

Examining Household Registration for Housing Reconstruction Survey and Linking to the Formulation of Municipal Plan

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Abstract

The Household Registration for Housing Reconstruction Survey (HRHRS) was the basis for the entire housing grant that was provided to the victims of the post-Gorkha Earthquake – 2015. A census survey was conducted in seriously affected 11 districts and Municipalities of the Kathmandu Valley Districts whereas the verification model was adopted in the Village Development Committees of 3 Kathmandu Valley Districts and other 17 moderately affected districts. However, concerns were raised for its efficacy in terms of time and money. The objective of this paper is to review the HRHRS methods and to recommend the appropriate way forward for the future. All HRHRS background literature was reviewed. Nepal's beneficiary Survey methods of 1934 and 1988 and best practices of New Zealand, India, China and Pakistan were examined. This study conducted interaction programmes and focused group discussions with the central and municipal officials. The HRHRS survey design yielded suboptimal outcomes as it did not reckon the ground level realities. Some anomalies prevailed at the central level as well. However, this exercise opened up the opportunity for the Municipalities and Rural Municipalities for creating their own housing database. The HRHRS questionnaire needs to be adapted for replicating at the local level. Such a housing database will contribute to strengthening of vulnerable houses and for promoting city renewal through house or land pooling systems. For this, the Ministry of Urban Development (MoUD) and Ministry of Federal Affairs and General Administration (MoFAGA) have to amend present housing standards or introduce new directives which can be enforced after approval of the local governments' council. This intervention will promote resilient housing development and will contribute towards promoting efficient city structure. With the increased volume of revenue, the Municipalities will be able deliver more effective services. Post disaster operation will be further efficient and can be initiated swiftly.

Keywords: beneficiary, survey, earthquake, method, planning

1. Introduction

The Gorkha Earthquake on 25 April 2015 killed 8790 and injured over 22,300 people. It also caused the economic loss of US \$ 7.6 billion. As it was extremely difficult to estimate the exact amount of destruction immediately after the earthquake, the Post Disaster Need Assessment (PDNA) estimated destruction in the monetary value except for the housing sector (NPC, 2015). The private housing sector's requirement was estimated as USD 4077 million which was nearly 61% of the total estimated amount. Health sector was estimated as USD 147 million, education sector USD 397 million, and cultural heritage sector was estimated as USD 397 million. Except housing there were 21 sectors included in the PDNA. About one third population was impacted. Out of 31 impacted districts, fourteen districts were defined as severely affected and remaining 17 districts were moderately affected.

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The agreement between the Government of Nepal (GoN) and the World Bank (WB) for the Credit amount of US \$ 200 Million for the reconstruction of 55,000 housing units in June 2015 set a number of supporting conditions to the individual households which includes an owner driven housing reconstruction approach and mandatory requirement of constructing multi-hazard resistant standard housing units (WB, 2015). For the implementation of this project, it was mandatory to screen out the beneficiary households through the Earthquake Household Damages and Characteristics (EHDC). This methodology was also followed by the Japan International Cooperation Agency (JICA) which funded the Earthquake Housing Reconstruction Project (EHRP) with a total allocation of US \$ 118 million. Having commitments with both of the major housing projects, it was imperative that the National Reconstruction Authority (NRA) generalized these covenants for the entire housing programme (NRA, 2016).

Immediately after the earthquake on 25 April 2015, the Nepal Police collected data on housing destruction. The format is shown in Fig. 1. Based on that and with additional validation, the District Disaster Relief Committee (DDRC) in conjunction with the local government issued Earthquake Victim Household Identity Card (Figure 2) which was the basis for receiving relief packages. On the top of that, a comprehensive assessment was felt necessary to ascertain the damage to the housing stock against uniformly applied engineering criteria, and to verify the eligibility of beneficiaries. Such surveys were considered instrumental for reassuring the public and ensuring public safety. It was also envisaged that these survey outputs would be instrumental for assisting with the social and economic recovery, and promoting long-term risk reduction. The DDRC led preliminary damage assessment and the National Planning Commission (NPC) led EHDC were not congruent with each other.

At the initial stage, it was estimated that there could be around 500,000 households with fully damaged houses, and an additional 250,000 households with partially damaged houses (NPC, 2015). However, as it stands in June 2020, the number of fully fledged beneficiaries is 832,408 and the number of partial beneficiaries is 77,325 totaling to 909,733. Ultimately with the provision of the Appellate Committee's verdict, 10,000 may be increased which totals to 920,000 as total number of beneficiaries.

In the initial stage, almost all media, general public and political parties complained for delay in reconstruction works (Shrestha, 2016) and the time which was taken by the beneficiary survey was one of the major contributing factors for such delay. Due to this public perception, the NRA had to encounter an enormous pressure and to face the allegation of incompetence..

The NRA's Ninth Steering Committee (NRA, 2017a) meeting instructed the NRA Executive Committee to conduct resurvey of those households which were declared as non-beneficiaries by NRA Grievance Handling Committee. The original result was based on the HRHRS. With this the Steering Committees' reservation on NRA's grievance redressal committee was pronounced.

In thirty two districts, two different survey methodologies were adopted. Census survey was conducted in 11 districts and villages of the Kathmandu Valley districts whereas the verification model was adopted in the urban areas of the Kathmandu Valley districts and moderately impacted 17 districts. Until now it has not been concluded which methodology is better under which circumstance.

How the NRA's housing database will be used in post NRA period has not been established so far. The database includes house owner information, house information and demographic and socio economic information. Such information is extremely important for local government's settlement planning and enforcing building codes. Having no direct link between the NRA's available databases with Municipal decision making process, the potential is underutilized.

The objectives of this paper are: to examine the household registration for Housing Reconstruction Survey; to collate the implemented method with other countries' best practices; to establish link of the database to the Municipalities' settlement planning and to ensuring compliance of the Municipalities' building code.

2. Methodology

This is a particularly experience based descriptive paper. All HRHRS related literature was reviewed. Literatures of Nepal's previous earthquakes, particularly of 1988 and 1934 were studied. Best practices of some of the sample countries such as New Zealand, China, India and Pakistan were examined. Selected experts in this field were interviewed. A focused group discussion was conducted with the authorities of Municipalities and Rural Municipalities. Based on 2015 Gorkha Earthquake experience and best practices in Nepal and selected sampled countries, an approach is proposed for linking these data with housing construction and settlement planning.

3. Findings

This section elaborates the elements in the questionnaire and preparation and implementation of the survey. It also analyses unrealistic increment in the number of beneficiaries, appropriateness of the Steering Committee's decision on reviewing survey result, positive and negative aspect of adopting different methodologies are also registered.

3.1. Pre Survey Enumeration

The Nepal Police initiated a preliminary damage assessment survey (*Muchulka*) after about one week of the Earthquake. The team comprised of one Sub Inspector and a Constable. The format is shown in Figure 1. The form included a description of damage which was endorsed by three witnesses. The damage was further endorsed by the Municipality's Ward Secretary. Based on that survey and with further validation, the DDRC issued one Earthquake Victim Household Identity Card (Figure 2). It categorized housing damage into two categories: full damage and partial damage. It also included information on total number of casualties; number of injured people, House damage – full or partial, cattle shed damage, reared animals

and birds, food stuffs and others. Against this, the household of the deceased family was entitled to receive NPR 140,000, against fully damaged houses NPR 5000 and partially damaged house NPR 3000. Additional NPR 2000 was provided for food relief and NPR 15,000 for warm clothing were distributed (MoHA, 2016).

3.2. Initiation of Earthquake Household Damages and Characteristics Survey

The World Bank (WB, 2015) in collaboration with the GoN formulated an Earthquake reconstruction project where the EHDC Survey was highlighted. WB emphasized the importance of building level damage and household survey for ascertaining the damage to the building against uniformly applied engineering criteria, and to verify the eligibility of beneficiaries. They expected that such a survey would be instrumental to reconstruct earthquake resilient houses and also will guide for social and economic recovery. The EHDC Survey was planned to build up on the ongoing Rapid Visual Damage Assessment work being carried out under the guidance of the Department of Urban Development and Building Construction (DUDBC). The objectives of the EHDC survey were to ascertain the damages to the housing stock, to prepare the list of beneficiaries to receive housing grants and to ensure site safety for reconstruction. The EHDC Survey was renamed as HRHRS later on.

3.3. Designing of Earthquake Household Damages and Characteristics (EHDC) Survey

After signing of the Financing Agreement with the International Development Association (IDA) on 14 Aug. 2015 (GoN & IDA, 2015), GoN initiated preparatory activities for conducting a housing survey. The Ministry of Federal Affairs and Local Development (MOFALD) was the responsible agency for conducting this survey with the technical support from the Central Bureau of Statistics (MoFALD, 2015). The objectives were to establish a household database and a list of potential beneficiaries based on a uniformly applied engineering criteria; flag any site safety issues and recommend further evaluation; establish a comprehensive household database and a social security allowance beneficiary list; collect baseline socioeconomic data to monitor the recovery from earthquake and evaluate the effectiveness of the Program.

In addition to MoFALD and Central Bureau of Statistics (CBS), MoUD, WB and United Nations Office for Project Services (UNOPS) were other directly related stakeholders. After NRA's establishment, it became the lead agency. In the first stage, 11 earthquake severely affected districts were selected with 577 local governments for surveying.

A two member survey team was proposed: an engineer and a social mobiliser who was expected to have local knowledge. The engineer was provided 7 days training at the Kathmandu level but orientation of the Social Mobilisers was organised at the district level. The engineer was provided with a Tablet with software where one was expected to populate data and upload which would be accessible from the CBS based processing unit. The team would be monitored by the district and central level monitoring and supervision teams. The whole operation was funded by the WB and UNOPS was contracted out for implementing the survey.

At the central level, the operation was steered by a NPC led Steering Committee. Other members were: Ministry of Finance (MoF), MoFALD, MoUD and CBS. The Technical Committee was chaired by the CBS Director General with five other members. UNOPS was designated to provide all procurement and logistics support and the Kathmandu Living Labs (KLL) was contracted by UNOPS to provide technical assistance to CBS in developing the survey application, installing the application on tablets, providing training to surveyors on the usage of the application, resolving any technical issues with the tablets during the survey, and supporting CBS to undertake data management and quality assurance until the data is transferred to MoFALD's MIS via CBS' platform.

3.4. Designing of HRHRS Questionnaire

For conducting the survey, a questionnaire "Housing Registration for Housing Reconstruction Survey (HRHRS)" was designed (CBS, 2016). The questionnaire contained two sections: Part 1: Detailed Information on Damage Assessment of Residential Buildings and Part 2: Demographic and Socio-Economic Information.

Under Part I, the information of owners and detail assessment of house itself which included house information: legal ownership of land, condition of the house after the condition of house before earthquake, foundation of the building, damage grade of house, technical solution of damaged house, types of house, position of house, plan configuration of the house, Building Damage Assessment and geotechnical risk. Under Part II: Demographic and Socioeconomic Information were collected: information about the income of the household head, age, sex, disability, educational status, size of family, social security allowance, facilities use by the household etc.

3.5. First Phase: Survey of highly affected eleven districts

In the first phase eleven most affected districts were surveyed following the census method which was kicked off from the Dolakha district. The survey outcome is shown in Table 1.

Table 1 : HRHRS Outcome in Highly Earthquake Affected 11 Districts

S.N.	District	Surveyed		Beneficiaries		Total Beneficiaries
		Houses Nos.)	HHs Nos.	Reconstruction	Retrofitting	
1	Okhaldhunga	39,352	36,114	19,819	1,643	21,462
2	Kavrepalanchok	98,019	91,906	67,731	2,415	70,146
3	Gorkha	78,074	75,911	58,503	2,019	60,522
4	Dolakha	60,639	70,496	51,940	637	52,577
5	Dhading	89,122	86,381	70,581	1,494	72,075
6	Nuwakot	77,148	75,454	65,773	936	66,709
7	Makwanpur	90,994	88,461	30,238	4,150	34,388
8	Rasuwa	12,644	12,384	11,236	117	11,353
9	Ramechhap	58,623	55,262	43,609	2,149	45,758
10	Sindhupalchok	88,741	90,083	78,537	376	78,913
11	Sindhuli	68,750	64,913	34,269	2,408	36,677
Total		762,106	747,365	532,236	18,344	550,580

Source: (CBS, 2016)

More than 72% of total houses were declared as beneficiaries. Of the total beneficiaries, nearly 97% were categorised as full beneficiaries and only 3% houses were considered as retrofittable. Nearly 15,000 households had more than one houses. The statistics shows the magnitude of destruction was overwhelming. On the other hand it also shows that there were very few earthquake resilient houses.

3.6. Second Phase: Survey in the Kathmandu Valley

On the second stage, the CBS conducted a beneficiary survey in the Kathmandu Valley covering 22 Municipalities and 19 Village Development Committees (VDCs). The census method was adopted in 19 VDCs and a verification model was used in the Municipalities meaning that surveys would be conducted only to those households who received DRCC's relief identity card and those who consider themselves as the victims of 2015 Gorkha Earthquake. Other institutional arrangements were similar to the first beneficiary survey conducted in 11 districts. Only difference is that the NRA's role became prominent in this phase. This survey was funded through the WB but it was undertaken directly by the government agencies rather than the involvement of UNOPS.

Having partly verification model, the number of beneficiaries reached to nearly 84% out of the total number of surveys. Out of the total beneficiaries, more than 98% were full beneficiaries and only two percent were declared as partial beneficiaries.

The Summary of the survey and the beneficiaries identified in the first step are listed in the Table 2.

Table 2 : Outcomes of the Second Phase HRHS

S.N.	District	Surveyed		Beneficiaries		Total Beneficiaries
		No. of Houses	No. of households	Reconstruction	Retrofitting	
1	Kathmandu	51,124	52,991	42,500	575	43,075
2	Bhaktapur	30,197	31,819	26,066	280	26,346
3	Lalitpur	33,093	33,162	25,893	667	26,560
Total		114,414	117,972	94,459	1522	95,981

Source : (CBS, 2016)

3.7. Third Phase of Survey in 17 Districts

The HRHS was initiated in 17 moderately affected districts in Jan 2017. The verification model was used which was previously used in the Kathmandu Valley Municipalities. NRA assumed leadership of surveying and 364 Engineers and 364 Social Mobilisers were mobilized. This survey was funded by the Department for International Development (DFID) and UNOPS mobilized the surveying. The budget estimate was US \$ 2.31 Million. The Summary of the survey and the beneficiaries identified in the first step are listed in Table 3.

Table 3 : Outcomes of the HRHS in Moderately Affected 17 Districts

S.N.	District	Surveyed	Beneficiaries	Total
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		No. of Houses	No. of households	Reconstruction	Retrofitting	Beneficiaries
1	Arghakhanchi	1,648	1,587	1,036	67	1,103
2	Kaski	11,074	10,410	6,026	242	6,268
3	Khotang	12,899	12,642	8,443	253	8,696
4	Gulmi	7,050	6,883	4,144	195	4,339
5	Chitwan	15,269	15,038	7,335	593	7,928
6	Tanahu	25,536	24,475	13,821	466	14,287
7	Dhankuta	4,561	4,448	2,796	70	2,866
8	Nawalparasi	984	992	872	8	880
9	Parbat	10,940	10,947	5,269	417	5,686
10	Palpa	10,727	10,172	4,652	384	5,036
11	Baglung	3,847	3,701	2,375	82	2,457
12	Bhojpur	9,379	9,159	5,749	453	6,202
13	Myagdi	1,413	1,346	868	7	875
14	Lamjung	22,361	21,791	13,959	539	14,498
15	Solukhumbu	17,460	16,852	11,979	456	12,435
16	Syangja	16,111	15,910	8,766	567	9,333
17	Sankhuwasabha	5,169	4,878	1,953	326	2,279
Total		176,428	171,231	100,043	5125	105,168

Source : (CBS, 2016)

There could be some confusion with regard to the number of districts in the third phase. Originally there were 17 districts. However, with the introduction of federalisation, Nawalparasi district was splinted into two districts which made the total number as 18.

The estimated number of survey was 98,248 households which rose to 176,428. This means, either the earlier DDRC administered beneficiary was too conservative or additional aspirants for housing grant entered into the scenario through caveats of surveying. However, the actual beneficiaries were only 105,168. It shows that the original DDRC number was very close to accuracy.

3.8. Grievance Handling

The NRA's working procedure "Grievance Management related to Reconstruction and Rehabilitation Guidelines, 2016" (NRA, 2017b) was the guiding document for addressing grievances. The total number of grievances was 635,973 which mean almost 100% of the declared beneficiaries. The question is why it happened. The first and foremost answer is it may have gone something wrong with the HRHRS. Some structural problems such as faulty questions were responsible. The questionnaire included all the damage features in the questionnaire however the final damage grade was ascertained by the Engineer's discretion. Second contributing factor was human error. Almost all fresh graduate engineers were used for surveying as it was impossible to obtain 3000 additional experienced engineers at a time. The judgment of the freshly graduated engineers was inevitably questionable. On the top, the rubble stone masonry which is a ubiquitous construction approach in rural Nepal is not included in the Civil Engineering Course Curriculum. Third contributing factor was the

individual households' greed for free money supported by the politicians' desire to secure vote for the next election.

Table 4: NRA's Grievance Handling Stages

Stages	Original Registration (a)	Resurvey 2074 (b)	Reg. 2074 Mangsir End (c)	Resurvey 75/76 (d)
Total registered nos.	216,285	129,410	101,278	189,000
Beneficiaries	40,967	84,408	9,368	25,315
Reconst. Beneficiaries	40,967	44,104	4,242	17,014
Retro. Beneficiaries	13,925	40,304	5,126	8,301
Non beneficiaries	72,613	45,000	-	146,707
Cases for reexamination	13,189	-	265	-
New cases	54,943	-	68,396	-
Others	20,625	-	-	-

Source: (NRA, 2020)

Each column of Table 1 is further elaborated below:

- a) Col. 1 - grievances from 14 severely affected districts until the end of Ashad 2074;
- b) Resurvey - Shrawan to Kartik 2074 for non-beneficiaries and new grievances as directed by NRA Steering Committee;
- c) Resurvey for new grievance and existing grievance: deadline 2074 Mangsir;
- d) Resurvey conducted during 2076 Chaitra to 2077 Shrawan of 189,000 households.

3.9. Beneficiary survey in Nepal and other countries

In recent history, Nepal experienced two major earthquakes. The first struck in 1934 with an 8.4 magnitude. Around 4,300 people died and roughly 20% of all buildings were destroyed and another 40% got damaged. In Kathmandu valley around 25% of all houses were destroyed just like several temples in the old town of Bhaktapur (EN, 2020). The beneficiary survey was conducted by a team of an officer and a soldier. Any fraudulent activity was subject to the death penalty (Sumsher, 1935). In 1988, another 6.9 magnitude earthquake occurred near the Indian border and affected much of northern Bihar which killed at least 709 persons and injured thousands. The earthquake affected 50,000 buildings. The beneficiaries were identified based on the recommendation of the Village Panchayat, then the local governments.

The 2005 Pakistan Earthquake of 7.6 Magnitude killed 73,000 people and rendered 2.8 million people homeless. The beneficiary survey was conducted by the Pakistan Army

comprising an Army Engineer, a local representative and another local government representative either a revenue officer or a local school teacher (NDMA, 2007).

The 2001 Gujarat earthquake, also known as the Bhuj earthquake, with a magnitude of 7.7 on the moment magnitude scale killed more than 20,000 people, injured another 167,000 and destroyed nearly 340,000 buildings (Johnson and Olshansky, 2016). The beneficiary survey team consisted of one Engineer, one revenue or Panchayat representative, and another NGO representative or social worker. Altogether 2051 teams were mobilised with 2932 technicians, 1794 revenue officers and 2798 other individuals.

The 2008 Wenchuan Earthquake with a magnitude of 7.9 killed 69,226 people and another 17,923 people went missing (Xinhua News Agency, 2008). A powerful 50-member led by the Premier Wen Jiabao, established the Post-Earthquake Reconstruction Planning Group. The state council established the National Committee of Experts to provide scientific support for damage assessment and reconstruction. The reconstruction plan was released on 08th June and the state council released the final version of the overall planning for Post-Wenchuan Earthquake Restoration and Reconstruction (Johnson and Olshansky, 2016). It means, as everything was property of the national government, it was not necessary to locate damage assessment of the individual households. The Government of the People's Republic of China (PRC) assessed the damage in totality and planned for the whole region.

The 2010 Canterbury Earthquakes, a magnitude of 7.1, had no human casualty but damaged a huge amount of property. In Feb. 2011, another tremor with a magnitude 6.3 struck just 6 km away from the Christchurch Central Business District (CBD) killed one hundred eighty-five people (CERA, 2012). Over 100,000 of the region's 160,000 homes suffered significant damage. New Zealand instituted the powerful legal foundations for commissioning various organisations. The damage assessment was of the responsibility of the Earthquake Commission (EQC) which was basically an insurance company but it was also granted the responsibility for repairing or rebuilding of insured homes rather than simply paying cash settlements to homeowners. The EQC also conducted land damage assessments as part of its claims process using remote sensing and subsurface investigations to characterise the regional issues while hundreds of engineers conducted detailed land-damage assessments.

The analysis presented above shows that Nepal, India and Pakistan have similar damage assessment methodology whereas China and New Zealand adopted different methods. The Chinese methodology of comprehensive planning is not replicable in Nepalese context based on the ground of financial and institutional capacity. The New Zealand experience requires the insurance regime to be extremely strong which was possible there as their disaster preparedness began in 1935 when they enacted the first building by-law (Tipler, 2019). There are a number of similarities among Nepal, India and Pakistan. All countries have an Engineer and other persons who have local knowledge. However, as the country makes progress in terms of economic development, the New Zealand model may be considered.

3.10. Planning of housing construction at the local level

How the housing database can contribute to the effective settlement development and resilient housing construction has to be studied closely. For local level planning, the NPC issued a directive which is based on the Constitution of Nepal, Local Governance Act – 2074 and National Natural Resources and Financial Act – 2074 (NPC, 2018). The directive mandates the local governments to prepare short, medium and long term plans and these plans should incorporate the disaster prevention and reconstruction activities. For disaster risk purposes, the Ministry of Home Affairs (MoHA) has promulgated another Guideline (MoHA, 2019). After experiencing unprecedented destruction induced by 2015 Gorkha Earthquake, the Ministry of Urban Development (MoUD) and the Ministry of Federal Affairs and Local Development (MoFALD) jointly issued a Basic Standard for Settlement Development, Urban Planning and Building Construction – 2072 (MoUD & MoFAGA, 2015).

In line with Nepal's federal structure, there are three parallel layers of the governments. The Municipalities and Rural Municipalities are the local governments which need to prepare their development plans according to their financial capacity. The local level plans have to be synchronised with the provincial and national level periodic plans. Three types of plans need to be formulated: long, medium and annual. The problem analysis is the point of departure for the local level planning. The vision, concept and targets are integral components of the planning. An accurate estimation of revenue is essential. There has to be separate sectoral plans which have to be assessed with respect to effectiveness, equity, cost effectiveness, acceptability, timeline, uncertainty and sustainability. There has to be an implementation plan followed by monitoring and evaluation.

In the Municipality level planning process, the settlement and housing construction is one of the most significant sectors. The housing plan has to incorporate land use based zoning of the municipality which includes residential, commercial etc. as specified in the building code. The vulnerable areas have to be delineated and no housing construction has to be allowed.

The MoUD and the MoFALD's Basic Standard for Settlement Development, Urban Planning and Building Construction - 2072 (MoUD & MoFAGA, 2015) mandates further to elaborate the provisions in the Municipality's periodic plan. The basic standards directed to follow the Building Codes. The basic standard also regulated the land plotting businesses and defined a minimum standard for all building purposes such as residential or commercial or social which included open space, road width and other infrastructure. The most important provision is to demolish vulnerable houses and other infrastructure. The building database will be instrumental for such demolition. The building has to be used for the defined purpose. For example the buildings which were constructed for residential purposes have been used for schools and hospitals which must be prohibited. For all buildings above the height of 15 m have mandatory provision of geo-technical investigation. The standard also prohibits housing construction on the slope exceeding 30°. Shopping complexes in the residential area are restricted. Minimum road width is defined as 4 m in all locations except in the heritage sites. The basic standard has also stipulated the floor area ratio which is 70% for below 250 sq. m and 60% above 250 sq.

In addition to the basic standard, the DUDBC promulgated Nepal National Building Code: NBC206: 2015 (DUDBC, 2015). The Building Code classifies buildings in 8 groups: residential, assembly, educational, hospital & clinic, commercial, office, industries and storage. The Building Code also classifies buildings based on their height: general, medium rise, high rise, and skyscrapers. The code also defines means of exit, corridors, staircase, and plinth height. The minimum room, ventilation, fire safety requirements. There is a specific requirement for multi-story buildings.

The NRA collected housing database can be replicated in the Municipalities for developing appropriate policies and strategies. Based on spatial characteristics of housing, the Municipality's sectoral plan can be developed. Implementation of Basic Standard for Settlement Development, Urban Planning and Building Construction - 2072 will be much easier with the housing database. How to handle the houses which do not comply with building codes can be determined with the housing database. In such a way, the building database can be used for settlement planning and to avoid risk against natural disasters. Secondly the database can be used for generating revenue and for ensuring adherence of the stated purposes. Thirdly, the database can be extremely useful for strengthening houses or take decision for demolition if it is too risky.

4. Discussions

This paper intended to examine the post-Gorkha earthquake beneficiary survey methods and to compare with best practices in other countries. This paper also aimed to recommend the appropriate model for the future by establishing a link of the database to a Municipality's housing construction and settlement planning mitigating all forms of disaster risks. This paper analysed the present situation and presented in the section of findings. All steps that were adopted for the HRHRS were described and analysed starting from pre-survey preparation to conclusion. The findings section also described the building construction permit system.

4.1. Survey Organisation

The survey organisation lacked clarity with regard to the owner. MoFALD was the *de jure* owner of this survey. However, the Steering Committee was headed by the NPC instead of MoFALD, which was a contradictory arrangement. The reason for NPC's leadership could have been that the CBS is under the NPC which was supposed to conduct this survey. The NPC's leadership for other preparatory activities could be another reason for chairing the steering committee. The problem further aggravated as CBS had no institutional experience in the collection of such engineering driven data. The HRHRS was planned to build up on the ongoing Rapid Visual Damage Assessment work being carried out under the DUDBC's guidance. Based on the technical competence, DUDBC should have led this survey. The Senior Divisional Engineer who was supposed to play a crucial role in quality control was under the DUDBC's command to whom CBS can request their cooperation but not to issue order. The problem further compounded due to lack of the local governments. The Village Secretary was the only authority at the local level but they abandoned staying at the village

after the commencement of Maoist insurgency (Acharya, 2009). The survey team did not receive support from the local level which constrained their capacity to deliver. Due to these all factors, the surveying approach became weak.

4.2. Recruitment of Survey Staff

UNOPS selected the Health Research and Social Development Forum (HERD) for mobilizing human resources for the survey. HERD is basically a NGO which has institutional experience dealing with health related issues as its vision is to promote health and wellbeing of people (HERD Nepal, 2020). It means their institutional association was directed towards health rather than building construction. They had a herculean task to recruit 5029 engineers, social mobilisers and other professionals within a very short period of time. It was almost impossible to get so many professionals in the market. Consequently they recruited mostly fresh graduates whom they provided with short term training. The civil engineering curriculum does not include rubble stone masonry in mud mortar. A majority of target houses fell in this category. It means the engineers had perfunctory knowledge on the questionnaire. All engineers may not have identical understanding of the issues. Moreover, the questionnaire allowed them to use their discretionary judgment on the damage category. Under these circumstances, it was fairly difficult to receive a uniform, well considered outcome. Consequently, it is believed that the households who should be entitled to receive grants did not receive and those who should not have received were included in the eligibility list.

4.3. Appropriateness of the Questionnaire

The questionnaire was divided into two sections. Part I: Detailed Assessment of Residential Building. All information included in Part I was relevant as it attempts to clarify legal ownership issues which is instrumental for providing grants. Secondly the characteristics of the house and characteristics of damage were also assessed. However, there was no direct link between damage characteristics and the damage grade that the enumerator would assign. The general assumption seems to be that the enumerator should reach the appropriate conclusion after filling out the previous questions dealing around the damage characteristics. Ultimately the enumerator's subjective judgment was used for ascertaining the damage grade. There had to be a connection between the damage characteristics with damage grade which was a weakness in the questionnaire. In the absence of the direct link, the enumerator's discretion prevailed which might have been biased due to various reasons. The second caveat in the questionnaire was the assessment of geo-technical risk. It is not wrong to have assessment of geo-technical risk in the questionnaire. However, NRA did not take any decision based on the reporting of questionnaires with respect to geo-technical risks. The DDRC collected landslide information of 1275 locations which was the basis for further investigations by a team of Geologists, Engineers and Surveyors. Hence the questions included in the questionnaire were redundant. Third and most important factor is that the Part II which dealt on Demographic and Socio Economic Information became largely irrelevant except two questions: family members' details with physical disability if any. The grant amount was flat for all types of households: NPR 200,000 at the initial stage which was

increased to NPR 300,000 later. If those two questions were embedded under section I, the interview time would have shortened by at least one third which would have profound impact on overall surveying time.

4.4. Timing and quality of the household survey

The duration and number of beneficiary surveys is presented in Table 5.

Table 5: Timing and Output of CBS Led Beneficiary Survey in Three Phases

Phase	Duration	Surveyed Beneficiaries (Nos)	Human Resource
First	2016.01.15 to 2016.06.20 (5 months)	679,919	5,029
Second	2016-07-11 to 2016-09-15 (2 months)	107,631	1,050
Third	2016-11-21 2017-04-14 (5 months)	114,308	364

Source: (CBS, 2017)

Table 5 shows that during the period of one year, the entire surveying was finished. The survey of this magnitude was the first of its type in the history of Nepal. It was conducted during the period when there was no local government. Recruitment and mobilization of over 5000 people at a time was the phenomenal task. The general public perceived this as a delayed operation because the survey itself was started after 8 months of the Earthquake. The question was whether such a comprehensive survey should have been conducted after such a huge disaster.

However, the NRA Steering Committee doubted the outcome of the survey by asking the NRA Executive Committee to conduct resurvey of the households who were declared as non-beneficiary (NRA, 2017a) by the NRA's Grievance Redressal Committee. On the other hand, the submission of grievances continued despite the fact that the number of beneficiaries exceeded the total number of households. For example in Dolakha, the number of households was 45,688 in 2011 and the population in the Mountain districts has been decreasing. However, the number of beneficiaries reached 72,859 which is 1.59 times more than the number of households considering that the number of households remained constant after 2011. Similarly the household to beneficiary ratio in Ramechhap, Sindhupalchowk, Kavrepalanchowk, Nuwakot, Dhading, Rasuwa and Gorkha is: 1.29, 1.36, 1.04, 1.32, 1.08 times respectively. The number of beneficiaries exceeded the number of households which means the number of beneficiaries increased due to artificial reasons.

The inaccurate survey may have largely contributed to this situation. The ineligible households may have been included on the list of beneficiaries which instigated others to make an attempt for getting included. With inappropriate surveying, some of the households which should have been included may have been excluded from the beneficiary list. This situation may have created social injustice and prompted grudges in the society. On one hand, the state's liability increased significantly on the other hand there are still some households who are not content with.

4.5. Assessment of Different Methodologies adopted in Different Survey Phases

Although the survey was conducted in three phases, there were basically two different methodologies. The first was the census and second was the verification model. Comparison has to be undertaken based on the objectives which was set earlier. The principal objectives of the survey were: to ascertain the complete scope of damages to the housing stock; to ascertain the list of beneficiaries to receive housing recovery assistance, to ascertain site safety to ensure that rebuilding at a specific site is safe and promote public reassurance that recovery is underway.

Against the first objective, both the census and verification model served the purpose. In the verification model, the municipality or the Village Development Committee prepared a list of victims on the basis of the DDRC's Earthquake Victim Card. Additional aspirant households were also added if they felt excluded for some reason. Based on this the local government prepared a consolidated list which was the basis for surveying. The verification model intended to save time and cost. The complete scope of damage to the housing stock was found out with both models. With this respect, the census was not required. The second objective was to prepare the beneficiary list which was also prepared with both survey models. Third objective of assessing site safety was not found adequate in the questionnaire which required more intensive investigation. Therefore both survey methodologies did not deliver the third objective.

The HRHRS objectives were limited to the reconstruction period. Census would have been justified had there been a long term objective of settlement planning, converting not damaged but weaker structures to earthquake resilient ones. It would have been justified if the database which was created would have been planned to hand over to the local governments for planning purposes. From all these perspectives, the earthquake reconstruction purpose alone the verification model was found to be sensible.

4.6. Linking Beneficiary Survey to the long term planning

The survey lacked conceptual clarity in terms of the stated objectives of ascertaining damages to the housing stock, finalising the list of beneficiaries and ensuring site safety for rebuilding at a specific site. For such a situation, the census survey would not have been required and the verification model would have been adequate. Similarly the content of the questionnaire could have been much focused on the housing damage. With this arrangement, the scope of survey widened unnecessarily which contributed to wastage of financial resources and to some extent delayed the process. However, if the objective was to create a database for long term planning of settlement with earthquake resilient housing stock and to support the creation of a production oriented society, then the census survey would have been appropriate. However, the content of the questionnaire had to be designed considering those objectives. For the future, all local governments should have a comprehensive database of housing stocks with land characteristics and also basic socio-economic information of the household. The local government can outsource for conducting surveys and establishing a database system. When a natural disaster occurs, the local authority can conduct a light survey to complete within a very short time. This arrangement will facilitate the state to plan

settlements, evacuate houses from vulnerable to safe areas. This database will be instrumental for extending appropriate packages of credit facility and other extension services.

4.7. Beneficiary survey methodology in Nepal and other countries

Nepal's methodology was compared with other four countries: India, Pakistan, China and New Zealand. Three South Asian countries' methodologies were similar. There could be a number of reasons behind. Having similar socio-economic conditions, identical level of development and people's psychology could be mainly responsible factors. In all three Earthquake projects, design was influenced by the World Bank. Drawing lessons from the 2001 Bhuj Earthquake, the Bank may have replicated the methodology to the 2005 Pakistan Earthquake which was further carried over to Nepal. However, the methodology did not appreciate the subtle differences among those three countries. India had a long lived stable democratic system with functioning and thriving local governments whereas Pakistan has been undergoing tumultuous history where Army and Civilian rules rotate like the game of musical chair. The Pakistan army played the central role in Pakistan's beneficiary survey.

Nepal was undergoing the transitional stage. When tremors struck in 2015 in Nepal, the monarchy had gone but the first Constituent Assembly ended in 2012 without being able to draft the constitution. The second Constitutional Assembly was elected in 2013 but until the day of tremor on 25 April 2015, the Assembly could not make headway for the conclusion of the constitution. However, political consensus was expedited due to the disaster which created pressure for the declaration of the constitution on 20 Sep. 2015. Until then the local governments were not there as local election could not take place after their dissolution in 2001. The Village Secretary was the only government representative at the village level who used to operate from the district headquarters as many village offices were bombed off by the Maoist rebels. Some village secretaries were also targeted during the period of insurgency. In retrospection, the adopted methodology was not appropriate in the circumstance when it was designed. The DDRC would have been an appropriate agency in the identification of beneficiaries.

With the vast differences in socio-economic circumstances, the highly successful methodology in Chinese context and relatively effective strategy in New Zealand is difficult to replicate in the present Nepalese condition.

The socio-political environment has changed in the present Nepal. The elected local governments are functioning under the federal structure. For the future these local governments have to be made accountable for beneficiary identification. However, there are certain limitations, the local leaders are elected based on partisan contest and would aspire to be reelected. Some elements of political biases could prevail. Secondly they might have a tendency to maximise the number of beneficiaries for the sake of popularity within their constituency. In the nutshell, the future beneficiary identification should be trusted to the local governments with some safeguard measures.

4.8. Future way forward

Based on the comprehensive review of the national and international experiences, the household database was found essential for effective planning, management and reconstruction in the event of disaster. It also facilitates the social security system. Towards this, Nepal has made some headway. The CBS has included housing information in the census (CBS, 2012). The CBS housing data includes type of foundation, type of outer wall, roof of the house, source of drinking water, usual fuel for cooking, source of lighting, toilet in the house, and other household facilities. Other socio-economic information is also included. This statistical overview offers very good resources for developing macro level policies. However, it is not much help at the local level.

The municipalities have introduced an electronic Building Permit System (KMC E-BPS Project, 2020). The Building permit is essential before constructing a house and the compliance of the Building Code is required. The owner also should secure a building completion certificate. For approval, the owner needs to submit information on house characteristics, land use zone and subzone, high tension line, Right of Way of River, description of land, road width and Right of Way (RoW) have to be submitted. This information are good enough for ensuring a housing record. However, this information does not include land characteristics sufficiently. On the other hand, socio-economic information is lagging.

Against this background, it will be sensible for municipalities to maintain a data base as collected by NRA. Some adjustment may be required in the questionnaire as the purpose of NRA was to assess damage caused by the Earthquake whereas the purpose of the housing database is to use the collected data for land use planning, vulnerability assessment, evacuation, and for delivering services. The database will be also useful to strengthen the weak houses and sometimes to demolish unretrofitable houses. In case of natural disaster, rescue operation and reconstruction can be initiated within a very short period of time.

However, the present Acts, rules and policies do not include enforcement provision of such housing information systems. Hence, the MoUD and MoFAGA have to issue one guidelines which can be enforced upon approval by the Municipalities and Rural Municipalities.

5. Conclusions

The objective and intention of the Household Registration for the Housing Reconstruction Survey (HRHRS) was justifiable. Having no local governments, inexperienced Central Bureau of Statistics (CBS) in housing surveys, anomaly in survey leadership resulted in suboptimal outcomes. Unavailability of the huge number of human resources with professional experience to tackle the technical complexity created socio-political anxiety expressed through a huge number of grievances. Despite these facts, the NRA's housing database has facilitated and led towards creating and maintaining municipal level housing databases. It will be instrumental for land use planning, for ensuring robust housing structures based on the ground characteristics and for collecting housing revenue. In addition, Municipalities can intervene for strengthening houses or even issue a demolition order for vulnerable structures. Such databases will be extremely valuable assets for house or land

pooling initiatives for urban renewal. For this, the Ministry of Urban Development (MoUD) in conjunction with Ministry of Federal Affairs and General Administration (MoFAGA) will need to either amend the Basic Construction Standards for Settlement Development, Urban Planning and Building Construction - 2072 (MoUD & MoFALD, 2015) and Nepal National Building Code; NBC 206:2015 (DUDBC, 2015) or issue another guideline for the provision of housing database with the Municipalities and Rural Municipalities. With the introduction of these new guidelines, Nepal's municipalities will be able to develop disaster resilient settlements, furnish better amenities and deliver effective services. The post disaster relief and rescue operation will be simplified and reconstruction will be faster

The end.

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Figures used in the text

1. Preliminary Survey Format

विहितमा हामी तपासिका लेखिएका मानिसहरू अग्ये मिति २०७२/०१/१२ गते ११:५६ बजेको समयमा गएका बिनासकारी बुकमात्रै जिल्ला ललितपुर ल.पु.उ.म.पा. वडा नं. ४ बजारको स्थित चतुर्वीर डोण्ड को छोरा / छोरी वर्ष २५ को चन्द्र बहादुर डोण्ड को शतिको विवरण निम्नानुसार रहेको, फरक छैन यदि भन्दा व्यहोरा लेखी दिएको ठहरेमा प्रचलित ऐन कानून बमोजिम सजाय भएमा सहन गीन मन्जुर छी शनि गो सर्जिमिन मुचुल्का लेखी लेखाई सही छाप समेत गरी महानगरीय प्रहरी प्रभाग सानेपा ललितपुर बाट खट्टि आएका प्रहरी अधिकृतको डोर भारत नेपाल सरकारमा चढायौ ।

शतिको विवरण :-

१. हस्ताले खनेको ३ तल्लाको पाक्कि चर पूर्ण रूपमा क्षति गर्छ फल नमालिन ।
२. वा ४-५ ३८५५ नं रातो मास्ती जति को अगाडी भाग कुच्चिब गर्छ क्षति भएछ ।

माथी लेखिएको व्यहोरा ठीक छ भनि सहीछाप गर्ने समिसहरू :-

ललितपुर जिल्ला ल.पु.उ.म.पा. वडा नं. ४ बस्ने वर्ष ६० को धन बहादुर पुन	१
ललितपुर जिल्ला ल.पु.उ.म.पा. वडा नं. ४ बस्ने वर्ष ४५ को चन्द्र बहादुर खड्का	१
ललितपुर जिल्ला ल.पु.उ.म.पा. वडा नं. ४ बस्ने वर्ष ४० को गोविन्द प्रसाद चौधरी	१
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ललितपुर जिल्ला ल.पु.उ.म.पा. वडा नं. ४ बस्ने घर धनी चन्द्र बहादुर डोण्ड	१
कानून तालिम गर्ने	
महानगरीय प्रहरी प्रभाग सानेपा ललितपुरका प्र. ना. नि. भुवन खड्का	१
जगत साह	१
ललितपुर	
३०७२ साल वैशाख महिना २० गते १ रोजमा शुभम	१

2. DRCC: Earthquake Victim Household Identify Card 2072



जिल्ला दैवी प्रकाप उद्धार समिति, ललितपुर

न.पा./गा.वि.स. ५.....

भूकम्प पीडित परिवार परिचयपत्र-२०७२



परिचयपत्र नम्बर १२८ पीडितको बर्ग 'क'

घरमूलीको नाम चन्द्र बहादुर श्रेष्ठ समल

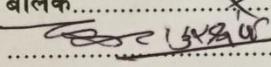
नागरिकता नं. ३८६९/२.१.० जारी गरेको जिल्ला २०३५/०३/२२ नं. ५

बाबु/आमाको नाम चन्द्र वीर श्रेष्ठ बाजेका नाम मह लाल श्रेष्ठ

वडा नं. ४ टोल कागडोल

परिवार संख्या ५ महिला: २ पुरुष ३

बालक ५ बालिका १

घरमूलीको हस्ताक्षर 

प्रमाणित गर्ने **वडा सचिव**

नाम: इन्द्र बस्न्याचार्य

दर्जा: वडा सचिव

मिति: २०७२/०८/२०

क बर्ग: घर पूर्ण क्षति भै मर्मत गरी बसोवास गर्न नमिल्ने भएको

ख बर्ग: घर आंशिक क्षति भै मर्मत गरी बस्न सकिने भएको

भौतिक तथा मानवीय क्षतिको बिबरण:

मृतक संख्या	महिला	५	पुरुष	५
घाइते संख्या	महिला	५	पुरुष	५
घर क्षती	पूर्ण	✓	आंशिक	—
गोठ/धनसार	पूर्ण	५	आंशिक	५
चौपाया/पन्डी	संख्या	५		
खाद्यान्न	के.जी.	५		
अन्य		५		

राहत प्राप्तिको बिबरण

मिति	राहतको प्रकार			उपलब्ध गराउने निकाय/संस्था	बुभाउनेको हस्ताक्षर
	नगद	खाद्य	गैह्र खाद्य		
२०७२/०८/१८	१६०००	—	—	१६०००	