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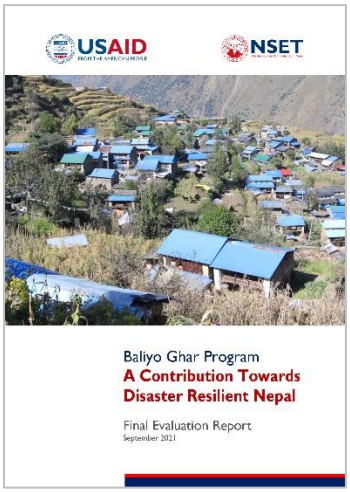
Disaster Resilient Communities in Nepal

Baliyo Ghar Program
A Contribution Towards Disaster Resilient Nepal

Final Evaluation Report

September 2021



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A Contribution towards Disaster Resilient Nepal

Final Evaluation Report

Program Period:

October 1, 2015 to September 30, 2021

Reporting Period:

October 1, 2015 to September 30, 2021

Cover Photo:

Reconstruction Scenario of Dolakha

Back Cover Photo

Overwhelmed house owner and family in front of their reconstructed house | ©NSET

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PREFACE

It is of great pleasure to share this report: **Baliyo Ghar Program- A Contribution towards Disaster Resilient Nepal, Final Evaluation Report"** an outcome of the evaluation study implemented under the Baliyo Ghar program. The Baliyo Ghar program was implemented during 2015-2021 by NSET with funding support from the United States Agency for International Development (USAID), Nepal and under the overall guidance and direction of the Government of Nepal, National Reconstruction Authority (NRA).

The Housing Reconstruction Technical Assistance Program, "Baliyo Ghar Program", is a key program of USAID-Nepal's reconstruction portfolio launched after 2015 Gorkha Earthquake that aimed to support Nepal Government's goal of "Build Back Better".

Baliyo Ghar program aimed to provide support to Nepal Government's owner-driven housing reconstruction program, which helped to empower and support homeowners, allowing them to build back safer. The program imparted knowledge, skills, and awareness about earthquake resistant building construction technology to house-owners and local masons. Furthermore, the program assisted the Government of Nepal, related authorities, and partner organizations to develop standards, guidelines, norms, and training curricula.

NSET executed this study to evaluate the effectiveness and impact as well as Baliyo Ghar program's contribution towards overall reconstruction in Nepal. The specific aims of the study are to:

- To examine the effectiveness of BG program in changing building construction practice.
- To understand the extent of social impacts of Baliyo Ghar program
- To assess the contribution of BG program towards sustainability of resilient reconstruction
- To capture and provide evidence and lessons useful for broader stakeholders

Various studies were carried out to measure the impact of Baliyo Ghar interventions and explore the institutional mechanisms and strategies that could maintain and build on the accomplishments of reconstruction and ensure the momentum of building disaster resilient Nepal.

This report highlights the objective, methodology, results, discussion and conclusions of the studies conducted as part of the Monitoring and Evaluation process of Baliyo Ghar program.

We are confident that this evaluation report will contribute on consolidating and sharing post-disaster reconstruction best practices both nationally and internationally. The outcomes of the study will also contribute to the improvement in future disaster management and the development of appropriate strategies for building disaster resilient Nepal. The report will be useful for decision makers, policymakers, and social leaders for future housing recovery planning after disasters. Relevant technical professionals and researchers may also find it a useful resource for better understanding the process of reconstruction in Nepal.

Mr Surya Narayan Shrestha

Executive Director

NSET

ACKNOWLEDGEMENTS

This study and the report "Baliyo Ghar Program- A Contribution towards Disaster Resilient Nepal, "Final Evaluation Report" have been possible with sincere thoughts and inputs by several individuals, professionals and practitioners in the departments, municipalities, various organizations, and communities. We highly acknowledge the contribution by all institutions and individuals for the study and contribution to this report.

This evaluation of the Baliyo Ghar's experience and contribution towards Gorkha Earthquake Reconstruction was done by NSET's MEL team with support from the Baliyo Ghar program team.

We would like to thank the Baliyo Ghar program team for their excellent and tireless support in survey preparation, oversight, and data collection and analysis.

We are thankful to the National Reconstruction Authority (NRA), Ministry of Urban Development (MOUD), Department of Urban Development and Building Construction (DUDBC) and the respective local governments for their continuous guidance and inputs. The study might not have been possible without the active support from the reconstruction stakeholders and program beneficiaries. We express our sincere gratitude to all of them.

We extend our gratitude to the United States Agency for International Development (USAID), Nepal, for the funding support and for the continued guidance throughout the implementation of the Baliyo Ghar program.

Monitoring and Evaluation Team

NSET

Table of Content

Annexes 73

List of Tables

List of Figures

ABBREVIATION

DOIB	Department of Information and Broadcasting
CBO	Community Based Organization
CGI	Corrugated Galvanized Iron
CLPIU	Central Level Program Implementation Unit
DRR	Disaster Risk Reduction
DUDBC	Department of Urban Development and Building Construction
DLPIU	District Level Program Implementation Unit
MDTF	Multi Donor Trust Fund
NGO	Non-governmental Organizations
NBC	National Building Code
NPC	National Planning Commission
NRA	National Reconstruction Authority
ODR	Owner Driven Reconstruction
PDNA	Post Disaster Needs Assessment
HRRP	Housing Recovery and Reconstruction Platform
SMM	Stone and Mud Mortar Masonry

EXECUTIVE SUMMARY

The Gorkha Earthquake Reconstruction mega campaign was initiated by The Government of Nepal under the leadership of National Reconstruction Authority (NRA) with adopting 'owner driven reconstruction' approach for the housing reconstruction. Government of Nepal's housing reconstruction program was based on key principles derived from its own past learnings, international experiences and best practices of other housing programs.

The Housing Reconstruction Technical Assistance Program, "Baliyo Ghar", is a key program of USAID-Nepal's reconstruction portfolio launched after 2015 Gorkha Earthquake that aimed to support the Government of Nepal's goal of "Build Back Better". The program aimed to support the government on owner driven reconstruction program through imparting knowledge, skills and awareness about the earthquake resistant buildings at different levels and assisting the government to develop standards, guidelines, norms and training curricula. Baliyo Ghar program was implemented in Nuwakot, Dhading, Dolakha and Kathmandu, which were among the most affected districts from Gorkha earthquake.

The Baliyo Ghar program had two-fold goals; in shorter-term, the program aimed at ensuring earthquake safer construction of all houses being reconstructed; and for longer-term, the program aimed to establish a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal.

The goals were achieved through the following three Intermediate Results (IRs):

- IR 1: Improved policy and standardization of training, guidelines and manuals for disaster resilient construction technologies
- IR 2: Enhanced local capacity to apply disaster resilient construction methods and techniques
- IR 3: Increased awareness on disaster resilient construction in Nepal

This final evaluation was designed to provide a review and validation of the analysis, strategies and interventions implemented by Baliyo Ghar program. It also intended to understand the impact of the Baliyo Ghar program, as well to gather learnings and opportunities for sharing among the key stakeholders and to provide guidance in designing and developing similar projects in the future.

All the evaluation surveys were conducted on the basis of "**Bal yo Ghar Program: Final Evaluation Plan",** which provided the framework for evaluatio ı of overall impact of the program towards disaster resilient reconstruction of houses. The evaluation also covered four major evaluation criteria: relevance, effectiveness, efficiency, and sustainability.

The evaluation employed a mixed methodology of quantitative and qualitative survey tools in an integrated design to enrich the process and provide more insightful understanding. It ranged from document review to semi-structured interviews, group discussions and field observations to household survey carried out in all program districts. Quantitative surveys like, baseline survey, endline surveys on risk perception of the community, mason retention surveys, engineers training effectiveness survey, pre-test and post-test for training participants etc. were also conducted.

Under **Intermediate Result 1(IR1)**, Baliyo Ghar program contributed significantly on development of required policies and for the standardization of training guidelines and manuals. Baliyo Ghar program contributed to develop 14 national level policy documents to support housing reconstruction.

Under the **IR 2**: **Enhanced local capacity to apply disaster resilient construction methods**, Baliyo Ghar program conducted capacity building activities such as, 7-days training to existing masons, 50 days On the Job training to develop masons, training for engineers and social mobilizers, training for local authorities. Various other knowledge dissemination and discourse workshops which covered a wide range of themes for supporting national reconstruction campaign were also conducted. Among all the capacity building programs **skills enhancement of local construction workers** i.e., Mason Training was highlighted as the most crucial by most of the respondents interviewed. NSET alone had trained 13,474 masons in total and contributed significantly to capacity building component of the national reconstruction campaign.

Under **IR 3: Increased awareness on disaster resilient construction in Nepal**, different awareness activities such as: orientations, door to door technical assistance, information desk, demonstration model, media campaigns etc. were organized to increase the awareness level of the community. Baliyo Ghar Program conducted large number of orientation and interaction programs targeted towards a wide range of stakeholders like house owners, masons, engineers, and local authorities. During the program period, Baliyo Ghar program provided orientation to 146,559 people within the program districts through 6,893 orientation events. Household level Risk Perception Surveys were conducted 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. The average KAP score in the baseline survey was 30 and the target KAP score to be achieved was 48 by the end of the program. The endline survey shows the KAP score increased to 50.

House owners that received technical assistance, employed trained mason and participant of awareness/training program and who have access to, and mass media are more likely to construct houses adopting disaster resilient construction methods. Based on the analysis, it was seen that the compliance was not affected by house owner's income.

Through numerous trainings, meetings, discussions, cross learnings and networking activities such as workshops and exposure visits, the program increased the capacity and awareness of stakeholders in program municipalities on importance of building code implementation and resilient building construction practices. As a result of the interventions, three program rural municipalities developed the "Building Permit Process Standard Operating Procedure", a key institutional policy to direct and guide the building regulation in the municipalities. The roster of masons trained by Baliyo Ghar has been handed over to all program municipalities to initiate the system of registering trained masons at the municipal level.

Additionally, GESI aspects have been addressed in Baliyo Ghar Program areas to foster socially inclusive housing reconstruction by taking care of special needs of disadvantaged groups, including women.

Overall performance and objective-wise achievement of Baliyo Ghar were evaluated by key informants. Key informants rated overall Baliyo Ghar performance as **9** in the scale of 1 to 10. Key Informants rated the achievement in first objective which was on policy support as **8**, the second objective which was on capacity building was rated as **9** and the achievement on third objective which was related to awareness was rated as **9**.

The stakeholders and beneficiaries viewed Baliyo Ghar program as one of the very useful and successful programs in terms of influencing the reconstruction process, to help people

reconstruct timely and safe manner, and to help raise awareness of the people on disaster safety and earthquake-resistant construction.

There are few significantly new and innovative outcomes and impacts of the Baliyo Ghar program. The training of women groups to become new masons in the communities is one of such outcomes which very positively influenced the reconstruction process. There are now several women masons who are actively working to build safer houses in the communities. This has also contributed to the livelihood and economy of the families in earthquake affected areas.

Reconstruction of earthquake resilient houses is the main output of the Build Back Better concepts followed during the owner-driven reconstruction program. The next logical step would be to continue the momentum achieved for safer reconstruction by adapting and changing the systems within the local governments to establish building permit systems and building code implementation mechanisms. Such systems need to be established in all local governments - urban as well as rural municipalities.

Documentation of the learnings gathered from the massive reconstruction campaign of six years period is also another important next step as we can scale up and utilize the knowledge and skills for the next possible disaster. The National Reconstruction Authority (NRA) is a special purpose short-term organization, the main objective of which has already been achieved. Once NRA's term is completed and the institution does not exist, the institutional memory should retain in many other organizations. Central level agencies such as Ministry of Urban Development (MOUD), Ministry of Education (MOE), National Disaster Risk Reduction and Management Authority (NDRRMA) should carry on the vast experience of NRA on the recovery and reconstruction so that these institutions can lead any future recovery efforts in Nepal.

Retaining the large number of trained professionals developed during the reconstruction process in the construction industry is another major task for the sustainability of resilience building. Large number of trained engineers and other technical professionals, trained masons and contractors, government officials and elected local government representatives are great assets for Nepal for building resilient nation. The country should develop policies and systems to retain and continue involvement of them in future recovery and reconstruction programs. On the other hand, a sustained system of training of construction workforce and technical manpower is required at various levels to ensure safer construction for disaster resilient communities.

Nepal's experiences and lessons of the recent recovery and reconstruction might be useful for similar contexts at regional and the global level. Nepal should utilize existing mechanisms and forums to share such experiences and lessons to the regional and global community to enhance the replicability.

Reconstruction Scenario of Bigu Rural Municipality, Dolakha
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New masons being trained through On-The-Job training
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PROJECT INFORMATION

Project:	Housing Reconstruction Technical Assistance Program 'Baliyo Ghar'
Project Locations:	Dhading, Dolakha, Nuwakot and Kathmandu Districts
Project Implementation Period:	1 October 2015 to 30 Sep 2021
Evaluation Team:	NSET- MEL Team

Introduction

This report summarizes all the evaluation activities and surveys conducted under Baliyo Ghar program as part of its Monitoring and Evaluation plan. Different trainings and capacity buildings activities were conducted under Baliyo Ghar program during its implementation. All the Evaluation surveys have been conducted on the basis of the Baliyo Ghar Evaluation Plan. Evaluation of Baliyo Ghar program was conducted to assess the overall impact of the program towards disaster resilient reconstruction of the earthquake affected communities of Nepal. This Evaluation has been designed to measure the impact of the program as well as to gather learnings and provide necessary guidance while designing and developing similar projects in future.

The audiences of this assessment report are Policy makers, decision makers, district level line agencies of government, partner organizations, NGOs, CBOs, donors, academia and others relevant stakeholders who were directly or indirectly involved in reconstruction activities.

Background

Earthquake Hazard and Risk

Nepal is a small mountainous, land-locked country that lies between India and China. Three geographical division: Terai, Mountain and Himalaya, in a sequential order from south to north, define the county and its risk. The southern plain "Terai" ranges consisting of low elevated land covers only 17% of total land but the majority of population lies in this area. The mountain regions cover 68% of the total area. The northern part of the country is the Himalayas region, an area consisting of snow-covered higher peak, and is the remaining 15 % of total. The climate in Nepal ranges from sub-zero to tropical (DOIB, 2019). Flash floods, inundation and fire are common in the Terai region, debris flow and landslides mostly occur in the mountain and Himalayas whereas earthquake risk is same throughout the country. The entire length of Nepal straddles the boundary of Tibetan and Indian tectonic plates making it highly prone to earthquakes. Apart from these major disasters avalanche, torrential rain, drought, thunderstorm, windstorm, hailstorm are other natural hazards present in Nepal. Non-natural disasters like epidemics, traffic accidents and conflicts are also regular events disrupting human lives in Nepal. Nepal suffers an average of 900 disasters each year resulting in the loss of life and severe impacts on people's livelihoods (MoHA, 2009).

During the period of 1900-2005, 1674 flood events were reported in the Terai region of Nepal causing nearly 3 million casualties (Aryal, 2012). In 1988, an earthquake of magnitude of 6.5 claimed the lives of over 700 people with over 65,000 buildings damaged (Dixit, Yatabe, Dahal, & Bhandary, 2013). Nepal has a long history of earthquakes, which may be considered the country's most prominent hazard. As many as ten major earthquakes have been recorded in Kathmandu in the past 750 years (Bilham et al. 1997). The destructive earthquake of 1934, and the more recent 1988 Udaypur earthquake are still in the memory of Nepalese people.

In 2011, the M6.9 Sikkim Earthquake resulted in widespread building damage disproportionate to the shaking intensity. Poor construction material quality, construction workmanship, and a lack of adherence to earthquake-resistant construction techniques were identified as important factors in the earthquake's devastation (Rai, Goutam, Singhal, Parool, Pradhan, & Mitra, 2012). In 2015, the M7.6 Gokha Earthquake resulted in nearly 750,000 houses experiencing damage. Of those, one-third experienced partial damage, broken down as 67% being low-strength masonry, 26% being cement mortar masonry, and just under 7% being reinforced concrete. Among the two-thirds that experienced unrepairable damage or collapse, the vast majority, 95%, was low-strength masonry (GoN, 2015). Notably, while modern Nepali construction seems to perform better than vernacular construction, modern construction itself remains

highly vulnerable to seismic shaking (EERI, 2015; Adhikary, 2016). Timber frame construction, however, performed well (Kaushik *et al.*, 2016).

Both rural and urban construction in Nepal include material and construction techniques that result in seismic fragility. In its various geographic regions, cultural differences are also reflected in people's housing traditions. Several different typologies suited to the needs of different communities, occupations, geographic and climatic conditions have been built using local skills, materials, and resources. Housing typologies can be defined based on their design forms, building materials, various construction techniques and structural systems. In Nepal, the predominant walling materials are stone masonry with mud mortar, but one can also find other materials, such as adobe, rammed earth, or burnt brick masonry (Fig 1). Similarly, while thatch on wooden understructure may be the most common roofing typology, one can also find slate stones, wooden shingles or clay tiles. Nepal government has a strategy to replace the thatched roof with modern materials like corrugated iron sheets considering the risk of fire hazard (NUDS 2017). Similarly, recent years have witnessed an increased use of cement as mortar, burnt bricks or concrete blocks for masonry walls, reinforced cement concrete for the structural frame or roof slabs, or CGI sheets as roofing material. As a result, housing and building practices in Nepal presents a rather complex scenario with various newer typologies being practiced alongside the wide range of vernacular housing typologies. This complexity of housing typologies reflects affordability issues, new aspirations, and poses a wide range of socioeconomic and environmental challenges. And to note the majority of the dwellings in Nepal are planned and constructed by the homeowners themselves.

In urban areas, rapid urban growth and lack of formal planning or robust adherence to a building code has also led to seismic risk. In particular, the introduction of steel reinforcement bars and cement has led to informal construction of reinforced concrete construction or the addition of new floors on older buildings (Anhorn, Kennartz, & Nusser, 2015). Structural analysis of reinforced concrete buildings with infill masonry walls has been found to be structurally deficient, with the possibility of heavy damage or collapse even at moderate shaking levels of 0.3g (Dumaru, Rodrigues & Varum, 2018). Use of these materials and the "(mal)-adoption of modern construction materials" had led to heightened building stock vulnerability in urban Nepal (Anhorn, Kennartz & Nusser, 2015). Such issues in both urban and rural construction led to the high rate of housing damage and collapse in recent earthquakes.

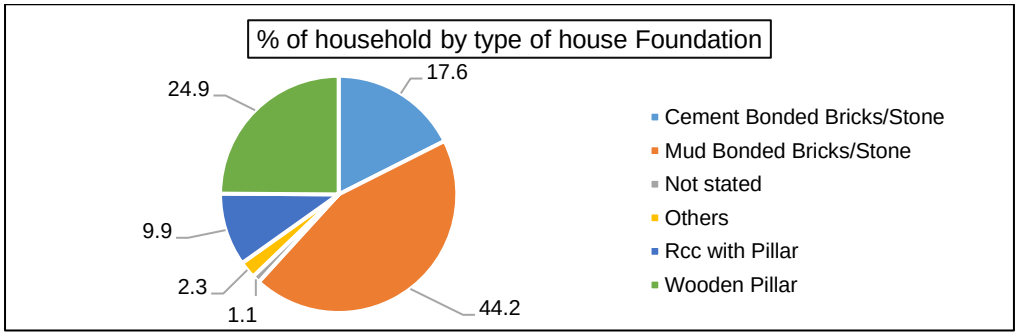


Figure 1: Housing Typology as per the foundation of houses

Source: CBS, 2011

The 2015 Earthquake and its Impacts

The devastating 7.6 magnitude Gorkha earthquake of April 25, 2015, and its aftershocks severely affected 31 districts of Nepal in the central and western regions inhabited by 5.4 million people: The PDNA categorized these districts based on damages – 14 districts were categorized as highly affected and 17 as less affected. The GON designated fourteen districts which comprise 20 % of the population of Nepal as heavily affected areas. According to the assessments by the United Nations (UN) and the GON, these fourteen districts hold more than 90% of the deceased and injured people, heavily affected public facilities and individual housing.

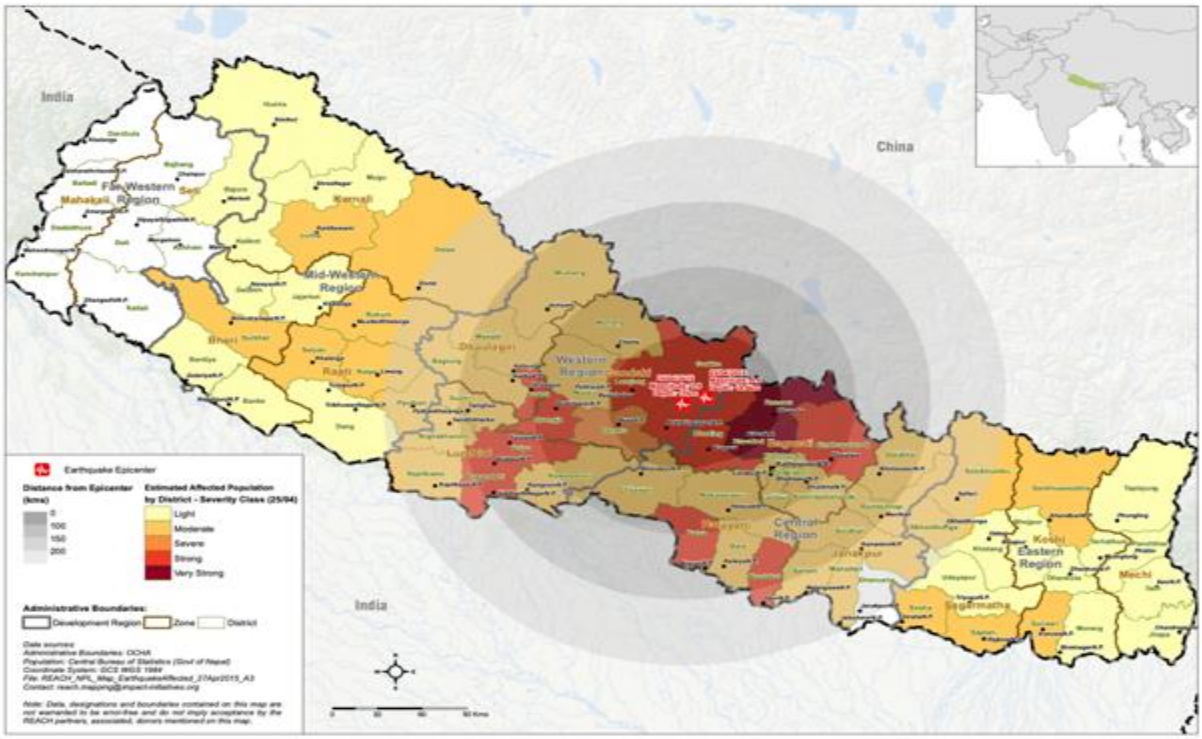


Figure 2: Map showing affected areas by 2015 Gorkha Earthquake

Source: HRRP

The earthquake caused extensive structural damage; a total 8790 people lost their life while 22,300 reported injuries. More than 75 percent of the casualties and 22,303 injuries occurred in rural areas (NRA, 2020). A total of 854,992 eligible beneficiaries' houses require reconstruction, out of which more than 600,000 were located in rural areas. It was estimated that the lives of eight million people, almost one-third of the population of Nepal, have been impacted by these earthquakes. The estimated damage in monetary terms was calculated at USD 7 billion. Post disaster assessments showed that the quakes destroyed at least 498,852 private houses and 2,656 government buildings and partially damaged 256,697 private houses and 3,622 government buildings (NPC, 2015).

The PDNA describes the situation of damage including the estimated monetary amount in four sectors; 1) Social sectors, 2) Productive sectors, 3) Infrastructure sectors, and 4) Cross-cutting sectors, which further consist of relevant sectors. The estimated amount of damage indicated in the PDNA for entire Nepal is shown in Figure 2: Social sectors covered 58 percent of the total effects of

which 86 percent included housing sector. This was followed by productive sectors (25 percent), infrastructure (10 percent) and cross-cutting issues (7 percent).

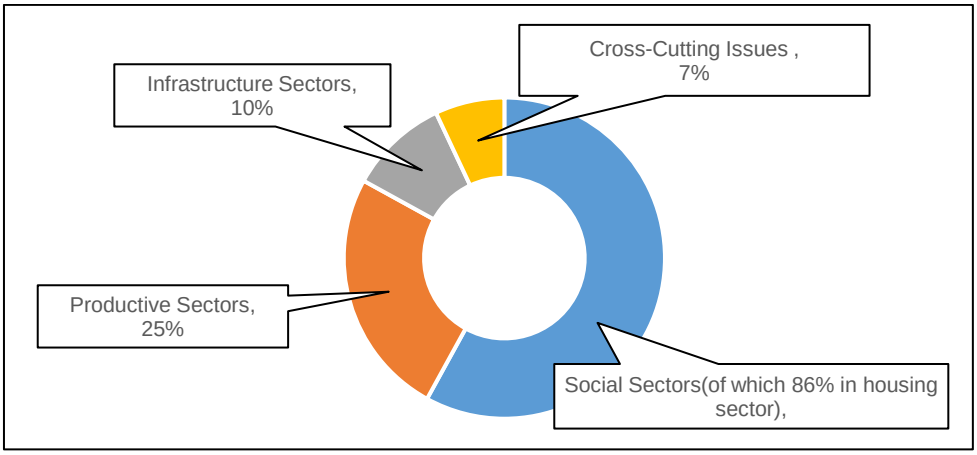


Figure 3: Share of disaster effects across the sectors

Soure: PDNA, 2015

Damage to Housing Sector

Large majority of houses in Nepal are non-engineered and constructed by owners themselves through non-formal process. The existing building typology in the affected 31 districts is as given in Table 1:

Table 1: Existing building typology in the affected 31 districts (Ref CBS 2011)

Low strength Masonry	Cement based masonry	Reinforced Concrete Frame	Wood and Bamboo based
58%	21%	15%	6%

Mostly, old, non-engineered, adobe and masonry buildings found in rural areas of Nepal were collapsed or were severely damaged by the 2015 Gorkha earthquake. In addition, some engineered buildings were also severely damaged or collapsed due to poor workmanship and quality of construction materials. Buildings damaged at grade 5 were mostly found in rural mountainous districts, according to the damage survey by National Reconstruction Authority (NRA 2016a), where low-strength masonry is most prevalent typology. Masonry houses with mud mortar binders are the most common typology in rural context. According to National Planning Commission, in all the affected areas, 96 percent of the damaged buildings were load bearing masonry structures (NPC, 2015). Most of the post-earthquake damage surveys (Goda et al. 2015; Parajuli and Kiyono 2015; Bhagat et al. 2018) reported that these typical loads bearing masonry typologies sustained substantial damage due to the absence of seismic resistant features like seismic band, through-thickness stones, diaphragm actions. The large damage during the 2015 Gorkha earthquake was in SMM (Stone and Mud Mortar Masonry) typology and contributed significant economic and human losses. SMM typology was the most common construction typology in the country. The contribution of SMM housing

typology to the overall damage was more than 60 percent in badly affected rural areas such as Dolakha, Dhading, Nuwakot and Sindhupalchowk (HRRP, 2018). The inconsistent application of seismic resistant features and poor implementation of Seismic design codes are the main reasons of the poor seismic performance of the residential building stock in the 2015 earthquake.

The earthquake severely affected 14 districts (Gorkha, Dhading, Rasuwa, Nuwakot, Kathmandu, Lalitpur, Bhaktapur, Kavrepalanchowk, Sindhupalchowk, Dolakha, Sindhuli, Makawanpur, Ramechhap and Okhaldhunga) and another 31 districts affected to varying extents. According to the Post-Disaster Needs Assessment (PDNA) report, at least 500,000 buildings require reconstruction, and another 250,000 buildings require retrofitting and/or repair. The devastating earthquake has affected vast parts of Nepal and left deep scars in the economy and infrastructure of the country.

Post-Earthquake Reconstruction Process

Government of Nepal's housing reconstruction program was based on key principles derived from its own past learnings, international experiences and best practices of other housing programs. The program's four principles are:

Owner driven construction, Equity, Safer Construction and Transparency and Accountability.

Owner Driven Construction: The program equipped homeowners with multi-faceted support to direct the reconstruction of their home. It provided socio-technical assistance, training, market facilitation and cash-based subsidies, among other forms of assistance.

Equity: All beneficiaries receive the same subsidy amount of NPR 300,000 (about $3,000) to rebuild their home. This cash assistance was provided in three tranches, to ensure that earthquake-safer techniques are used in alignment with the government's national building code (NBC).

Safer Construction: Reconstructed housing is being rebuilt in a more resilient manner in order to withstand future disaster events. Key components of the program included technical assistance on resilient designs for housing, recommendations on appropriate local materials and the training of engineers, masons, and homeowners regarding resilient techniques, practices, and earthquake-safer materials.

Transparency and Accountability: The program included many features to ensure that the principles of transparency and accountability are respected. They included third-party monitoring and evaluation of transparency, the fairness of the program, and beneficiary satisfaction. The program also included a formal grievance redress mechanism to register and address complaints by beneficiaries. In addition, the Management Information System (MIS) has been designed and implemented to monitor the project's physical and financial progress and to ensure fundamentals of transparency and accountability in the process (MDTF, 2015/16)

Additional elements of the government's housing reconstruction program included: A uniform and simple housing reconstruction and rehabilitation

policy that is applied to all reconstruction, regardless of the funding source, with responsibility shared by qualified development partners, under the overall guidance of the Government of Nepal. The program promoted a harmonized approach to reconstruction; Updating and dissemination of earthquake-safer construction standards, housing designs and construction practices, using accessible, affordable, and culturally appropriate materials, and construction methods flexible to reflect local realities. This facilitated resilient construction in the rebuilding process; Primarily in situ reconstruction followed except where relocation is necessary due to land vulnerability or loss of original location and Effective communication to the public throughout the process, ensuring effective feedback mechanisms.

The Owner Driven Approach

Owner Driven Reconstruction (ODR) is identified as a dignified approach encouraging individual homeowners to implement safe building design and construction in disaster affected areas. ODR is a participatory and bottom-up approach which places homeowners at the center of reconstruction, integrating homeowner's decisions on housing design and site selection for house construction with building techniques tailored to local environments and resilient to environmental hazards. Reconstruction mega campaign was initiated by Government of Nepal under the leadership of National Reconstruction Authority (NRA) with adopting 'owner driven reconstruction' approach for the housing reconstruction. Effectiveness of owner driven reconstruction in the context of developing countries has been well documented in past similar recovery experiences (Duyne, 2006). Noticing concerns of the vulnerable populations identified in PDNA, strategic objectives of PDRF included specific points to guide policy formulation. In the owner-driven reconstruction process, financial assistance as well as support for technical, material, supervisory, training and social facilitation is provided by government assisted mechanisms by which homeowners build back better with improved hazard resilience. Public infrastructure and private houses are encouraged to use locally available materials. Tax concessions were granted for building materials for a certain duration, to facilitate material supply.

USAID/NSET's Support for Reconstruction – The Baliyo Ghar Program

After post disaster need assessment conducted by Government of Nepal, there was projection on need of huge resources to carry out recovery and reconstruction activities and there were certain questions on government's capacity for reconstruction and recovery activities. 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. Similarly, there was need of huge number of awareness raising activities to enhance the knowledge of community people on disaster resilient construction. Government was seeking for the support from different development partners and concerned stakeholders for the successful completion of reconstruction mega campaign. Being a major development partner of Government of Nepal, USAID implemented Baliyo Ghar program through implementing partner NSET-Nepal.

Program: Baliyo Ghar

Goal: Contribute to Sustainable Earthquake Reconstruction

Timeframe: Oct 1, 2015 – Sept 30, 2021

Budget: 10M USD

Donor: USAID

The Housing Reconstruction Technical Assistance Program, "Baliyo Ghar", is a key program of USAID-Nepal's reconstruction portfolio launched after 2015 Gorkha Earthquake that aimed to support Nepal Government's goal of "Build Back Better". NSET implemented the program under Cooperative Agreement AID-367-A-15-00005 during the period from October 1, 2015 until September 30, 2021. "Baliyo Ghar" program aimed to provide support to Nepal Government's owner-driven housing reconstruction program, which helped to empower and support homeowners, allowing them to build back safer. The program imparted knowledge, skills, and awareness about earthquake resistant building construction technology to house-owners and local masons. Furthermore, the program assisted the Government of Nepal, related authorities and partner organizations to develop standards, guidelines, norms, and training curricula.

Baliyo Ghar contributes to USAID/Nepal's Country Development Cooperation Strategy (CDCS) Development Objective 4, "Post-Earthquake Nepal Rebuilt to be Disaster Resilient and Well Positioned for Sustainable Development." It also supports Intermediate Result (IR) 4.1, "Critical Infrastructure Sustainably Constructed."

The Baliyo Ghar program has two-fold goals; in shorter-term, the program aimed at ensuring earthquake safer construction of all houses being reconstructed; and for longer-term, the program aimed to establish a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal.

The goals are achieved through the following three Intermediate Results (IRs):

- IR 1: Improved policy and standardization of training, guidelines and manuals for disaster resilient construction technologies
- IR 2: Enhanced local capacity to apply disaster resilient construction methods and techniques
- IR 3: Increased awareness on disaster resilient construction in Nepal

Baliyo Ghar Program contributed to the overall reconstruction program of the Government of Nepal through mobilization of technical assistance at three levels: national, district and local. **Figure 4** shows major program activities at all three levels.

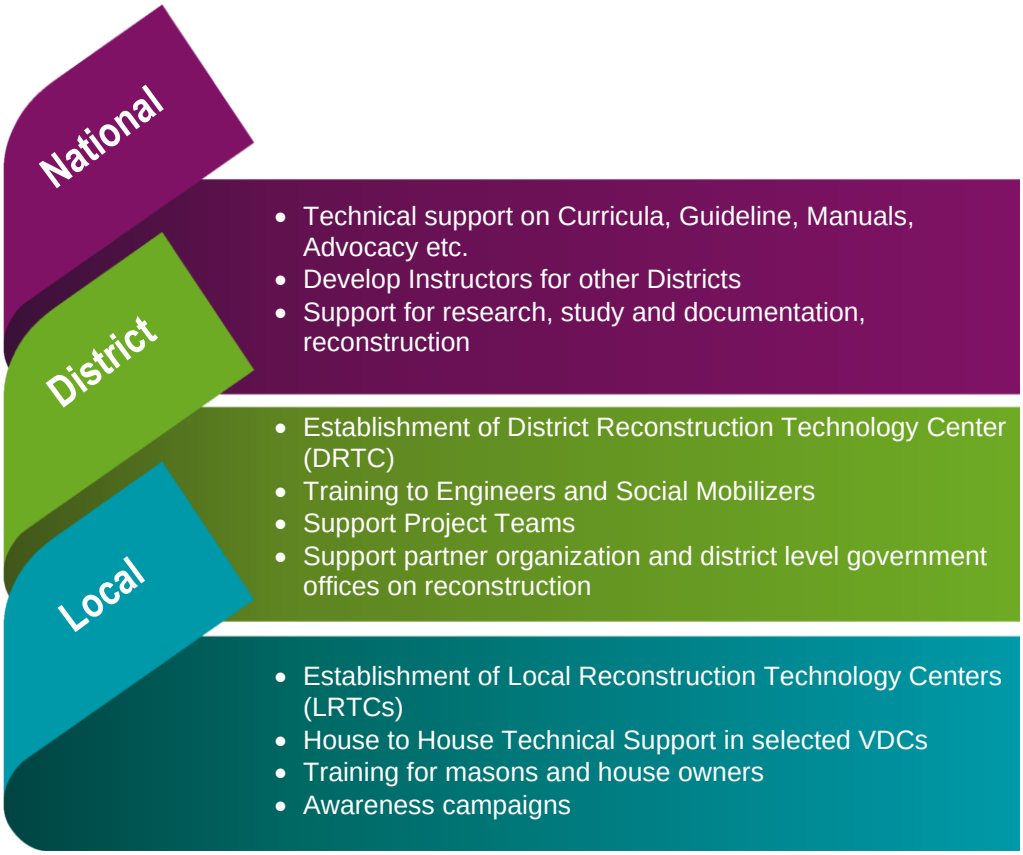


Figure 4: Hierarchical structure of Baliyo Ghar Program Implementation

Geographical Coverage:

Baliyo Ghar program has been implemented in four most affected districts namely, Nuwakot, Dhading, Dolakha and Kathmandu. Within these four districts, Baliyo Ghar program covered 23 wards of 3 Urban Municipalities

(UM) and 43 wards of 12 Rural Municipalities (RM), 66 wards of 15 municipalities in total.

Table 2 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.

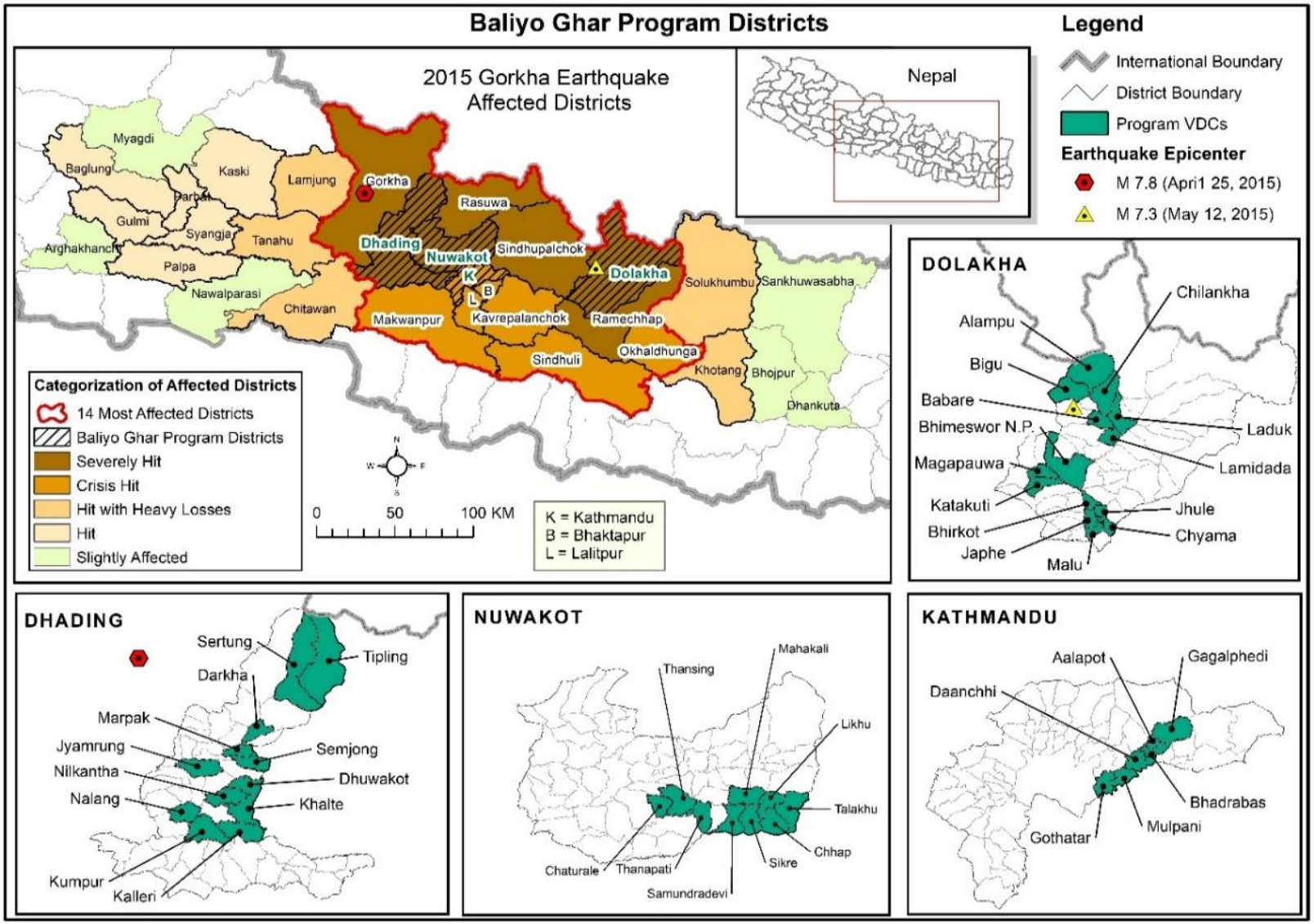


Figure 5: Map showing Baliyo Ghar working area

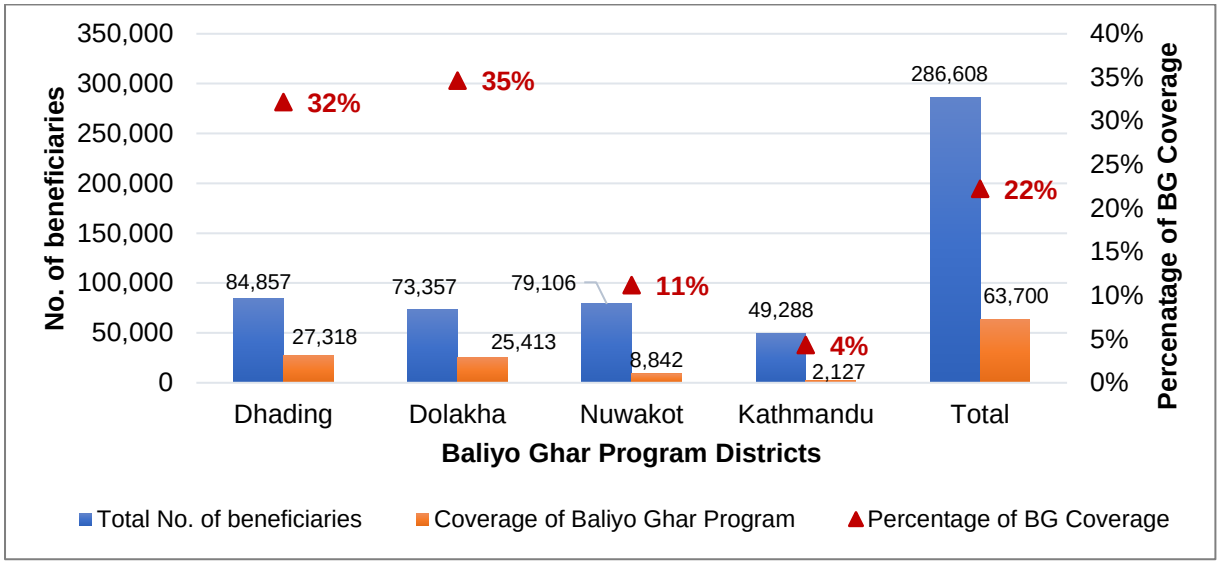


Figure 6: Baliyo Ghar Program districts and coverage in terms of beneficiaries

Guiding Principles of Baliyo Ghar Program

- Housing reconstruction through owner led and owner driven approaches
- Blanket technical Assistance reaching to every household
- Country-led polices and processes
- Inclusion and access
- Integrating DRR and promotion of disaster resilient construction
- Flexibility and context specific approaches
- Longer term and sustainable approach
- Follow national and international standards and practices
- Robust monitoring and evaluation systems

Socio technical assistance under Baliyo Ghar Program

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 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 as shown in **Figure 7.**

Figure 7: Baliyo Ghar Program strategy, key areas of interventions and relevant stakeholders

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 and 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; and
6. **Partner Organizations** involved in reconstruction and platforms

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 in six major themes, as categorized by NRA.

7. **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 classroom-based sessions on earthquake risks, mitigation measures and the technical and administrative provisions of reconstruction were conducted in program areas. Such orientations were very helpful to build people's confidence on the housing reconstruction program
8. **Short Trainings:** Short duration trainings (typically between 3 to 7 days) for engineers, masons and social mobilizers on different aspects of reconstruction and earthquake resistant construction were the other major component of socio-technical assistance. These trainings for enhancing the capacity of masons, artisans, social mobilizers, stakeholders and technical personnel were also considered of vital importance. The trained manpower was instrumental to raise awareness and to ensure construction quality through regular monitoring. Moreover, engineers and social mobilizers trained as part of these trainings were further developed into Master Instructors.
9. **On-the-Job Trainings:** These are the vocational trainings targeted towards developing new skilled masons to support the demand of human resources during surge of reconstruction activity.
10. **Door-to-Door Assistance:** These are the household level assistance provided to earthquake affected beneficiaries to support their decision-making as well as supervise their construction in order to help make the houses compliant to the standards.
11. **Demonstration Construction:** Construction of small and large-scale demonstration models to aid house owners, masons, engineers and other stakeholders to adequately visualize earthquake resistant construction techniques. Such demonstration houses helped to increase the understanding and confidence of the community in the prescribed building technologies.
12. **Information Desks:** These consisted of mobile outlets and information hubs aimed at providing information to a large group of beneficiaries in quick time and increasing outreach. These hubs also functioned as distribution points of free information and communication materials like flyers, posters, brochures, and books.

Theory of Change

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

Results Framework of Baliyo Ghar Program

Figure 8 below presents the results framework of the Baliyo Ghar program and shows the goal, objectives, intermediate results and outputs.

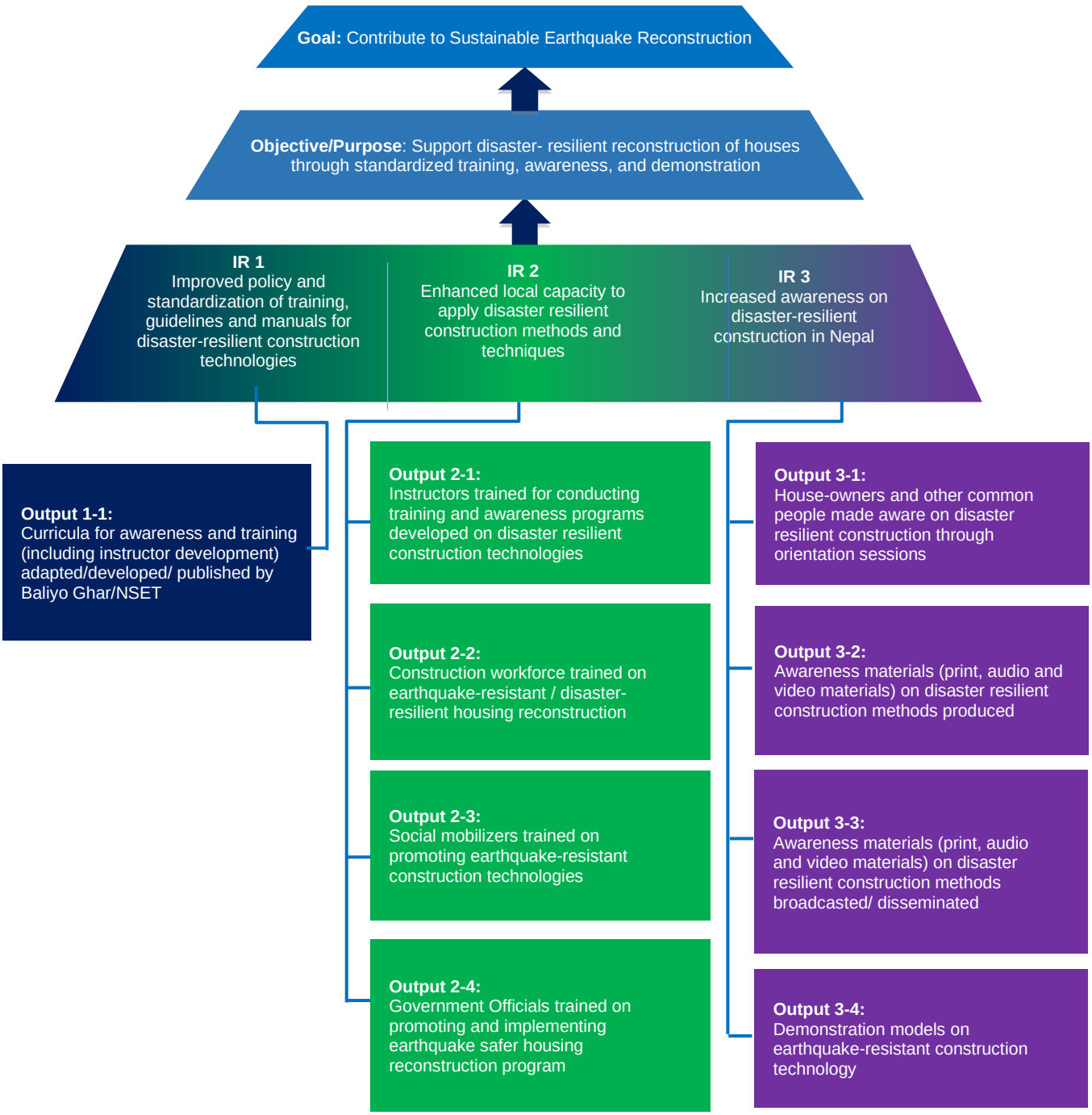


Figure 8: Results Framework of Baliyo Ghar program

Program Indicators and Targets

Impact Indicator

Proportion of houses reconstructed adopting disaster resilient construction methods in the program areas – 70%

Outcome Indicator

- Numbers of Policies/Regulations/Administrative Procedures in different stages of development -12
- Percentage of trained construction workforce who continue working in the field one year after training – 60%
- Perception score of the communities on possibilities of disaster resilient construction- 60
- Proportion of houses that engage at least one trained mason while constructing their house – 60%

Output Indicators

- 6 Number of Curricula for awareness and training (including instructor development) adapted/developed / published by Baliyo Ghar/NSET
- 15604, Number of Construction workforce trained on earthquake-resistant / disaster-resilient housing reconstruction
- 633, Number of Social mobilizers trained on promoting disaster-resilient/earthquake-resistant construction technologies
- 3264, Number of Government Officials trained on promoting and implementing safer construction practices
- 3, Number of supports for engaging local authorities in the process of institutionalization of safer building practices
- 160,000, Number of House-owners and other common people made aware on disaster resilient construction through orientation sessions
- *2121, Number of IEC materials on safer construction produced* (print, audio and video materials)
- *70706, Number of IEC materials on safer construction* (print, audio and video materials) broadcasted/disseminated
- 1409, Number of models on earthquake-resistant construction technology demonstrated
- 45015, Number of Houses constructed/benefited from door-to-door technical assistance including special support to vulnerable population

Reconstruction scenario of Sertung, Dhading
©NSET

During the mobile clinic at the construction site, Kageshwori Manahara
©NSET

PURPOSE AND METHODOLOGY

The evaluation was designed to provide a review and validation of the analysis, strategies and interventions being undertaken by NSET/BALIYO GHAR program. The evaluation is further intended to strengthen accountability and transparency to partners, donors and the affected population.

Accordingly, the designed Evaluation of Baliyo Ghar Program intended to understand the impact of the BG program, as well to gather learnings and opportunities for sharing among the key stakeholders and to provide guidance in designing and developing similar projects in the future.

All the evaluation surveys have been conducted on the basis of "**Baliyo Ghar Program: Final Evaluation Plan".** Final Evaluation plan provided the framework for evaluation of overall impact of the program towards disaster resilient reconstruction of houses. The evaluation covered four major aspects of resilient reconstruction. The evaluation also covered classic evaluation criteria such as relevance, effectiveness, efficiency and sustainability.

Evaluation Objectives

The main purpose of the evaluation is evidence-based learning and adaptation. Specifically,

- To examine the effectiveness of BG program in changing building construction practice.
- To understand the extent of social impacts of Baliyo Ghar program
- To assess the contribution of BG program towards sustainability of resilient reconstruction
- To capture and provide evidence and lessons useful for broader stakeholders

Evaluation Questions

a. Improved policy:

- To what extent developed policy document is applied in national reconstruction by stake holders and what are the application results?

b. Increased community perception

- Is BG program successful in changing the perception of people towards disaster-resilient construction techniques? And how?

c. Enhanced capacity

- Is BG program successful in enhancing the capacity of masons, engineers, social mobilisers?

d. Improved building construction compliance

- How effective is the program in changing the building construction practice?
- Is building construction compliance due to reconstruction policy of GON or increased awareness of community or enhanced local capacity? Or due to synergetic effect of all?

e. Sustainability

- To what extent institutionalization of reconstruction efforts in Local Government contribute towards sustainability? How and what are the efforts of BG program?

Methodology

The evaluation employed a mixed methodology of quantitative and qualitative survey tools in an integrated design to enrich the process and provide more insightful understanding. The sequence of the mixing was such that the quantitative tools supported the qualitative ones. Combining quantitative and qualitative techniques ("mixed method") allowed for a comprehensive understanding of the project's accomplishments and lessons learned. These

ranged from document review to semi-structured interviews, group discussion and field observation to a household survey carried out in each program districts. The evaluation aimed through these different techniques is to achieve solid evidence through triangulation of findings and complementarity of research methods.

Evaluation process: methods for data collection and analysis

NSET/Baliyo GHar's Monitoring and Evaluation team used both qualitative and quantitative methods to ensure that issues were explored in depth.

a) **Document Review**- the desk review consisted of an analysis of associated project documents to extract information and an overview of the processes before conducting the evaluation fieldwork.

b) **Field Phase -** The MEL team worked in collaboration with program team to determine the sample and districts to be visited. Field evidence were gathered through key informant interviews (KII), focused group discussions (FGD), field observations and household surveys. 9 different FGDs were conducted by the team in the program districts reaching out to 94 beneficiaries (Trained masons, Houseowners and Female Masons). The interviews were based on open -ended questions to enhance the opportunity to capture detailed descriptive data about perceptions and opinions. Similarly, a comprehensive KII was conducted with key informants representing different institutions in the partner community, NRA executive members, Local Government Representatives, NRA field engineers, BG senior officials, trained workforce (Instructors, engineers, social mobilizers, and masons) etc. 39 individuals were reached out through the KIIs.

Similarly, quantitative surveys like; Baseline Survey, Endline surveys on Risk Perception of the community, Mason Retention surveys, engineers training effectiveness survey, Pre-test and post-test for training participants etc. were also conducted. Detail about each survey is presented below.

The evaluation team ensured that participants were informed prior of the nature of the activities when gathering information needed to get their consent for sharing personal information.

The household survey for both risk perception and mason retention of the trained mason were carried out in each of the program districts.

For this study, team reached to a total of **9,271** stakeholders, beneficiaries through different types of surveys. The survey results for independent surveys are summarized in separate report as different volumes, and relevant parts are included in this report under each section.

Table 3: Different Surveys conducted for Baliyo Ghar Program Evaluation

S.N	Name of Survey	Survey Year (in AD)	Survey Type	Sample Size	Respondents Type
1	Study on Risk Perception among people in the VDC/Municipality of Baliyo Ghar Program				
1.1	Baseline Study	2016	Quantitative	9,856	Program Beneficiaries (Sample based household survey)
1.2	Endline Study	2020	Quantitative	3,073	Program Beneficiaries (Sample based household survey)
2.	Mason Retention Surveys (MRS)				
2.1	1st MRS	2017	Quantitative	1,286	BG Trained masons
2.2	2nd MRS	2018	Quantitative	3,162	BG Trained masons
2.3	3rd MRS	2019	Quantitative	1,020	BG Trained masons
2.4	4th MRS (MRS Part B)	2020	Quantitative	195	BG Trained Masons (Sample based)
2.5	MRS Part C	2020	Quantitative	195	On-the-Job Trained Masons (Sample based)
3.	Key Informant Interviews	2020/21	Qualitative	39	NRA officials (3), BG officials (4), Trained masons (4), House owners (4), Local Government Representatives (4), NRA Field Engineers (4), Partner Organization Representatives (4), Trained BG Master Instructors (2), Trained Social Mobilizers (2) & Trained Engineers (8)
4.	Focus Group Discussions	2021	Qualitative	94 Participants in 9 FGDs	Trained Masons, House Owners, Trained Female Masons
7.	Training Effectiveness Survey for Trained Engineers	2020	Quantitative	207	BG Trained Engineers

Limitations

The study primarily focuses on the impact of Baliyo Ghar program on reconstruction in Nepal. It does not explicitly evaluate the overall reconstruction of Nepal.

Various quantitative and qualitative surveys were conducted in different phases (Baseline/ Endline) to generate the results. However, some of the end line surveys were hampered due to the COVID-19 pandemic and as such the sample size had to be reduced and online meetings had to be conducted in some cases.

Some of the surveys were conducted on sample basis as a part of internal evaluation of Baliyo Ghar Program and hence the results presented in this report are the findings of sample-based surveys. Therefore, the findings of this report might not be suitable to generalize for the whole districts of Nepal.

Community participating in FGD, Nuwakot
©NSET

EVALUATION FINDINGS

The overall goal of the Baliyo Ghar program was to contribute to sustainable Earthquake Reconstruction. The goals are achieved through the following three outcomes; improved policy and standardization of training, guidelines and manuals, enhanced local capacity to apply disaster resilient construction methods and techniques and increased awareness on disaster resilient construction in Nepal.

To measure the effectiveness and impacts of various Baliyo Ghar components and identify best practices and lessons learned towards disaster resilient reconstruction of houses, a system of internal monitoring and evaluation of Baliyo Ghar Program has been developed through which different monitoring and evaluation activities were conducted.

Different surveys and studies have been conducted during the program period to evaluate the program outcomes and provide necessary learnings for course correction. The baseline and end-line surveys, building compliance survey, mason retention survey, risk perception surveys and collection and analysis of various periodic data on program achievements and reconstruction progress have continuously supported in the programs' strategic planning and formulation of program activities. Similarly, the program M&E team also regularly monitored the program activities to ascertain those objectives are met and activities are conducted to the best of established standards. This section summarizes the results and findings of those studies, independent reports of the studies are presented as separate reports.

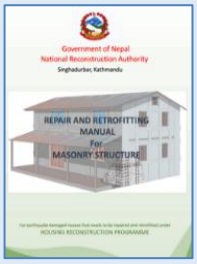
Program Indicators and Achievements

This section presents the achievements on program indicator of Baliyo Ghar Program with respect to the intermediate results.

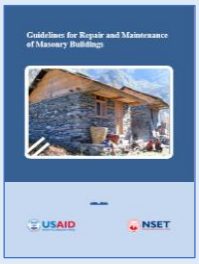
IR 1: Improved policy and standardization of training, guidelines and manuals for disaster-resilient construction

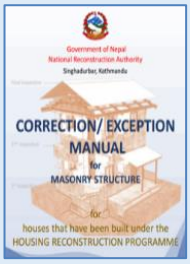
Baliyo Ghar program contributed significantly for development of required policies and the standardization of training guidelines and manuals. Under this intermediate result following indicators were achieved.

Baliyo Ghar program has made key contribution to develop total 14 national level policy documents to support housing reconstruction. Out of 14 policy documents, Baliyo Ghar supported for full contribution on three documents and partial contribution for the rest (Infograph listed presents the policy documents contributed by Baliyo Ghar). Similarly, Baliyo Ghar Program has developed 8 different types of awareness and training curricula during the project period. Baliyo Ghar's contribution on drafting enrollment and housing grant distribution SOP, inspection guideline, multiple ownership guideline for housing grant for traditional settlements are few examples of its support on policy which was largely based on the need felt by NRA. Similarly, technical guidelines, training curricula were developed in different phases based on the felt need such as correction and exceptional technical manual, retrofitting manual, curriculum on the job training for retrofitting of houses etc. These documents helped in resolving the technical issues that arose during housing reconstruction and facilitated the inspection process and standardized the training courses. Among the developed documents the Training curriculum developed for 7 Days mason training was endorsed by the government and widely adopted and applied in overall reconstruction process.



8 Technical Guidelines & Manuals Developed





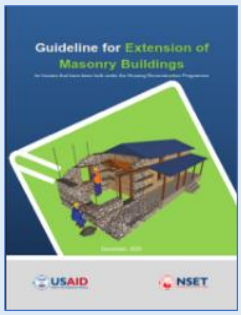
Training Manual on Basic Technical Training for Engineers on Earthquake Resistant Design and Construction
Publish Date: March 2016

Repair and Retrofitting Manual for Masonry Structures
Publish Date: June 2015

Guidelines for Repair and Maintenance of Masonry Buildings
Publish Date: 2020

Correction/Exception Manual for Masonry Structures
Publish Date: May 2017

Fully or Significantly Drafted



7 Days Mason Training manual on earthquake resistant building construction technology (Rural/Urban)
Publish Date: 2015

Light Timber/Steel Frame Structure Manual
Publish Date: 2018

Hollow Concrete Blocks Manual for Load Bearing Structures for houses that have been built under the Housing Reconstruction Program
Publish Date: February 2019

Guidelines for extension of masonry buildings for houses that have been built under the Housing Reconstruction Program
Publish Date: March 2021

Participants constructing cement motor model during the mason training, Thansingh, Nuwakot ©NSET

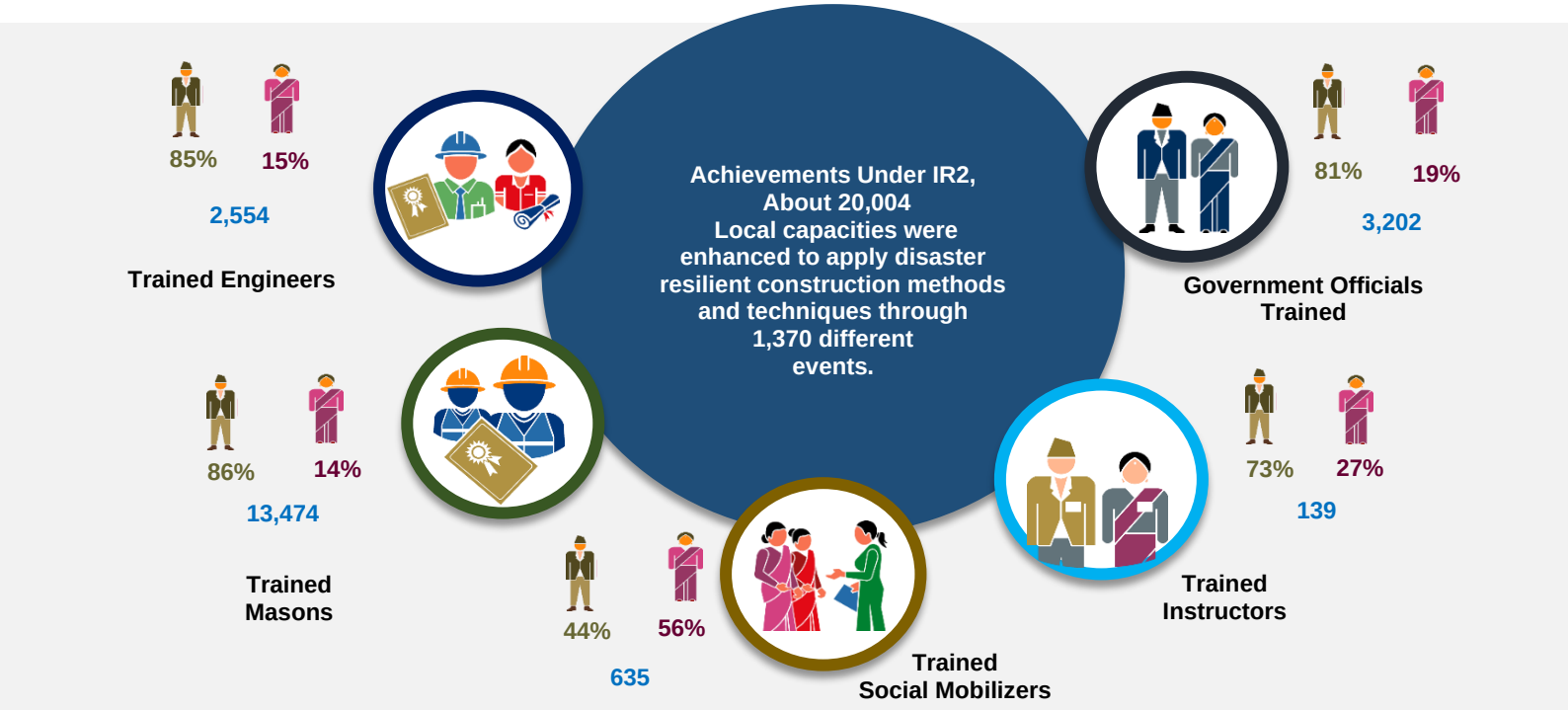
IR 2: Enhanced local capacity to apply disaster resilient construction methods and techniques

To enhance the local capacity on disaster resilient construction methods and techniques, Baliyo Ghar program conducted different training program (short-term and long-term). Under this intermediate result following indicators were achieved.

Several instructor development courses were conducted by the program for developing master instructors in the districts who can serve during further training courses in the earthquake affected areas. In total, 139 master instructors were developed through 5 different training events in Baliyo Ghar program.

To enhance the local capacity on earthquake-resistant housing construction, Baliyo Ghar program conducted different trainings for local masons and technical trainings for technical professionals. In total, 13,474 masons were trained through short term (7 days) and long-term vocational trainings. Similarly, a total of 2,554 technical professionals were trained through different technical trainings.

Large number of social mobilizers were required to reach out to every household in the community to spread the awareness message. This was also felt needed to increase the nexus between social, technical professional and community on various reconstruction aspects. Baliyo Ghar program conducted separate training courses for social mobilizers to enhance their skills in facilitating the community. Total of 635 social mobilizers were trained through Social Mobilizers Training of Trainers (SM ToT) and Social Mobilizers (SM) trainings.



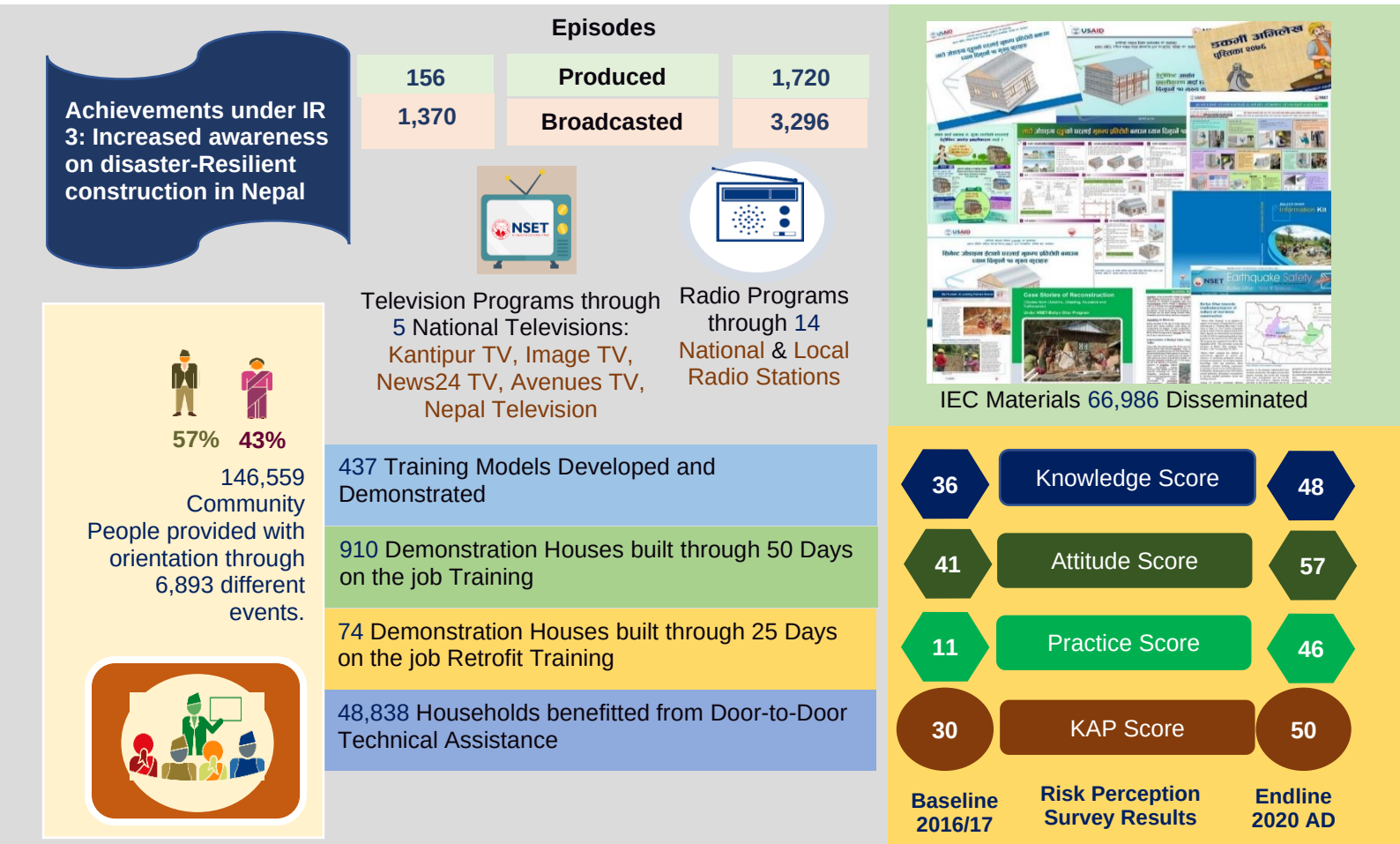
Capacity building for the local authority plays a crucial role in the post-earthquake period and reconstruction activities. With the approach of building capacity of elected authorities, social activists, regarding Disaster Risk Reduction, Building Code Implementation and Retrofit, a number of trainings

has been conducted in the four program districts under NSET-Baliyo Ghar Program. Total of 3,202 local government officials and social activists were trained through 19 training events.

IR 3: Increased awareness on disaster-Resilient construction in Nepal

One of the major objectives of the reconstruction campaign was the enhancement of local awareness and capacities to develop disaster resilience. 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. Total of 146,559 individuals were benefitted from Baliyo Ghar orientation programs and 48,838 beneficiaries were benefitted from door-to-door technical assistance.

During its implementation period, Baliyo Ghar program reached to 166,563 beneficiaries directly through 8263 different events. 2,554 Engineers, 13,474 masons, 3,202 government officials, 635 social mobilizers and 139 instructors were trained and around 146,559 people were oriented on safer construction.



The following **figure 9** depicts the progress status of output level activities conducted under Baliyo Ghar Program.

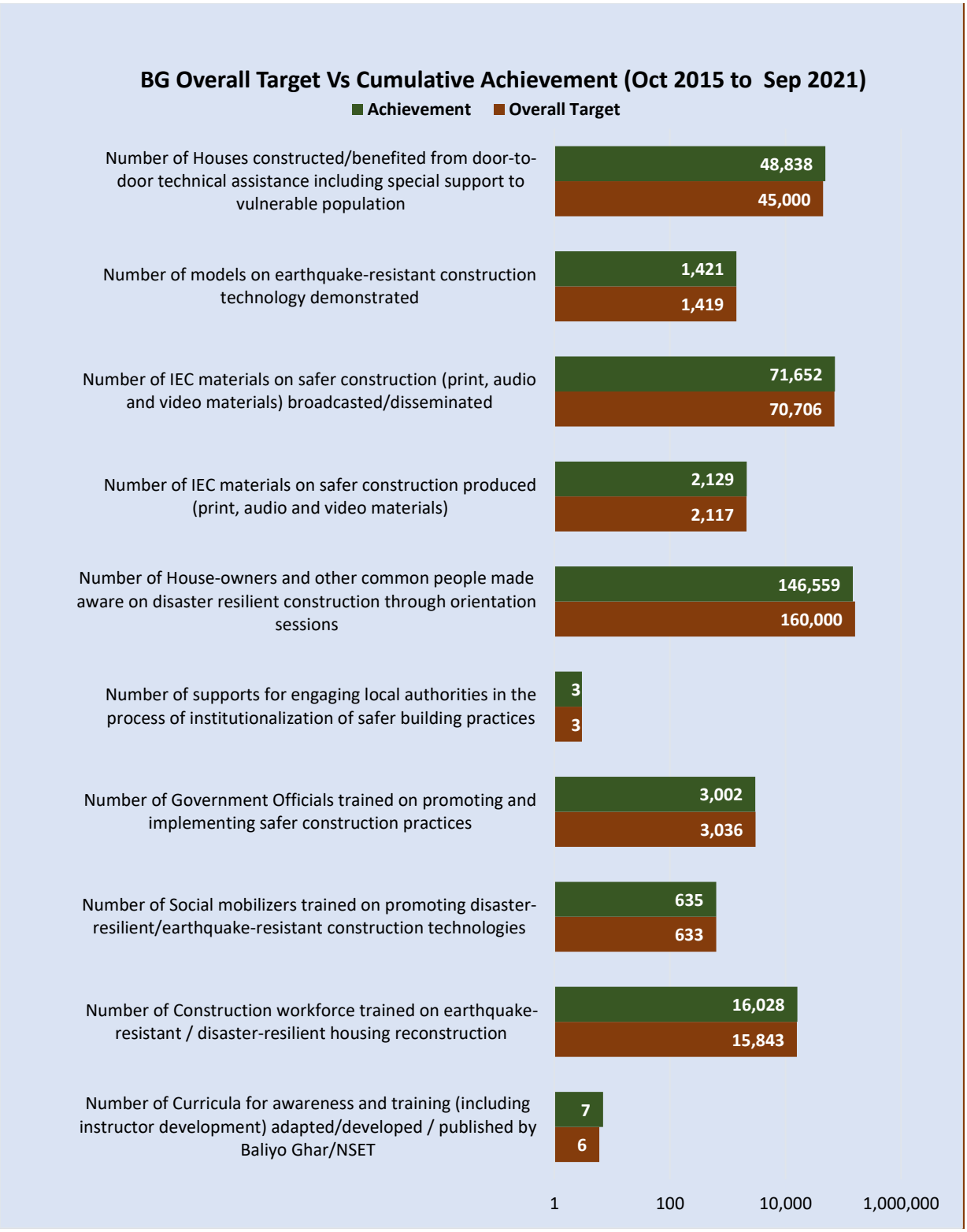


Figure 9: The Cumulative Progress of output level activities in comparison to overall target of Baliyo Ghar Program

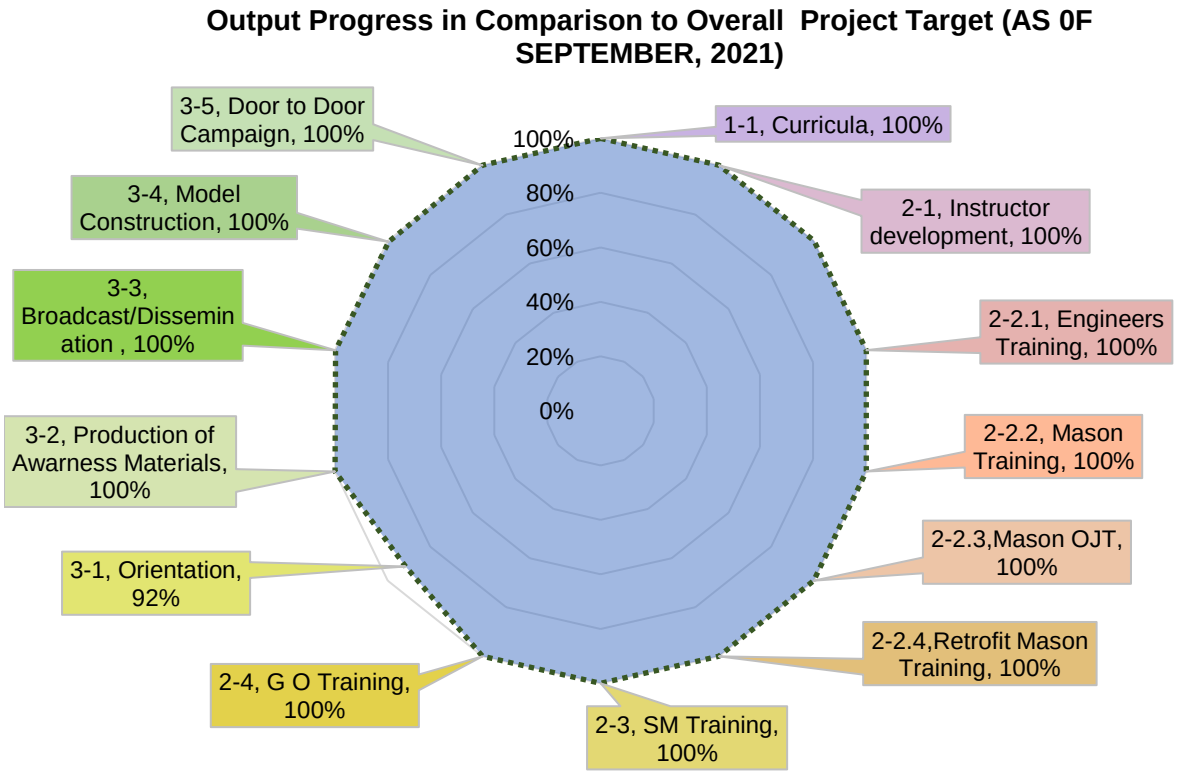


Figure 10: Progress of output level activities at the end of Year 6 Third Quarter with respect to Project Target

Results & Impacts of Baliyo Ghar Program

This section presents the results and findings from the information collected from the respondents during the survey. Under NSET-Baliyo Ghar Program: Evaluation Design Plan, different surveys were designed as a part of the program evaluation process for the assessment of the number of trainings and awareness raising activities conducted. The studies examine the positive changes observed towards achieving disaster resilient construction and most importantly the role of skilled construction workforce in ensuring the compliance.

Findings from all those different studies/ surveys conducted for the evaluation of the program are presented below in the form of key learning questions adopted in the NSET-Baliyo Ghar Program: Evaluation Design.

Improved policy

- To what extent developed policy document is applied in national reconstruction by stake holders and what are the application results?

Policy Intervention

Under intermediate Result 1: Improved Policy and Standardization of training curricula, guidelines and manuals for disaster resilient construction technologies, Baliyo Ghar program's contribution was found to be significant.

The beneficiaries and other key stakeholders considered the reconstruction to be very effective and successful. Among many other factors and elements of success, the role of timely and appropriate policies has been almost undoubtedly acknowledged by everyone. The study tried to evaluate and understand the role of most important policies and role/contribution of NSET Baliyo Ghar in Policy implementation.

As explained by NRA leadership, most of the NRA leadership team was from various other professional background and did not have much prior knowledge and experience on post-disaster recovery and reconstruction. At the initial stage, there was very limited number of experts with the understanding of background and need of post-earthquake reconstruction. There were number of institutions who were behind and supported the NRA, and there was USAID's Baliyo Ghar program implemented by NSET whose support was worth mentioning.

NRA leadership also mentioned - "We knew that NSET is one of the pioneer organizations working in the field of earthquake resistant designs, safer building construction, raising awareness for technology transfer and capacity building activities. NRA undoubtedly felt that NSET's support is required for this reconstruction process. NSET's involvement was noteworthy in the advisory and expert role, and NSET contributed significantly to develop policy documents, guidelines and to implement those at the field level."

NSET has been involved in advocacy and lobbying for disaster resilient reconstruction right after Gorkha Earthquake. NSET's Executive Director, himself served as the Technical Advisor to NRA in the initial period and supported in developing major reconstruction policies and guidelines. NSET demonstrated the first grant distribution process held in Singati, Dolakha. NSET has been involved in the three major processes of reconstruction i.e., advocacy for policy/ guidelines, formulation of policy/guideline and demonstration of policy implementation.

NSET through Baliyo Ghar program has made key contribution to develop total 14 national level policy documents to support housing reconstruction.

Baliyo Ghar program team mentioned: "Three different approaches were taken by Baliyo Ghar for the application of the developed policies in the field. First was the demonstration or the piloting of the activities, for e.g., demonstration of Enrollment procedure in Singati; Second, reaching out to individuals through door-to-door campaigns, orientation and trainings and third was through the use of mass media, key messages and information were disseminated through radio and television programs."

As stated by NSET's senior officials, "Different training activities were conducted for the NRA field engineers for the inspection of houses and related guidelines. At some places, NSET was directly involved in field for the demonstration of inspection. Similarly, NSET was involved in drafting the SOP for Training strategy development and training. Approximately 3,000 newly recruited NRA engineers were trained by NSET for the operationalization of policies".

Senior leadership of NSET expressed that there were very limited number of existing policies prior to the earthquake on reconstruction and hence the policies

were developed as per the need. The developed policies were just sufficient to take forward the reconstruction process. Wherever gaps were identified, necessary amendments to the polices were done which made the reconstruction success and the process dynamic. However, there had been delay in formulation and implementation of some of the policies which complicated the process. For example, policy related to retrofit of partially damaged houses was formulated late; due to which most of the retrofit beneficiaries either changed to full beneficiary or demolished their house for reconstruction. Similarly, policy related to urban recovery and reconstruction of houses with multiple ownership was also formed lately. Due to which urban reconstruction has not been as successful as rural reconstruction.

Increased community perception

- Is BG program successful in changing the perception of people towards disaster-resilient construction techniques? And how?

Change in risk perception of the community

Of the three intermediate results (IR) of Baliyo Ghar program i.e., IR1- Improved policy and standardization of training, guidelines and manuals for disaster resilient construction technologies; IR2- Enhanced local capacity to apply disaster resilient construction methods and techniques and IR 3- Increased awareness on disaster resilient construction in Nepal, to achieve the third result, the awareness level of the community was increased through different program activities such as: orientations, door-to-door technical assistance, information desk, demonstration model, media campaigns etc.

Perception score of the communities on possibilities of disaster resilient construction increased by 60% from the baseline value

Baliyo Ghar program also assisted Government of Nepal for the formulation of reconstruction related policies and its field implementation. Apart from the capacity building programs for different stakeholders, 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 and capacity of earthquake affected beneficiaries regarding reconstruction policies and earthquake resistant construction technologies. During the program implementation period, Baliyo Ghar program oriented 1,46,559 people within the program districts through 6,893 orientation events. These orientation programs addressed the governments grant facilitation process, and the safer construction techniques adhering the national building code compliance.

To measure the progress of the Baliyo Ghar program activities, a comprehensive Monitoring and Evaluation plan of the program was developed which had framed the program output, outcome, intermediate results and impact along with its' indicators. Data source, data collection methods, and mode of analysis were also defined for each indicator.

Change in the perception of the people was measured to evaluate the effectiveness of the awareness activities carried out by the program towards the

end. Household level Risk Perception Surveys was conducted by the MEL team with support from the program team and external enumerators. 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. Baseline was conducted during August-October 2016 while endline survey was conducted towards the end of the program, during January-March 2020 in all the program VDCs/municipalities. Both baseline and end-line study used simple random sampling based on the Stratified Systematic Area Sampling procedure. The sample size was calculated using the following Krejcie and Morgan, 1970 formula. Total number of households in each program wards were treated as population to calculate the sample size in each program wards. The results were extrapolated to the whole population with a confidence level of 95% and error margin of ± 10%. Due to human resource and time constraint, error margin was increased by ± 5% in this endline survey as compared to the baseline error margin.

A total of 3002 surveys were administered in the three program districts: Nuwakot, Dhading and Dolakha during the endline survey while 9856 surveys were administered in the then 33 VDCs and 3 municipalities of the three program districts during the baseline. A follow-up qualitative study was subsequently conducted to further explore and expand on the insights gained from the survey. This report presents the results of the study. The report highlights the significance of awareness activities and change in risk perception towards promoting safer building construction.

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 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 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 (Fig 11). This baseline-end line comparison indicates that each component of KAP i.e., knowledge, attitude and practice score of the community people has been increased significantly. Massive change in practice score indicated that

earthquake safe construction practices has been adopted widely by the community people during the reconstruction. This result implies that the reconstruction efforts made by the NRA as well as other relevant stakeholders may have positive impact on reconstruction activities.

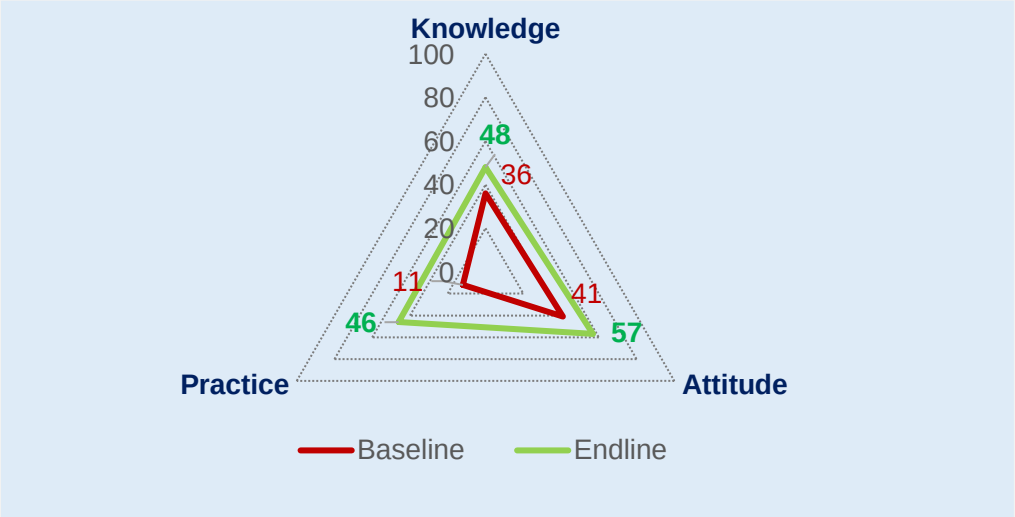


Figure 11: Knowledge, Attitude and Practice Scores of respondents in Baseline (2016/17) and Endline (2020) Risk Perception Survey

The mean KAP score was higher among male respondents in both surveys. Each component of KAP score i.e., knowledge, attitude and practice score were higher in case of male respondents. The respondents in both surveys thought that it was their own responsibility to make community and individual houses safe from earthquake.

During the reconstruction process, respondents had faced many challenges. Among many challenges, lack of resources/money was the major challenge faced by the respondents in both surveys. Other challenges were lack of technology and knowledge, lack of trained human resource, lack of community unity etc. The percentage of the respondents who practiced correct pillar and beam size in RC frame houses has been significantly increased in end-line survey as compared to baseline survey. The practices of involvement of the trained masons fully or partially during reconstruction of houses has been increased significantly in case of end-line survey as compared to the baseline survey (Fig12). Similarly, the respondents who took technical support during construction has also increased in the end-line survey (Fig 13).

"We learned about the government standard design, the tranche system and the codal provision from NSET technical team, ward members, radio and television programs. It was very helpful for us."

House owner Dhading

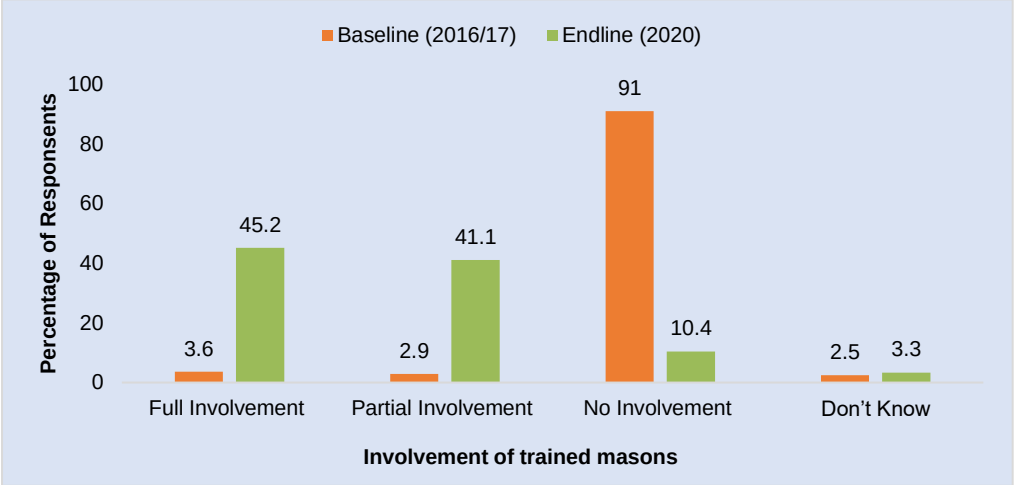


Figure 12: Involvement of trained masons while constructing their house

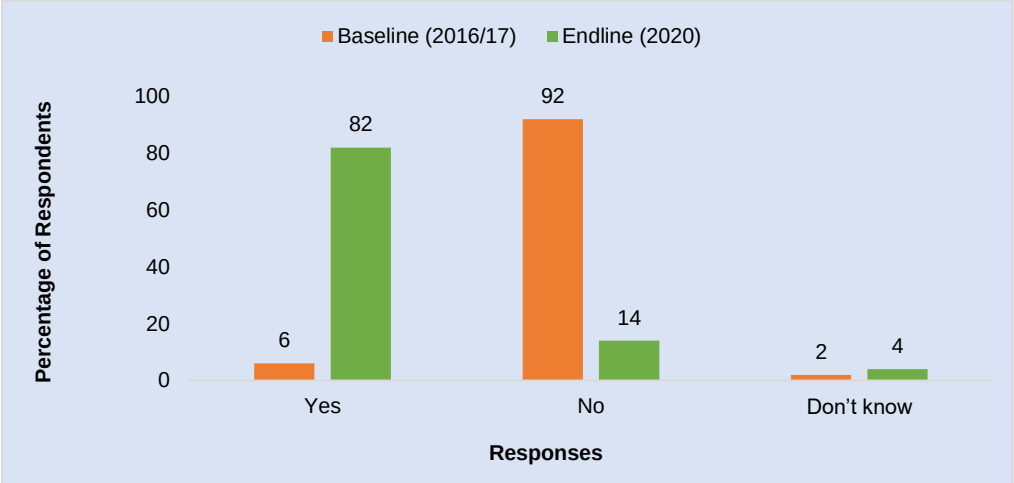


Figure 13: Technical support and suggestion taken during reconstruction

It was also observed that almost 60% of the respondents were willing to invest double the cost, 19% even 3 times the cost in the endline survey. These percentage were significantly increased from the baseline survey, 39% were willing to pay double during the baseline (Fig 14).

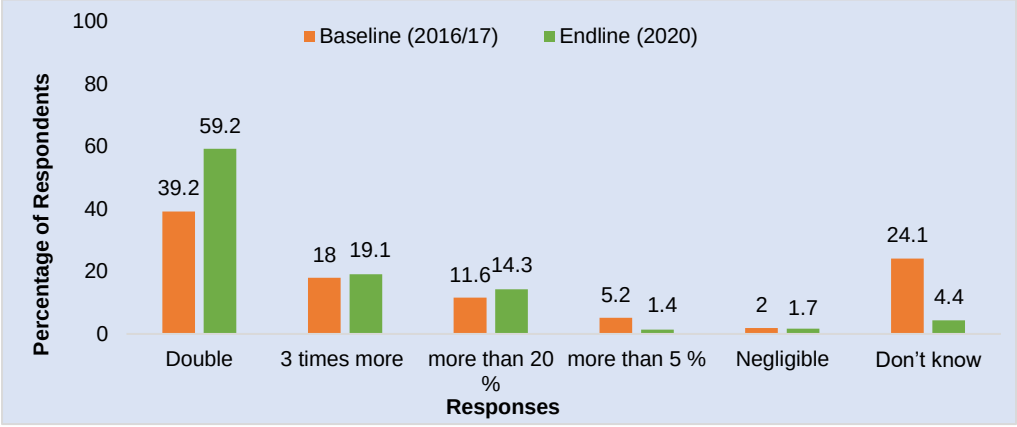


Figure 14: Respondent's willingness to invest additional cost earthquake resilient houses

Number of factors such as gender, ethnicity, age group, education level, occupation, monthly income, participation in formal awareness program and listening/watching awareness program from different communication medium plays the important role to changes the KAP score of the respondent. Most of the variable are significantly related with KAP score.

The survey conducted in the two different time periods; the initial phase and towards the end of the Baliyo Ghar program allowed us to explore similarities and differences in knowledge gained about earthquake-resistant construction techniques in ways that leaded towards earthquake safer constructions.

Baliyo Ghar team had prioritized door-to-door assistance in the early days, gathering as much information as possible. Similarly, they also sought help from local leaders who were positive about the program. Interactions were held with beneficiaries and local leaders about the reconstruction policies, their implementation mechanism and grant disbursement process through series of orientation campaigns and placing information and help desks at different locations. The beneficiaries were made aware about the importance and significance of incorporating earthquake resistant elements, and local masons were trained in several levels to enhance their skills which helped them hone their skills as well practice in field. With intensive and focused social mobilization, people started believing in technical assistance provided. Mobile teams conducted door to door campaigns regularly to aware people of the reconstruction strategies and norms as well as the assistance being provided by Baliyo Ghar Program. The blend of socio-technical expertise gained through these teams provides an ideal mechanism to interact with affected communities and provide effective assistance. This form of assistance is fruitful in earthquake-affected areas that have a reasonably low level of technical knowledge and awareness, especially in disseminating information on technical provisions related to safer reconstruction.

This exploration suggests that there are potential benefits of embedding robust public education campaigns within programs designed for shifting building practices in Nepal. While intensive, it appears that these programs of TV/radio broadcasting, community orientations, and door-to-door engagement may have been an important part of an effective strategy for educating people about these construction techniques but also convincing them of the importance and value of the techniques. The local government and other related stakeholders should therefore allocate more resources towards educating community people for achieving disaster resilient community.

Skill and knowledge transfer to the grass root level is the only solution for becoming safe from future disaster. Safer construction practices will only be achieved by the increased level of awareness of community people, utilization of skills and knowledge obtained by the trained construction workforce and establishment of robust building code implementation system at the local government. For details of the study, please refer to the report, NSET *(2021),* "Changing Perception of People, Reducing Risk; A Report on Risk Perception Survey implemented under the Baliyo Ghar Program.

Baliyo Ghar supported in rebuilding my house strong and changed my perception on earthquake: A case story of a beneficiary

Ms. Sita Biswakarma and her house at Lamidada, Dolakha

Sita Biswakarma is from Kalinchok Rural Municipality-3, Lamidada of Dolakha District. She is farmer by profession and has been growing maize, millet and paddy in a small land plot that she owns in the village. She also owns few cattle and goats. Her major source of income is agriculture and daily wage that she earns from supporting in others agricultural works.

She was not aware of earthquake risk and earthquake safety prior to the 2015 earthquake. The earthquake had completely destroyed her house. She was in dilemma on how to rebuild her house.

With the implementation of Baliyo Ghar program in her village, she got enlightened on various aspects of earthquake risk and earthquake safe construction techniques. She shares those orientations conducted by Baliyo Ghar Mobile team and counseling has helped her understand about earthquake risks and ways to minimize the risks and to be safe during such disasters. She shared that her perception of earthquake risk changed after that.

Baliyo Ghar supported in rebuilding her house earthquake safe

She further adds that mobile team from Baliyo Ghar program provided all the technical assistance for rebuilding her house. During entire the reconstruction process, she remained in touch with the mobile team and sought help whenever she required. Ms. Biswakarma added, “I would not have been able to rebuild my house had there been no help from Sir and Madam from Baliyo Ghar. I will never forget their contribution in my life.”

According to her, it costed her around NRs. 4 to 5 lakhs for the reconstruction of her new house. She managed the cost from the government grant she has received and some of her savings.

She further adds ‘Many people, from local house owners, engineers, masons to high-level teams from Charikot and Kathmandu visited my house during and after the construction and all appreciated the way it was constructed. “Although my house is relatively small in terms of rooms and size, but a house is a house after all, and it has given me great satisfaction of owning a Baliyo Ghar (Strong house) more than anything”.

Enhanced capacity

- Is BG program successful in enhancing the capacity of masons, engineers, social mobiliser?

“Socio technical assistance has been very important as technical experts has reached to each and every village. It was evident that houses have been built faster and safer in those areas where technical assistance was provided through socio-technical approach”.

- DUDBC Senior Official

Baliyo Ghar Program had covered 66 wards in four earthquake affected districts, with only 7% of the total listed beneficiaries being provided with direct socio-technical assistance. However, Baliyo Ghar program's capacity building activities such as, 50 days On the Job training for developing masons, training for engineers and social mobilizers, training for local authorities and various other knowledge dissemination and discourse workshops covered a wide range of themes for supporting national reconstruction campaign. 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.

Baliyo Ghar program had conducted different trainings programs for technical professional as well as local construction workers. The training programs were found to be highly effective in enhancing the skills and knowledge of masons, engineers, social mobilizers and master instructors. The skills gained from these trainings were found to be significantly utilized in the field level for safer construction. According to the stakeholders involved, Baliyo Ghar program has been effective in building earthquake resilient community with support from various other stakeholders.

> "Baliyo Ghar training activities were focused on developing common understanding among the different stakeholders like Local government representatives, local social and political leaders, DLPIU engineers, technical persons deployed from different partner organizations and social mobilizers. The ultimate goal of the trainings and capacity building program was to assist house owners/ beneficiaries on successful and timely completion of reconstruction work."
>
> **Baliyo Ghar Program Engineer**

Simplified training curricula, terminology and training content has been used during the training which enhanced the applicability of training.

In case of capacity building, the main reason of success/achievement is the standardization of training in all places, tested curricula and tested method was used by all. The mason training curricula developed by NSET and endorsed by DUDBC prior to reconstruction was followed by all. This made a huge difference as whoever conducted the training the standard was maintained throughout.

The 7-day mason trainings were most effective for the existing masons as they gained better skills and knowledge to use in their professional work. These trainings were also able to bridge the gender gap in this profession as more women were active in mason profession after attending Baliyo Ghar trainings.

Among all the capacity building programs skills enhancement of local construction workers i.e., masons were highlighted as the most crucial by most of the respondents interviewed. NSET alone had trained 13,474 masons in total and contributed significantly to capacity building component of the National Reconstruction campaign.

"In the earthquake affected districts wherever there have been massive mason trainings, the trained masons themselves became the advocates of safer construction". Engineer, NSET

Apart from masons, there were several trainings given to the engineers at the field level. Baliyo Ghar program provided different trainings to those technical persons who were involved in reconstruction and the necessary trainings were provided at initial stage of the reconstruction which became helpful for the implementation of reconstruction activities. Baliyo Ghar had provided trainings to the technical professionals of other NGOs/INGOs (such as CARE, CRS, ASF, Oxfam etc.) working in the area which helped them smoothen their work in their working districts. Respondent of one of the organizations mentioned, "We were having difficulties to work in Okhaldhunga, we even observed trainings of Baliyo Ghar in Dhading and learned from there and implemented in our works.

Despite lack of clear plans and policies, these trainings had helped engineers to start their work at the field level. Some of the advanced trainings they received during this period made them competent in their professional careers as well. According to the trained engineers the trainings had been very relevant in the given context and their professional upliftment, as they have been immensely using the skills and knowledge obtained from those trainings. More than half of the engineers who were involved in the survey, mentioned that they have conducted trainings and have trained fellow engineers and masons.

"Especially in the training and capacity enhancement sector more than government, institutions like NSET and other organizations played a pivotal role, they also introduced socio technical package. NRA was mostly hardware oriented, not much was done from our side on the software part which is also one of our limitations."

- NRA Senior Official

Different Training of Trainers (ToT's) provided at central and district level was another important part of reconstruction efforts. Series of ToT's enhanced and promoted the disaster resilient construction practices at local community level. Similarly, instructor development process-built confidence among the stakeholders as well as masons and house owners. The trained engineers visited and inspected each and every household and guided mason which built confidence among the masons and house owners. Technical person working in NRA were guided and informed about NRA policies, instructed about important aspects to monitor during building inspection through TOT and basic technical trainings which helped in grant distribution.

"NSET have contributed a lot in the sector of capacity building. Apart from training the local masons, NSET/BG has trained the technical persons-engineers/social mobilizers through the TOT so that they can train other people, this has been very helpful to spread the skills, NRA Focal Engineer

"After we got training from NSET we trained and transferred our knowledge to other people from different partner organization, we covered 14 VDC of Gorkha, 6 of Sindhupalchowk and 6 of Dhading, altogether 26 VDC." Engineer CRS Nepal

Similarly, the trainings provided to the social mobilizers were helpful in bridging the gap between the community people and technical professionals. Social mobilizers played an important role in creating a positive environment among the local people during reconstruction especially in the initial days. Social mobilizers were able to gain everyone's trust and fill communication gap between the technical person and community. Engagement of trained social mobilizers and mobile masons for reconstruction was very effective during reconstruction. Baliyo Ghar program had deployed trained social mobilizers, trained masons and technical professionals together in a team as Mobile team for door-to-door technical assistance. Mobile masons provided the practical knowledge on site while the social mobilizers played a significant role in the increment of community awareness.

"Social mobilizer's role was equally important as engineers in this process. From information dissemination to convincing, motivating, and increasing the construction rate, our social mobilizers has done everything to support disaster resilient construction. They went to every doorstep and disseminated the technical messages in a simplified and understandable form through the door-to-door campaigns". Field Coordinator, Baliyo Ghar

Effectiveness, contribution and impacts of the mason trainings conducted under Baliyo Ghar program- Findings from the Mason Retention Surveys

To understand the influence of skilled masons for enhancing compliance in the Gorkha Earthquake Reconstruction, different studies were conducted in the 4 districts of Nepal under Baliyo Ghar program.

The effectiveness of mason trainings was measured in two different phases; in short term, effectiveness was measured through the analysis of the pre and post test results while in the longer term, impact of mason training was evaluated in terms of the retention of knowledge and profession by the participating masons over the period of one year.

Masons Retention Survey was conducted to know the effectiveness of the mason training and to comprehend the status of appropriate implementation of skills and supporting build back safer houses by the trained masons. The proportion of houses that engage at least one trained mason while constructing their house was also studied and the performance of those trained masons were evaluated through information collected during the Building Compliance Survey.

Altogether 4 different MRS were conducted during the program period. With support of BG field team, the MEL team of Baliyo Ghar conducted the mason retention survey on an annual basis i.e., one year after the trainings conducted in the year 2017 AD, 2018 AD and 2019 AD respectively. These surveys were carried out in the program wards where the 7 days Mason Training were conducted by the program. All the trained masons were approached for this survey.

Additionally, a sample-based mason retention survey was conducted on the fourth year (2020) with those masons who were trained in first and second year of Baliyo Ghar program and with the masons trained from the 50 days mason on the job training.

For details of the study, please refer to the report, NSET (2021), "Contribution and Effectiveness of Training Programs in Post-Earthquake Reconstruction of Nepal after 2015 Gorkha Earthquake: A Case of Baliyo Ghar Program.

The key finding of the study are as follows.

Professional Retention of the masons

Continuous engagement of trained masons is one of the key factors contributing to the escalation of reconstruction and compliance. The figure shows the proportion of trained masons who continued their profession over a period of at-least one year after the training over the course of the program period from 2016-2019 when majority of the trainings were conducted. It was observed that more than 80% of the trained masons had continued their profession even in the fifth year of the program. In the year, 2016-2017 and 2017-2018, when the reconstruction progress was at its peak, 88% of the trained masons were involved in construction while it dropped to 80% in the year 2018-2019. The percentage of active masons remained constant around 80% even in the year 2020 (a sampled based survey was conducted with masons trained in program year 1 and 2 i.e. 2015/16 to 2017/18).

More than 80 % of trained construction workforce have continued working in the field one year after training

It was evident that majority of the masons are still continuing the mason profession. Few of them could not continue and when asked for the reason, there were diverse reasons such as, family problem, busy at household/ agriculture activities, health problem/over-aged, some didn't find work since reconstruction of many houses have already been completed. Hence, they are engaged in other professions like farming, working as carpenter and others.

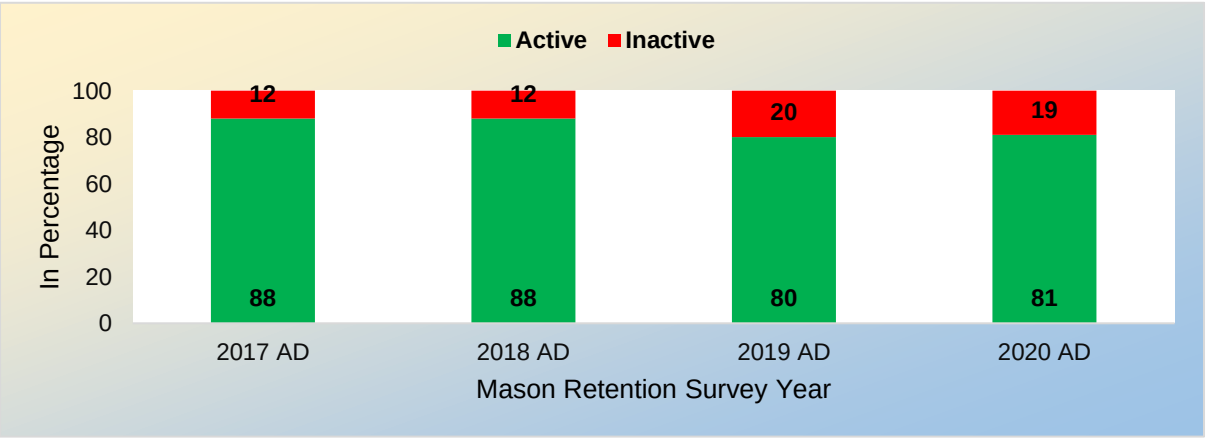


Figure 15: Profession Retention of Trained Masons during different surveys

Knowledge Enhancement

It was observed that even in the fifth year of the program that is 2/3 years after the masons have taken the training, they have retained more than 70% of the knowledge that they have gained during the training (Fig 16). The questions used during the pre/post-test was used to determine the knowledge retained by the masons. The knowledge score of the respondents has direct relation with the working status of the masons and application of the construction technologies might have enhanced the knowledge score of the participants.

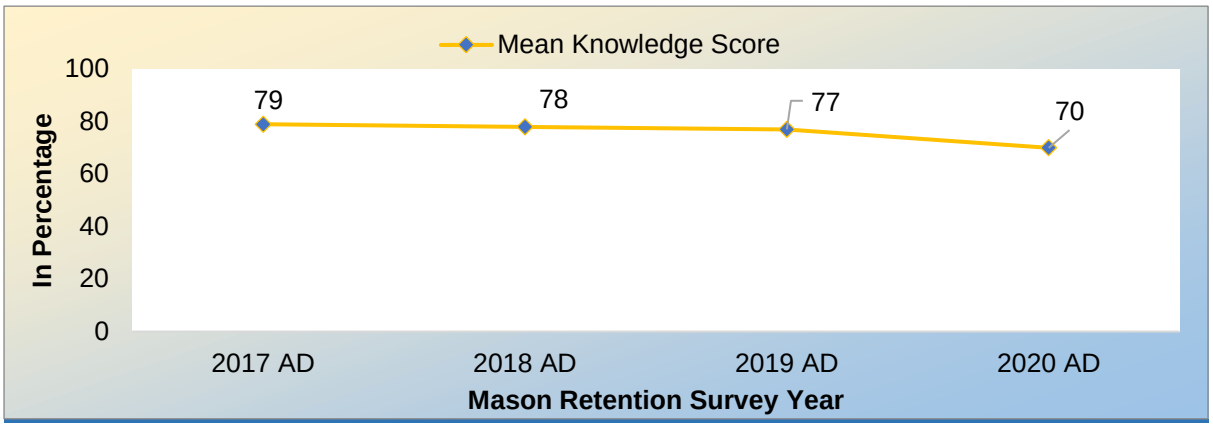


Figure 16: Knowledge retention score of participants during different trainings

Effectiveness of the training/Application of Skills learnt during training

Majority of the respondent's (more than 90% masons) of different retention surveys reported that they have fully used the knowledge and skills obtained from the trainings.

When asked where they have applied the skill they have learnt, highest percentage of the respondents mentioned that they have used them while building their own house and relatives houses, then construction of others houses, some also used while providing training to others and providing guidance to house owners.

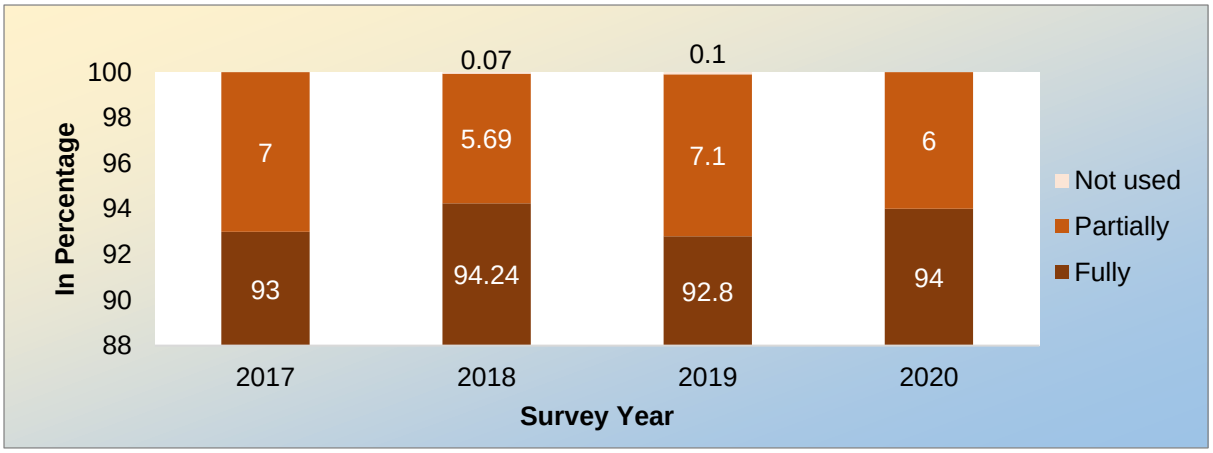


Figure 17: Utilization of skills obtained from trainings

This result implies that, the knowledge and skills gained from the training has been fully applied in practice thus contributing towards establishment of disaster resilient communities. Similar kind of responses were reported during the interviews and focus group discussions.

Most of the respondents mentioned that mason training has been the most important part of the reconstruction process and was very effective. The respondents from all the surveyed areas (Jyamrung, Kalleri, Nilkantha, Kageshwori, Talakhu, Chhap, Magapauwa, Alampu and Bhimeshwor) have said that the trainings have been very fruitful. Respondents mentioned that they learned about the government standard design, benchmarks and about the quality materials.

One of the masons from Jyamarung (Dhading) said, "We received the training when we were in desperate need of the training, it taught us about the earthquake resistant construction techniques. We could apply those learnings during the reconstruction of our house and other houses in the community.

Masons spoke most often about how the program gave them new skills and knowledge on earthquake resistant construction technology. One mason stated that "prior to this training, we didn't know about earthquake resistant building construction technology and methods; after training, I am a certified trained mason now."

One of the masons from Chhap (Nuwakot) said, "Before earthquake I was not aware about the methods/techniques of building earthquake resilient houses. Now I know how to build earthquake resilient house. The mason training provided by Baliyo Ghar has helped me and other people to become empowered and independent.

"After receiving the training, even when I pass by the construction site and see if somebody is doing it wrong, I used to correct the person by sharing the knowledge that I received during the training". Trained Mason Chhap, Nuwakot

During the discussion with the trained masons, it was observed that the masons were clear about their role and responsibilities as a mason. Masons echoed that their role as a trained mason is to build earthquake resilient houses for all the beneficiaries and also to motivate the houseowner to build earthquake safe houses. They further mentioned convincing people to construct the earthquake resilient buildings, telling them on how to construct the buildings, usages of quality materials are also their role.

One of the masons said "My responsibility to make the house earthquake resistant is very important because if I don't build the house without considering the seismic criteria, the house could collapse at any time

"As a house owner and as a trained mason, we think we possess great responsibility. We have to flow information regarding the importance of eq. resistant houses to those house owner who don't pay attention for making earthquake resistant houses". Mason, Jyamarung, Dhading

Professional Satisfaction

Masons were found to be satisfied with their profession. More than 95% of the trained masons interviewed mentioned that they were satisfied with their job (**Figure 18).** Retained mason were satisfied with their job because of various reasons such as change in their social status, gained confidence after trainings, work value they have got during the reconstruction and increased wages after trainings.

Masons interviewed or surveyed noted that training had changed the way others viewed and respected them. The most common response was that after training they "gained the trust of house owners" or that their voices were "appreciated." The training seemed to increase masons' social status and increase house owner satisfaction with their work.

After training masons also experienced a growing sense of pride and confidence. Masons stated they felt confident in their work and in convincing colleagues and house owners about building safer and stronger houses. An overwhelming majority of masons indicated that training increase their access to jobs. There were positive statements indicating that access was "enhanced" or that masons had more work opportunities.

"After participating in the Baliyo Ghar Mason training, we got more working opportunity after we received training which led us being more financially strong. Also, we felt more competence in new technology of earthquake resilient building construction and could convince people about the technology". Trained Mason, Kalleri (Dhading)

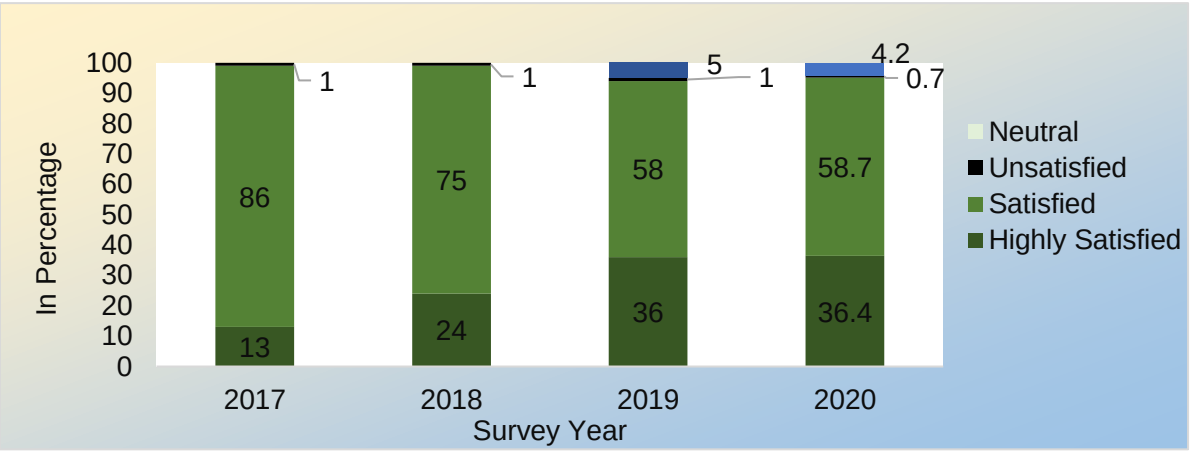


Figure 18: Professional Satisfaction of trained masons during different retention surveys

Provided Guidance/Supervision of Untrained Masons

It was observed that the trained masons not only implemented the learned skills in their works but also imparted those skills to other untrained masons during the course. Out of 143 masons, interviewed, 64 % (91) masons were able to supervise new masons on earthquake resistant construction technology and hence shared their skills and knowledge to non-trained co-masons. Even the new masons trained from On-the-Job training stated that they were able to supervise untrained masons in the group.

Participants of the focus group discussions (FGD) had reflected the same. For e.g., participants of FGD conducted at Kageshwori of Kathmandu mentioned that "we have taught the skills to the new masons at workplace which we have learned during trainings, and they have also built the houses following the same techniques." Also, in the focus group discussion conducted in Jyamrung of Dhading district participants stated that, they have taught earthquake resilient construction practices to untrained masons, and they will do similar skill transformation process in coming future as well.

Even the female mason group during the focus group discussion at Alampu of Dolakha District, mentioned, "What we have learned during the training we have taught the same to the new mason who worked together with us in the construction site and they have been following the similar earthquake resilient techniques to build strong house".

Involvement of Trained Masons in Reconstruction

86% of houses engaged at least one trained mason while constructing their house

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 had also developed strategies to ensure that house owners rebuilding their damaged houses utilize and employ 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 and other construction stakeholders, a significant proportion of house owners in Baliyo Ghar Program areas were able to employ trained masons in construction. The survey results showed that overall, 86% of the house owners employed trained masons in construction, the number was much higher in Dhading (93%) followed by Dolakha and Nuwakot at about 80% each.

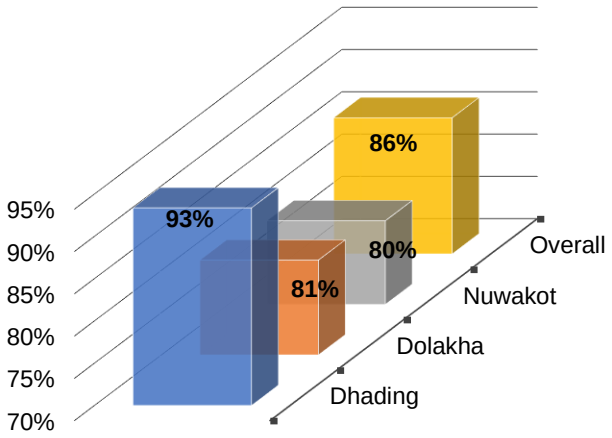


Figure 19: Proportion of reconstructed houses that utilized at least one trained mason during construction

Challenges and Way Forward

Masons when asked about the challenges faced during reconstruction, competition among the masons was reported as the major problem faced most of the time Similarly, difficulty to convince house owner, lack of the construction materials was stated as another major problem.

Masons stated that they had difficulty convincing the house owner to use earthquake resistant construction because of the extra cost associated with it.

Masons mentioned that in some cases house owners didn't want to follow the guidelines as they were not satisfied with the new designs. 3 feet attic system in new design was not satisfactory to them. FGD with Trained Masons, Talakhu, Nuwakot

Most masons spoke about continued competition with untrained masons. They believed untrained masons tended to construct in low-cost ways with lower quality construction, compromising the building code requirements. Masons spoke about untrained masons, especially untrained masons from neighboring districts and "untrained workforce from India" competing for work.

One of the Mason from Jyamarung (Dhading) mentioned, "As there is no listing of the standard and uniform wages for masons, untrained mason from outside worked in low wages which prevented us from getting work even in our own community.

During the discussion it was evident that masons seem to understand the importance of having a roster of trained mason in the municipality. Majority of the participants of the FGDs mentioned that they are not aware on any such provision at their municipality. They further mentioned that it will be beneficial if they have the system as it will lead to recognition of skilled masons, more job opportunities for them such as in the local government development works etc.

Masons when asked about the steps to be adopted to make the mason job more effective. Almost all of them mentioned management of authorized ID card and Refresher training as the primary step to be taken.

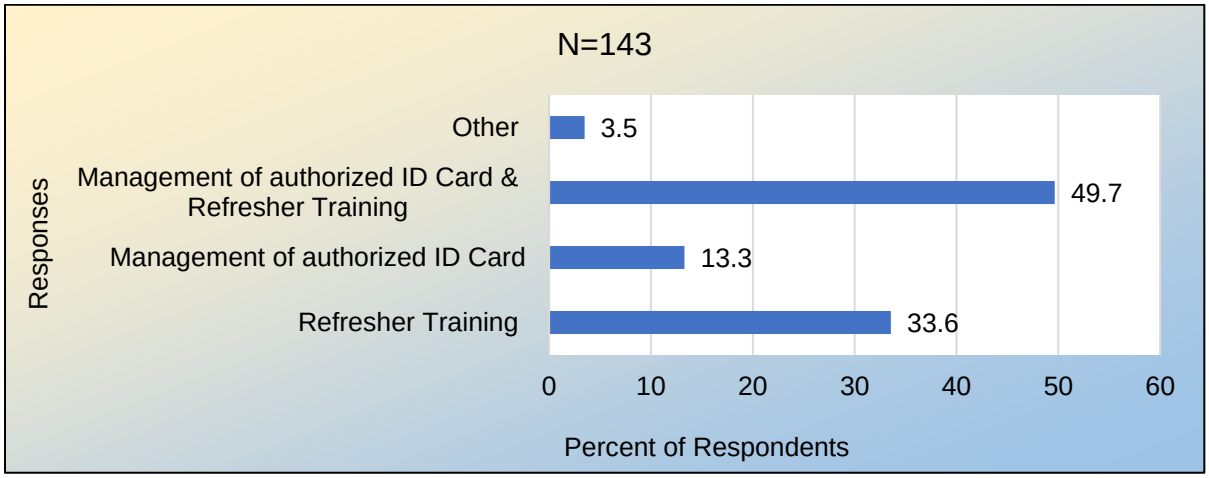


Figure 20: Steps to be taken to make mason profession more effective

One of the Mason of Kageshwori (Kathmandu) said, “Before there was no provision of listing of trained masons in our local government unit. The listing of trained masons might be helpful for us for getting jobs in our locality."

Trained Masons when asked if they have any suggestions to improve the trainings provided by Baliyo Ghar, majority of them mentioned there is no such improvements required in the existing training. However, they demanded for more of such trainings and refreshers training for them.

Effectiveness, contribution and impacts of Training other Reconstruction Stake-holders (Engineers, Social Mobilizers, Local/Government Officials) under Baliyo Ghar program

Apart from construction technicians/ masons, there were several trainings given to other stakeholders of reconstruction such as engineers, social mobilizers, local government representatives, technical professionals from different organizations, social/political leaders, community people etc. Baliyo Ghar program had provided different trainings to those technical/non-technical persons who were involved in reconstruction at the central, district and the field level.

This section includes the results obtained from quantitative and qualitative surveys conducted with those trained professionals.

Utilization of skills & knowledge obtained from different trainings for Engineers under Baliyo Ghar Program

Among the 207 trained engineers contacted, majority of them (40%) have participated the “7 days mason TOT” followed by 16.30% retrofitting trainings (basic 3 days). 10% of them attended basic retrofit inspection training, 9% attended 3 days basic technical training (BTT), 7.50% attended 5 days advanced retrofit design training, 7.30% attended Training for Instructors (TFI), 6.50% retrofit demonstration training and 2% had attended engineer training on BCI & 5 days advanced design technical training.

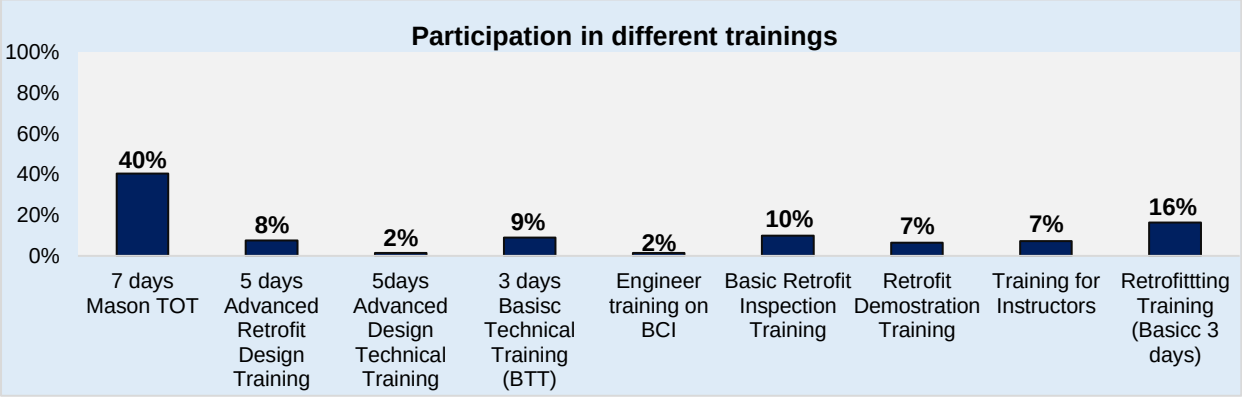


Figure 21: Different trainings attended by the Engineers

Among the different trainings participated, respondents were asked to rate them based on their utilization (Fig 22). All the trainings were found to be important and utilized during the reconstruction process however, 7 days Mason TOT, Training for Instructors (TFI), Basic Technical training, Advanced design

training were found to be most frequently utilized among others according to the respondents.

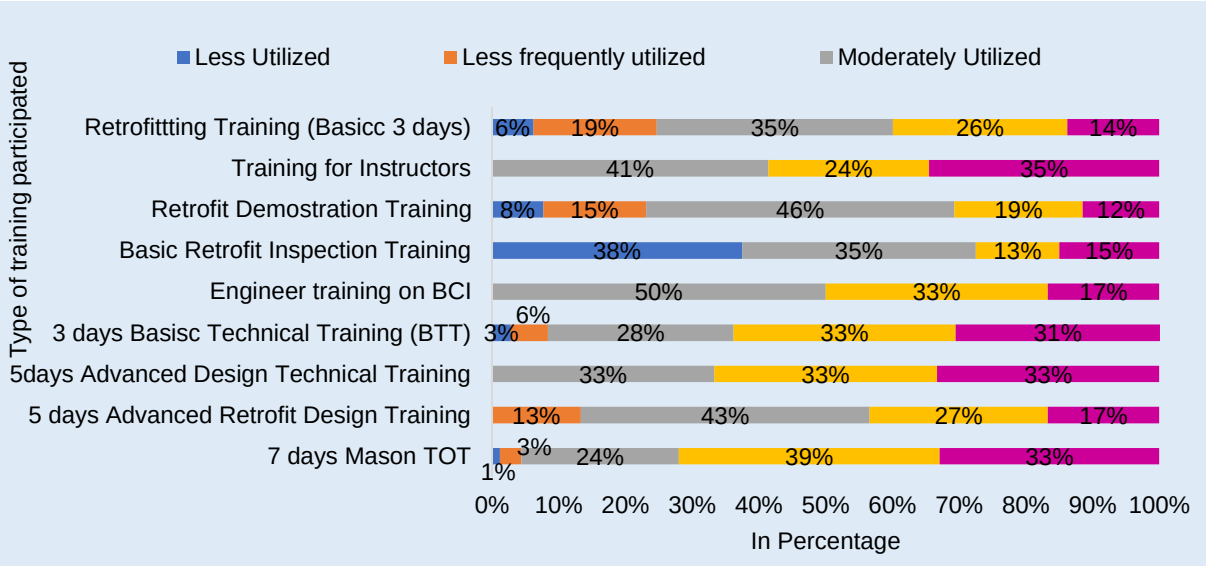


Figure 22: Participants participated in different types of training

Qualitative survey also supported the quantitative findings, as respondents mentioned that they took different kinds of training from Baliyo Ghar as mentioned above. They further stated that these training helped them in their professional career; Basic technical training was useful in orienting people/house owner about the holistic approach of constructing Baliyo Ghar rather than delving into minor technical details.

"All the training have their own importance, none of the training are non-important. Training for engineers, earthquake resilient design training, Building Code Implementation are little more important for us because these are directly being implemented in field and every engineer should participate in these trainings." Field Engineer

Secondly, Training of Trainers, TFI enhanced their delivery skills and was useful in training masons in a simpler manner, it helped in detailing their knowledge to the masons. Similarly, trainings on Retrofitting, Advanced Design training of RC structures helped to enhance their knowledge on advanced building methods.

"After getting Training for Instructors (TFI) from Baliyo Ghar, it helped me a lot for preparation of my presentation slides and way of presentation thus improving my delivery skills. I used the knowledge obtained from TFI during conduction of different types of trainings." Engineer, Partner Organization

Relevancy of Baliyo Ghar Engineer's Trainings in their Professional Carrier

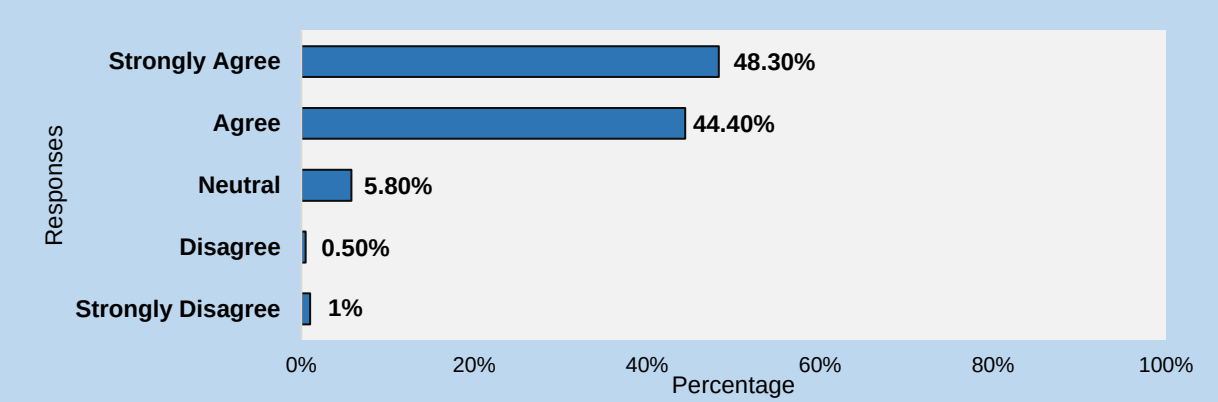


Figure 23: Relevancy of training in their professional carrier

One of major objective of different trainings provided to technical professionals was to enhance their knowledge on earthquake resilient construction technologies. From the quantitative survey it was observed that more than 90 % of the respondents agreed that the trainings were relevant to their jobs (Fig 23).

"We, engineers, had very less idea regarding the type of earthquake resilient houses that are built in the rural area. Baliyo Ghar trainings enhanced our skills and knowledge on earthquake resilient construction in rural areas using locally available material." NRA Field engineer

Involvement of trained engineers in skill and knowledge transfer

Out of 207 trained engineers who participated in the online survey, more than half (56%) of the respondents were involved in knowledge and skill transfer process as they served as a trainer in different trainings conducted during the reconstruction period.

Of them, 15.8% conducted engineer training, 55.4% conducted 7 days mason training, 15.3% 50 day On the Job Training, 10.2% retrofit training and about 3.4% were involved in other types of training (Table 4).

Table 4: Types of training involved as trainer

Type of training involved as trainer	Responses	
	Frequency	Percent
Engineer training	28	15.8%
7 days mason training	98	55.4%
OJT (50 days)	27	15.3%
Retrofit mason training	18	10.2%
Others	6	3.4%

Engineers during the interviews had also mentioned that after participating in the trainings under Baliyo Ghar program, many of them were involved in training other stakeholders of reconstruction. Each trainer was found to provide around 12- 15 trainings on earthquake resilient construction and trained around 200-300 beneficiaries on an average.

Trained engineers further contributed to escalating the coverage of socio-technical assistance

Like the masons trained by Baliyo Ghar Program, the engineers participating in various training and capacity building activities conducted by the program further contributed to expand the coverage of a uniform and consistent delivery of socio-technical assistance in housing reconstruction.

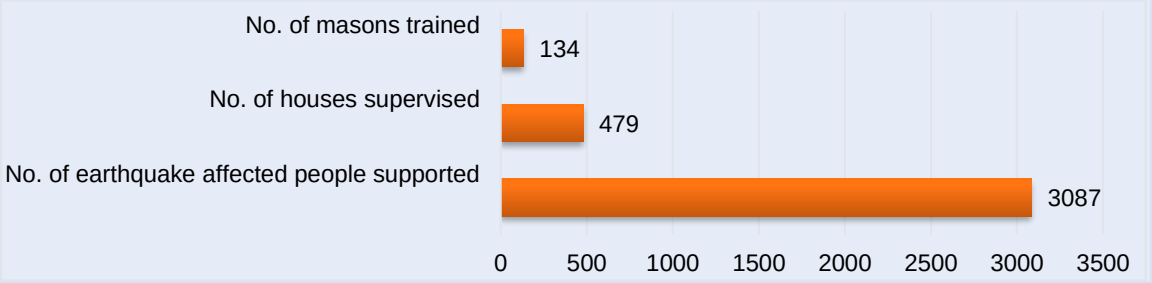


Figure 24: Average coverage of socio-technical assistance by each engineer trained through BG / TOT program

The graph above shows the direct involvement of the engineers trained through the TOT program in the different aspects of reconstruction. On an average, one 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. It was evident that through the capacity building and training of engineers, Baliyo Ghar Program was able to increase its outreach 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"

- NRA Field Engineer, Kageshwari Manohara Municipality, Kathmandu

Contribution of Trained Social Mobilizers in Reconstruction

Social mobilizers have played a crucial role during the reconstruction and has led to the success of reconstruction. The trainings provided to the social mobilizers were helpful in bridging the gap between the community people and the technical professionals. Social mobilizer acted as a bridge between engineer and house owner since they were familiar with the social settings with their knowledge of local culture and way of living. Technical message provided by the engineers were simplified by the social mobilizers. Social mobilization thus enabled the house owners in understanding and utilizing the reconstruction information in their decision-making process. Trained 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 house

owner'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. It was evident that, 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.

"NSET/BG played a vital role in reconstruction by integrating social mobilization along with technical assistance. Socially excluded group of people also got the information through social mobilizers and mobile masons. With the help of social mobilizers and mobile masons many vulnerable households can construct their houses which was the one of the best examples of effectiveness of social mobilization on reconstruction". DUDBC official

"In the beginning I thought it was a very easy job, as we just have to normally speak with people and share the information. But I was wrong we have to apply different techniques to convince people, the way we talk differs a lot and wherever we go we should adapt to the local culture. These all we came to know through the training". Social Mobilizer, Nuwakot

"Social mobilizer role was very important in the reconstruction process. As we have to work in the community and convince community people regarding the earthquake resistant construction techniques, NRA's policies and governments grant requirements. I, as a technical person was not good on that and didn't not know how to interact with people and convince them. The social mobilizers were very good at communicating with local people, explaining them about the importance of earthquake resistant construction techniques and motivating them for following the standards. We also learned from them. At initial stage, we did not know much, after working together we also learned a lot and it helped us a lot in the process. Field Engineer, Dolakha

"In our community we found an old lady who was differently able and was listed both in the full beneficiary list and vulnerable group. But she was not able to construct her house and was still living in a tent. So, we reached out to her, listened to her problems and supported her to build her house. In close coordination with ward office, and technical support from Baliyo Ghar we were able to construct her house. That was one successful story of social mobilization. I feel so gratified that we could actually help her." Social Mobilizer, Kageshwori, Kathmandu

Sensitization of Local government officials, political/social leaders

Sensitization of Local government officials, political/ social leaders had been very crucial in reconstruction. Various Acts, Policies and Guideline have been formulated by the Government of Nepal to ease the reconstruction process and to implement disaster risk management in a strong and effective manner. 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 social

engineers is crucial for advancing sustainable development with a focus on disaster risk management.

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, workshops and trainings or capacity building of local stakeholders, especially the locally elected representatives conducted through Baliyo Ghar Program with the objective of contributing to the safer reconstruction process and sustainable disaster management practices was found to be very helpful. Those trainings/workshops did not only focus on enhancing understanding and capacities in the reconstruction process, but also in disaster mitigation principles and practical applications. The trainings/workshops were conducted in different phases, progressively covering a multitude of topics and discussing on the relevant issues. The discussions held during such events 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.

The local representatives especially chairperson of the Ward office, Ward members should be briefed about the program before implementation. "At the initial phase, we contacted several local political leaders from all the parties, and this helped us to implement our program effectively and efficiently at the local level." Field Engineer

"Almost 90% of the buildings damaged by earthquake were reconstructed but there are many other disasters which can damage our infrastructure and our lives. Disaster may occur again and again and at any time. Such disaster can be reduced by preparedness and disaster management activities. DRM forum/committee should be established in every ward level for the reduction and mitigation of any kind of disaster risk and we are ready to develop such forum in collaboration with NSET. It is necessary to conduct similar kind of program in every local level as well as wards for disaster risk awareness. We have learnt many things about DRR and we will implement it in our palika." Ward chairperson of Likhu Gaunpalika-3, Nuwakot, one of the participant of the training conducted by the program.

Improved building construction compliance

- How effective is the program in changing the building construction practice?

The ultimate goal of Baliyo Ghar program is the reconstruction of houses complying with the standards, incorporating earthquake resilient techniques. The program's Theory of Change states:

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

Measuring the actual change in the community's building construction practice is the key component of assessing the program's impact.

To learn about the changes in building construction practices among homeowners, data collected by the program mobile team during each of their visit to the construction site were analyzed. The Mobile team of the program visited the house several times as when required. 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. 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. Overall, on an average, the Baliyo Ghar Mobile Teams visited each house in its program areas a total of 2.7 times during the reconstruction process. During their visits, apart from providing them with the required technical guidance the team collected robust amount of data related to construction compliance of under construction as well as construction completed houses.

90% of the houses were reconstructed adopting disaster resilient construction methods in the program areas

It was observed that almost 90% of the houses built in the Baliyo Ghar program area were compliant and they have already received the government's third tranche. Similarly, 95% are towards completion and have received the second tranche from the government (As of Aug 2021). Fig (25, 26) shows the comparative cumulative progress of the third and second tranche received by the beneficiaries. When compared with the national average, although there was not much difference, but it was observed that the Baliyo Ghar program beneficiaries received the tranches 3-9 months earlier than other areas indicating they were able to get the socio-technical assistance on time and hence complete the construction sooner.

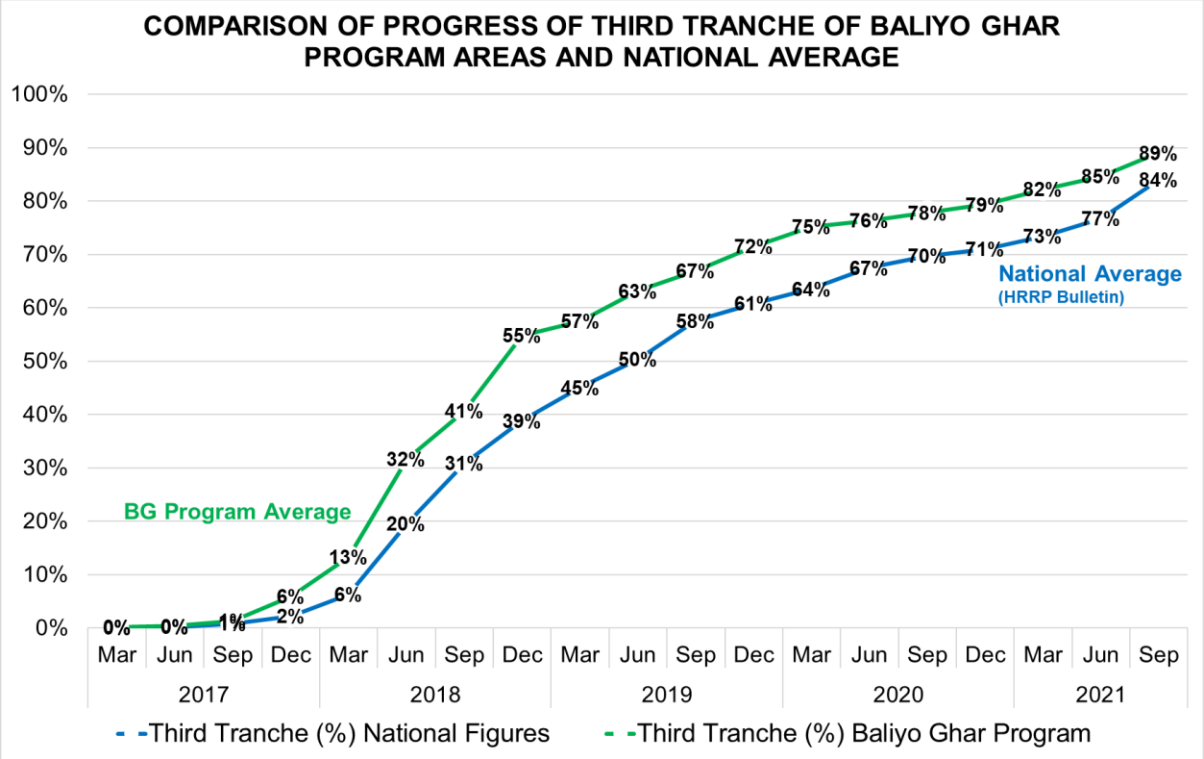


Figure 25: Comparative cumulative third tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)

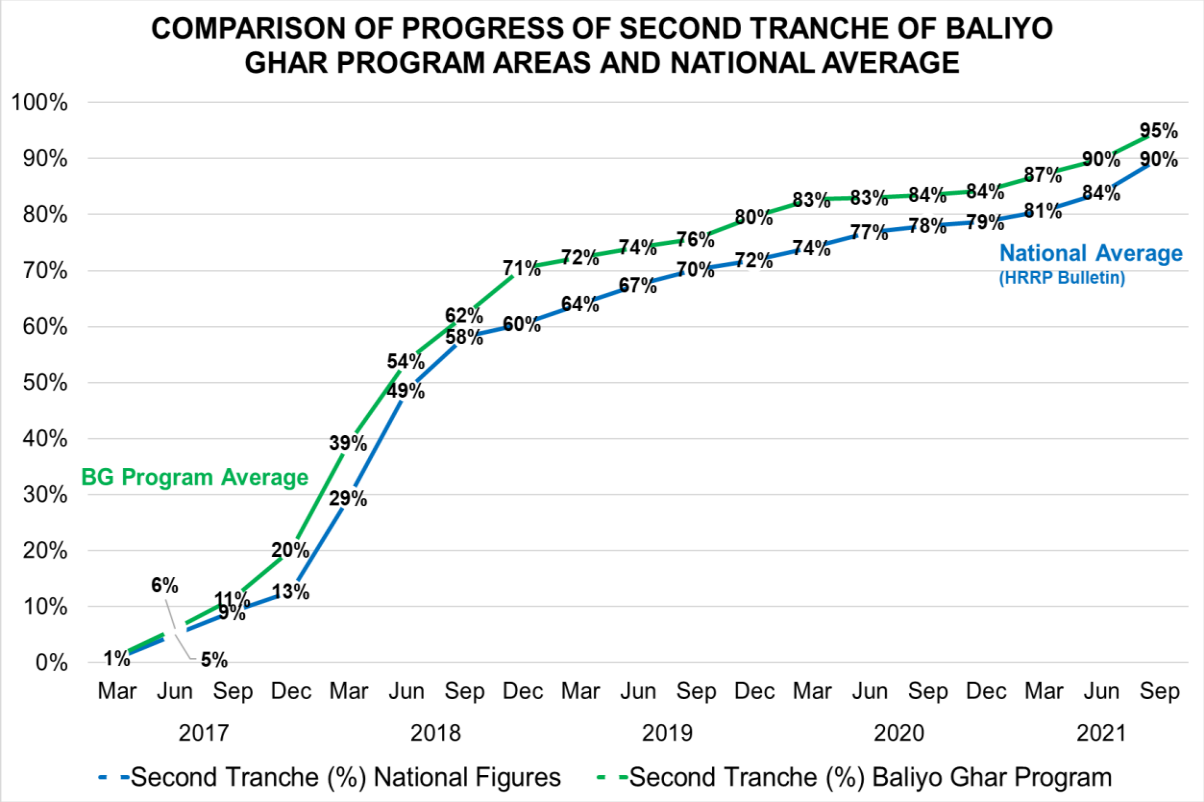


Figure 26: Comparative cumulative second tranche progress of housing reconstruction in Baliyo Ghar Program areas and National Average (as of total beneficiaries in Aug 2021)

Following are some of the key observations derived from the collected data:

- The income of house owner and level of compliance are not associated. This means compliance was not affected by the income of the house owner.
- The house owner that received technical assistance as well as employed trained mason are more likely to construct houses adopting disaster resilient construction methods.
- The elements such as exposure to awareness/training and mass media were supplementary condition for house owner to construct houses adopting disaster resilient construction methods.
- **About 90% of surveyed houses that have completed construction involved skilled manpower for supervision during their construction.**
- **Likely, 89% of surveyed houses that have completed construction were built involving trained mason.**

VDC wise list with the proportion of houses involving skilled manpower for construction supervision and trained mason in construction is attached as Annex 1.

Sustainability

- To what extent institutionalization of reconstruction efforts in Local Government contribute towards sustainability? How and what are the efforts of BG program?
- Has the program contributed towards establishing building code compliance system in the program municipal units?

One of the Baliyo Ghar Program's long-term goals of establishing a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal is to strengthen local government institutions to undertake the regulation of building construction to ensure safer construction practices. The program made a substantial contribution to the reconstruction and recovery effort over the first four years following its implementation. Thousands of local masons and engineers were taught in disaster-resistant construction techniques, and homeowners were educated on catastrophe risks and mitigation strategies. Local construction capacity and public understanding of disaster resilience have both improved significantly, while local government institutions have been continually involved, encouraged, and driven to establish the structures and mechanisms required to continue safer construction.

Majority of the Key informants during the interviews, noted that engagement with the local government and the local leaders as the contributing factor. The reconstruction activities at the local level also depends on the level of understanding of leaders, mainly those local government who had better understanding about the reconstruction policies, reconstruction process and implication of policies had achieved greater success on reconstruction for e.g. Alampu village of Dolakha district. Key informants further explained that Baliyo Ghar program implemented its activities along with the guidance and continuous engagement of local government. In coordination with the central government (NRA, DLPIU), Baliyo Ghar program conducted training to

enhance the capacity and understanding of the local government and the local leaders and provided continuous support to facilitate the reconstruction process.

Specifically, the program's final two years focused on the institutionalization of the reconstruction efforts and establishing the building code compliance system in the program area by assisting the local governments in building their capacities for creating and enacting critical building regulations and disaster risk management policies.

In summary, via numerous trainings, meetings, discussions and cross learning and networking activities such as workshops and exposure visits, the program increased the capacity and awareness of its program municipalities in terms of building code and building construction practices. A table with activities carried out as technical help to municipalities to ensure the long-term viability of safer construction methods through the building regulation process is attached as Annex II.

As a result of the program interventions, three program 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.

Similarly, the roster of masons trained by Baliyo Ghar has been handed over to all program municipalities to initiate the system of registration of masons. It was noted during the interviews and field visits that some municipalities have already started the process.

"NSET/ Baliyo Ghar's contribution in our village is mammoth. We are very much thankful to Baliyo Ghar program, with the support of whom we could complete the reconstruction of our community.

When you catch the fish and give us to eat, once we consume it, it's finished. It is one time only, but if you teach us the skill to catch the fish then it is long term and sustainable. NSET has done the same thing for us, they have taught us the skills to construct resilient houses which will be passed on to generations. Unlike others who have just distributed the supplies or constructed the houses on their own ", said Ward Chair of Bigu, Alampu

"In our **Siddhalek RM**, Baliyo Ghar program reached to the earthquake affected communities at household level and have conducted different activities to raise awareness and build capacities of the communities. Counselling house owners to construct earthquake resistant buildings, providing training to the exiting masons and providing On the Job training to develop new masons are the major activities performed by Baliyo Ghar program in Siddhalek RM. Likewise, in the recent years, Baliyo Ghar have provided trainings and demonstration models for the retrofit of masonry buildings in our rural municipality. Retrofitting of those houses, which were planned for demolition by house owners is very impactful activity conducted by Baliyo Ghar in our area. We are very much thankful to NSET, USAID for contributing towards resilient community in our communities.

Several practicing masons and new masons are now trained on earthquake resistant building construction technology in Siddhalek RM. **Siddhalek RM has owned those trained workforce as an asset for its infrastructure development works and have already started to register the masons, we have the roster of trained mason now and we are willing to provide opportunity for the construction of government buildings and other civil works within the municipality**. Vice Chair, Siddhalek RM, Dhading

"As the reconstruction process began, we were not aware about the ideas of retrofit. Neither the government engineers told anything nor did others. And I should confess, I along with other representatives were negative towards retrofit. We thought, it's the technology only feasible to implement in RCC houses. We never thought of retrofitting masonry buildings. But when I participated the Local Authority Training provided by NSET-Baliyo Ghar and got opportunity to observe the ongoing retrofit site in Thansing Nuwakot, our thoughts have been changed. We did great mistake by transforming the retrofit beneficiaries to reconstruction beneficiary just by seeing the grant amount which was a big mistake of my life. Through retrofit we could preserve our traditional assets, archeological identity. Also, many house-owners who have rebuilt new house by demolishing partial damaged house have been limited to 2 rooms which have hindered them in running their house. As a proverb says, "seeing is believing", after I came to see myself, it touched me. Retrofit is not only about making house earthquake safe, rather saving the cultural identity and traditional wisdom too." **Member, Office of Rural Municipal Executive, Kakani Rural Municipality, Nuwakot**

Masons performing exercise during the mason training

Masons implementing the techniques of retrofitting, Retrofitted house, Talakhu, Nuwakot
©NSET

Reconstruction scenario of Alampu, Dolakha
©NSET

OVERALL EVALUATION OF BALIYO GHAR

The April 25, 2015 earthquake and its aftershocks destroyed or significantly damaged over 755,000 homes in Nepal. These were mostly traditional stone-mud and brick-mud structures built and occupied by the rural poor. Most of these houses were non-engineered, constructed by homeowners and with little consideration of seismic risks or building codes. The immense structural damage to housing after the earthquake highlighted many areas of vulnerability. These include construction workers' and homeowners' lack of awareness and training in earthquake-safe construction, especially in rural areas. Additionally, the absence of national curricula, standards, guidelines, and manuals for training individuals involved in housing construction and inadequate compliance with building codes contributed to the scale of the damage.

The Baliyo Ghar program was designed to help homeowners and communities rebuild in a way that increases their resilience to future disasters. The program was closely aligned with the Government of Nepal (GON) Housing Reconstruction Program. At the local level in three districts, Reconstruction Technology Centers were established through Baliyo Ghar program to provide technical assistance to homeowners, construction professionals, local authorities, and hence support the Government of Nepal's housing reconstruction program. Mobile teams were deployed to ensure that rural communities and homeowners continue to receive technical assistance throughout the reconstruction process. At the national level, Baliyo Ghar worked with the GON and other partners to improve and standardize the guidelines and training curricula on disaster resilient housing reconstruction and provide required technical support to the NRA housing program.

Baliyo Ghar program was evaluated based on the important evaluation criteria as below. The findings of the evaluation are as follows

Table 5: Evaluation Criteria

Criteria categories	What does it mean?
Relevance	Is the project in line with local needs and priorities, including policies? Does it sound accountable based on the assessments? Is the intervention doing the right things?
Efficiency	How well are resources being used? A measure of the outputs (qualitative and quantitative) achieved as a result of inputs. Are the outputs (hard and soft) a good result of the inputs? Does it show value for money, quality and appropriate response
Effectiveness	Have the project objectives been achieved or are they on track to be achieved? To what extent has the program met its program targets as specified? To what extent has program intervention contributed to an enabling environment for program beneficiaries including women and children? To what extent was the process of implementation inclusive of stakeholders? • To what extent the policy level intervention well implemented? • To what extent the capacity building efforts been adequate, accepted and used by affected population? To what extent have the services provided been adequate, accepted and used by affected population?
Sustainability	Will the benefits last?

Relevance

In these criteria, we tried to evaluate the program for the following important aspects:

- Is the project in line with local needs and priorities, including policies?
- Does it sound accountable based on the assessments?
- Is the intervention doing the right things

Baliyo Ghar program adequately addressed the need of earthquake affected communities. Baliyo Ghar program were aimed to contribute on disaster resilient communities in Nepal through standardization of Policy documents, enhanced local capacities and increased risk awareness by conducting different program activities.

Given the scale of destruction and damage, the reconstruction of safe homes was the urgent need. 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. This approach significantly enhanced the relevance of the program to the pressing needs of the affected communities. The reconstruction support provided by Baliyo Ghar program was also found very relevant, notably the approach of sociotechnical assistance provided to the affected communities in rebuilding their houses stronger.

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 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.

Community awareness through Radio/TV program, orientation, door-door technical assistance, mason trainings etc. were the appropriate and most relevant activities conducted as highlighted by the beneficiaries during different evaluation surveys. All the training activities, orientation raising activities, technical supervision was to support affected communities on Build Back Safer reconstruction process. Support on policy formulation and implementation was done as per the requirements. Similarly, On-the-job mason trainings were conducted to produce new masons and retrofit mason training to address the need of trained human resources for strengthening partially damaged buildings.

Relevance-High: Through the above main areas of work and contribution of Baliyo Ghar, it can be concluded that the Relevancy of Baliyo Ghar was very High.

Effectiveness

In these criteria, we tried to evaluate the program for the following important aspects:

- Have the project objectives been achieved or are they on track to be achieved?
- To what extent has the program met its program targets as specified?
- To what extent the policy level intervention well implemented?
- To what extent the capacity building efforts been adequate, accepted and used by affected population?

The first level of analysis for effectiveness is provided by the Baliyo Ghar indicators. Targets as defined in the Baliyo Ghar MEL plan have been largely achieved (Fig 10). Not only the output indicators but outcome indicators set for the program has also been achieved.

On the effectiveness dimension, the Baliyo Ghar program is found to be highly effective.

The effectiveness of the support of Baliyo Ghar program on the overall reconstruction is related to the actual performance of the buildings, which has achieved significant progress over the last years. More than 90% of the houses reconstructed are compliant to the code. From the evaluation surveys it was observed that more than 86% of the house owners employed trained masons while constructing their houses.

The household surveys showed that there have been significant positive changes in the perception of people towards earthquake/disaster safety. The KAP survey showed the average score increased by 60% from the baseline value.

Local partners and all other stakeholders highlighted training and activities as helpful in raising the awareness and building the capacity of the construction stakeholders towards building strong houses. In case of capacity building the main reason of success/achievement is the standardization of training in all places, tested curricula and tested method was used by all. The mason training curricula developed by NSET and endorsed by DUDBC prior to reconstruction was followed by all. This made a huge difference as whoever conducted the training the standard was maintained throughout.

The housing reconstruction model in Nepal primarily consisted of three main aspects: socio-technical assistance, financial support and compliance check mechanism. Baliyo Ghar Program strongly advocated for a complementation between the three aspects to ensure safety and disaster resilience of the construction practices. Baliyo Ghar primarily focused on providing socio-technical assistance to house owners, 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.

At the onset of the reconstruction campaign, the most critical challenges foreseen was the confusion and indecision among house owners regarding earthquake resistant technologies in the reconstruction process. In many communities, house owners 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, economically affordable, culturally acceptable, locally available, sustainable

Program activities like on-the-job trainings, retrofit mason trainings, Trainings to local authorities were implemented as per the need. These program activities has helped to strengthen local capacity on earthquake resilient construction practices. After trainings local construction workers were able to construct earthquake resilient houses and they were as well able to guide new untrained masons on earthquake resilient building construction. All the activities were implemented in close coordination with NRA, CLPIU, DLPIU, Local government, social leaders and other stakeholders of reconstruction. During the different evaluation survey's respondents mentioned that IEC materials that were disseminated and Radio/TV program that were broadcasted simplified the technical knowledge and make understandable to normal communities' people. Similarly, concept of mobile team for door-door technical assistance with combination of technical professionals, social mobilizers and masons was another unique and effective activities conducted during program implementation. Mobile team visited nearly 3 times each house during construction and provided technical guidance as well as oriented house owners on earthquake resilient construction. Baliyo Ghar program reached up to 48,838

household during door-door technical assistance. Similarly, more than 80 % of trained masons of Baliyo Ghar program still in the active in their profession during 5th year of reconstruction which also one of major achievements of Baliyo Ghar training program.

Effectiveness-High: Hence, we can conclude that the effectiveness of Baliyo Ghar program was very high.

Efficiency

In these criteria, we tried to evaluate the program for the following important aspects:

- How well are resources being used?
- A measure of the outputs (qualitative and quantitative) achieved as a result of inputs.
- Are the outputs (hard and soft) a good result of the inputs? Does it show value for money, quality and appropriate response?

As regards to the overall efficiency, Baliyo Ghar program played a catalytic role in the reconstruction process with an extremely dedicated team to implement the developed national plans/policies at the ground level; to sensitize and build the capacities of the local communities to follow the standard guidelines on earthquake resistant constructions.

The efficiency was evident in the timeliness of Baliyo Ghar activities to support the reconstruction process as well. Activities were planned and executed as per the need. In the initial phase there were no existing policies on reconstruction and hence policies and guidelines were needed to be developed immediately for this NSET/Baliyo Ghar program contributed significantly.

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.

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 to fulfill the ever-growing demand for skilled masons, 50-day On the Job Training programs were conducted for construction workforce who had no experience in construction or only worked as apprentices, to develop skills as a mason in each of the wards of Baliyo Ghar Program area.

The efficiency of the approach is also evident from the capacity building and demonstrations on earthquake resistant building techniques. These trainings and

demonstrations reached out to masons, engineers and individual builders. A set of master trainers were trained to ensure sustainability and continuity of the intervention and several model buildings were constructed for demonstration purposes.

Demonstration of the earthquake resistant construction techniques at the community level was of paramount importance to help the affected house owners 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. 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. Similarly, 437 small-scale demonstration models to provide hands on skills of the technology of resilient construction were constructed during the training of mason, as the training models.

All these training, awareness and demonstration activities implemented under Baliyo Ghar program was both cost and impact effective as it reached out to key people, created public awareness and imparted crucial training that would not have been available without such an intervention.

Sustainability

In these criteria, we tried to evaluate the program for the following important aspects:

Will the benefits last?

The strengthening of local government institutions to continue the regulation of building construction to ensure safer construction practices is one of Baliyo Ghar Program's long-term goal for establishing a system of disaster-resilient construction.

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. The 910 demonstration model houses constructed in three districts by the program will long serve as physical representation of earthquake resistant construction techniques in their communities, indirectly contributing to the sustainability of safer construction practices.

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. Further, 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 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.

Gender Equality and Social Inclusion (GESI) in reconstruction

Baliyo Ghar's Contribution towards Gender Equality and Social Inclusion

GESI aspects have been addressed 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 was the basis for the program activities and has been specifically highlighted in the GESI Strategy and Action Plan of the program.

As per the GESI plan, assessment of population of Baliyo Ghar program area in terms of gender, ethnicity and vulnerable social groups were conducted and activities were designed accordingly. Similarly, the program also identified key vulnerable household groups to better understand the need of socio-technical assistance and plan for relevant strategies and activities.

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 house owners 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.

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

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 cultures 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 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.

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.

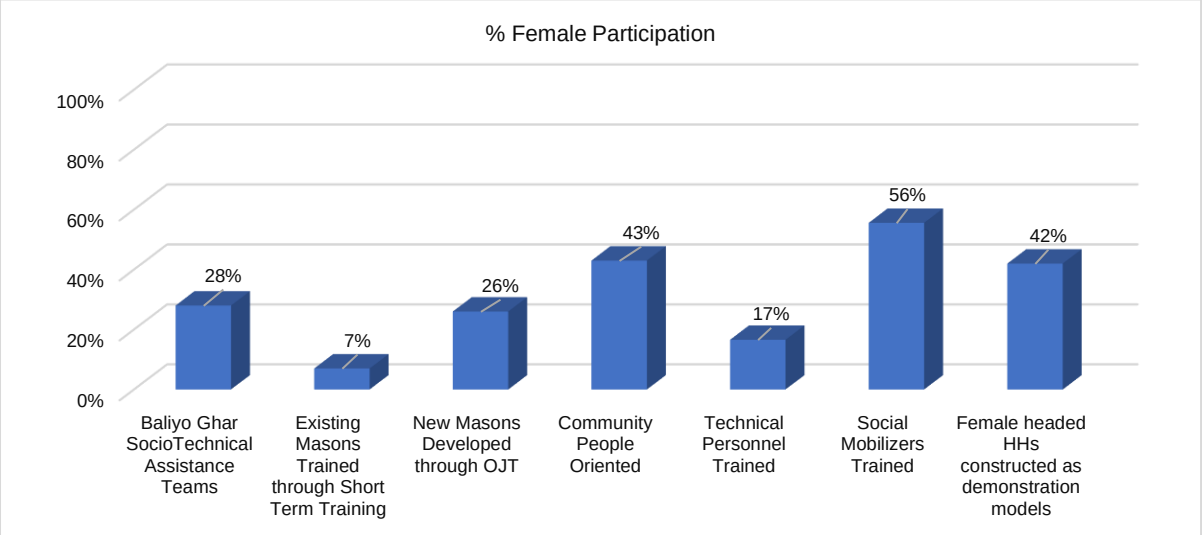


Figure 27: Female participation in various Baliyo Ghar Program interventions and outputs

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, 56% of the trained social mobilizers were female. And 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 important 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, significantly engaged in the reconstruction process. This has not only helped the reconstruction and recovery but also changed the 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 them 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 stunned. 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

Support to Vulnerable household

As per the need, Baliyo Ghar program had introduced the Special Technical Support for Vulnerable Households" in Year 5 primarily focusing on two major activities; Formation of Vulnerable Support Group and providing direct socio-technical assistance to the 15 identified vulnerable beneficiaries to support the reconstruction.

According to NRA, by the end of May 2020, reconstruction of 64% of total houses in 14 most affected district had been completed and another 23% were under construction (NRA, 2020).

Houseowner doing their daily chores in their newly reconstructed house. ©NSET

Reconstruction scenario of Syankhu, Dolakha
©NSET

CONCLUSIONS AND RECOMMENDATIONS

Reconstruction mega campaign after 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 activities. It provided tremendous opportunities to promote disaster resilient communities. Lessons learned from this post-disaster recovery are very much valuable for the long-term disaster risk management in Nepal.

Baliyo Ghar program also had many learnings which can be replicated in future housing recovery programs. Baliyo Ghar program was aimed to contribute on disaster resilient communities in Nepal through standardization of policy documents, enhanced local capacities and increased risk awareness by conducting different program activities. As per the program objectives Baliyo Ghar program contributed in disaster resilient reconstruction through different activities. From result of different surveys, we can conclude that Baliyo Ghar was very successful in terms of its appropriateness and effectiveness. All program activities were focused for disaster resilient construction. Training of local construction workforce not only accelerated the reconstruction efforts but also being helpful to earn their livelihood within their own locality.

The following important aspects of the policies made Nepal's reconstruction successful and allowed potential for making it sustainable:

1. First of Nepal, Nepal developed appropriate policies and institutions to guide the massive reconstruction process based on the analysis of country context and by utilizing the recent examples and experiences from around the world. Many development partners and relevant organizations brought their inputs to help the reconstruction process in Nepal.
2. Policy frameworks were supported by detailed procedures (SOPs), guidelines and manuals. Associated training and orientations to concerned officials, professionals and beneficiaries helped to properly apply the policies and principles.
3. The overall policy framework was very dynamic. Continuous monitoring and feedback system was in place which helped to make timely amendments in the policies.
4. There are several policies which possesses potentials for sustainability. Training and capacity building system established at many government institutions and other organizations, involvement and leadership of local governments to help and facilitate the reconstruction process at local levels, engagement of communities in the form of community reconstruction committees or other informal forms are some of the examples of such elements of sustainability.

Analysis of the data and information gathered from the qualitative surveys and through the views expressed by the key informants of various surveys, it can be considered that Baliyo Ghar program had a significant contribution in the successful implementation of owner-driven housing reconstruction program lead by National Reconstruction Authority (NRA) after the 2015 Gorkha Earthquake. The program had main inputs and contributions on four main areas of housing reconstruction:

1. Support on policy formulation and implementation
2. Development of large number of skilled human resource through training and capacity building,
3. Enhance awareness of people on safer building construction practices
4. Better coordination and collaboration among reconstruction stakeholders

Overall performance and objective wise achievement of Baliyo Ghar were also evaluated by the key informants. Key informants rated overall Baliyo Ghar performance as 9 in the scale of 1 to 10. And objective-wise, the achievement in first objective, policy support was rated as 8, the second objective capacity building was rated 9 and third objective awareness achieved a score of 9.

The stakeholders and beneficiaries view Baliyo Ghar program as one of the very useful and successful programs in terms of influencing the reconstruction process, to help people reconstruct timely and safe manner, and to help raise awareness of the people on disaster safety and earthquake-resistant construction.

There are few significantly new and innovative outcomes and impacts of the Baliyo Ghar program. The training of women groups to become new masons in the communities is one of such innovative ideas to influence the reconstruction process very positively. There are now several women masons who are actively working to build safer houses in the communities. This has also contributed in the livelihood and economy of the families in earthquake affected areas.

Recommendations and Way Forward

Reconstruction of earthquake resilient houses is the main output of the Build Back Better concepts followed during the owner-driven reconstruction program. The next logical step would be to continue the momentum achieved for safer reconstruction by adapting and changing the systems within our local governments to establish building permit systems and building code implementation mechanisms. Such system needs to be established in all local governments - urban as well as rural municipalities.

Next is documentation of the learnings gathered from the massive reconstruction campaign of past six years so that we can scale up and utilize the knowledge and skills for the next possible disaster? The National Reconstruction Authority (NRA) is a special purpose short-term organization, the main objective of which has already been achieved. Once NRA's term is completed and the institution does not exist, the institutional memory should retain in many other organizations. Central level agencies such as Ministry of Urban Development (MOUD), Ministry of Education (MOE), National Disaster Risk Reduction and Management Authority (NDRRMA) should carry on the vast experience of NRA on the recovery and reconstruction so that these institutions can lead any future recovery efforts in Nepal.

Retaining the large number of trained professionals developed during the reconstruction process is another major task for the sustainability of resilience building. Large number of trained engineers and other technical professionals, trained masons and contractors, government officials and elected local government representatives are great assets for Nepal for building resilient nation. The country should develop policies and systems to retain and continue involve them in future recovery and reconstruction programs as well as in other development processes. On the other hand, a sustained system of training of construction workforce and technical manpower is also required at various levels to ensure safer construction for disaster resilient communities.

Nepal's experiences and lessons of the recent recovery and reconstruction are potentially useful for similar contexts in the region and at the global level. Nepal should utilize existing mechanisms and forums to share such experiences and lessons to the regional and global community to enhance the applicability and reliability.

Happy family in their newly reconstructed house

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ANNEXES

Annex 1. Proportion of houses involving skilled manpower for construction supervision and trained mason in construction as per the VDCs

District	VDC	Houses in which skilled manpower involved for supervision		Houses involving trained mason in construction		Total Construction Completed Houses
		Number	Percent	Number	Percent	
Baliyo Ghar Program		**19,723**	**90%**	**19,588**	**89%**	**21,997**
	Dhading Total	**10,076**	**93%**	**10,161**	**93%**	**10,883**
Dhading	Darkha	570	95%	506	84%	603
Dhading	Dhuwakot	1,014	98%	983	95%	1,033
Dhading	Jyamrung	846	98%	853	99%	861
Dhading	Kalleri	840	86%	932	95%	982
Dhading	Khalte	839	92%	871	96%	911
Dhading	Kumpur	1,031	90%	1,097	96%	1,148
Dhading	Marpak	351	87%	310	77%	402
Dhading	Nalang	929	95%	949	97%	978
Dhading	Nilkantha	2,301	96%	2,229	93%	2,389
Dhading	Semjong	608	96%	511	81%	634
Dhading	Sertung	272	64%	412	97%	424
Dhading	Tipling	475	92%	508	98%	518
	Dolakha Total	**6,605**	**88%**	**6,087**	**81%**	**7,495**
Dolakha	Alampu	438	90%	476	98%	484
Dolakha	Babare	930	97%	917	96%	954
Dolakha	Bhimeshwor Municipality	808	96%	778	93%	839
Dolakha	Bhirkot	286	93%	183	59%	308
Dolakha	Bigu	416	86%	429	89%	481
Dolakha	Chilankha	758	95%	787	98%	802
Dolakha	Chyama	594	97%	299	49%	614
Dolakha	Japhe	357	72%	378	77%	494
Dolakha	Jhule	308	72%	300	70%	427
Dolakha	Katakuti	188	75%	164	65%	251
Dolakha	Laduk	498	78%	595	93%	642
Dolakha	Lamidanda	493	89%	342	62%	551
Dolakha	Magapauwa	242	94%	235	91%	257
Dolakha	Malu	289	74%	204	52%	391
	Nuwakot Total	**3,042**	**84%**	**2,855**	**79%**	**3,619**
Nuwakot	Chaturale	270	64%	277	66%	419
Nuwakot	Chhap	378	80%	438	93%	472
Nuwakot	Likhu	319	98%	322	99%	325
Nuwakot	Mahakali	327	98%	323	96%	335
Nuwakot	Samundradevi	477	83%	358	62%	576

District	VDC	Houses in which skilled manpower involved for supervision		Houses involving trained mason in construction		Total Construction Completed Houses
		Number	Percent	Number	Percent	
Baliyo Ghar Program		**19,723**	**90%**	**19,588**	**89%**	**21,997**
Nuwakot	Sikre	131	76%	137	79%	173
Nuwakot	Talakhu	322	92%	341	97%	351
Nuwakot	Thanapati	408	94%	296	69%	432
Nuwakot	Thansing	410	76%	363	68%	536

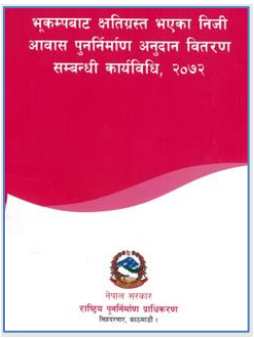
Family performing daily chores in the newly constructed house, Nuwakot
©NSET

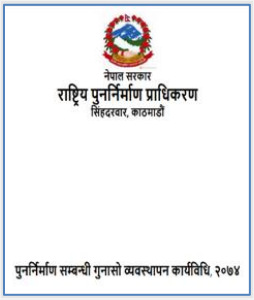
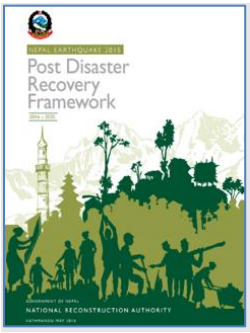
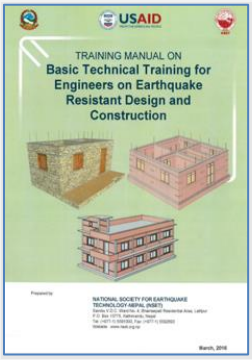
Annex 2. Activities performed as technical assistance for sustainability of safer construction practices in municipalities through building regulation process.

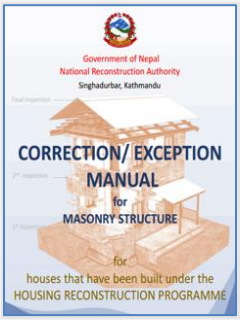
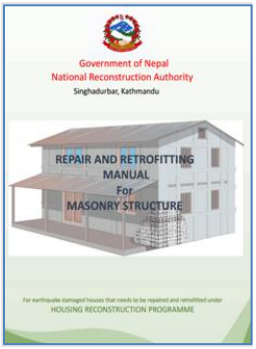
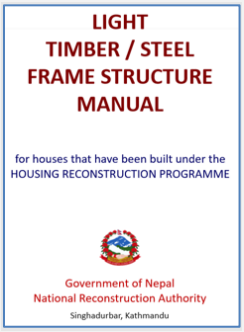
SN	Name of Activity	Description	Achievements
1	Training to Local Authority on Building Code Implementation	**Objectives:** • To sensitize local government representatives and officials on National Building Code and its implementation mechanism • To enhance understanding of local governments for establishment of building permit system and, • To strengthen coordination among BG team and local authorities for BCI development. **Target Participants:** • 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	**Objectives:** • 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. **Target Participants:** • 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	**Objectives:** • 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. **Target Participants:** • 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.

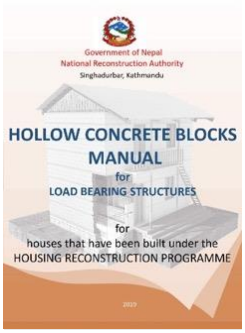
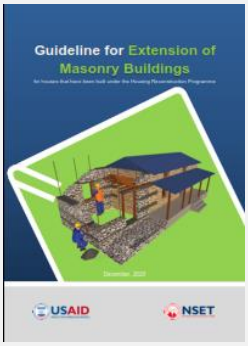
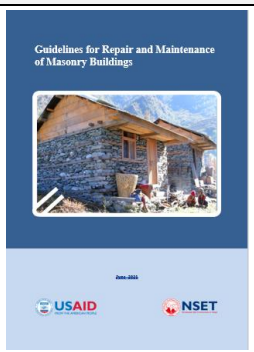
SN	Name of Activity	Description	Achievements
4	Technical Support for Building Permit System Development	**Objectives:** • Conduct meetings with stakeholders • To assess the status of municipalities (carry out SWOT analysis) to establish building permit system • To assist municipalities in preparing required 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	**Objectives:** • 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.
6	Workshop to exchange learnings in Building Code Implementation	**Objectives:** • 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	**Objectives:** • 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. **Target:** • Officials and elected representatives from BG Program municipalities	20 local government officials and representatives from 12 Rural and 3 Urban Municipalities Baliyo Ghar program municipalities visited Vyas and Kawasoti municipalities for cross learning in building code implementation.

Annex 3. List of policy level documents prepared and contributed by Baliyo Ghar Program

SN	Title of Document	Cover Page	Contribution to Resilient Reconstruction
1	7 Days Mason training manual on earthquake resistant building construction technology – RURAL* Stage: Approved Level of contribution: Full: Developed from NSET-BG on the behalf of DUDBC.		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.
2	7 Days Mason training manual on earthquake resistant building construction technology – URBAN* Stage: Approved Level of contribution: Full: Developed from NSET-BG on the behalf of DUDBC.		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 ensures minimum knowledge and skill required for masons working in urban building technology practiced in Nepal. The major building typology of urban setting is RCC frame structure and brick masonry with cement mortar. This curriculum incorporates the details of both frame structure and masonry building construction technology considering different hazard mainly earthquake. After endorsement by government it's became a mandatory course for mason training on urban building construction.
3	SOP for Enrollment and housing Grant Distribution, 2073* Stage: Approved Level of contribution: Significant		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.

SN	Title of Document	Cover Page	Contribution to Resilient Reconstruction
4	SOP for Grievance Addressable Guideline, 2074* Stage: Approved Level of contribution: Significant		"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.
5	GON policy for reconstruction and rehabilitation, 2072* Stage: Approved Level of contribution: Significant		This is the overall policy document adopted by Nepal Government for the reconstruction and rehabilitation efforts after the 2015 Gorkha Earthquake.
6	Training strategy development and training SOP, 2073* Stage: Approved Level of contribution: Significant		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.
7	Preparation of sectorial plan of housing sector for the PDRF, 2016-2020 Stage: Approved Level of contribution: Significant		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.
8	Development and implementation of Basic Training course on reconstruction for GON new technical professionals Stage: Approved Level of contribution: Significant		It has provided a way forward to have uniform practice as well as to disseminate all the essential technical knowledge's required for reconstruction. Following this document, Engineers were trained for basic technical on earthquake resistant design and construction following National Building Code. This training capacitate 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 before deployment to the field in Year 1. They were

SN	Title of Document	Cover Page	Contribution to Resilient Reconstruction
			capacitate to supervise the earthquake resistant building reconstruction,
9	Development of Housing Reconstruction Inspection Check List, 2073* Stage: Approved Level of contribution: Significant		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.
10	Correction/Exception manual for masonry structure Stage: Approved Level of contribution: Significant		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.
11	Repair and Retrofitting manual for masonry structure Stage: Approved Level of contribution: Significant		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.
12	Light Timber / Steel Frame Structure Manual for houses that have been built under the Housing Reconstruction Programme Stage: Approved Level of contribution: Significant		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.

SN	Title of Document	Cover Page	Contribution to Resilient Reconstruction
13	Hollow Concrete Blocks Manual for Load Bearing Structures for houses that have been built under the Housing Reconstruction Programme Stage: Approved Level of contribution: Significant		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.
14	Guidelines for extension of masonry buildings for houses that have been built under the Housing Reconstruction Programme Stage: Final draft submitted for endorsement Level of contribution: Full		The guideline aims at providing technical knowledge and expertise to technical personnel 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.
15	Guidelines for Repair and Maintenance of Masonry Buildings** Stage: Draft Complete Level of contribution: Full		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.

Annex 4.Baliyo Ghar Considerations on Gender Equality and Social Inclusion

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. New 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. Baliyo Ghar GESI Strategy and Action Plan Gender equality means 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.

Equal opportunity for all, Equity for Equality and Mainstreaming GESI are the main key principles of the GESI action plan, which complements to the overall

program and guides in making the different activities of Baliyo Ghar GESI friendly. Equality is having the same rights and equal opportunity to all sectors of society. All people, irrespective of the ethnicity, gender, and economic status will have equal opportunities to the program activities and technical assistance for reconstruction. Equity is the first step for equality. All activities will use "equity" considerations as a basis for promoting equality. GESI is both a process and an objective. Integrating GESI perspective forms the basis for policy, design, approach and implementation to ensure enabling environment for different social groups including women and encourage their meaningful participation in all the activities of the program.

In our Nepali context, there is still a perception that women should not build houses. Due to which, various challenges and door-to-door programs show that women have to face many challenges in participating in the reconstruction.

- Women masons are less trusted in house building, house owners also express the opinion that houses built by women are not strong. That is why women are doing normal labor work in the field.
- Also, the fact that women have to devote time to household chores and childcare has made it difficult for women to participate in reconstruction programs.

Annex 5.Training female masons in earthquake resistant construction

a. 7 days Mason Training

Baliyo Ghar Program, focused on training a large number of masons on earthquake resistant construction techniques through short and long term trainings on construction of rural and urban buildings. The short term trainings were focused on providing existing masons with additional skills of incorporating earthquake resistant elements in the construction while long term training Capable of working as skilled masons in construction. The trainings were conducted based on standard curriculum endorsed by the National Reconstruction Authority and followed the training guidelines formulated by the NRA. All trainings were conducted in close collaboration with the local and district level stakeholders.

Women's participation in 7 days mason training in Kathmandu

Seven days mason training was organized with the objective of involving women in reconstruction who were already in the field of reconstruction. Such short term course of mason training provided the knowledge and boost the skills of existing masons. Total of 7,245 masons were trained through 244 mason training events within the program districts. Out of total trained masons, 6,773 (93%) were male masons and remaining 472 (7 %) were female participants.

The **figure 1** highlights the distribution of 7 days mason training participants based on five major ethnic groups; Janajatis, Brahmins/Chhetris, Newars, Dalits and Muslims. Among these ethnic groups, more than half i.e.51% of all training participants were Janajatis, owing to two major reasons; first, Janajatis are predominantly large ethnic groups in Baliyo Ghar Program areas and second, most of the construction work in rural communities are done by Janajatis.

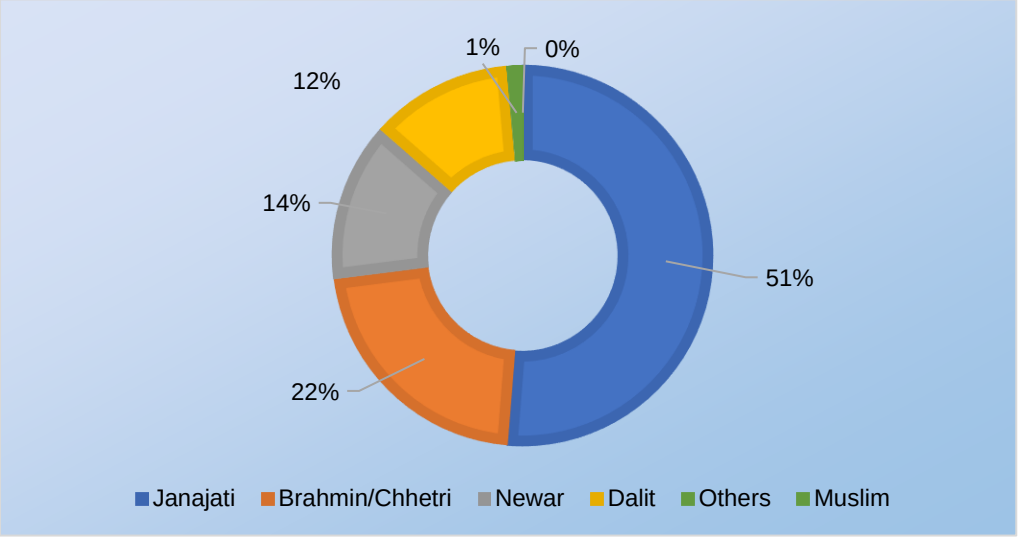


Figure 28: Ethnicity wise disaggregation of 7 days mason training participants

b. On-the-job (OJT) Mason Training

On the Job Trainings are vocational trainings targeted towards the development of new skilled masons to support the demand of human resources during surge of reconstruction activity. OJT assisted marginalized, socio-economically back warded society and differently abled people and to enhance their skills on housing construction as a new opportunity for professional growth. Constructing an Earthquake Resistant Building at local level and made local people aware on earthquake resistant technology through demonstration model. Total of 5,430 new masons were trained through 910 on-the-job training events. Out of total 4,034(74%) were male participants and remaining 1396 (26%) were female participants. 910 houses that has been built during the OJT has been selected based on the vulnerability criteria of NRA and those houses were selected in consultation with local governments.

The **figure 2** highlights the distribution of on-the-job mason training participants based on major ethnic groups. Among different ethnic groups, more than half i.e.53% of all training participants were Janajati followed by Brahmin/Chhetri ethnic group. Janajati's are predominantly large ethnic groups in Baliyo Ghar Program areas.

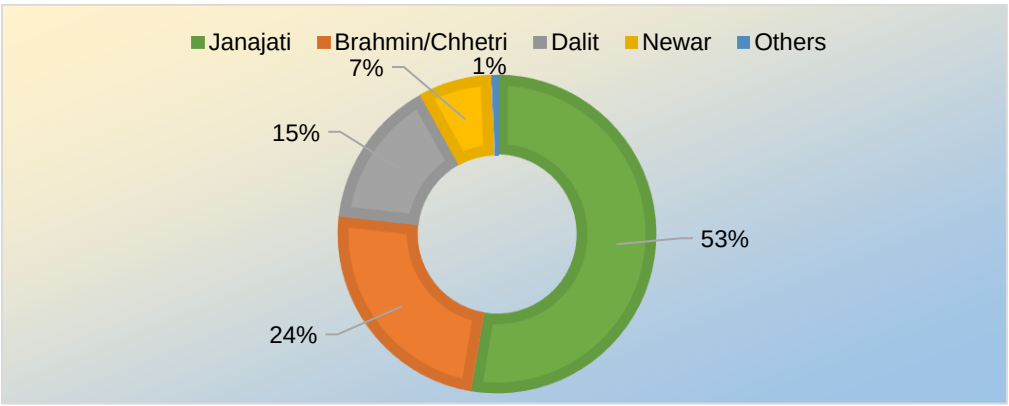


Figure 29: Ethnicity wise disaggregation of OJT mason training participants

Annex 6. Community Based Orientation Events

In order to make the house owners aware on the need of earthquake resistant construction, massive level of awareness campaign consisting of closed class room based sessions on earthquake risks, mitigation measures and the technical and administrative provisions of reconstruction were conducted in program areas. Among various socio-technical assistantship, various community-based awareness and engagement activities, were identified and implemented through the program. 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.

With the objective of orienting people about the earthquake, its consequences and measures to be adopted to build Earthquake Resistant houses, series of orientations were done in different parts of the program area in Dhading, Dolakha, Kathmandu and Nuwakot, district. With the time being the topics used in the orientations were stretched to retrofit and correction of the house as well as the non-structural mitigation as per the need of the community. Altogether 6893 orientation events have been conducted where 146,559 beneficiaries participated. Out of total, 57 % participants were males whereas 43% of the total participants were females. As the program was conducted in 4 different districts. The participants of orientations were also from different ethnic groups. Figure 3 above shows that the highest ethnic group benefitted by orientations were Janajati followed by Brahmin/Chhetri. Muslim community in the program area were negligible as few of them participated in orientation were all migrated due to different purpose.

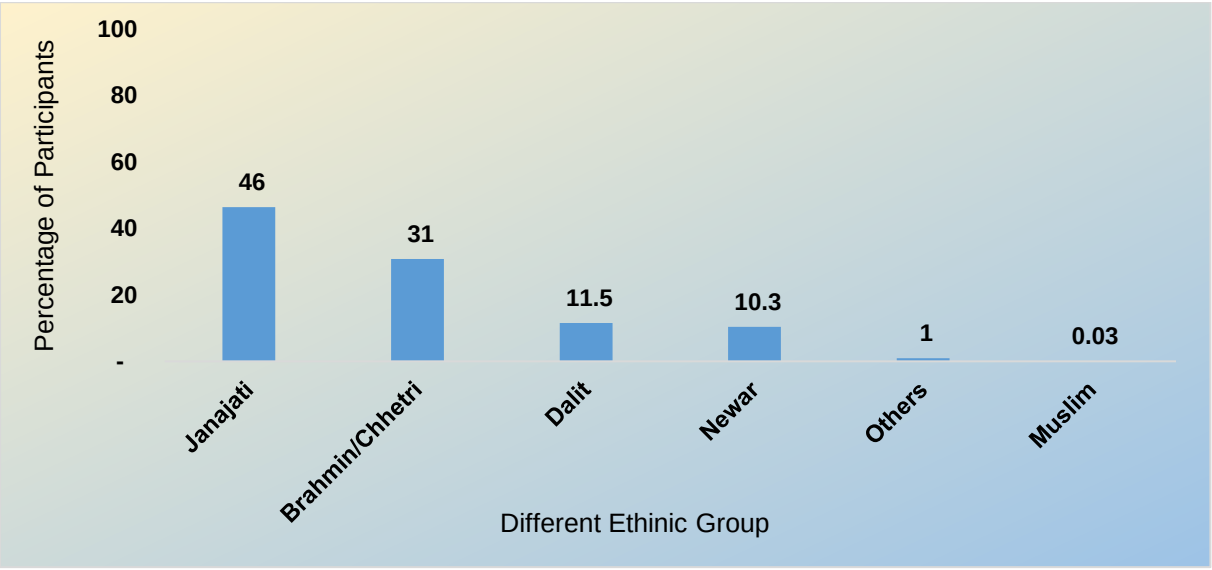


Figure 30: Ethnicity wise Disaggregation of the Orientation

Annex 7.Social Inclusion through BG program activities

Based on the GESI Guiding Principles, Strategies and scope of the program, the following are the major activities to be conducted in Baliyo Ghar to make it GESI friendly. The activities with the processes to carry out the major activities are also further listed below in bullets.

- Planning and Preparation: Develop a preliminary GESI strategy and action plan based on a preliminary situation analysis on the gender and social situation in the program area.
- Conduction of Baseline survey: Conduct surveys for segregated data of the population by gender and ethnicity such as male and female population, dalits, marginalized ethnic groups, senior citizens, single women, female-headed households and people living with disabilities/ or impairment, youth without parents/ child-headed households, boys and girls.
- Development of GESI Strategy and Action Plan
- Finalization of GESI Strategy and Action Plan
- Implementation of Activities as per Action Plans
- Monitoring GESI tasks in conjunction with M&E Plan of BG
- Impact Assessment and Final Report of GESI

Briefing the fellow female masons in one of the retrofit site – Nuwakot ©NSET

Annex 8. Specialized socio-technical support for reconstruction of vulnerable beneficiaries

There are different types of people living in the society. Their physical, mental, social and economic part is different. Due to various social and natural reasons, such people cannot be involved in development activities, which has a direct impact on sustainable development. Even in the reconstruction of Nepal, such people could not be rebuilt, which requires special kind of technical assistance to fulfill. Accordingly, Baliyo Ghar Program has collaborated with the ward office, municipality and NRA to facilitate the construction of houses for the beneficiaries by facilitating the construction of houses for the beneficiaries who have not been able to build their houses.

Out of several vulnerabilities in beneficiaries, the NRA has prioritized 4 major vulnerabilities amongst the people who need significant support to build their houses. The priority amongst several vulnerable population was set to support Children under the age of 16, Old aged people over the age of 70 who are alone, single women over the age of 65 and people with disabilities. 1254 people were listed as vulnerable population in areas where Baliyo Ghar program is being implemented. The table below shows the district wise distribution of vulnerable population as per the criteria set by the NRA.

Table 1: Distribution of Vulnerable population within the program areas

Vulnerability Type by NRA	District				Total
	Dhading	Dolakha	Nuwakot	Ktm_kageshwori	
Children	5	2	0	0	7
Old age (over age of 70)	367	208	50	22	647
Disable	20	5	2	0	27
Single Women (over age of 65)	283	222	41	27	573
Total	675	437	93	49	1,254

Reconstruction of vulnerable beneficiaries were also facilitated through the OJTs where one house was built as a demonstration house and house owner has been selected as per the recommendation of ward and municipality. Such OJTs have helped vulnerable beneficiaries build their houses. Out of total 1,254 vulnerable houses with in the program area Baliyo Ghar program assisted 12 houses for reconstruction. Different activities were conducted for socio-technical assistance of vulnerable populations and assistance was provided through an initial home survey. After which the entire technical part of the house was planned by BG. Here are some key tasks as part of providing technical support:

Socio Technical Assistantship

The socio technical support will comprise of mass orientation and community interaction on problems the vulnerable population are facing in reconstruction, the methods on how houses have to be constructed and earthquake

preparedness. The door to door support will facilitate the vulnerable people about the identifying the proper site for construction, basic drawing of houses planned to be built, cost estimation and quantity estimation of materials. This Comprehensive door to door technical support will help the vulnerable population in identifying the quantity of material and manpower required along with the cost that comes with it.

Meetings conduction and facilitation

Series of meetings is planned to discuss about the issues the vulnerable population are facing when it comes to construction of their houses, the probable solution and progress on their reconstruction status.

Market Facilitation

The construction materials required for the construction of the beneficiary's house are arranged in coordination with the ward office and the municipality.

Grant Facilitation

For such cases ward & municipality level can advocate to ensure they release all the grant amount in advance or social activist or ward can generate a revolving fund of certain amount which will be used in the construction of houses and will be reimbursed back upon receiving the tranche. This grant facilitation will help the vulnerable population who can't build their houses due to economic conditions with amount which can be invested in procurement of materials or paying for the work force.

Advocacy

The advocacies could be in construction quality of house being made, materials procurement and its process, grant status of the vulnerable population and other features that could enhance the livelihood of the vulnerable population.

Glimpses of Reconstruction Activities

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Back to the normal life after reconstruction

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.

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