



# Baliyo Ghar Program Training New Masons on Earthquake Resistant Construction Technology

A Summary Report





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Program Period: October 1, 2015 to September 30, 2021 Reporting Period: October 1, 2015 to September 30, 2021

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## FOREWORD

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

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

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

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

Sushil Gyewali

Chief Executive Officer National Reconstruction Authority

## REMARKS

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

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

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

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

Surya Narayan Shrestha

Executive Director NSET-Nepal

## PREFACE

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

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

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

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

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

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

#### Dr. Ramesh Guragain

Program Director and Deputy Executive Director NSET-Nepal

# LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AIN	Association of International Nongovernmental Organizations in Nepal
BCRAC	Building Code Revision Advisory Committee
CBOs	Community-Based Organizations
CDO	Chief District Officer
CLPIU	Central Project Implementation Unit
CSO	Civil Society Organizations
DACFC	Development Assistance Coordination and Facilitation Committee
DCC	District Coordination Committees
DEID	Department for International Development
DI PIU	District Level Project Implementation Unit
DOR	Department of Roads
	Department of Local Infrastructure Development and Agricultural Roads
DPR	Detail Project Report
DRCN	District Road Core Network
DRRM	Disaster Risk Reduction and Management
DRSP	Disaster Resilience of Schools Project
	Department of Lirban Development and Building Construction
DWSS	Department of Water Supply and Sowerage
	Early Childhood Education and Development
	Early Childhood Education and Development
	Eannyuake Emergency Assistance Project
	Economic Internal Rate of Return
ESKP	Emergency School Reconstruction Project
	European Union
	Export-import Bank of India
GESI	Gender Equity and Social Inclusion
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit / German Corporation for
GMaLI	Grant Management and Local Infrastructure
Gol	Government of India
GON	Government of Nepal
IEE	Initial Environmental Examinations
IDA	International Development Association
INGO	International Non-Governmental Organization
JFPR	Japan Fund for Poverty Reduction
JICA	Japan International Cooperation Agency
KOICA	Korean International Cooperation Agency
KVDA	Kathmandu Valley Development Authority
LRN	Local Road Network
MDTF	Multi-Donor Trust Fund
MoE	Ministry of Education
MoFALD	Ministry of Federal Affairs and Local Development
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoUD	Ministry of Urban Development
NEA	Nepal Electricity Authority
NFN	NGO Federation of Nepal
NGO	Non-Governmental Organization
NNBC	Nepal National Building Code
NPC	National Planning Commission
NPR	Nepalese Rupee
NRA	National Reconstruction Authority
PCU	Project Co –Ordination Unit
PDNA	Post-Disaster Needs Assessment
PDRF	Post-Disaster Recovery Framework
PIU	Project Implementation Unit
PMC	Programme Management Consultancy
POs	Partner Organizations
PRC	People's Republic of China
RC	Reinforced Concrete
SEANep	Structural Engineers' Association Nepal

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

## EXECUTIVE SUMMARY

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

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

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

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

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

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

## Table of Contents

Fore	wordii
Rem	arksiii
Prefa	aceiv
List	of Abbreviationsv
Exec	cutive Summaryvii
1	Introduction1
2	Socio Technical Assistance under Baliyo Ghar Program
3	On the Job Training for Development of New masons4
4	Objectives5
5	Training Course
6	Implementation Mechanism
7	Outputs
	7.1 Geographical Distribution9
	7.2 Gender Wise Distribution
	7.3 Ethnicity Wise Distribution
	7.4 Age Wise Distribution
8	Monitoring and Evaluation Mechanism12
	8.1 M&E Checklists
	8.2 Expectations collections and discussion13
	8.3 Pre and Post Test
9	Measuring Impacts
	9.1 Retention of knowledge by trained masons13
	9.2 Profession Retention of Trained Masons14
	9.3 Trained mason engagement in construction15
10	Challenges and Strategies16
11	Lessons
12	Recommendations18

## List of Figures:

Figure 1.	Baliyo Ghar Program activities at National, District and Local levels	1
Figure 2.	Earthquake affected and Baliyo Ghar Program districts	2
Figure 3.	Baliyo Ghar Program strategy, key areas of interventions and relevant stakeholders	3
Figure 4.	Steps in Training Implementation	7
Figure 5.	Pictorial representation of overall outputs of mason training across the four program districts	9
Figure 6.	Distribution of urban and rural mason training events and participant numbers in four program districts	9
Figure 7.	Gender-wise distribution of training participants	10
Figure 8.	Ethnicity wise disaggregation of training participants	11
Figure 9.	Age wise distribution of training participants	12
Figure 10.	Knowledge retention of trained masons scored out of 100	14
Figure 11.	Percentage of trained masons who retained their profession in construction	15
Figure 12.	Average cost per participant of mason trainings	21
Figure 13.	Breakdown (proportion) of different costs associated with mason trainings	22

## List of Table:

Table 1:	Coverage of Baliyo Ghar Program in terms of wards and beneficiaries	2
Table 2:	Challenges and strategies administered during mason trainings	16
Table 3:	Materials for Mason Training (Urban Module)	23
Table 4:	Tools for Mason Training (Urban Module)	23
Table 5:	Materials for Mason Training (Rural Module)	24
Table 6:	Tools for Mason Training (Rural Module)	25
Table 7:	Data Quality Assurance Responsibility Matrix and Timeline for Mason Training	30



## I INTRODUCTION

With an aim of supporting the Government of Nepal's owner driven approach for the reconstruction of private houses damaged during the 2015 Gorkha Earthquake, NSET has been implementing the "Baliyo Ghar Program" as a key part of the reconstruction portfolio of USAID/Nepal under the cooperative agreement AID-367-A-15-00005. Baliyo Ghar Program is providing comprehensive technical support to the GoN's owner driven model of housing reconstruction by promoting disaster resilient construction standards and design and empowering and supporting earthquake-affected communities to "Build Back Better".

The program has two-fold goals:

- In shorter-term, the program aims at ensuring earthquake safer construction of all houses being reconstructed;
- For longer-term, the program aims to establish a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal.

The program duration is from October 1, 2015 to September 30, 2020.

This is the summary report of the activity "Training for Masons on Earthquake Resistant Construction of Rural and Urban Buildings" that was conducted as part of the technical assistance capacity building activity under the program. This report highlights the strategies, outputs, outcomes and impacts of 244 training activities conducted during the life of the program through which 7245 masons were trained.

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 1** shows the involvement and major program activities at the three levels.

National	<ul> <li>Technical support on Curricula, Guideline, Manuals, Advocacy etc.</li> <li>Develop Instructors for other Districts</li> <li>Support for research, study and documentation, reconstruction</li> </ul>
District	<ul> <li>Establishment of District Reconstruction Technology Center (DRTC)</li> <li>Training to Engineers and and Social Mobilizers</li> <li>Support Project Teams</li> <li>Support partner organisation and district level government offices on reconstruction</li> </ul>
Local	<ul> <li>Establishment of Local Reconstruction Technology Centers (LRTCs)</li> <li>House to House Technical Support in selected VDCs</li> <li>Training for masons and houseowners</li> <li>Awareness campaigns</li> </ul>

Figure 1. Baliyo Ghar Program activities at National, District and Local levels

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



Figure 2. Earthquake affected and Baliyo Ghar Program districts

The **Table 1** below highlights the program coverage in terms of number of wards and beneficiaries within the four program districts.

In these four districts, Baliyo Ghar program covered 23 wards of 3 Urban Municipalities (UM) and 43 wards of 12 Rural Municipalities (RM), 66 wards of 15 municipalities in total. Similarly, in terms of number of earthquake housing reconstruction beneficiaries, Baliyo Ghar provided direct technical assistance to 61,444 out of total 274,910 beneficiaries in the four districts. In total, 16.6% of the wards and 21.74% of the listed beneficiaries of the four districts have been covered with blanket technical support through Baliyo Ghar Program.

SN	Name of Districts	Distric	t Total	BG Co	verage	BG Coverage (%)		
		Mun. (wards)	Beneficiaries	Mun. (wards)	Beneficiaries	Wards	Beneficiaries	
I	Dhading	13 (104)	84,393	6 (31)	26,614	29.81%	31.54%	
2	Dolakha	8 (67)	72,859	5 (21)	24,143	31.34%	33.14%	
3	Nuwakot	12 (88)	78,770	3 (11)	8,983	12.5%	11.40%	
4	Kathmandu	( 38)	48,612	I (3)	2,127	2.17%	4.38%	
Total		44 (397)	284,634	15 (66)	61,867	16.6%	21.74%	

 Table I:
 Coverage of Baliyo Ghar Program in terms of wards and beneficiaries

## 2 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 Government of Nepal (GoN) National Reconstruction Authority (NRA) and its project implementation units. The program covered a wide range of stakeholders targeted through its comprehensive technical assistance for awareness, capacity building and institutional improvements as shown in **Figure 3.** 



Figure 3. 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, social activists
- 3. **Technical professionals** Structural and Earthquake Engineers, Civil Engineers, Architects, Sub Engineers, Assistant Sub Engineers deployed in earthquake affected areas by GON, local governments and partner organizations.
- 4. **Common People** house owners, beneficiaries, consumer groups, clubs, and community based committees.

- 5. **Policy and decision makers** elected representatives and officials at local (rural and urban municipalities), provincial and central level governments, district and central level NRA officials and PIUs, political leaders, officials at ministries and departments.
- 6. **Partner Organizations** involved in reconstruction and platforms.

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 the National Reconstruction Authority.

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

## 3 ON THE JOB TRAINING FOR DEVELOPMENT OF NEW MASONS

The massive scale of reconstruction required in the earthquake-affected areas prompted the need for huge number of skilled masons. Across the country, the National Reconstruction Authority estimated the requirements of more than 100,000 construction workers to complete the reconstruction of more than 825,000 fully damaged and retrofitting of another 70,000 houses. Preliminary data and information collected from different sources form the earthquake affected districts, and from the PDNA report showed that the existing masons

in the earthquake affected areas covered 50% of the total needs for reconstruction. Thus, it was very important that skill enhancement of local masons would be a crucial step in the reconstruction process.

**On the Job Training** refers to the long term (50 days) vocational training that Baliyo Ghar Program conducted in its program implementation areas to in a bid to enhance local capacity in earthquake resistant construction and support the reconstruction process by fulfilling the demand of high number of trained masons for construction. The trainings were specifically targeted for local construction workforce to undertake construction of rural masonry buildings following the technical standards as guided by the National Building Code of Nepal, Minimum Requirements (MRs) and other technical guidelines developed by the National Reconstruction Authority.

## 4 **OBJECTIVES**

Baliyo Ghar Program conducted intensive short-term training courses targeted to the existing local masons in its program areas. The main objective of the training course was to enhance knowledge and skills of masons and construction workers of the affected areas on the earthquake resistant construction technology. Generally, the existing masons have basic knowledge and skills required for construction of a house, but lack specific knowledge and skills on earthquake resistant technology. The training intended to serve two purposes.

- 1. Enhance local capacities to undertake earthquake resistant construction of rural and urban buildings at local levels with minimum external interventions.
- 2. Help in transfer of skills from existing masons to unskilled masons working as labors to increase the number of skilled human resource, thus supporting during the surge of the reconstruction process.

## 5 TRAINING COURSE

The construction sector in Nepal is largely an informal one, with local workforce and contractors predominantly leading the construction of residential buildings. Similarly, the production of masons and workforce required for the construction is also largely informal; people generally start working in the sector as laborers in the early teens and gradually learn skills as apprentices, eventually working up the ladder. Although a formal training and skill certification institute and system has been established, very few pass through these processes. As a result, a large proportion of local construction workforce prior to the Gorkha earthquake were unskilled in earthquake resistant construction.

Training of local masons in earthquake resistant construction started in Nepal in the early 2000s, when the government of Nepal as well as different partner organizations such as NSET started delivering trainings to local masons at construction sites, particularly during school construction and retrofitting. A more formal and structured approach for training was felt which led to the development of a standard curriculum for training masons; a 5 day training comprising of theoretical classroom based sessions and hands on practical exercises on earthquake resistant construction of urban buildings. The trainings were especially effective and widely run in a number of municipalities across the country.

However, the trainings only covered aspects of earthquake resistant construction of urban buildings, typically reinforced concrete frame and brick in cement masonry buildings. Rural buildings, constructed using stone or bricks in mud mortar and wooden roofs, floors and bands were not adequately covered. With heavy losses during the Gorkha earthquake happening in rural areas, and the highest need for training local masons in these regions, need was felt to include rural construction in the training curriculum as well. Furthermore, various theoretical and practical concepts were found to be missing from the earlier curriculum. As a result, Baliyo Ghar Program supported the Government of Nepal's Department of Urban Development and Building Construction (DUDBC) in developing and standardizing the curriculum for conducting short training (7 days) for masons in rural and urban construction. Two separate volumes of the training curricula were developed focused on different types of construction. The curricula was endorsed by the government and was widely used as the standard curriculum for training masons throughout the earthquake affected areas during the reconstruction campaign.

## 6 IMPLEMENTATION MECHANISM

The implementation of training for masons was done following the guidelines and curricula endorsed by the National Reconstruction Authority. Similarly, all local level policies and directives were duly followed to ensure inclusion and transparency in conducting the trainings. **Figure 4** below shows the implementation steps as a flowchart diagram.

• Assessment of Needs: To ascertain the needs of the training as well as the financial, administrative and other preparations and planning, an assessment was conducted. This primarily consisted of collection of information on number of existing masons in the program areas, type of construction prevalent in the area, types of issues in construction and the availability of the masons for training.



Figure 4. Steps in Training Implementation

• **Preparation of roster of available masons:** After a brief study to ascertain training needs, roster of masons eligible and interested for trainings were prepared. Three different approaches were utilized for this; (i) through consultation with house owners and masons during door-to-door visits by mobile teams, (ii) public notices at local level offices/notice boards/local radio and (iii) recommendation from local level representatives (ward citizen forum, VDC office, ward offices etc). The roster contained personal contact information as well as professional information including the experience in construction. This was typically done to ensure that only skilled masons previously involved in construction were called for the training, as per the training curricula and implementation guidelines. The roster also helped ascertain the module of training (rural/urban) best suited for the incumbent participants. The local level authorities then endorsed the prepared roster to ensure transparency and inclusion

- Administrative, Financial and Logistic Arrangements: Following the endorsement of trainee participants and selection of module, all required administrative, financial and logistics preparations were done to ensure the smooth conduction of the training. Administrative arrangements included approval from concerned local and district-level government authorities, and program management. Similarly, financial and budgetary approvals were sought from program management. Under logistics, appropriate venue was selected confirming to the needs of the training such as classroom for theoretical sessions, open space for hands-on practical exercises, availability of electricity, water, restrooms and proximity for all participants. Similarly, materials, stationery and equipment required for the training were either collected from the store or procured from nearby market owing to financial norms.
- **Training Implementation:** After completing all required preparations, participants were called for the training at the designation venue on the planned date. All training activities were conducted following the standard curricula and guidelines. Monitoring and evaluation of the training were done based on standard checklist. Local level authorities and NRA officials were invited for monitoring and evaluation of training and for constructive feedback.
- Certification and Reporting: After the completion of training, all trainees successfully completing the training were provided with certificates approved by the local and district level government authorities. Additionally, reports of the training were provided to all relevant government offices and to the Baliyo Ghar M&E team. Data and information generated from the training were uploaded to the program database for reporting.

## 7 OUTPUTS

Across the four program districts, **244** mason-training events were conducted in Baliyo Ghar Program. The district wise event and participant outputs of the trainings are shown in the pictorial representation in **Figure 5**. The highest number of trainings were conducted in Dolakha where 90 events were conducted which resulted in 2745-trained masons. Following Dolakha, 85 events were conducted in Dhading with 2534-trained masons while 57 events were only three wards of one municipality is covered, 12 training events were conducted from which 313 masons were trained.



Figure 5. Pictorial representation of overall outputs of mason training across the four program districts

## 7.1 Geographical Distribution

The disaggregation of training events across the four program districts in terms of module of training is presented in the bar chart in **Figure 6** below.



Figure 6. Distribution of urban and rural mason training events and participant numbers in four program districts.

Overall, more than twice rural mason trainings were conducted than urban trainings, largely owing to the geographical and topographical distribution of program areas. From 80 urban training events, 2245 masons were trained whereas from 164 rural training events, 5000 local masons were trained on earthquake resistant construction. In district wise distribution, proportion of urban trainings is higher in Nuwakot, owing to the increasing urbanization in the program areas in Shivapuri RM. In Kathmandu, all training events were urban modules, as stone masonry or brick in mud construction was largely replaced by RC frame or brick in cement construction in Kageswari Manohara Municipality.



## 7.2 Gender Wise Distribution

Figure 7. Gender-wise distribution of training participants

**Figure 7** above depicts the gender wise disaggregation of masons trained through the training events. As shown the bar chart, in total, 93% (6773) of the masons trained were male whereas only 7% (472) were female. This proportion was more or less consistent throughout all the program districts. A major reason for the low proportion of female trainees in these trainings is due to the eligibility criteria of the training, which required participants to have prior experience in masonry construction. As women were largely involved in construction only as laborers, very few were eligible to participate in the 7-day trainings.



## 7.3 Ethnicity Wise Distribution

Figure 8. Ethnicity wise disaggregation of training participants

The **Figure 8** above highlights the distribution of training participants based on five major ethnic groups; Janajatis, Brahmins/Chhetris, Newars, Dalits and Muslims. Among these ethnic groups, nearly 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. They are followed by Brahmin/Chhetri (22%), Newars (14%) and Dalits (12%). A small proportion of Muslims (<1%) and other ethnic groups (1%) participated in the trainings. Janajatis were also significantly higher in Nuwakot than any other district.

### 7.4 Age Wise Distribution

Figure 9 depicts the age wise distribution of participants of mason training. The average age of training participants was 40 years.

The proportion of participants in three age groups, 25-34, 35-44 and 45-54 were more or less similar, comprising, in total 72% of all participants. Similarly, around 12% of participants fell under the 15-24 and 55-64 age groups each. Only about 2% of the participants were 65 years or older.



Figure 9. Age wise distribution of training participants

## 8 MONITORING AND EVALUATION MECHANISM

To ensure the quality of training implementation confirming to the curricula and guidelines prescribed by the National Reconstruction Authority and the program management, different monitoring and evaluation mechanisms were developed by the program. These mechanisms covered a wide range of aspects of training from participant selection, knowledge delivery, administrative and financial check. The following section highlight the key components of monitoring and evaluation.

### 8.1 M&E Checklists

The following list highlights the different forms and checklists were developed as part of the program M&E plan to monitor the process and outputs of the training. Sample forms have been placed in Annex ... of this report.

- **Registration form:** To collect and document personal information of training participants.
- Attendance form: To collect daily attendance of participants.
- **Socio-economic form:** To collect socio-economic information of the participants for documentation and analysis.
- Data Quality Checklist for Mason Training: To ascertain conformity of process, data and information to NRA training guidelines and Baliyo Ghar Program M&E guidelines.

• **Data Quality Assurance Responsibility Matrix:** For delineating responsibilities as well, as monitor the reporting of data, information, and documentation of training from data collection, compilation to reporting and supervision.

### 8.2 Expectations collections and discussion

To better align the training to the needs of the participating masons, expectations of the participants were collected during the start of each training. The major objective behind this was to ensure that theoretical and well as practical sessions conducted during the training were addressing the critical issues being faced by masons in the construction sites. For each training, a review of the expectations was done at the end of the event as one of the approaches of ascertaining that the training was able to cover all pertinent issues.

### 8.3 Pre and Post Test

As one of the major objectives of the mason, training was to enhance the knowledge and understanding of the participating masons in earthquake risk and mitigation measures, improvement in theoretical knowledge during the training was measured through structured tests; named Pre Test and Post Test. For each training, a standardized set of 20 objective questions, covering all the major aspects of the training curricula were given to the participants at the start of the training. Similarly, at the end of the training, participants were once again asked to solve the same set of questions. The difference in the scores of the two tests were a tentative measure of the enhancement of knowledge gained by the participants during the training.

## 9 MEASURING IMPACTS

The effectiveness of mason trainings were 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 by the participating masons over the period of one year.

### 9.1 Retention of knowledge by trained masons

As a measurement of IR-2 Enhanced Local Capacity, Baliyo Ghar Program has been continuously evaluating the role of masons in reconstruction by measuring their knowledge and professional retention over the program period. The survey and study titled "Mason Retention Survey" was carried out each year in Year 2, Year 3 and Year 4 to measure the retention of masons trained in the year before. In Year 4, in addition to surveying masons trained a year before, an additional survey was conducted to measure the knowledge and profession retention of masons trained during Year 1 and 2 of the program, denoted as Year 4 (Part B).



The results of retention of knowledge scored on a 100-point scale obtained from these surveys is presented in **Figure 10** below

Figure 10. Knowledge retention of trained masons scored out of 100

In yearly surveys (Year 2, 3, 4), the surveyed masons scored an average of 78.3 on the knowledge retention score out of 100. This results show that, as trained masons were able to retain the knowledge gained during the training program for year to a very satisfactory level. The results can be attributed both to the effectiveness of the training event as well as the continued technical assistance to the trained masons during construction. However, with time, retention of knowledge was gradually decreasing. In Year 4 (Part B), survey conducted targeting masons trained in Year 1 and 2, knowledge retention scores of trained masons was found out to be at 70 out of 100 as shown in the bar chart below.

### 9.2 Profession Retention of Trained Masons

Another crucial impact of training local masons in their continuous engagement in the field of construction in the earthquake affected communities. To measure this, details of the involvement of trained masons was collected during the Mason Retention Surveys conducted each year. The bar chart in figure 11 below depicts the results obtained from the surveys conducted in Year 2, 3 and 4 for mason trained in the previous year.



Figure 11. Percentage of trained masons who retained their profession in construction

As seen in the bar chart, an average of 85.3% of the trained masons surveyed one year after the training had retained their profession in construction. In other words, these trained masons were actively involved in construction of houses in their communities and vicinity. Similarly, an average of 81% of masons trained in Year 1 and 2 had retained their profession when surveyed in Year 4.

### 9.3 Trained mason engagement in construction

One of the primary objective of the national reconstruction campaign as well as Baliyo Ghar Program was to facilitate for the engagement of trained masons in reconstruction, in a bid to ensure that disaster resilient construction practices were appropriately applied. Baliyo Ghar Program not only focused on training local masons but also continuously advocated for their engagement in construction through awareness raising and door-to-door campaigns. The subsequent result is the tremendous involvement of trained masons in reconstruction in program areas, which in turn has resulted in faster and better reconstruction, conforming to the government norms.

This evaluation corresponds to the program indicator IR 3.2 "Proportion of houses that engage at least one trained mason while constructing their house". As part of the Building Compliance Survey, the program assesses the involvement of trained masons in construction of houses. Preliminary results of 27343 houses surveyed until Year 5 show that of in all program areas, an average of 87% of the house owners employed trained masons in their construction. This value is a significant achievement compared to the program target of 60%.

## **10 CHALLENGES AND STRATEGIES**

The various challenges faced during the implementation of the mason trainings and the strategies adopted by the Baliyo Ghar Program in overcoming those challenges are highlighted in the **table 2** below

Challenges	Strategies to overcome
Lack of road access during monsoon: As many of the program areas were situated in, rural hills of Nepal, road access were hampered for an average of four months during the monsoon season that	In most cases, trainings were planned keeping these seasonal conditions in mind. Where training had to be conducted during monsoon (especially since masons were mostly free during this time), the following strategies were most effective:
hindered material transportation for conducting trainings.	<ul> <li>Procurement and transportation of construction materials beforehand.</li> </ul>
	<ul> <li>Procurement of small quantity of construction materials from stock of house owners in the community.</li> </ul>
Masons/House owners uninterested in attending trainings: As masons work on a daily wage basis, they were uninterested in attending trainings for a 7-day period leaving their work. In several cases, even house owners were reluctant to send in	After the first few trainings, trained masons were mostly requested for assistance to persuade their fellow team members to attend the training. Similarly, consultations were done with house owners to convince them of the benefits of the training. Other strategies used were:
their masons for training.	<ul> <li>Request support from local authority (WCF/Ward) to help regulate masons involvement.</li> </ul>
	• Conduct trainings during the morning (7-2) so that masons could still work half a day during the afternoon and earn a living.
	<ul> <li>Participate masons from a single group in small numbers to avoid hampering ongoing construction.</li> </ul>
Social/Political bias in selection of masons: Although the role of local authority or representatives was important, in many cases, biasness in selection of masons was seen concerning social status or political alliances.	To avoid selection bias, open calls for trainings were done through the local authority (VDC/ward office) and registration of masons was done. Similarly, to ensure inclusion of all existing masons, mobile teams prepared rosters of masons working in construction during door-to-door visits. Through this, all masons were given equal opportunity for participating in the trainings. Trainings were also conducted specifically for different social groups as part of the inclusion process.
Difficulty in managing appropriate training venue: Managing standard training hall/venue, place for model demonstration and training exercise was difficult. The participating masons had to walk a long distance due to lack of transportation facility and the geography.	As much as possible, training venues were selected to ensure that travel time for participants to and from the venue was minimum. To ensure standard training hall for theoretical sessions, most generally community buildings such as schools, community halls were used. Temporary shelters or tents were also used when appropriate. In municipal and urban areas, halls were hired during the training period. Similarly, for practical exercise and demonstration construction, as much as possible, communal open space was selected. However, in cases where not possible, private land was used with verbal agreement between owner, program and local authority to allow for demonstration for at-least a few months period.
Issues in participant selection: Although considerations were made to ensure that participants selected for the trainings fulfilled the training pre-requisites, many a times, participants attending the training were novice masons. Similarly, some non-masons also attended trainings with false information lured by the daily wages. The selection of wrong participant not only violated training criteria but also hampered effective learning during the training.	To avoid the selection of unqualified participants, screening of participants was done, most preferably at-least a day before the training start date. Screening, where available was done via phone interview and field visits. On the day of the training too, screening was done prior to registration of participants for the training. If, however, an unqualified participant skipped the screening process and identified later, they were most often removed from the training. In such cases, interested participants who were unqualified for the 7-day training were suggested to sign up for the 50-day OJT training program.

Table 2: Challenges and strategies administered during mason trainings.

Challenges	Strategies to overcome
Social, cultural and language related issues: As many of the program areas were diverse communities, several social, cultural and language related issues were widespread.	To resolve these challenges for effective training implementation, special focus was made to ensure that participants were provided with adequate time to understand and interact. Other strategies used were:
<ul> <li>The most common was that many of the trainees were not literate and did not</li> </ul>	<ul> <li>Seek support of construction technician (a local mason) to facilitate in translation of key terms.</li> </ul>
<ul> <li>comprehend on theoretical sessions or tests.</li> <li>In many cases, Nepali was not the mother tensors of the tensors have a functioned.</li> </ul>	• Use oral methodology for conducting pre and posttest for trainees who had difficulty in reading or writing in Nepali.
interaction between instructors and trainees.	• Use of graphics, figures and photographs much more than texts during presentation and group works.
<ul> <li>Different social and cultural norms and festivals hampened training events (such as in Tampag</li> </ul>	• Allow time for interaction between the trainees themselves.
community, when a person dies, the entire community left training on the day to support in funeral rites and mourning)	• As much as possible, consideration was done for social and cultural norms. However, when unavoidable, trainees who missed sessions due to such norms were allowed to either take an extra day of training or join the next training event in order to receive certification.

## II LESSONS

With 244 individual events, the training conducted under the program not only helped develop skilled masons for earthquake reconstruction, but was also a great opportunity to test the process, curricula and implementation mechanism of such trainings on a wider scale. The following key learnings were gathered as part of the implementation.

- The mason training that were conducted like peer learning and in such learning situations, participants made stronger connections with other trainee participants and developed working relationships that went beyond the learning experience.
- The training itself can be new learning experience for instructors as different ideas and working methods of large number of working masons are shared.
- The training model not only helped the mason to understand the new technology but also helped the community to visualize how their houses are going to be strong then before.
- Proper planning resources required for the training ahead of time helped in smooth operation.
- Training hall is hard to come by in rural areas, so alternatives should be sort out and for model demonstration, public place would be optimal for the model to be demonstrated for longer period.
- Monsoon season is the least optimal season to conduct a mason training as it hampers the practical session heavily.
- Some of the masons recommended by ward committee forum were not actual working mason but due to the deep-rooted political ties, they attended the training for the sole purpose of training completion certificate. The masons in need of training might not get chance.

- By transferring knowledge and skills needed for resilient reconstruction instead of just rebuilding houses for them, the community/mason felt a sense of ownership of the houses they build with their own sweat and blood.
- Social mobilization and mason selection for training is a key part to conduct an efficient and impactful training where the masons actually working on the field will get the chance to attend the training and implement the knowledge on field level.

## **12 RECOMMENDATIONS**

The following key recommendations are made based on the challenges incurred during the implementation, the strategies used for short-term problem resolution and the learnings gained through the program.

- 1. Mason selection
  - Active participation of female masons should be encouraged to develop their confidence. For this, qualification criteria for female should be reconsidered.
  - Transportation allowance provided to participants should be reviewed. Geographical conditions and time taken for travel must also be considered. Similarly, as trainees have to give up their day job to participate in the training, allowance should cover the basic living expenses. One of the best approaches would be to have allowances proportionate to the daily wages earned by the trainees.
  - Proper notice and selection criteria should be set by implementing and partner organization for fair selection of masons. Screening of participants must be done prior to the training event. A simple checklist can be most helpful for this purpose.
  - Proper commitment of interested participants should be taken prior to the training day to ensure the presence of estimated number of participants in the training.
  - Follow up of trained mason and refreshment trainings would encourage them to take the work sincerely.
- 2. Course content
  - For trainings conducted in rural regions, slides should include detailed information about rural construction materials like stones, mud mortar and wood. Special focus must be given to local construction techniques (and materials) beyond the standardized curricula.
  - Practical exercise on roof and floor construction using timber should also be included in training.
- 3. Logistics Management

- Mobile temporary training centers should be built to conduct the trainings and other programs. It would be good if such training center can transfer from place to place.
- The training venue and model location should be selected near high traffic area so that people besides mason can observe and understand the new technology of construction.
- Tools and equipment's should be maintained regularly and any faulty or damaged tools should be replaced from smooth practical sessions.
- 4. Others
  - Training programs should be planned considering the religious as well as agricultural calendar of the targeted communities.

District	Evente	s Participants	Gende	Gender Ethnicity				Age								
District	Events		Male	Female	Dalit	Muslim	B/C	Newar	Janajati	Others	0-14	15-19	20-24	25-29	30-34	>=35
Dhading	85	2534	2406	128	380	0	362	450	1321	21	3	75	171	229	338	1718
Dolakha	90	2745	2519	226	357	0	879	294	1185	30	1	93	272	318	308	1753
Nuwakot	57	1653	1553	100	127	0	270	156	1081	19	1	65	191	218	207	971
Kathmandu	12	313	295	18	П	4	62	81	128	27	0	20	49	58	56	130

### ANNEX I. DATA DISAGGREGATION OF MASON TRAINING

### ANNEX 2. FINANCIAL ANALYSIS OF MASON TRAINING

The following section highlights the financial aspects of mason trainings conducted under Baliyo Ghar Program. The average cost of training per participant is shown in **Figure 10** below. The figures represent the training cost as singular events, without considering for re-use of tools and construction



Figure 12. Average cost per participant of mason trainings

materials from previous trainings.

As seen in the graph, the average cost of mason trainings across all regions and modules is around NPR 13,000 per participant. Average costs of training of urban module trainings fall around NPR 12,747 while rural trainings are a bit more expensive, around NPR 13,307 per participant.

Similarly, trainings conducted in rural areas (such as Tipling and Sertung in Dhading, and Alampu and Bigu in Dolakha) had an average cost per participant around NPR 13,237.

Similarly, **Figure 11** below highlights the breakdown of different costs associated with urban, rural and remote mason trainings. As evident from the bar chart,

the percentage of costs of stationery supplies (2%), participant allowances (16%) tools and equipment (11%) are similar in all cases. Other costs such as hall rental expenses, communication, internet and fuel costs comprise 2% of the total training costs. The highest proportion of costs incurred in trainings are instructor cost and construction material costs as shown in the bar chart. Significant differences can be seen in the costs associated with construction materials and material transportation, the former being higher in urban trainings while the latter being higher in remote area trainings.



Figure 13. Breakdown (proportion) of different costs associated with mason trainings.

# ANNEX 3. LIST OF TOOLS, EQUIPMENT AND MATERIALS FOR TRAINING

SN	Exercise	Materials description	Qty.	Unit	Remarks
		Cement	1.6	Bags	
I	Managial Tassian	Sand	2.6	Cuft	
	Material Testing	Aggregate (12mm down)	5.2	Cuft	
		Sand	7.5	Cuft	
		Peg wooden	40	Nos	(I.5"xI.5"xIft)
2	Planning and	Lime or white cement	7	KG	
2	Layout	I" Nails	40	Nos	
		Thread ( Mason thread)	12	small roll	
		16 mm dia rod	6	pcs	
	RCC Frame	12 mm rod	25	pcs	
3		10 mm rod	2	pcs	
		8 mm rod	45	pcs	
		Binding Wire	15	KG	
		Bricks	1000	Nos	
		Cement	4	bag	
		Sand	40	cu.ft.	
	Brick Masonry	8 mm rod	5	pcs	
4	Construction	10 mm rod	1	Pcs	
		12 mm rod	2	Pcs	
		4.75 mm	12	KG	
		Aggregate (Crushed)	40	Cu.ft.	(1/2 tractor trip)

#### Table 3: Materials for Mason Training (Urban Module)

#### Table 4: Tools for Mason Training (Urban Module)

SN	Exercise	Description	Qty.	Unit	Remarks
	Martin	Stonecrete Block frame	6	sets	
I		Cement Brick frame	6	sets	
	Materials Testing	Sand Bags	5	bags	
		Concrete carrying tray	10	Nos	
		Measuring Tape (5m)	4	Nos	
		Measuring Tape (30m)	1	No	
2	Planning and Layout	L- Angle	4	nos	I ft length
		Hammer (Ikg)	4	Nos	
		Plumbob	4	Nos	
		Steel binding tool	14	Nos	
		Steel Cutting Saw Frame	8	Nos	
		Cutting Blade	20	Pcs	
2	DCCF	8 mm rebar bender	4	Nos	
3	RCC Frame	12 mm rebar bender	2	Nos	
		16 mm rebar bender	1	Nos	
		GI pipe	I	Nos	2ft length
		Wooden bench	3	Nos	For stirrup making

SN	Exercise	Description	Qty.	Unit	Remarks
		Level Pipe (5m)	I	nos	
		Bamboo	5	nos	
		Rope Nylon 20 m	I	Roll	
		Rope Jute	5	Mutha	
		Shovel	5	Nos	
		Trowel	10	Pcs	
		Steel binding tool	16	Nos	
		Bucket	5	Nos	
		8 mm rebar bender	3	Nos	
		12 mm rebar bender	1	Nos	
4	Brick Masonry Construction	16 mm rebar bender	1	Nos	
		GI pipe	1	Nos	2 ft. length
		Wooden Bench	3	Nos	For stirrup making
		Level Pipe	2	Nos	5 m length
		Batch box (I'xI'xI5")	1	Nos	
		Hacksaw Frame	5	nos	or steel grinder
		Hacksaw Blade	20	nos	

#### Table 5: Materials for Mason Training (Rural Module)

SN	Exercise	Materials Description	Qty.	Unit	Remarks
		Cement	1.6	Bags	
I	Material Testing	Sand	2.6	Cu.ft.	
		Aggregate (12mm down)	Is Description         Qty.         Unit         Remain of the second s		
		Peg wooden (length)	35	Nos	1.5"x1.5"x l'
2	Planning and	Lime or white cement	7	kg	
2	Layout	I" Nails	40	nos	
		Thread ( Mason thread)	terials Description         Qty.         Unit         Re           1.6         Bags         1.6         Cu.ft.         1.6         Cu.ft.           2.6         Cu.ft.         Cu.ft.         1.5"x1.5"x         Moden (length)         35         Nos         1.5"x1.5"x           white cement         7         kg         1.5"x1.5"x         White cement         7         kg           40         nos         1.2         small roll         1.5"x1.5"x         Moden (length)         12         small roll         1.5"x1.5"x           (Mason thread)         12         small roll         1.5         cum         1.5         1.5"x1.5"x           (Mason thread)         12         small roll         1.5         cum         1.5         cum         1.5         1.2         small roll         1.5         cum         1.2         cum         1.1/2 tractor         2         pcs         1.5         1.5         1.2         kg         1.5         1.2         kg         1.5         1.2         kg         1.5         1.2         kg         1.5         1.5         1.2         kg         1.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5 </td <td></td>		
		Stone	5	cum	
		Cement	4	bag	
		Sand	40	cu.ft.	I/2 tractor trip
<b>_</b>	Stone Masonry	8 mm rod	5	pcs	
3	Construction	10 mm rod	1	pcs	
		12 mm rod	2	pcs	
		4.75 mm	12	kg	
		Aggregate	40	cu.ft.	I/2 tractor trip
		6 Ft long Wooden logs	1	nos	6"x6"
		5Ft long Wooden log	11	nos	4"x4"
		5 ft long wooden log	6	nos	3"x3"
5	Timber Frame	Ift Long wood	30	nos	2"x2"
		1.5" thick wooden Planks	10	nos	4"x3"
		4mm thick MS Flat	1	m	
		Nails	3	kg	Mix. 3",2",1.5"
		Bamboo	10	nos	
6	Bamboo Exercise	Jute Rope	5	bundle	
		GI wire	5	kg	

SN	Exercise	Description	Qty.	Unit	Remarks
		Stone-crete Block Frame	6	sets	
	<b>-</b>	Cement Brick frame	6	sets	
1	lesting	Sand Bags	5	bags	
		Concrete carrying tray	10	Nos	
		Measuring Tape (5m)	4	Nos	
		Measuring Tape (30m)	1	No	
2	Planning and layout	L- Angle	4	Nos	l ft. length
		Hammer (1kg)	4	Nos	
		Plumbob	4	Nos	
		Shovel	5	Nos	
		Trowel	10	Pcs	
		Steel binder	16	Nos	
		Bucket	5	Nos	
		8 mm rebar bender	3	Nos	
		12 mm rebar bender	1	Nos	
3	Masonry ( BM/SM)	16 mm rebar bender	1	Nos	
		GI pipe	1	Nos	2ft length
		Wooden Bench	3	Nos	For stirrup making
		Level Pipe (5m)	2	Nos	
		Batch box (I'xI'xI5")	1	Nos	
		Hacksaw Frame	5	Nos	
		Hacksaw Blade	20	Nos	
		Chisel 1/2"	5	Nos	
		Chisel I"	5	Nos	
		Wooden Hammer	3	Nos	
		Metal Clove Hammer	5	Nos	
		Metal Hammer Ikg	3	No	
		Wood Cutting Saw	10	Nos	
4	Timber Frame	L-Angle	5	Nos	6" and 1 ft
		Measuring tape (3m)	2	Nos	
		Pencil	5	Nos	
		Wooden Plane Jack	3	Nos	
		Bench Vice	1	No	
		Pliars	2	Nos	For GI wire
		Wood Cutting Spade	3	Nos	

#### Table 6: Tools for Mason Training (Rural Module)

### ANNEX 4. TESTIMONIALS AND STORIES

# Experience enriched with training: The story of Mr. Chatra Bahadur Gurung

Chatra Bahadur Gurung, 68, is renowned name in the village of Thanapati, Shivapuri Rural Municipality in Nuwakot. Although merely 30 kms away from Kathmandu, the village of Thanapati is primarily rural, with stone in mud masonry buildings abundant. Mr. Gurung, as he says himself, was one of the pioneers of stone masonry construction in his village, and had been working as a mason for 40 years prior to the 2015 Gorkha earthquake.

"I started young, as an apprentice to an older mason in the village itself. We worked in groups of about 5 people. I learned the skills of construction from him; we did not have any formal education or training. We constructed houses the only way we knew, and did not even think about earthquakes," says Mr. Gurung explaining about the construction field in his village. Construction of residential houses, especially in rural Nepal is largely an informal affair, with house owners dependent on local masons and contractors for technical advice, supervision and construction. This resulted in lack of awareness and skills in earthquake resistant construction; the effects of which were seen during the 2015 Gorkha



earthquake, where more than 800,000 houses were damaged. In Thanapati too, earthquake disaster effects were widespread. Mr. Gurung recalls, "Almost all of the houses we constructed were damaged by the earthquake. We were not able to understand the reassons, but concluded that our construction techniques were insufficient". More than 750 houses in Thanapati have been identified as fully damaged by the National Reconstruction Authority, another 50 partially damaged and needing retrofitting interventions. The widespread damage of houses let masons like Mr. Gurung reeling with desperation to find better ways to rebuild.



"I had worked for more than 40 years as a mason, but that was the first training I ever received on how to build strong houses", says Mr. Gurung recalling of his participation in the mason training. The training he participated was the first one Baliyo Ghar conducted in his village, on 8<sup>th</sup> September 2016. Prior to conducting the training, Baliyo Ghar Program team had started community mobilization, consulting with house owners, masons and local authorities on aspects of earthquake resistant construction. Understanding the need of training, 35 local masons had participated in the training. "All of us were excited to learn, and since the

construction had not started, we were free as well. That was the best time to learn to build strong houses". On what he learned from the training, Mr. Gurung further adds, "We learned on techniques required for making building earthquake resistant, and that the materials were readily available in our own villages. We learnt about the importance of bands, reinforcements and proper stone laying. We were also able to practice what we learned."

When asked how he started applying the knowledge and skills, he stated, "Immediately after the training, I started looking to persuade and convince the villagers to construct earthquake resistant houses. It was a difficult time, as government norms were not clearly understood by all. However, being an experienced mason in the village, I was able to persuade Ram Bhai (Ram Saran Pandey) in Bismure to follow the techniques. I also asked Baliyo Ghar Team to come and brief him about the technical provisions. After that, he readily agreed." Ram Saran Pandey's house in Bismure, Thanapati was the first house to be built by trained masons in Thanapati, and with adequate technical support from Baliyo Ghar Program, the house was constructed fulfilling all technical The house even standards. became a demonstration model for the villagers, and Mr. Gurung turned into an influencer in earthquake resistant construction in Thanapati.

Over the course of the reconstruction campaign, Mr. Gurung has constructed nearly 50 houses in the village and has subsequently trained 10 local masons himself. "The training provided me with ample opportunity to work in rebuilding my village, and also brought me good income and pride. It would not have been possible without their (Baliyo Ghar Program team) continuous technical support and guidance to house owners. Now that all houses are nearly complete, I think





our village is safe now. I will continue advocating on earthquake resistant construction throughout my life."



#### Trained mason continues engagement over the course of five years

Gobinda Lamsal, now 35, a permanent resident of Muralibhanjyang in Nilkantha Municipality, Dhading had worked for only a four years as a mason when the 2015 Gorkha earthquake rattled the country, and his community. Although his village falls within the boundaries of the Nilkantha Municipality, there is very little urbanization, and masonry buildings, primarily built with stone and bricks are abundant. Due to the poor quality of construction prior to the earthquake, his village suffered heavily damaging all but a few houses.



When Baliyo Ghar Program started its field activities in Nilkantha in January 2016, his village was only starting to think of reconstruction. The

damage and need for training local masons was felt when Baliyo Ghar team first visited his village in late May, to collect information and conduct the Risk Perception Survey. Owing to the large need of masons, Baliyo Ghar planned for a training in the community on September 19, 2016. Gobinda was one of the 34 local masons who attended the training, learning about the skills of earthquake resistant construction. When asked why he decided to join the training, he recalls the day, "Reconstruction in our village hadn't started yet, as all of us were in a dilemma. I thought the training would be useful to learn about something new. Also, I had heard that trained masons would have more work and would earn more."



Over the course of five years since the training, Gobinda has directly led hand in the reconstruction of more than 50 houses in his community. "They are all safe and have been approved for the tranches too", he exclaims, smiling. What's more, in a recent survey conducted by Baliyo Ghar Program to study the retention of knowledge and profession of trained masons, Gobinda scored 91 out of 100 in the knowledge score. When asked how he was able to remember so much from the training, he states, "What we learnt were very simple things, which we had missed in our previous construction. Also, as we began applying, they (Baliyo Ghar team) continuously supported us, reminding us of the provisions. The

more houses we constructed, the better we became." His contribution to the reconstruction campaign does not end here. Along with constructing houses, he also developed and trained five more masons under his wing, who have now learned the skill and have moved on to form their own construction groups. This passage of knowledge skills through informal means is the backbone of the sustainability of the construction profession in Nepal; the involvement of trained masons in this skill transfer is important for the continuation of safer construction practices.



The story of Gobinda and thousands others is a testament of the impact that Baliyo Ghar mason trainings has had on the enhancement of local capacity for disaster resilient reconstruction in Nepal. However, as reconstruction campaign comes to a close, Gobinda is worried about the continuity of his profession. He wishes to continue working as a mason, as the profession gives him enough income to support his family of four as well as earn good reputation in his village. "I want to learn new techniques of construction, perhaps even constructing urban buildings that they built in the 'Besi' (Nilkantha Muncipality Center)." For now, Gobinda, and many more are in huge demand to complete the construction of houses in his community.

### ANNEX 5. MONITORING AND EVALUATION

Different forms and templates were designed and used for the purpose of monitoring, evaluation and reporting of outputs of mason trainings. The overall data generation, reporting and verification of data was done as per the Data Quality Assurance (DQA) guideline of Baliyo Ghar Program. The different documents and the responsibilities of different personnel of the program is given in matrix form in table ... below. The different checklists and forms associated with mason training are placed subsequently.

	Information				Responsibi	ility				
SN	Document	Preparation	Certification	Verification	Documentation	Reporting	Report to	Reporting Media	Data Storage	Timeline
I	Participant socio economic form fill up	SM/TO	Training coordinator	LRTC- Engineer	DRTC/LRTC	LRTC	DRTC/IDO	Email/hard copy	DRTC/ LRTC	3 days of training completion
2	Participation registration sheet fill up	SM/TO	Training coordinator	LRTC- Engineer	DRTC/LRTC	LRTC	DRTC/IDO	Email/hard copy	DRTC/ LRTC	3 days of training completion
3	Mason Directory	SM/TO	Training coordinator	LRTC- Engineer	DRTC/LRTC	LRTC	DRTC/IDO	Email/hard copy	DRTC/ LRTC	4 days of training completion
4	Participation roster with necessary data disaggregation	SM/LRTC	DRTC/IDOS	LRTC- Engineer	DRTC/LRTC	LRTC	DRTC/IDO	Email/hard copy	HO/ DRTC	7 days of training completion
5	Data compilation	DRTC/IDO	DRTC head	DA	DRTC	DRTC/IDO	HO/DA	Email	HO/ DRTC	monthly
6	Training report	LRTC/DRTC	Data Analyst	MEE	DRTC/HO	DRTC/IDO	HO/DA	Database entry/digital file storage in computer as well as in external hard drive	HO/ DRTC	Regularly

Table 7: Data Quality Assurance Responsibility Matrix and Timeline for Mason Training

### Data Quality Checklist for Mason Training

Item Co	Item Code:						
Name o	f indicator						
Interme	diate Result		Indicator type (Outcome/Output)				
Data sou	Data source Reporting period						
Data Generation Checklist							
Respons	ible Person:						
I	Yes 🗆 No 🗆						
2	ls mason-training participant's Dire Comments (if any)	Yes □No □					
3	Are participants' socio-economic f annex) Annex: I Comments (if any)	Yes 🗆 No 🗆					
4	Is filled up form and format sufficie institutional, citizenship number, co Comments (if any)	ethnicity, existing/new mason, from individual or	Yes 🗆 No 🗆				
5	Are data ready for reporting to co Comments (if any)	Yes □ No □					
6	6 Is mason training photos maintained with proper caption and further use for reporting? ( At least 8 photos with good caption) Comments (if any)			Yes □ No □			
7	ls pretest and post examination of this checklist) Annex: 15 Comments (if any)	mason properly taken? (For reference pretest and p	ost-test examination questionnaire attached with	Yes 🗆 No 🗆			

#### **Socio-Economic Form**





### बलियो घर कार्यक्रम (Baliyo Ghar)

बलियो धर अन्तर्गत

#### ग्रामिण डकर्मीहरुका लागि सात दिवसीय सीप अभिवृद्धी तालिम कार्यक्रम

#### व्यक्तिञत, सामाजिक, आर्थिक स्तर र तालिम सम्बन्धि जानकारी फाराम

तपाईंसँग यो जानकारी लिनुको मुख्य उद्देश्य हाम्रो यस तालिमका सहभागीहरुको आधारभूत जानकारी आर्थिक– सामाजिक अवस्था र तालिम लिनुको मुख्य उदेश्यको बारेमा थाहा पाउनुका साथै भविष्यमा पनि संचारमा रहनु हो । तपाईंका प्रतिक्रियाहरु गोप्य रहनेछन् । कुनै पनि व्यक्तिगत जानकारी प्रकाशीत हुनेछैन । तपाईंको प्रतिक्रिया कुल जानकारी संकलन गर्न अन्य सहभागीको प्रतिक्रियासँग संग्लन गरिनेछ ।

व्यक्ति	गत विवरण							
٩	नाम							
	लिङ्ग	🗌 पुरुष 🗌 महिल	॥ 🗌 अन्य					
२	उमेर	🗌 ૧૪-૧૬	🗌 २०-२४	🗆 २४-२९	🗌 ३०-३४			
		□ ३५ वा सो भन्दा माथि						
ર	ठेगाना	अथायी	जिल्ला	न.पा ⁄गा.वि.स	वडा			
					टोल			
		स्थायी	जिल्ला	न.पा ⁄गा.वि.स	वडा			
					टोल			
ૡ	सम्पर्क	मोबाइल नं 		घर नं 				
દ્	जातीय समूह	🗌 ब्राम्हण	🗌 क्षेत्री	🗌 जनजाती	🗌 नेवार			
	🗌 मुश्लिम	🗌 दलीत	🗌 अन्य (निर्दिष्ट)					
৩	अहिले तपाई ज	नहाँ बस्नुहुन्छ के त्यो स	ां बस्नुहुन्छ के त्यो स्थान तपाईंको जन्म स्थान हो ? 🛛 🗌 हो 🗌 होइन					
٢	यदि होइन भने	ा, कृपया आफ्नो जन्म	भएको स्थान उल्लेख	गर्नुहोस् ।				
९	नगरपालिका ⁄ः	गाविस	वडा नम्य	बर				

कुनै एउटा उपयुक्त कोठामा चिन्ह लगाउनुहोस् ।

व्यक्तिगत, सामाजिक, आर्थिक स्तर र तालिम सम्बन्धि जानकारी फाराम

एनसेट । बलियो घर । फाराम नं.: ३ । २०७४

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Sample socio-economic form (Page 1 of 4)

१	टोल∕चोकको नाम	घर नम्बर					
१	तपाईंको अहिलेको बैवालि	हेक अवस्था के हो ?					
१	🗌 अविवाहीत	🗌 विवाहीत	🗌 अलगिएको	□ बिदुर ⁄ विधुवा			
१३	तपाईंको शिक्षा						
	🗌 निरक्षर		🗌 प्राथमिक शिक्षा				
	🗌 साक्षर		🗌 माध्यमिक शिक्षा				
	🗌 साक्षर तर औपचार्ग	रेक शिक्षा नलिएको	🗌 उच्च माध्यमिक शिक्षा				
	🗌 स्नात्तक वा सो भ	न्दा माथि	🗌 अन्य (उल्लेख गर्नुह	गेस्)			
१४	तपाईंको परिवारमा कति	सदस्यहरु हुनुहुन्छ ?		जना			

सामार्गि	जेक-आर्थिकस्तर			
٩	तपाईंको मूख्य पेशा के हो	?		
	१) कृषी ब्यवसाय		९) डकर्मी	
	२) सरकारी कर्मचारी		१०) इन्जिनियर	
	३) राजनीतिज्ञ		११) प्राविधिक	
	४) गृहिणी		१२) सामाजिक परिचालक	
	५) दैनिक ज्यालादारी		१३) श्रमिक	
	६) परामर्शदाता		१४) बेरोजगार	
	७) निजी संस्था		१४) ब्यवसायी	
	८) विद्यार्थी		१६) संघसंस्था	
			१७) अन्य (उल्लेख गर्नुहोस्	)
२	तपाई अन्य पेशाहरुमा पनि	ा आबद्ध ह <u>ु</u> नुहुन्छ	?	
	🗆 छ 🛛 छैन			
२	यदि अन्य कुनै पेशामा आ	बद्ध हुनुहुन्छ भने	१ नं. मा दिइएको अनुसार पं	रेशा उल्लेख गर्नुहोस्
	नं			
४	सबै आम्दानी मिलाएर तप	ाईंको मासिक औ	सित आम्दानी कति हुन्छ ?	
	🗌 छैन	□<	90,000	🗌 १०,००१-२०,०००
व्यक्तिगत	n, सामाजिक, आर्थिक स्तर र तालिम स	म्बन्धि जानकारी फाराग		२
				एनसेट । बलियो घर । फाराम नं.: ३ । २०७४

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Sample socio-economic form (Page 2 of 4)

🗌 २०,००१-३०,०००	🔲 ३०,००१-४०,०००	L x0,009-900,000
□> 900,000	🗌 थाहा छैन	🗌 भन्न चाहँदिन

X	तपाईको परिव सदस्यले कमा	गरमा अरु कुनै उनु हुन्छ ?	🗆 छ	🗌 छैन		
∙ور∣	तपाईंको आफ	्नो कुनै सवारी साधन	छ ? 🗌 कार	🗌 मोटरसाईकल	🗌 साईकल	🗌 छैन 🗌 अन्य
٩	तपाईं आफ्नो पेशाप्रति सन्तुष्टि हुनुहुन्छ ?					
	🗌 सन्तुष्ट	🗌 धेरै सन्तुष्ट	🗌 अर	गन्तुष्ट		
Б	तपाईं राम्रो अ	वसर पाएमा आफ्नो पे	शा परिवर्तन गर्ने	सोच बनाउनु भएको	छ ?	
	🗆 छ	🗌 छैन				
९	पेशा परिवर्तन	गर्न चाहेमा कुन काम	गर्ने सोच्नु भए	<b>को छ ? उल्लेख गर्नुहो</b>	स्ः	

तालिम सम्बन्धी

१	तपाईंले माथि उल्लेखित तालिम को बारेमा कुन श्रोतबाट थाहा पाउनुभयो ?								
	🗆 टि.भी 🗌 रेडियो		🗌 पत्रपत्रिका	🗌 पत्रपत्रिका 🔲 ईन्टरनेट 🛛		🗌 पुस्तक	] पुस्तक⁄पुस्तिका		
	साथीभाईहरु तगरपालिका / गा.वि.स संघसंस्था अन्य सरव छरछिमेक					य सरकारी कार्यालय			
२	तपाईंले तालिम लिनुको मुख्य उद्येश्य के हो?								
	🗆 प्रमाणपत्र क	ो लागि	🗆 वैदेशिक रोजगारी 🛛 आय वृ			वृद्धि	ीस		
	🗆 जानकारीको	लागि मात्र	🗆 दक्षता वृद्धि 🛛 अ		🗆 अन्य	अन्य			
४	घरलाई भूकम्प प्रतिरोधी बनाउनको लागि तपाईंको जिम्मेवारी कत्तिको छ जस्तो लाग्छ?								
	🗆 पूर्ण रुपमा		🗆 अधिकतम 🛛 आंशिक		आंशिक	<u> </u>	कत्तिपनि <b>छैन</b>		
ų	तालिम लिएपवि	छे के कस्तो सग	म्भावित परिवर्तन प	ाउने अ	पेक्षा गर्नुभ	भएको छ?			
	□ भूकम्प प्रतिर बनाउन सक्ने	रोधात्मक घर	🗆 दक्षता वृद्धि	□ बर	आम्दानी इने	को स्तर	□ जिम्मेवारी बढेको		
ų	तालिम लिएपवि	छे कुन ठाउँमा	काम गर्ने सोच ब	नाउनुभ	एको छ?				
	🗆 नगरपालिक	T	🗆 गा.वि.स		विदेश				
व्यक्तिग	त सामाजिक आर्थिक स्तर	र तालिम सम्बन्धि जानव	गरी फाराम						

व्यक्तिगत, सामाजिक, आर्थिक स्तर र तालिम सम्बन्धि जानकारी फाराम

एनसेट । बलियो घर । फाराम नं.: ३ । २०७४

Sample socio-economic form (Page 3 of 4)

७ तालि	ोमलाई आफ्नो पेशामा	कसरी अपनाउने भन्नेबारे स	गेच्नुभएको छ?	

तपाईंको सहयोगको लागि धेरै धेरै धन्यवाद ।

व्यक्तिगत, सामाजिक, आर्थिक स्तर र तालिम सम्बन्धि जानकारी फाराम

एनसेट । बलियो घर । फाराम नं.: ३ । २०७४

8

Sample socio-economic form (Page 4 of 4)

Sample Course Schedule of Urban Mason Training

## बलियो घर कार्यक्रम भूकम्प प्रतिरोधी सहरी भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम

समय		पहिलो दिन	दोश्रो दिन	तेस्रो दिन	चौथो दिन	पाँचौ दिन	छैंठौं दिन	सातौँ दिन
90:00	१०:३०	नामांकन, शुभारम्भ	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?
90:30	११:३०	र्पारचय, अपेक्षा संकलन र तालिम कार्यकमको उद्देश्य	घडेरीको छनौट, भवन संरचना र अभ्यासको तयारी	गारोवाला भवन निर्माण प्रविधि	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	काठ र बाँसको बन्धन निर्माण अभ्यास	गारोसंग चोटा र छत जाडने विधिको अभ्यास	वातावरण र निर्माण प्रविधि
११:३०	१२:३०	समुह निर्माण, र तालिम पूर्व परिक्षा	भवन संरचना अभ्यास	गारोवाला भवन निर्माण प्रविधि	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	काठ र बाँसको बन्धन निर्माण अभ्यास	पिलरवाला भवन निर्माण प्रविधि	राष्ट्रिय भवन निर्माण संहिता र डकर्मीको भूमिका
१२:३०	१२:४५	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम
१२:४४	१३:४४	भुकम्प संम्वन्धि आधारभुत जानकारी	भवन संरचना अभ्यास	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	काठ र बाँसको बन्धन निर्माण अभ्यास	अवधिक मर्मत सम्भार	गुणस्तर र भार बहन क्षमता परिक्षण
१३:४४	१४:३०	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम
१४:३०	१४:३०	स्ल्याब, ढङ्गे ब्लक र ढलाने इटा बनाउने अभ्यास	निर्माण सामग्रीको गुण	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	गारोसंग चोटा र छत जाडने विधिको अभ्यास	बैकल्पीक निर्माण सामग्री तथा उविधि र दीगो विकास	तालिम समापन परिक्षा र पृष्ठपोषण
૧૫:૨૦	<u>१</u> ६:३०	स्ल्याब, ढङ्गे ब्लक र ढलाने इटा बनाउने अभ्यास	निर्माण गुणस्तर	ढुंगाको गारोवाला भवन निर्माण प्रविधि अभ्यास	काठ र बाँसको घर निर्माण प्रविधि	गारोसंग चोटा र छत जाडने विधिको अभ्यास	कमजोर भवनको भूकम्पीय प्रवलीकरण	तालिम मुल्यांकन, प्रमाणपत्र वितरण तथा विदाइ समारोह

तालिम कार्यक्रम

#### Sample Course Schedule of Rural Mason Training

## बलियो घर कार्यक्रम भूकम्प प्रतिरोधी ग्रामिण भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम

समय		पहिलो दिन दोश्रो दिन		तेस्रो दिन	चौथो दिन	पाँचौ दिन	छैंठौं दिन	सातौँ दिन	
90:00	90:३0	नामांकन, शुभारम्भ	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	हिजो के गरियो ?	
१०:३०	११:३०	परिचय, अपेक्षा	घडेरीको छनौट, भवन	पिलरवाला भवन	पिलरवाला भवन	स्लाव तथा छज्जा	गारोवाला भवन	वातावरण र निर्माण	
		संकलन र तालिम	संरचना र अभ्यासको	निर्माण प्रविधि	निर्माण प्रविधि अभ्यास	निर्माण प्रविधि	निर्माण प्रविधि	प्रविधि	
		कार्यक्रमको उद्देश्य	तयारी			अभ्यास ।	अभ्यास		
११:३०	१२:३०	समुह निर्माण, र	भवन संरचना अभ्यास	पिलरवाला भवन	पिलरवाला भवन	गारोवाला भवन	गारोवाला भवन	राष्ट्रिय भवन निर्माण	
		तालिम पूर्व परिक्षा		निर्माण प्रविधि अभ्यास	निर्माण प्रविधि अभ्यास	निर्माण प्रविधि	निर्माण प्रविधि	संहिता र डकर्मीको	
							अभ्यास	भूमिका	
१२:३०	१२:४४	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	लघु विश्राम	
१२:४४	૧ર:૪૪	भुकम्प संम्वन्धि	भवन संरचना अभ्यास	पिलरवाला भवन	सिँढी निर्माण प्रविधि	गारोवाला भवन	अवधिक मर्मत	गुणस्तर र भार बहन	
		आधारभुत जानकारी		निर्माण प्रविधि अभ्यास	अभ्यास ।	निर्माण प्रविधि	सम्भार	क्षमता परिक्षण	
						अभ्यास			
१३:४४	98:30	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	खाजा विश्राम	
१४:३०	१४:३०	स्ल्याब, ढङ्गे ब्लक र	निर्माण सामग्रीको गुण	पिलरवाला भवन	सिँढी निर्माण प्रविधि	गारोवाला भवन	कमजोर भवनको	तालिम समापन परिक्षा	
		ढलाने इटा बनाउने		निर्माण प्रविधि अभ्यास	अभ्यास ।	निर्माण प्रविधि	भूकम्पीय प्रवलीकरण	र पृष्ठपोषण	
		अभ्यास				अभ्यास			
૧૪:३૦	१६:३०	स्ल्याब, ढङ्गे ब्लक र	निर्माण गुणस्तर	पिलरवाला भवन	स्लाव तथा छज्जा	गारोवाला भवन	बैकल्पीक निर्माण	तालिम मुल्यांकन,	
		ढलाने इटा बनाउने		निर्माण प्रविधि अभ्यास	निर्माण प्रविधि अभ्यास	निर्माण प्रविधि	सामग्री तथा प्रविधि	प्रमाणपत्र वितरण तथा	
		अभ्यास			1	अभ्यास	र दीगो विकास	विदाइ समारोह	

### तालिम कार्यक्रम

### Sample of Registration sheet of Participants

	बलियो घर कार्यक्रम										
	भूकम्प प्रतिरोधी शहरी भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम										
	संहभागी नामांकन फारम										
				ठे	गाना						
			स्थाई			अस्थाई		जन्म मिति		<del></del>	
क.स नाम	् । 	गाउँ ∕ नगर पालिका	वडा नं.	टोल	गाउँ⁄नगर पालिका	वडा नं.	टोल		<b>ี ๆ</b> เ. <b>ง</b> .ч. <b>ๆ</b> .	सम्पक नम्बर	हस्ताक्षर

### Sample of Daily Attendance Sheet

	बलियो घर कार्यक्रम											
	भूकम्प प्रतिरोधी शहरी भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम											
	सहआगीहरूको दैतिक हाजिरी फारम											
कम	नाम	पहिलो दिन	दोश्रो दिन	तेस्रो दिन	चौथो दिन	छैँठौं दिन	सातौँ दिन					
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Template for Participant Directory

## बलियो घर कार्यक्रम भूकम्प प्रतिरोधी ग्रामीण भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम भूकम्प प्रतिरोधि भवन निर्माण प्रविधि तालिम प्राप्त डकर्मीहरुको नामावली

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	अस्थाई ठेगाना				अस्थाई ठेगाना				
	संपर्क नम्बर	Photo			संपर्क नम्बर	Photo			
	कोड नं.				कोड नं.				
	जन्म मिति				जन्म मिति				
	ना.प्र.प.नं.				ना.प्र.प.नं.				
२	नाम		X	ሂ	नाम				
	स्थाई ठेगाना				स्थाई ठेगाना				
	अस्थाई ठेगाना				अस्थाई ठेगाना				
	संपर्क नम्बर	Photo			संपर्क नम्बर	Photo			
	कोड नं.				कोड नं.				
	जन्म मिति				जन्म मिति				
	ना.प्र.प.नं.				ना.प्र.प.नं.				
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२	नाम			દ્	नाम				
	स्थाई ठेगाना				स्थाई ठेगाना				
	अस्थाई ठेगाना				अस्थाई ठेगाना				
	संपर्क नम्बर	Photo			संपर्क नम्बर	Photo			
	कोड नं.				कोड नं.				
	जन्म मिति				जन्म मिति				
	ना.प्र.प.नं.				ना.प्र.प.नं.				

#### Training Certificate Template



#### Template of Roster of Training Participants

#### Baliyo Ghar Program Training for Masons on Earthquake Resistant Construction of Buildings Mason Training Participant Details

District: Reporting Period:

SN	Training Date	Venue	Participant Name	Citizenship	Address	Ward	Tole	Contact	Age	Gender	Ethnicity	Education	Type of	Years of	Certification	Certificatio	Remarks
4	(Start)			Number	(Mun.)	NO.		Number	-				Mason	Experience	Status	n No.	
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Template for documenting and reporting Pre and Post Test results

## बलियो घर कार्यक्रम भूकम्प प्रतिरोधी ग्रामीण भवन निर्माणका लागि डकर्मी तालिम कार्यक्रम तालिम पूर्व तथा समापन परिक्षा

	[	तालिम पृ	ूर्व परिक्षा	तालिम समापन परिक्षा			
कम	नाम	पूर्णाङ्क	प्रार्प्ताङ्क	पूर्णाङ्क	प्रार्प्ताङ्क		
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### ANNEX 6. PHOTOGRAPHS



I. Theoretical session being conducted during a mason training in Nuwakot. As almost all buildings were damaged by the earthquake, Baliyo Ghar Program team made use of temporary shelters like these to conduct theoretical sessions of the trainings.



2. Training participants working together in construction of stone masonry walls using earthquake resistant construction techniques in Dolakha. Participants constructed a small scale model of masonry walls to apply hands on practice of the techniques of construction under close supervision of instructors.



3. Participants working on construction of wooden bands during hands on practical exercise of rural mason training in Dhading.



4. Training instructor briefing participants on the importance of different earthquake resistant elements in rural masonry construction.



5. Theoretical session during urban mason training in Kathmandu.



6. Participants working on hands-on exercise in construction of Brick in Cement Masonry buildings as part of practical exercise during urban module mason training in Nuwakot.



7. Participants, including female masons working on construction of reinforcement frame of staircase during urban mason training in Bhimeswar, Dolakha. Although female masons are quite few in number, Baliyo Ghar Program made considerations to ensure their inclusion as much as possible.



8. A group of participating masons try hands-on exercise in rebar placement and binding to construct RC frame columns and beams during urban mason training in Kathmandu.



9 Mr. Krishna Hari Thapa, Mayor of Kageswari Manohara Municipality, Kathmandu felicitating a participant who successfully completed training on earthquake resistant construction of urban buildings.



10 National Reconstruction Authority (NRA) Chief Executive Officer Mr. Sushil Gyewali interacts with participants during a urban mason training event held in Nilkantha Municipality, Dhading in May 2016.

#### **Baliyo Ghar Project Team:**

Ramesh Guragain Ranjan Dhungel Ayush Baskota Pramod Khatiwada Bishnu Hadkhale Pranav Dahal Achyut Poudel Manish Raj Gouli Hari Ram Pathak Prakash Shrestha Prabhat Khanal Bigyan Thapa Subash Dhakal Vishma Basnet Manoj Sharma Chapagain Santosh khadka Santosh Nepal Govind Raj Bhatta Sagar Chandra Adhikari Lila Bahadur Bhujel Sangib Shrestha Manoj Adhikari Geeta Bhandari Shyam Baniya Parbati Motra Achyut Paudel Arjun Ghimire Gopal Gautam Ram Shrestha Bhimsen Nepal Sujan Bhusal Manoj Sharma Wagle Mabin Panday Suman Kumar Dahal Suman Khanal Samir B.K. **Bikesh Kasula** Naresh Sayaju Resuna Koju Sunil Lamichhane Sujal Niroula Anupam Kumar Balkrishna Shiwakoti Milan Shrestha Aabiskar Timilsina Santosh Shrestha Puspa Kumar Bista Kiran Shrestha Bijesh Kaiti Prabin Shrestha Aashis K C Kamal Hari Dulal Laxman Khatri Ganesh Prasad Acharya Arjun Adhikari **Bikram Prasad Poudel** Kamalendra Mallik

Raj Lamichhane Ganesh Prasad Pandey Krijan Maharjan Nawin Deo Anand Prashad Pant Dhruba Devkota Aasish Tiwari Tara Lama Anuj Shrestha Jenish Sharma Binod Dahal Ek Raj Gautam Ranjan Basnet Anil Bhattarai **Bipin Sapkota** Anisha Khatri Saroj Kandel Saroj Adhikari Prajwal Sanjel Aarjan Adhikari Aashish Khadka Santosh Kumar Shrestha Nishkarsha Koirala Ujjwal Niraula Manoj Shrestha Nischal Parajuli Santosh Regmi Kshitij Rai Dundu Ram B.K Bikesh Kila Shrestha Manas Thapa Shekhar Mahat Sujeet Gurung Dwaipayan Sharma Suyog Bhandari Dipesh Ray Raiati Dahal Dipesh Tiwari Nilesh Rawal Sabin Chand Hemraj Bogati Neeraj Upadhyaya Sakar Maskey Narayan Prasad Kharel Manoj Bista Aavash Ghimire Keyur Pradhan **Bimarsha Kaphle** Jayesh Singh Gurung Ramesh Dhimal Dinesh Pradhan Shreeram Lawaju Summit Pokhrel Sushil Kumar Shrestha Kishan Adhikari Sanjit Wagle Ihalak Man Basnet

Sudip Karna Kirti Chandra Joshi Sasit Shah Pratiksha Thani Prakriti Paudel Binaya Nepal Santa Bahadur Jirel Manisha Maharjan Bipin Simkhada Ram Prasad Acharya Ved Prakash Chaudhary Nirman Devkota Hari Prasad Arval Shrawan Dhakal Krishna Prasad Dhakal Biwash Kafle Ashok Dhungana Sudip Raj Adhikari Prakash Kumar Shrestha **Bipin Kumar Chand** Ganesh Bhattarai Arunachal Pokharel Ramesh Poudel Janaki Somare Nirmala Nepali Surina Kayastha Dirge Tamang Ramesh Shah Jagadish Shiwakoti Laxmi Baniya Sharada Kumari Joshi Rojeena Timilsina Sabitri Khatiwada Dipak Kumar K.C Bhabana Dhakal Bhantana Ram Bahadur Nepali Hemraj Itani Dhan Bahadur Basnet Subhash Tamang Binata Bhurtel Paudel Ganesh Gautam Binita Silwal Kaushila Shrestha Janaki Sapkota Dipendra Karki Chiranjibi Bhusal Susma Adhikari Samjhana Lama Arbin Adhikari Shova Koirala Indira Kumari Thapa Tika Kumari Budhathoki Bijay Kumar Baruwal Nabina Dulal Nita Bhandari Sanu Maiya Shrestha Sabita Wosti

Srijana Tiwari Bimala Adhikari Rajendra Bhattarai Reshma Rai Ranju Dhungana Sujan Rai Dewan Sing Maden Dorje Lama Tamang Krishna Bahadur Moktan Rabindra Dhakal Min Kumar Thapa Kamala Aryal Narendra Bahadur Shahi Dipak Raj Ojha Bhim Bahadur Nepali Shambhu Ram Niraj Bahadur Ayadi Ishwor Dutt Joshi Sushil Pandit

#### Experts

- Amod Mani Dixit Surya Narayan Shrestha Shree Ram Singh Basnet Bijay Krishna Upadhyay Surya Bhakta Sangachhen Bhubaneswari Parajuli
- Nisha Shrestha Rabindra Kumar Suwal Kashyap Kumar Sharma Hikmat Adhikari Pradip Sedhain Anjali Silakar
- Khadga Sen Oli Chandan Dhoj Rana Magar Ram Krishna Sharma Mahananda Timalsina
- Niva Upreti Adutiya Narayan Kanth Dhirendra Kumar Dawadi Mamata Banskota

Utsav Rai Simon Thapa (Tamang) Sushila Bhandari **Bijay Tamang** Sushil Kumar Gurung Mek Bahadur Tamang Dhruba Neudane Susmita Puri Rikesh Maharjan Bhuvan Khanal Puskar Basnet Nabin Raj Ruwali Parbati Thapaliya Yam Kumari Uchai Pratima Parajuli Sajaya Shrestha Duni Ram Saru Nimesh Bogati Summit Maharjan

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

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

- Dammar Singh Pujara Kuber Bogati Aditi Dhakal Jyoti Mani Bhattarai Sumit Maskey Om kala Khanal Ichcha Ram Parajuli
- Hima Shrestha Rajani Prajapati Kirty Tiwari Jaisi Rachana Kansakar Rabin Chaulagain Prayash Malla Vibek Manandhar



### 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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Get Involved ! Visit the NSET website: www.nset.org.np; Follow us at

