches in beneficiary assistance were made, such as revolving funds for financial support, infrastructure development to ease reconstruction process, mobilization of partner organizations in supporting vulnerable beneficiaries and advocacy with the National Reconstruction Authority in resolution of pertinent issues.

Since the 2015 Gorkha earthquake itself, Nepal has faced multitude of localized disasters such as the Melamchi and Myagdi floods, Bhotekoshi landslides and the Lamjung earthquake. The national response on local disasters has been inconsistent, affected people have received assistance disproportionately. Hence, local governments must play a pivotal role in managing and monitoring post-disaster response and recovery, especially in localized disasters such as landslides, floods etc. For this, a national strategic plan for post-disaster recovery, either local or on a national scale, must be developed with corresponding strengthening of local government units to undertake these actions with support from the national government and partner organizations.

Robust planning, mobilization, monitoring and evaluation mechanism to ensure consistency, uniformity and coverage of technical assistance

The post-Gorkha earthquake reconstruction and recovery campaign was a huge endeavor with substantial input from the government institutions and overwhelming support and assistance from various partner organizations. Socio-technical and financial assistance were provided to the affected households, beneficiaries and communities through different approaches and modes. The current significant levels of progress and compliance seen in housing reconstruction is an outcome of these assistance. However, assistance to affected communities were not always consistent or uniform. Additionally, technical assistance was largely focused on the 14 most affected districts, in rural areas. Where they were, activities and intensity varied to a high degree; some communities had multiple inputs from different partner organizations, while some received none. This discrepancy in technical assistance coverage had a direct correlation in progress of reconstruction; studies have shown that communities with technical assistance had a higher rate of reconstruction than those that did not. A comprehensive strategy and thorough planning and monitoring system must be developed and put to use to ensure that assistance is proportionately and uniformly distributed across all earthquake affected areas.

Similarly, mobilization of a large number of organizations and assistance in communities also requires a robust monitoring and evaluation mechanism. Several instances of conflicts in information, in assistance model and approaches and in mobilization were documented throughout the reconstruction and recovery program, which have resulted in negative impacts of assistance. One of the major policy level inputs from the government in the current housing reconstruction program were the quick actions in standardization of various assistance activities. Guidelines were developed for conducting trainings for masons and other construction workers, for supporting vulnerable beneficiaries, for financial assistance and others. For instance, more than 70,000 masons

trained during the reconstruction program went through a uniform and consistent training model, following standardized curriculum and guidelines. This has significantly helped in dissemination of uniform information in the affected communities. These guidelines were crucial in delineating the role and limitations of assistance to the affected communities, ultimately enhancing coherence in delivery of assistance across the earthquake affected areas.

Comprehensive approach in socio-technical assistance by engagement with a wide range of stakeholders for consistency and uniformity in information

Although homeowners were the primary decision makers in an owner driven model, the housing reconstruction and recovery program was a multi-stakeholder action. The national, provincial, district and local government institutions, political and social leaders, I/NGOs, CBOs, CSOs, media among others played a significant role in shaping the decision-making process of the affected beneficiaries and communities. A singular dissonance in information from any of these stakeholders had a direct impact on the reconstruction program, highly evident with the case of partially damaged buildings. The housing reconstruction can be seen as a three-tier structure; the national government institutions such as the NRA developed policy and programs for housing recovery, the district institutions, partner organizations and local governments followed the national guidelines in helping the affected communities whereas the homeowners themselves and their community engaged in the reconstruction and recovery. With such a complex information and assistance structure, socio-technical assistance was crucial to ensure that adequate bridging was made among the various stakeholders.

Thus, comprehensive approach in assistance, as delivered through Baliyo Ghar Program had immense impact on the national recovery. With specific actions and programs implemented targeting the different groups of stakeholders, the program was able to adequately engage in reconstruction at all levels, and subsequently supported largely on policy development, capacity building as well as homeowner facilitation and support. Comprehensive assistance models also help in maintaining coherence among the strategies and actions and create a feedback loop to measure effectiveness of the interventions.

Baliyo Ghar's comprehensive mode of socio-technical assistance was crucial in developing synergy of the reconstruction policies and their implementation in the field. The model not only aided the homeowners in compliant construction, but also acted as a feedback mechanism for shaping national reconstruction policies. One key outcome of this is the development of several "need based" policies and programs by the National Reconstruction Authority to ease and boost the reconstruction process. The Correction Exception Manual, Guidelines for Multiple-Ownership housing reconstruction, Guidelines for Land Management etc. were developed as a result of this engagement.

Complimenting technical assistance with social mobilization

It has been well established that post-disaster recovery assistance in an owner driven reconstruction model should not be limited to engineering but also

encompass several aspects to empower and motivate homeowners in the reconstruction process as well as in sustainability to achieve the desired disaster resilience. Social, cultural, legal and environmental aspects must also be included in such assistance. Furthermore, effective assistance also relies on adequate and appropriate communication of information from the source to the target beneficiaries.

The term “social mobilization” was used in the 2015 Gorkha earthquake housing reconstruction to broadly describe the use of various tools and techniques to support earthquake affected beneficiaries in the reconstruction process. More prominently, social mobilization empowered the homeowners in understanding and utilizing the reconstruction information in their decision-making process. Social mobilizers made household visits, conducted awareness raising and orientation campaigns and engaged with the local stakeholders to identify underlying issues in reconstruction, raising them in various platforms and facilitating for addressing such issues. Their role in this process had a direct positive impact on the homeowner’s perception towards the reconstruction activity, policy and norms and created a congenial environment for the penetration of technical knowledge and skills in the communities. Thus, Baliyo Ghar Program’s socio-technical assistance model of complimenting technical support through social mobilization by deploying trained and skilled social mobilizers alongside technical personnel and construction technicians in its program areas was one of the key principles that has aided recovery and the sustainability of disaster resilient construction practices in the earthquake affected communities.

Demonstrating techniques and technologies at community-level

In the aftermath of the Gorkha earthquake, there was an obvious disdain among the earthquake affected households, especially in using stones and mud, the only locally available materials in rural communities across Nepal. Stones from the rubbles of the damaged houses were being thrown away, in absence of clarity of earthquake resistant construction techniques. However, construction of houses using any other materials except those locally resourced were not feasible. This posed a serious challenge to expediting the reconstruction process.

To address this issue, the philosophy of demonstration was adopted in Baliyo Ghar Program to exhibit and proliferate earthquake resistant construction techniques in the earthquake affected communities. Demonstration, either in small or large scale, actual or representative have been widely used as an effective and efficient awareness tool in dissemination technical information in Nepal. Over the past two decades, the demonstration construction and retrofitting of school buildings starting in the late 1990s and mini shake table demonstrations, a representative small-scale model of the highly sophisticated engineering equipment have been crucial in changing perceptions and enhancing community awareness in earthquake risks and mitigation measures across the country. Demonstration models provide communities an opportunity to witness technologies firsthand and develop their own judgement regarding the benefits. This highly increases the acceptability of any technique, and also

allows for discourse on amendments required to enhance effectiveness of the interventions.

Hence, following these principles, Baliyo Ghar Program largely focused on constructing various small- and full-scale demonstration models for training, capacity building and awareness activities. The program constructed 437 small scale models for hands-on exercises for masons during short term mason trainings while 984 full scale model houses were constructed during the On the Job trainings to develop new masons in construction. Following these successful interventions, 910 model houses were also constructed to demonstrate the techniques of retrofitting of partially damaged buildings, which, in particular has been the key for the changed perception in retrofitting, not just of house owners but of a wide range of stakeholders including local and national policy and decision makers. The demonstration model house owners have also endorsed to continue proliferating awareness and information on disaster resilience and will help in the sustained establishment and development of awareness in these communities.

Thus, on one hand, the demonstration models fulfilled the immediate need of the reconstruction program by imparting knowledge to the earthquake affected communities and on the other is supporting in continuing awareness on safer construction practices.

Baliyo Ghar Program constructed one demonstration model house on earthquake resistant construction in each ward of the previous VDC structure of its program areas. In the current federal structure, there are approximately nine demonstration model houses in each ward of a rural municipal unit: one model house in every community. This density of model houses portrays the immense scale of coverage of the program and its significant contribution in awareness raising in earthquake affected communities.

Using of multiple tools and channels for communication

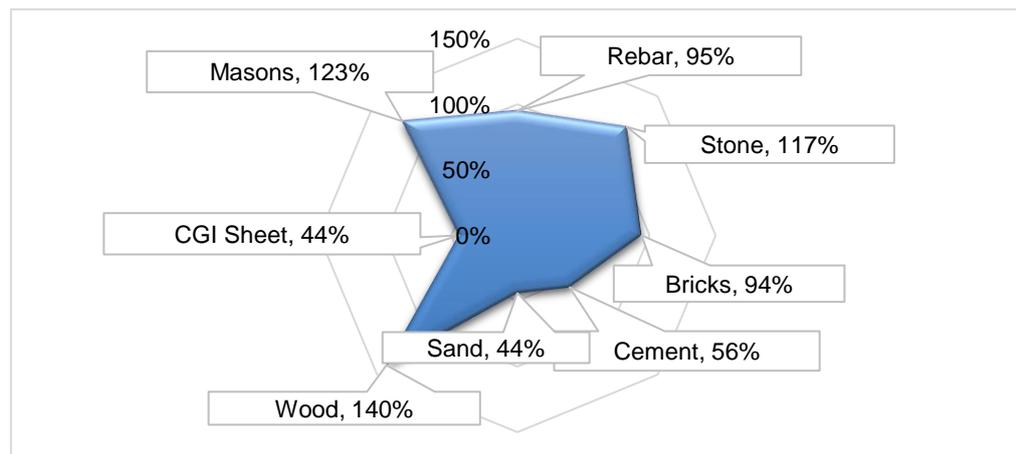
Different groups of people receive and perceive information differently. Effective communication does not only entail the delivery of information, it also requires an assurance that the end-users are able to adequately process the delivered information and use them to their benefits. This principle is much more important in post-disaster recovery, where the dynamic environment may create conflicts and confusion, ultimately reducing the affected communities' ability to recover quickly and better.

While mass media in general are able to cater to large numbers of people in a huge geographical area, in complex and dynamic process like post-disaster recovery, mass media alone is not able to fulfill all the information requirements of those affected. Hence, effective communication in post-disaster recovery focusses on complimenting large scale general information dissemination through mass media with specialized interpersonal information sharing through local governments and socio-technical assistance groups. Similarly, specific information must be propagated owing to the level of education, access to facilities and the needs and necessities of the target communities.

Studies in post-disaster recovery communication have shed light on the positive impacts of effective communication and information sharing on the ability of house owners to engage in reconstruction. Baliyo Ghar Program actively recognized communication and effective information sharing as a major component of post-disaster recovery and focused on use of multiple tools and channels to increase effectiveness. The program used multiple sources and media of communication appropriately to disseminate information, owing to the diversity of the end-users. Similarly, as interpersonal communication through local authorities and social leaders were a major source of information, they were also engaged, informed and trained on different aspects of reconstruction and disaster risk management. The program realized the potential of localized media of information including local radios, community and social leaders and worked in enhancing capacities and as well as resources at these levels to increase effectiveness of assistance and outreach.

Developing local level resource centers to aid post-disaster recovery and technical assistance of affected communities

The delivery of socio-technical assistance effectively and efficiently is the key to a successful housing reconstruction and recovery campaign, especially in large scale disasters such as the Gorkha earthquake. Conversely, this also is the foremost challenge, exacerbated by the heavy damages and losses incurred in the affected areas. The mobilization of assistance teams to the communities becomes a cumbersome task, affected communities are most often deprived of basic standards of living themselves. Facilities and infrastructure to conduct and implement technical assistance activities such as trainings, orientations, meetings are seldom available. These challenges directly affect the intensity of assistance delivered to the communities and has a significant impact on the recovery process.



On the other hand, large scale post-disaster reconstruction also has a direct impact on the market, with increasing demand for human resources and construction materials, prices rise. An already devastated local and individual economy is further aggravated by this surge. A study conducted between 2014 and 2018 showed that prices of major human resources and materials had increased by a lowest of 44% in sand and aggregates and at highest of 140%

and 123% in wood and masons respectively within the four years period. This surge in prices had a detrimental impact on the reconstruction process and will have a long-term impact on the path to full economic recovery.

Local Reconstruction Centers can play a huge role in addressing the aforementioned issues. Baliyo Ghar's Reconstruction Centers at three locations in each of the three program districts and one in Kathmandu were crucial in aiding the effective delivery of socio-technical assistance. Although the National Reconstruction Authority conceptualized local reconstruction centers in the initial stages of reconstruction, it did not go into implementation.

Facilities and infrastructure developed at strategic locations could be beneficial to both the assistance teams and the affected communities. Such resource centers provide ample resources to conduct mass scale awareness and training activities, in mobilization of human resources for support, monitoring reconstruction activity at the local levels, and act as information repositories for administrative purposes. Furthermore, these centers could also play a pivotal role in market facilitation for the earthquake affected beneficiaries, resulting in a control of price surges primarily resulting from a lack of monitoring mechanism.

Engaging local ambassadors for sustainable disaster resilience

One of the goals of the post-earthquake housing reconstruction and recovery program was to enhance resilience of the affected communities through community participation. Awareness and capacity building activities throughout the affected areas have significantly contributed towards this end. The key for the sustainability of the disaster resilience knowledge and practices depends on how effectively they are diffused into the communities, either through a formal mechanism such as academic courses and trainings or through informal mechanisms; stories and experiences of the recovery and transfer of skills from one generation to the other. Both of these approaches are equally important and complement each other in imprinting the knowledge and skills into the next generation and so forth.

For this, local ambassadors of reconstruction can play a significant role. Local trained masons, house owners, elected representatives who understood the benefits of the reconstruction program and its various components were crucial in shaping communal perception and enhancing recovery progress. These masons, homeowners and representatives are now the ambassadors for continued advocacy in disaster resilience. The homeowners supported in reconstruction through Baliyo Ghar's OJT or retrofitting demonstration construction activity, the local trained masons who worked as Construction Technicians or as Mobile Masons, and the local representatives who have advocated and facilitated the recovery of their communities have been sensitized about their role in this regard and have obliged for the same. Local schools, clubs, community organizations and groups have been provided with various tools such as IEC materials to continue proliferating the knowledge into their communities. With local participation, the lessons in post-earthquake

recovery will remain in the communities and will further aid the path to disaster resilience.

Need for specialized and comprehensive strategies for urban recovery

Post-disaster recovery across the world have shed light on the complexity of urban settlements in the reconstruction process. Urban recoveries in Haiti, Christchurch and Kobe were hindered by a multitude of challenges and issues and are requiring or required a much longer timeframe and strategic interventions to complete. In the earthquake affected areas of Nepal, 757 (~30%) of the wards were categorized as urban, whereas they constituted more than 40% of the total eligible beneficiaries. Several reports and case studies have pointed to the high degree of variation in urban and rural reconstruction. As of Jan 2021, while 81% of the rural households had already completed construction, only 61% of the urban households had done so. Even in the urban areas, the progress of reconstruction varied among those inside Kathmandu Valley and outside. While 70% of the houses in urban settlements outside Kathmandu Valley had completed reconstruction in Jan 2021, only 39% had done so in the valley. Urban reconstruction in Baliyo Ghar Program followed similar trends. While Bhimeshwar Municipality in Dolakha and Nilkantha Municipality in Dhading boasted a completion rate of more than 80%, program wards in Kageshwari Manohara Municipality had only recorded 47% completion in January 2021.

These discrepancies have highlighted the immense complexities and challenges of urban recovery, largely left behind due to lack of finances, issues in land management, information and an absence of a comprehensive and specialized policy and strategy tackling the problem. It is however, important to recognize and acknowledge the multitude of challenges hindering urban housing reconstruction and recovery. There were several historical towns and heritage settlements in urban areas, such as Dwalkha in Bhimeshwar that had issues with land management, poor infrastructure, strict construction norms and social issues such as multiple ownerships hindering the process. The settlement has only started gaining pace in the recent couple of years after resolution of these issues. The dense settlements within Kathmandu Valley pose a much greater challenge.

Urban housing reconstruction in Nepal is set to prolong for a longer period of time, much after the disengagement of the NRA or any other current reconstruction and recovery programs. The NRA has already made some efforts in addressing these issues and strategizing for urban recovery in the long-term, various studies have been done to ascertain the challenges and strategic needs. Strategies to expedite the process, through institutional support to DUDBC, NDRRMA and municipal units, and specialized technical support in retrofitting, demolition, urban land management and heritage settlement reconstruction have been highlighted in a strategy paper that Baliyo Ghar Program contributed to. These strategies and further actions will determine the path to urban recovery. The lessons, however, have provided crucial inputs in planning future reconstruction and recovery programs.

The experiences in retrofitting must be utilized to scaleup nation-wide risk reduction

Before the 2015 Gorkha earthquake, Nepal had a long experience in seismic retrofitting, going back as far as the late 1990s. Since then, about 300 schools and hundreds of residential and public buildings had been retrofitted and one a half decade. However, these examples and experience were largely in urban buildings, typically brick or reinforced concrete. On the other hand, the highest proportion of buildings damaged during the earthquake were low strength masonry rural buildings built of stone and mud. With very little experience in research as well as implementation, retrofitting of these partially damaged buildings did not expedite at the same level of reconstruction, where pre-set criteria and guidelines were prevalent in the National Building Codes.

To facilitate the retrofitting process, the NRA developed and published the Repair and Retrofitting Manual in 2017. But its implementation was severely hindered, plagued by overwhelming confusion and rife discontent among the beneficiaries, masons, engineers and officials alike on the process. Retrofitting initiatives were undertaken in a small scale and were not adequate to assist the huge number of beneficiaries on a short period of time. Hence, although more than 2000 buildings have been retrofitted throughout the earthquake affected areas, several thousands have now transferred to reconstruction beneficiaries, the opportunity to establish retrofitting an integral component of earthquake risk management has been delayed, if not lost completely.

While initiatives on the promotion of retrofitting were done on a comparatively small scale when, the interventions themselves have paved the way for risk reduction and mitigation against future possible disasters. Large number of human resources, policies and experiences in practice have been developed, and lessons learnt during implementation of retrofit programs have been recorded. Resources such as manuals, guidelines, communication materials and outputs from various laboratory and field-based research are readily available. These valuable learnings and the documentation should guide the future implementation of retrofit programs, either during post-disaster response or, more importantly, in preparedness and mitigation.

Housing extension is imminent; local governments must be vigilant

The current progress is the outcome of key strategies implemented by the National Reconstruction Authority and supported by the timely development of various guidelines and manuals to aid the government officials, technical personnel, masons and house owners in the rebuilding process. The reconstructed houses have followed the Minimum Requirements (MRs) developed and enforced by the National Reconstruction Authority following provisions of the Nepal National Building Code. The MRs clearly stated that for buildings with stone/brick masonry in mud mortar, the number of stories are restricted to only one story if wooden band is used and up to one story plus an attic, if RC bands are used.

While these minimum requirements were in place to ensure safety, and have largely been followed by the reconstruction beneficiaries, the decrease in usable space in the houses that existed prior to the earthquake and that have been constructed during the reconstruction process is evident. The need for additional usable space is also apparent from the beneficiaries who opted the construction of hybrid structures, with lightweight upper floor using timber or metal posts and CGI sheet panels.

In a study conducted during 2018, the difference in usable space between houses existing prior to the earthquake and after reconstruction was highlighted, where highest proportion of beneficiaries before the earthquake had two or more floors, 57.8% of the beneficiaries had built one storey houses during post-earthquake reconstruction. The same study had shown that the average number of rooms in the houses had decreased from 3.25 to 2.57 during the post-earthquake reconstruction. Similarly, in two separate assessments conducted in 2018 and 2020, the average built up area of houses before the earthquake was 978 sq.ft, but had significantly reduced by nearly half to 502 sq.ft. This reduction in the built-up area and usable space of the houses has tremendous personal and socio-cultural impacts on the households.

Thus, as the reconstruction and grant disbursement process complete, many beneficiaries are intending towards expanding their reconstructed building structure to add more usable space. It is, therefore, necessary to ensure that the additional structure also complies with the building regulations. This scenario presents both a challenge as well as an opportunity. Past experience in post-earthquake reconstruction in the region have shown that a lack of adequate monitoring and supervision of construction in the aftermath of a reconstruction program can lead to haphazard and non-compliant expansion and extension of houses, eventually leading to a failure in sustainable construction practices as envisioned during the programme. However, with adequate and timely information to house owners, masons, engineers and local governments, this challenge can be overcome.

Therefore, to ensure safety of the additional structure against seismic and other loads, it has become an urgent task to develop and disseminate adequate measures with proper construction and connection details. Additionally, to ensure longevity of the existing structure, it is necessary to disseminate adequate information on the regular maintenance of the structural components such as wood, reinforcement, flooring and roofing. The National Reconstruction Authority, with contribution from Baliyo Ghar Program and various other partners has developed and published the “Guidelines for Extension of Masonry Buildings”, to aid the process of potential extension of such houses and to ensure the compliance to building codes. However, as the NRA disengages from its responsibility, it is critical that the local governments are strengthened to monitor these constructions and ensure that disaster resilience construction provisions are met. Complacency in the handover of this responsibility or in successful engagement of the local governments in this could result in a significant overhaul of the achievements of the reconstruction and recovery efforts in the past six years.



CHAPTER - II: WAY FORWARD

Owner driven model was adopted in the housing reconstruction in Nepal because of its widely documented and accepted effectiveness in reconstruction of large number of households, most prominently in terms of cost effectiveness, transparency, satisfaction among the beneficiaries and institutionalization of risk reduction measures. Through the implementation of past ODR projects, especially in the aftermath of the 2001 Bhuj and 2005 Pakistan earthquakes and the 2004 Indian Ocean tsunami have emphasized on the need for adequate recovery assistance to the affected house-owners, including the need for technological choices, skilled labor and continuous engagement of the communities. The post-Gorkha housing reconstruction campaign has been termed as successful despite many political, socio-economic, financial constraints hindering the process. Proactive policy development driven by field experiences and assistance to the affected houseowners were the key drivers that helped enhance the reconstruction process.

On the other hand, several facades of reconstruction and recovery were so complex that socio-technical assistance models and approaches effective elsewhere were not able to address the underlying issues. In many cases, this resulted from an oversight in policy formulation or quick response in implementation while in many others, there were too many constraints hindering the recovery program.

Need further interventions to ensure multi-hazard resilience of reconstructed communities

Now houses being constructed are earthquake resistant and safer so further work can be done in terms of preparedness in Landslides and floods in many areas.

Use lessons gathered since 2015 to develop national framework for post-disaster recovery and assistance

The national framework should also be able to address the small disasters not only providing funds but also through the socio technical support

Strategies and specialized support for remaining urban reconstruction and recovery

The urban area should have different strategies and specialized support. We have tried in Dolakha similarly using the experience of other different areas the urban recovery and reconstruction can be taken forward.

Enhance role of provincial governments in disaster risk mitigation, preparedness and post disaster response and recovery

In case of reconstruction, the provincial government role was not much defined so there should be equal involvement of provincial government in disaster risk mitigation, preparedness and post disaster response and recovery.

Further support to local governments on building regulation through Building Code Implementation and Permit Process

There should be further support from national government, partner organizations and through networking and collaboration needed to ensure sustainable safer construction practices.

Need National programs for promotion and scale-up of retrofitting in and beyond earthquake affected communities.

We think and suggest that there should be national wide program for retrofitting beyond the earthquake affected communities as retrofitting is equally important for the other communities.

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 Dewan Sing Maden
 Dorje Lama Tamang
 Krishna Bahadur Moktan
 Rabindra Dhakal
 Min Kumar Thapa
 Kamala Aryal
 Narendra Bahadur Shahi
 Dipak Raj Ojha
 Bhim Bahadur Nepali
 Shambhu Ram
 Niraj Bahadur Ayadi
 Ishwor Dutt Joshi
 Sushil Pandit

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 Puskar Basnet
 Nabin Raj Ruwali
 Parbati Thapaliya
 Yam Kumari Uchai
 Pratima Parajuli
 Sajaya Shrestha
 Duni Ram Saru
 Nimesh Bogati
 Summit Maharjan

Mahendra Acharya
 Sanita Sainju
 Ronal Bikram Thapa
 Puspa Khadka
 Yeknath Acharya
 Sachin Chaudhary
 Sishir Khatri
 Bighnesh Regmi
 Milan Hadkhale
 Anita Rajlawot Khatri
 Arati Shrestha
 Hridaya Man B K
 Rammaya Silwal (Upadhyay)
 Aang Dorje Lama
 Yogesh Khatri
 Chitra Bahadur Lama
 Bikash Paudel
 Subarna Thapa Kshetri

Experts

Amod Mani Dixit
 Surya Narayan Shrestha
 Shree Ram Singh Basnet
 Bijay Krishna Upadhyay
 Surya Bhakta Sangachhen
 Bhubaneswari Parajuli

Nisha Shrestha
 Rabindra Kumar Suwal
 Kashyap Kumar Sharma
 Hikmat Adhikari
 Pradip Sedhain
 Anjali Silakar

Khadga Sen Oli
 Chandan Dhoj Rana Magar
 Ram Krishna Sharma
 Mahananda Timalisina

Niva Upreti
 Adutiya Narayan Kanth
 Dhirendra Kumar Dawadi
 Mamata Banskota

Sumit Shrestha
 Nischal Sedhain
 Ashwash Akash Parajuli
 Kundan Kumar Sah
 Nirmala Rai

Dammar Singh Pujara
 Kuber Bogati
 Aditi Dhakal
 Jyoti Mani Bhattarai
 Sumit Maskey
 Om kala Khanal
 Ichcha Ram Parajuli

Hima Shrestha
 Rajani Prajapati
 Kirty Tiwari Jaisi
 Rachana Kansakar
 Rabin Chaulagain
 Prayash Malla
 Vibek Manandhar



NSET

Earthquake Safe Communities in Nepal

National Society for Earthquake Technology-Nepal (NSET)

About NSET

National Society for Earthquake Technology-Nepal (NSET) was founded on June 18, 1993, with the vision "Earthquake Safe Communities in Nepal by 2020". NSET was conceptualized with main objective "to foster the advancement of science and practice of earthquake engineering and technology for mitigating the earthquake risk and increasing the seismic safety, and to enhance professionalism, professional engineering and scientific ethics. Bringing "substantial change in the application of technology to the many facets of earthquake disaster management for saving the lives of the people" has remained the guiding philosophy of NSET ever since its inception.

Today, NSET is considered as one of the major contributors in the field of earthquake risk management. Its seismic risk reduction approaches are now being replicated beyond the borders of Nepal. Consolidating the experience, knowledge, learning in disaster vulnerability reduction and preparedness to policy drafting and strategy development, and working with variety of stakeholders for more than two and half decades, NSET has now realized the need and decided, as stipulated by global thoughts, to expand its scope and works to managing multi-hazard situations, climate change adaptation and risk management, and integration of this synthesis of DRM and CRM into economic development efforts.

Vision

"Disaster Resilient Communities in Nepal by 2050"

Mission: "To contribute in enhancement of disaster resilience of the communities through development and implementation of appropriate technologies, inclusive and collaborative approaches in order to minimize and manage disaster risks."

Strategic Objectives

- SO1: Develop and implement integrated and inclusive interventions related to Multi- Hazard Disaster and Climate Risk Management through development and enhancement of understanding, capabilities and resources of communities in Nepal and region
- SO2: Assist in Institutionalization and Integration of validated understanding, approaches and technologies related to Disaster and Climate Risk Management into the laws, regulations, policies, initiatives and mechanisms in order to strengthen Disaster Risk Governance in Nepal.
- SO3: Devise and integrate innovative, cost- effective and appropriate methods and measures in order to increase involvement and investment of public and private sector in Disaster and Climate Risk Management
- SO4: Develop and promote effective and inclusive collaboration in order to enhance and scale-up innovation and R&D in the area of Disaster Risk Management.
- SO5: Be a dynamic, sustainable and learning organization through enhancement of capabilities, networks and collaborations.



NSET
Disaster Resilient Communities in Nepal

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