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Inclusion of the poor and vulnerable: Learning from post-earthquake housing reconstruction in Nepal

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ABSTRACT

The poor and vulnerable people are the most affected in any disaster and find recovery extremely challenging. After the 2015 Nepal earthquake, the need for inclusive and targeted policy provisions and socio-technical facilitation was well identified. Nepal's post-earthquake housing reconstruction is world's largest owner driven reconstruction program under which nearly 700,000 houses are being constructed. This paper examines policies, and implementation mechanisms for ensuring social inclusion in this post-earthquake housing reconstruction process in Nepal, specifically examining provisions and delivery mechanisms for finance, land, design and technology for addressing recovery needs of the most vulnerable houseowners in terms of achievements, effectiveness, and challenges of implementation. The paper uses mixed methodology and is informed by the primary survey data of 26,912 houseowners in eight municipalities of the Gorkha district and overall reconstruction data from National Reconstruction Authority and other relevant sources of the Government of Nepal. Data is analysed and interpreted to gain insights on the specific issues of the poor and vulnerable. Top-up grant assistance and subsidized loan scheme have not yet benefited the vulnerable households despite the policy provisions. At the same time, housing reconstruction process in Nepal has helped a significant number of landless households get ownership of homestead land, which is a remarkable achievement. Shift in building typologies needs to be deliberated in context of affordability, sustainability and disaster risk reduction in the future. While policy provisions are the first step for the inclusion of the vulnerable, the desired outcome is difficult and challenging to achieve without enabling environment for their own agency and targeted socio-technical facilitation. Experience of post disaster housing reconstruction in Nepal strengthens our understanding of 'owner driven reconstruction' to make it more inclusive.

1. Introduction

Vulnerability may be understood as lack of resilience. Sendai Framework for Disaster Risk Reduction defines resilience as ability to resist, absorb or recover from the effects of hazards [47]. In other words, vulnerability can be defined as sensitivity to stress and shocks due to disasters and lack of abilities to mitigate, respond, cope or recover. Vulnerable people are not just more impacted but are also likely to have more difficulty in recovering to resume pre-disaster functionality as compared to other community members [14]. Vulnerability in disasters is essentially a construct of interactions between socio-economic attributes and geo-physical environment [6,30]. People's ability to cope or recover after a disaster is dependent on a complex set of factors such as physical capacities, caste, class, gender, social network, income, land and other assets, information, legal entitlements, government policies and mechanisms, amongst others. Unequal physical and financial capacities and access to resources can make certain groups of people more vulnerable than others and can increase social divide and conflict [6,15,26]. Impact on women during a disaster is disproportionately high [13]. Disasters can further worsen the capacities and conditions necessary for coping and recovery and hence result in increasing vulnerabilities [4,22,41].

Inclusion of the poor and vulnerable in post-disaster reconstruction processes has been a challenging issue even in the past, and has seldom been addressed effectively or comprehensively. The 2001 Gujarat earthquake reconstruction policy framework included joint ownership of women in the reconstructed houses. But at the same time, there were no provisions for the land tenure security of the landless [39]. After the South Asian tsunami, the exclusion of *dalits* and *irula* tribals from the rehabilitation in Tamil Nadu, India indicated inadequacy of the policy framework [23]. Policies after the 2005 Kashmir earthquake in Pakistan included the land assistance only for households who were living on hazardous locations and required relocation [46]. The policy did not include other landless poor existing

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due to the socio-economic inequities. After the hurricane Katrina in 2005, policy framework ignored the poor renters dependent on public housing [19]. Review of many such past experiences shows that the reconstruction policies were either uninformed and oblivious of the socio-economic inequities, or inadequate to address such structural issues for ensuring inclusive and equitable reconstruction and recovery.

Nepal is highly prone to multiple natural hazards and falls under high risk seismic zone of Himalayas. The 2015 Nepal Earthquake affected 31 districts of which 14 were severely affected. While 8790 persons died and 22,300 were injured, over 500,000 houses collapsed or were severely damaged [32]. Post Disaster Need Assessment (PDNA) by Government of Nepal highlighted the significant impact of earthquake on the poor and vulnerable accentuated by pre-existing inequities due to geography, income, and gender. Nearly 700,000 persons were estimated to have been pushed below poverty line. The loss of housing could further amplify the shock pushing people below poverty line for extended periods [32]. Taking cognizance of the critical needs of the earthquake-affected people, Government of Nepal (GoN) created a new entity in the form of National Reconstruction Authority (NRA) through a Statutory Act of the Parliament. Subsequently, the government brought out policies for providing financial assistance, materials, skills, technology, and land. It established regulatory and implementation mechanisms for inclusive and resilient reconstruction and recovery.

Reconstruction of more than 700,000 houses after the 2015 Nepal earthquake is the largest owner driven housing reconstruction program globally. In the Gujarat earthquake (2001), the South Asian tsunami (2004), the Kashmir earthquake (2005) or any other disaster, owner driven reconstruction had not been undertaken at this scale [3,29,31]. Confronted by extremely difficult mountainous terrain with very limited access to road networks to reach to the houseowners and lack of institutional and financial capacities, Nepal faced unprecedented challenges in implementation of such a large recovery programme. Concurrently, Nepal adopted the new Constitution and made a complex political transition towards new federal system of governance. Facing the formidable task of strengthening the nascent administrative layers at sub-national and local levels, Nepal undertook substantive devolution of power to municipalities with the mandate of playing a direct role in disaster recovery.

With this backdrop, this paper delves into the key research question of effectiveness of the reconstruction policies, implementation modalities and challenges pertinent to the poor and vulnerable particularly in terms of access to financial support, homestead land and guidance on safer technology for housing reconstruction.

2. Data and methodology

This paper is based on mixed method approach. It draws upon information and data collected from primary and various secondary sources during the course of socio-technical facilitation of housing reconstruction by UNDP. As the paper is focussed on issues specific to the poor and vulnerable in context of effectiveness of reconstruction policies, it analyses data and information available at national level for all the affected districts while diving deeper into specific data of the Gorkha district where primary surveys were undertaken.

Primary data sources include i) houseowner surveys undertaken during last three years in six rural municipalities and two urban municipalities of the Gorkha district - the epicentre of the 2015 earthquake, ii) community meetings, and iii) case studies. The municipalities of the Gorkha district included in this study are Arughat, Ajirkot, Dharche, Gandaki, Gorkha, Palungtar, Shahidlakhan and Siranchowk. The surveys covered each of 26,912 houseowners being supported by UNDP with funding from Government of India through the census process. The houseowner surveys were conducted using a mobile application linked to Reconstruction Information Management System (RIMS) developed by UNDP for the purpose of socio-technical facilitation and monitoring progress of housing reconstruction. This primary data survey is a large dataset covering demographic and socio-economic details of the household, administrative and technical aspects of damage assessment, participation agreement, tranche disbursement, construction progress, certification and completion. Depending on the stage of construction, each individual houseowners was surveyed between 1 and 6 times in past three years as the construction progressed. This database from the census surveys has been regularly checked for discrepancies and validated. The data interpretations have been confirmed through meetings with the community, ward members and municipalities, that were conducted during the same period for discussions on issues, challenges and progress of reconstruction work.

In addition to the above-mentioned survey data, reports and publications from NRA and National Planning Commission (NPC) have also been used to understand formulation of various policies and analyse the progress in reconstruction. Central Bureau of Statistics (CBS) survey reports, design and technology catalogues by Department of Urban Development and Building Construction (DUDBC) and information from Nepal Rastra Bank (NRB) were also referred.

Literature review was also conducted to understand the socio-economic conditions and issues, land and housing rights and the vulnerability, specifically on Nepal so as to situate the discussion in relevant, but broader, context of vulnerability reduction and disaster resilience.

Data analysis undertaken is essentially on interpretation of data related to disbursement of housing grant assistance, reconstruction progress, cost of construction, and other aspects related to land, technology and administrative facilitation, to derive insights particularly focussed on the poor and vulnerable. The information from the primary field surveys is used in conjunction with the secondary source information to highlight the specific issues. Wherever possible data was segregated for the vulnerable and other households. The progress and outcomes of housing reconstruction were examined from the perspective of policy provisions and their intent. The insights gleaned were verified through discussions and field meetings with the community and other local stakeholders.

3. Results and discussions

3.1. Vulnerable households: A brief profile

While occurrence of hazards is a natural phenomenon, the coping capacities depend, to a great extent, on the socio-economic conditions and environment variables within a community [7]. It, therefore, is important to understand the key socio-economic attributes that identify the vulnerable in Nepal. Besides being a low-income country, Nepal also ranks low (147) in the Human Development Index [45].

Poverty levels are high in Nepal with 25.2% of population below poverty line [12]. While the districtwide data shows that approximately 20.4% population is below poverty line in the Gorkha district, in some municipalities such as Dharche in the Gorkha district, it is as high as 72%. Such high poverty levels have also resulted in a high rate of outmigration. CBS estimates gross migration rate to be about 11.3% - primarily for seeking employment [9]. However, the proportion of the out-migration is much higher in Gorkha as indicated by about 32% absentee houseowners there [10]. The 2016 National Demographic and Health Survey [50] showed that nearly 47% of households had at least one person out-migrated in the past 10 years.

25.7% of the total households in Nepal are women headed [8]. However, gender inequality remains high with Nepal ranking a low 102 in Gender Development Index [48]. At least, 2.2% of the total population in Nepal has some type of disability with a higher concentration in the mountains and rural areas and amongst people with lower literacy [9].

With more than 120 ethnic groups, the vulnerability of households also increases due to social exclusion and caste and gender discrimination [2]. The *dalits* (a term used to identify the communities discriminated or excluded in traditional system of the caste hierarchy) and *janjatis* (tribal/ indigenous communities) are 13.6% and 36% of the total population respectively [9].

Exclusion from land ownership is another key indicator of vulnerability [6]. About 25% of Nepal's population is landless or near landless [49]. Landlessness amongst the *dalits* and *janjatis* is much higher as compared

to the other castes of social hierarchy. Nearly 50% of the *dalits* in Nepal do not have land ownership certificates [5].

The profile of 26,902 households surveyed who reconstructed their houses is important to understand their vulnerabilities and socio-economic status. The marginal occupational conditions of the poor and vulnerable are indicated in Table 1. As compared to others, vulnerable households were nearly 50% less involved in occupations like shops and businesses, government or private jobs. Unemployment in vulnerable households is more than double as compared to other households.

The social asymmetries and discrimination are well identified causes of the vulnerability [22,24,25]. *Dalits*, *janjatis* and female-headed households are comparatively poor having low literacy, marginal social status, negligible political participation, unfavourable work conditions, and high debt burden [21,38]. These conditions hamper mobilization of active local collaborations essential for recovery and thus cause exclusion of the *dalits*, and *janjatis* [27]. The vulnerable households are not a uniform but intricately and unevenly layered group particularly when two or three different vulnerabilities exist together.

3.2. Policy framework for housing reconstruction

Nepal adopted 'owner driven reconstruction' framework for the housing reconstruction. Owner driven reconstruction in the context of developing countries has been proved to be the most effective in terms of its achievements of satisfaction and disaster risk reduction [18]. Nepal's policy framework is quite fascinating and progressive in many ways. Noting concerns of the vulnerable identified in PDNA, strategic objectives of PDRF included specific points to guide policy formulation.

The GoN policy framework was based on a uniform approach to support and implement with universal coverage irrespective of funding sources [33]. Initially GoN committed to provide assistance of NRs 200,000 (≈$2000) in three tranches which was later increased to NRs 300,000 (≈$3000) to each houseowner whose house had fully collapsed or was damaged beyond repair. These tranches were provided at the stages of i) participation agreement with NRA (≈$500), ii) completion of plinth level construction (≈$1500), and iii) roof level (≈$1000) through bank transfer. Certification by NRA engineers indicating compliance with technical norms and building codes was made mandatory at the time of the release of second and third tranches and finally after completion (to issue completion certificate). NRA prepared a two-volume catalogue of sample designs to communicate the approved standards and technologies [16,17]. The design and technologies included in the catalogue were vetted by a technical committee of experts constituted by the DUDBC, NRA also formulated a scheme to provide loan up to NRs 200,000 (≈$2000) at 2% annual interest rate through the commercial banks.

Post disaster recovery is seldom equal and depends largely on extent of access to resources allowing financially able citizens to recover faster [37]. To address the needs of the vulnerable households such as single women, people with disabilities, children at risk and senior citizens, an additional grant assistance of NRs 50,000 (≈$500) was designed as top-up on NRs 300,000 (≈$3000) grant assistance. This was included in the financial assistance package for the most vulnerable at a later stage of implementation. PDRF also identified adoption and expansion of social protection particularly cash transfer or cash-for-work schemes as a means to support the poor and vulnerable groups [33]. However, no such policy provisions were instituted or implemented.

Ownership of homestead land was a prerequisite for receiving housing reconstruction assistance from the NRA. Though landlessness was not included criteria of vulnerability, separate policy provisions for providing land entitlement to landless were made. These include three options - i) land regularisation at the same location where houseowner was residing, ii) provision of land at alternative location (minimum 6 *anna* i.e. 2052 sq.ft. or iii) additional grant assistance of NRs 200,000 (≈$2000) to purchase a new plot of land.

Similarly, a policy was also adopted to provide financial assistance of NRs 100,000 (≈$1000) towards retrofitting of the partially damaged but repairable houses. PDRF also articulated intention of meaningful participation of women, vulnerable and marginalised groups through community-based organisations. However, no specific guidelines or operating procedures were developed and implemented.

3.3. Identifying the earthquake affected vulnerable households

The 2015 Nepal earthquake damaged 1,053,033 houses in 31 districts. The extent of damage is indicated in the following Table 2.

Based on the detailed damage assessment of more than 1.0 million houses, 782,695 households were supported for house reconstruction, which turned out to be 28% higher than the number estimated in PDNA. PDNA also identified the need for a special assistance package for the vulnerable households to ensure they were not left behind [32]. The vulnerable households were identified through analysis of data from the socio-economic survey conducted concurrently with the damage assessment undertaken by the CBS. NRA considered gender, age, and disability for identification of the vulnerable. Similarly, orphan children needed protection and were also included in the list of the vulnerable. Landless were identified through a separate process and a separate policy provision to support their access to land was formulated. It is a limitation of the policy perspective that the defining criteria for the vulnerable households does not consider explicitly the structural inequities and deep-rooted social discrimination due to class and caste hierarchies. Similarly, the awareness of gender issues is very little amongst the community [43]. Therefore, it becomes further challenging to identify the vulnerable as they have weak agency to articulate and influence. While the criteria to identify the vulnerable adopted by NRA may not be comprehensive, these were specific enough to identify significant number of vulnerable households. With detailed operational guidelines for identifying the eligible vulnerable out of 782,695 houseowners for the top-up housing assistance, only a small number of 18,505 households (2.4%) were finally designated as vulnerable (Table 3).

A review of social demographic indicators based on census 2011 [9], there seems to be likelihood that many vulnerable may have been left

Table 1
Occupational profile of houseowners surveyed in eight municipalities of Gorkha district.

Primary Occupation	Vulnerable HHs		Other HHs	
	Number	%	Number	%
Agriculture	6280	78.1	14,256	75.6
Artisans	323	4	442	2.3
Shops and small business	236	2.9	1065	5.6
Govt. Job	258	3.2	1448	7.7
Private job	78	1	415	2.2
Other	211	2.6	491	2.5
Unemployed	653	8.1	756	4
Total	**8039**	**100**	**18,873**	**100**

Source: Primary data collected by UNDP, Nepal.

Table 2
Extent of damage to the houses.

Damage Grade*	% of damaged houses
G1: Negligible to slight damage (No structural damage, slight non-structural damage)	9.7
G2: Moderate damage (Slight structural damage, moderate non-structural damage)	13.5
G3: Substantial damage to heavy damage (moderate structural damage, heavy non-structural damage)	19.4
G4: Very heavy damage (heavy structural damage, very heavy non-structural damage)	24
G5: Destruction (very heavy structural damage)	33.4

Source: Household registration for housing reconstruction survey, 2016–17, CBS.
* refer [20].

Table 3
Vulnerable houseowners identified by NRA.

Vulnerability Type	No. of houseowners
Orphan children (below 16 yr)	91
Single women	9024
Old aged (above 70)	9147
Persons with disability	243
Total	**18,505**

Source: Household registration for housing reconstruction survey, 2016–17, CBS.

out. In six rural municipalities and two urban municipalities of the Gorkha district, where UNDP is providing socio-technical support to 26,912 houseowners for housing reconstruction, NRA identified and approved 695 houseowners as vulnerable. However, the municipalities identified 1115 houseowners as vulnerable using the same criteria that was used by NRA. However, only 100 households were found to be common between the NRA and the municipality lists. At the same time, using broader criteria to include left out vulnerable groups such as *dalits*, landless and chronically ill patients also, UNDP identified 8062 houseowners as vulnerable for its socio-technical facilitation support. The lists of vulnerable by the various agencies identified different houseowners albeit using the same criteria. Despite having clear and specific criteria for identification of the vulnerable households, these disparities in terms of coverage and inclusion are indicative of the implementation challenges due to lack of voice and influence of the vulnerable.

3.4. Status of housing reconstruction by the vulnerable

According to NRA, by the end of May 2020, reconstruction of 64% of total houses in 14 most affected district had been completed and another 23% were under construction. By this period, more than 74% of houseowners had received the third tranche [35].

Timeline study (Fig. 1) in the Gorkha district shows that the vulnerable households were slower in reconstruction of their houses as compared to the others. With targeted socio-technical support, the gap between completion rate by the vulnerable and non-vulnerable households has narrowed.

Generally, the vulnerable houseowners took much longer to complete the construction. A reconstruction timeline based on an interview with a vulnerable household from the Gorkha municipality was drawn up. It spanned 5-year long period, for completing the house construction (Fig. 2).

Once construction stage was completed, it took 2–4 months for the tranches to be received by the houseowners. Such delays for the poor and vulnerable were difficult as they had little capacity to pursue with the government and the banks or continue with their own resources. This resulted in repeated halts in construction. Due to the halts, even the continuation of same team of artisans and timely restart was difficult. Progressing from one construction stage to another, required the vulnerable houseowners to cross many barriers related to the availability of the financial resources, land, design and technology. These aspects of house construction have been discussed below.

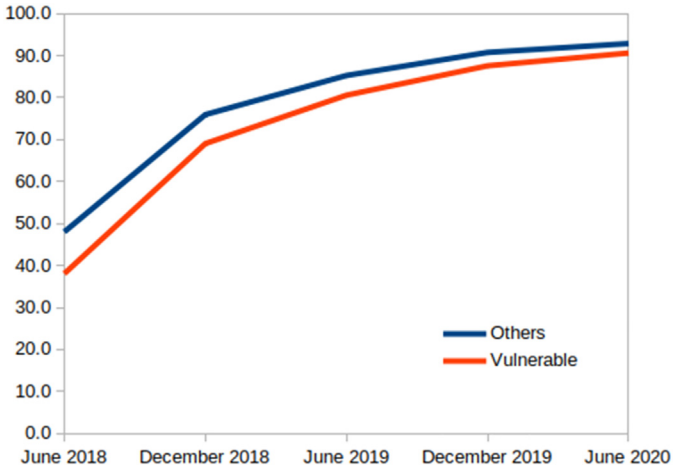

Fig. 1. Timeline of housing reconstruction in Gorkha district (June 2018–June 2020). Source: Primary data collected by UNDP, Nepal

3.5. Access of the vulnerable to financial assistance

The most common obstacle for the reconstruction was the gap in funds required for house construction. Nearly 30% of damaged houses continued to be used after the earthquake with or without repairs as of April 2017 [11]. Only 8.4% of the houseowners in 8 *municipalities* of the Gorkha district where survey was undertaken were able to construct within the financial assistance provided by NRA (Table 4).

NRA grant assistance was received as per the progress of the construction. 80% of the vulnerable households identified by NRA have received NRs 300,000 (≈$3000) in three tranches completing the house construction.

Table 5 shows more vulnerable houseowners are still in intermediate stages of first and second tranches as compared to the other houseowners as of 30 June 2020. Proportion of vulnerable houseowners (11%) still at first tranche stage (i.e. yet to begin the construction) was almost double as compared with the other non-vulnerable houseowners (6%). And more of non-vulnerable houseowners (88%) have received all the three tranches as compared to the vulnerable houseowners (80%). This data shows clearly that vulnerable houseowners lag behind and are slower to start and complete the construction. Most interestingly, the above data shows that the vulnerable have not yet received top-up grant assistance of additional NRs 50,000 (≈$500). Though the identification of vulnerable houseowners is debatable on aspects of inadequacy of criteria, coverage and accuracy, none of the 18,505 vulnerable houseowners identified by NRA were able to receive top-up grant assistance of $500 so far. This policy provision for the vulnerable to provide additional grant of $500 on top of the housing assistance grant of $3000 has clearly not been effectively implemented.

Market survey conducted over the last 5 years indicated significant increase in construction cost. Daily wages of unskilled labour had increased by two thirds i.e. from $6 per day in 2015 to $10 per day in 2019. Similarly, the costs of building material such as bricks, cement, steel, had gone up by 20% to 30% in the last five years. The inflation in material and labour costs led to requirement of more funds to complete the construction of the houses. The situation was further exacerbated by the exclusion of the vulnerable from the traditional communal labour exchange system [27]. All these factors resulted in making house reconstruction costs unaffordable for the poor and vulnerable.

NRA had also drawn up a policy of subsidized credit through commercial banks to the affected houseowners to support reconstruction of their house. There were two schemes: i) an interest-subsidized loan up to NRs 1,500,000 (≈$15,000) in other than Kathmandu valley and NRs 2,500,000 (≈$25,000) in the Kathmandu valley at an interest rate of 2% per annum was to be made available, and ii) an interest-free loan up to NRs300,000 (≈$3000) could be availed on the basis of collective collateral [34]. However, these schemes failed to take off due to lack of willingness from the banks and were withdrawn in August 2018 [34,44]. NRA replaced the earlier schemes with a new scheme of loan up to NRs300,000 (≈$3000) with repayment period of 5 years on the condition of property collateral. The new scheme made loans available with 5% subsidy on the interest. Implemented since 2018, only 200 houseowners had been able to receive this loan totalling about NRs. 58,630,000 (≈$586,300). The various schemes for loans altogether benefited only 1592 houseowners by April 2020 [36].

In the Gorkha district, households borrowing from informal sources tripled to 52% within the first two years after the earthquake, with higher debt levels in remote locations [42]. In the Gorkha district, a staggering 68.8% of the surveyed houseowners had borrowed money from the local

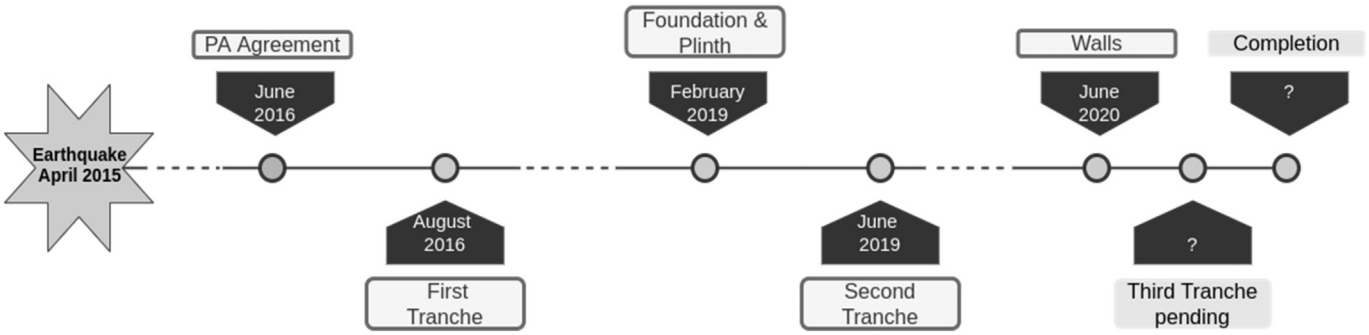

Fig. 2. Timeline of house construction for a vulnerable household in the Gorkha district.

Table 4
House Reconstruction Costs in 8 municipalities of the Gorkha district.

Reconstruction costs of the house	% of houses
Less than $3000	8.4
Between $3000 to $6000	50.7
Between $6000 to $9000	21.4
More than $9000	19.5

Source: Primary data collected by UNDP, Nepal.

Table 5
Status of housing grant assistance to vulnerable houseowners in 8 municipalities of Gorkha district.

Housing Grant Assistance Received	% of households	
	Other than vulnerable houseowners in Gorkha district	Vulnerable houseowners in Gorkha district covered by UNDP facilitation
Only 1st tranche ($500)	6	11
Both 1st and 2nd tranches (total $500 + $1500)	6	9
All three tranche (total $500 + $1500 + $1000)	88	80
Top-up tranche (additional $500)	0	0

Source: compiled from the data shared by GMALI, GoN and primary data by UNDP Nepal as on 30 June 2020.

moneylenders at 24 to 36% annually compounding rate of interest [40]. Increase in such forms of borrowing during the post-earthquake reconstruction is also resulting in mortgage and sale of assets [28].

Due to unaffordable costs of house construction, a large number of houseowners have been forced to build much smaller houses inadequate for their real needs. Table 6 shows the size of houses constructed by the houseowners.

To enable the vulnerable houseowners with required finance, some innovative approaches were adopted by a few municipalities in the Gorkha district. Arughat, Sahidlakhan and Gandaki municipalities set up *ghoomti kosh* (revolving fund). Through this fund, the municipalities provided interest-free loan of $500 – $1000 to the vulnerable houseowners on the condition of repayment when the next tranche was released. Fifty-nine households had been supported so far through this revolving fund modality in these three rural municipalities with total assistance of NRs 450,000 (≈$45,000). A similar concept was also adopted by some municipalities in other districts, for example Chautara Sangachowkgadhi in Sindhupalchowk. In Palungtar, the municipality assisted with the supply of essential building materials for the vulnerable families whose housing reconstruction was stuck due to financial constraints. Though this approach has been implemented by municipalities at a limited scale, it provides a viable and evidence-based policy input for enabling vulnerable houseowners to reconstruct their house.

Table 6
Size of the houses reconstructed in 8 municipalities of Gorkha district.

Size of the houses reconstructed	% of houses
One-room house	28.6
Two rooms house	47.9
House with 3–4 rooms	19.1
Houses with more than 4 rooms	4.4

Source: Primary data collected by UNDP, Nepal.

3.6. Access of the vulnerable to homestead land

With more than 25% of the population being landless, unequal distribution of land has been one of the key political issue in Nepal for decades [49]. One of the most significant aspects of Nepal's housing reconstruction and recovery has been the acknowledgement of vulnerability of landless and formulation of policies to address the same. By making the first amendment to working procedures of housing grant distribution, provisions were made to include the option of either regularisation of existing land, or provision of alternative land or additional grant for the purchase of land. The policy for land assistance has benefited 11,551 landless owners in all earthquake affected districts of Nepal so far as shown below in Table 7. However, as the awareness of gender inequality is generally low amongst the people, this aspect of ownership of houses does not find much articulation by the affected households including women or in the policy framework.

Multiple steps through which landless had to navigate for this entitlement involved initial application along with citizenship documents and proofs of residence, affidavits by the neighbours (*muchulka*), verification of landlessness and recommendation by the ward committee, further verification by Grant Management and Local Infrastructure (GMALI), recommendation by Central Level Project Implementation Unit (CLPIU) at NRA and finally, decision by the NRA Executive Committee. To ensure that the grant assistance for land was not used for any other purpose, this amount was released directly to the seller by GMALI based on the agreement between the landless houseowner and the seller. Land registration fees were also waived on the recommendation of GMALI. However, collecting all the documents at each step of verification, approval, land measurement,

Table 7
Status of approval of land assistance for the landless.

Approval of land assistance	Houseowners (no.)
In-situ land regularisation	10,287
Additional grant assistance for land purchase	535
Allocation of alternative public land	105
Land procured by the owners on their own	236
Approved but land yet to be facilitated	367
Built on public land without awaiting approval	21
Total	**11,551**

Source: Update Report of Durable Solutions as of 30 June 2020.

and registration was a long and complex process making it extremely difficult for the vulnerable households with little resources they had. Looking at geographic constraints of households, each visit to district headquarters where GMALI, land registration office, District Coordination Committee are located involved significant time, effort and cost. Despite such difficulties, significant number of landless households (11,551) have received land ownership, which indicates need, priority and effectiveness of the policy framework. Setting up of Land Rights and Recommendations Committee at the district level to decide upon land registration was an empowering provision for the municipalities and effective for addressing this issue.

3.7. Access of the vulnerable to design and technology

For the communities in Nepal, the house is not merely an engineering product, but it is a result of the socio-cultural and economic processes in interaction with local climate and environmental resources. While discussing the access of the poor and vulnerable households to design and technology, there is need to examine both dimensions – the engineering as well as the socio-economic. An approach towards design and technology in Nepal is an example of implementing stricter building norms with the changed perception of seismic risks by the engineers. Prima facia observations show that the engineers' preference is biased towards 'modern' industrial materials such as cement, steel, etc. Traditional materials such as stone and mud, and construction systems had limited adoption primarily due to engineers' limited knowledge and a lack of confidence in these materials and systems besides a lack of established engineering methods to design of houses using these materials.

Design and technology have been of significant focus for the post-earthquake reconstruction in Nepal and were seen as a panacea for disaster risk reduction. PDNA identified maximum damage in low-strength masonry houses [32]. DUDBC prepared two volumes of the building design catalogues that became the basis for house reconstruction in all the earthquake affected areas [16,17]. Compliance with these designs and technologies was mandatory for receiving the instalments of financial assistance offered to the houseowners. Unlike other South Asian experiences, Nepal's approach included both traditional and modern materials and technologies. Though conceptually, the need to include traditional building typologies was understood, insistence was made to use only what could be vetted through the engineering models to meet safety standards of Nepal Building Codes (NBC). While the basis of stipulated norms remains a matter of debate, the design catalogues offered little flexibility for customising the designs as per the needs of the household, climate, site, functions or owner's affordability. When using reinforced cement concrete (RCC) and cement-based construction system, technical guidelines were made available to allow modifications in designs to suit people's own preference and needs. However, traditional technologies were limited to be used only with pre-approved plans in volume 2 of the design catalogue. For any modifications in design when constructing with traditional technologies, structural analysis was made mandatory [17]. In practice, any modification to the designs in the catalogues was considered non-compliance if not supported by structural analysis. For many of the alternative designs prescribed in the catalogues, inspection norms were never developed and therefore, severely limited their use for reconstruction. This approach resulted in a shift in the building typologies for construction of houses. Table 8 based on the data collected from eight municipalities provides an understanding on this shift and Table 9 explains the typologies adopted by the vulnerable.

As evident from the data, the reconstruction programme led to a significant change in housing typologies in the earthquake affected areas - from stone and mud-based construction to cement and steel-based construction (Tables 8 and 9). Proportion of low strength masonry houses reduced drastically. From 76% in pre earthquake situation to only 11% in post-earthquake reconstruction in urban areas. Similarly, in rural areas the proportion of low strength masonry went down from 95% to 41%. Cement based building typologies saw very significant rise. In urban areas, these typologies increased from 15% to 72% and in rural areas the increase was from 4% to 48%. Discussion with the houseowners and community representatives revealed two factors that influenced this process - i) orientation of engineers who guided and certified for grant assistance, and ii) lack of clarity in compliance norms for traditional or alternative construction systems. The other factors such as limited number of approved designs using traditional materials, perceived safety of modern buildings and notion of progress in the communities. This shift in typologies has completely changed the architectural milieu in earthquake affected areas leaving them bereft of the rich cultural heritage that the traditional construction technologies resulted in. This raises issues about how desirable the change is in terms of hazard resistance, socio-cultural aspects and environmental sustainability. An increasing proportion of cement-based load bearing and RCC frame houses could be an indication of improved hazard resistance of new houses. But this is a particularly complex issue. On one hand one would tend to assume the improved performance of houses during hazards with compliance to the building norms, on the other, there is a likelihood of greater risk if the quality compromises were made due to cost constraints, lack of timely technical guidance and unfamiliarity with technologies. However, more detailed studies may be required to know the extent of hazard resistance achieved in the newly constructed houses. Sustainability of the shift in the building typologies, particularly in the context of the poor and vulnerable and likelihood of negative socio-cultural and environmental impacts. Further to this, issues of extensions, modifications and maintenance might ultimately lead to mixed and hybrid structures compromising hazard resistance in absence of appropriate technical advice and affordability.

3.8. Access of the vulnerable to administrative and facilitative mechanisms

Housing is not merely a product but also a process involving access and delivery of finance, materials, land, design, technology, information, and skills. Such a process needs navigation through each stage of damage assessment, participation agreement, banking, land procurement, approval for building design, building permit, compliance to construction norms, inspection and certification, completion report, and grievance redressal. These processes were complex and exhausting for the earthquake affected vulnerable houseowners.

The process of damage assessment, the first and foundational step for housing reconstruction, was too complex and earthquake affected communities remained uninformed about the classification and basis for eligibility for housing grant assistance. There were repeated appeals for grievance redressal by the people, and multiple rounds of verification and resurvey process were undertaken.

Municipalities have lacked capacities to ensure compliance to the building codes through the permit process and that had resulted in poor quality housing stock in past [1,25]. The building permit process at the municipality level would have ensured compliance with the building bye laws in

Table 8
Changes in housing typologies in eight municipalities of Gorkha district.

Building Typologies	Prevalence % (urban)		Prevalence % (rural)	
	Pre-earthquake	Post Reconstruction	Pre-earthquake	Post Reconstruction
Low strength masonry	76	11	95	41
Cement based load bearing	15	72	4	48
RCC frame structure	9	17	1	11

Source: Primary data collected by UNDP, Nepal.

Table 9
Adoption of different typologies by the vulnerable in eight municipalities of Gorkha district.

Building Typologies	Prevalence % (urban)		Prevalence % (rural)	
	Vulnerable households	Other affected households	Vulnerable households	Other affected households
Low strength masonry	13	9	44	34
Cement based load bearing	73	72	45	55
RCC frame structure	14	19	11	11

Source: Primary data collected by UNDP, Nepal.

accordance with the development plans. Post-earthquake, many urban municipalities made it mandatory for the houseowners to get approval of the building plans. However, the limited availability of engineering services there resulted in either unauthorised construction or a significant expense of hiring private consultants. This was particularly challenging for the poor and vulnerable. Field studies in Gorkha municipality indicated that the costs for engineering services to obtain building permit from the municipality were between NRs5,000 (≈$50) for a load bearing house to NRs25,000 (≈$250) for RCC frame house. A quick estimate shows that services offered by Gorkha and Palungtar municipality with assistance from UNDP helped nearly 2600 houseowners (Table 10) so far with saving of approximately $270,000 to the houseowners while ensuring authorised construction as per the municipal bye laws. Nearly 25% of total households assisted through these services were the vulnerable. A few building permits were rejected due to issues of lack of right of way, inadequate documents or unclear land titles. Many houseowners who had constructed the house without building permit also needed to be facilitated for rectification and approval. These needed to be resolved on case to case basis. However, such services have been limited and a large number of vulnerable families in other urban municipalities have to make significant expense to obtain building approval.

One of the most challenging aspect of the administrative processes for the vulnerable has been technical guidance during construction and subsequent certification of stage completion. Lack of information and advice at the time of construction resulted in rejection unless rectified as per the feedback of the engineer. The modality of feedback after the construction was a problem for the vulnerable houseowners who had to spend significant costs on rectification [42]. Two separate mechanisms were needed for providing on-site technical advice and certification after each construction stage to avoid conflict of interest and improve effectiveness of the process. However, the NRA continued to rely only on one engineer deputed at the ward level to fulfil both the tasks. At the same time, houseowners depended on the petty contractors or the head masons to follow the technical norms who were not so aware. Largely, the owners remained responsible to ensure compliance of technical norms in their houses without adequate information and technical inputs from the government. This gap was fulfilled by other supporting agencies to some extent in the limited geographic area of their presence. This could be one of the major cause of observed poor construction quality compromising hazard resistance of the newly constructed houses to any hazard in the future.

4. Conclusions

Nepal's post-earthquake housing reconstruction offers many lessons relevant not only to Nepal but globally, particularly on the inclusion of the poor and vulnerable. Recognising the complex interaction of context, needs, capacities, and challenges during the process of reconstruction improves our understanding of owner-driven reconstruction.

Table 10
Building permission for house reconstruction in Gorkha and Palungtar upto July 6, 2020.

Building Permission Process	Gorkha	Palungtar
Total applicant houseowners	1173	1493
Applicant for new construction	427	763
Applicants for as built approval	720	717
Building approvals obtained	804	705
Building approvals rejected or cancelled	26	13

Source: Primary data collected by UNDP, Nepal.

Nepal's reconstruction and recovery policies and implementation mechanisms evolved slowly and were refined and expanded as housing reconstruction progressed and the needs and challenges became more evident. Specific provisions for additional financial assistance to the vulnerable and securing land ownership for the landless along with the use of instruments vested with municipal governments were the hallmark of the 'owner driven reconstruction framework' in Nepal. However, the policy formulation, though essential, is only a first step for enabling recovery process of the poor and vulnerable. It has to be followed with instituting of mechanisms and modalities that are people-friendly and convivial so that the vulnerable households can access their entitlements in timely manner without barriers. Certain implementation mechanisms particularly for damage categorisation, identification of vulnerable families, disbursement of top-up grant assistance and subsidized loans could not be as effective as envisaged and hence, inclusion of the vulnerable though well-intended in the policy framework remained limited.

Identification of the poor and vulnerable was not easy and simplistic criteria were inadequate given the multi-dimensional complexities of socio-economic factors. The weak agency of the poor and vulnerable makes them silent and therefore, invisible. The policy formulation needs to be refined through more in-depth understanding of the myriad forms of the socio-economic vulnerability allowing the invisible to become visible.

Access to the housing finance remained another difficult issue in the reconstruction process. Due to partial financial assistance from the NRA and failure of the subsidized bank loan schemes, many poor households not only constructed much smaller houses than they had before, but also had to borrow money from informal sources at highly exploitative interest rates. There is a risk that the increased debt burden on the poor and vulnerable households can perpetuate deeply entrenched power dynamics of social hierarchies further diminishing their agency.

The security of tenure for the landless through ownership of the homestead land was an unprecedented and remarkable inclusion in the policy framework and its implementation. Though fulfilling land entitlement is a complex process, strengthening of local governments through the devolution of power made this process feasible and effective. However, this policy intervention has also been a missed opportunity to further the cause of social justice in terms of ensuring an equal land entitlement to be held jointly by the women.

It is also amply evident that there has been a major shift in housing typologies in earthquake-affected districts from stone and mud-based masonry to cement based construction. Though more evidence is still required, it is likely that potential hazard performance of new houses may have improved. However, the control of the design process which traditionally had been rooted within the communities through artisanal practices has been shifted to the domain of engineering experts. This has made the communities, artisans in particular, passive recipient of information on hazard resistant design and technology. This also poses a challenge to the sustainability of disaster risk reduction efforts, if the communities lose control over their own construction processes in name of social welfare and safety. Socio-technical facilitation of the vulnerable houseowners, wherever available, helped the poor and vulnerable in mandatory administrative and technical compliances. But it is important to recognise that the design and

technologies have to be perceived within the framework of community empowerment and not merely seen through the engineering perspective. Without an empowerment perspective, the process would violate the basic tenets of 'owner driven reconstruction'.

For effective and inclusive post-disaster reconstruction, mere identification of the mechanics and procedures of implementation is not enough. Policies and implementation mechanisms need to be formulated with the understanding of pre-existing forms of socio-economic marginalization in order to address those barriers. The poor and vulnerable are better enabled to access their entitlements when the governance shifts from upper echelons of the government to the local governments. The key to their more equitable and effective inclusion is likely to be the transformation of development planning and governance processes enabling the praxis of the communities to influence and lead their own recovery process.

Declaration of Competing Interest

None.

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