International Journal of Disaster Risk Reduction 15 (2016) 52–60

Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

journal homepage: www.elsevier.com/locate/ijdrr

Remittance and earthquake preparedness

Bikram Manandhar

61, Koba Lane, Banepa-8, Kavre, Nepal

ARTICLE INFO

Article history:
Received 10 August 2015
Received in revised form
6 December 2015
Accepted 6 December 2015
Available online 10 December 2015

Keywords:
Remittance
Earthquake
Building code
Migrant worker
Remittance dependent household
Ex ante preparedness

ABSTRACT

Nepal is located in a highly active seismic zone. This has been evident from the 7.8 magnitude tremor that was felt on April 25, 2015 with numerous aftershocks. In light of a lot of financial aid that started pouring in from numerous humanitarian organizations, the supports received from remittances have been largely forgotten. This research aims to determine the role of remittances in ex-ante disaster preparedness through the linkage between remittances and safer building practices. The primary source of information comes from two questionnaire surveys: (1) administered to migrant workers in Qatar and South Korea and (2) administered to remittance dependent and non-dependent households in Kathmandu valley and Jhapa. The study shows that there is a significant contribution of remittances in building construction practices. From the surveys conducted in Kathmandu valley and Jhapa, it is seen that remittance dependent households allocated 20% of remittance income received in last 12 months for construction practices. Similarly, migrant workers in South Korea and Qatar allocated 18.1% and 7% of remittances for construction purposes back home. In terms of ex ante preparedness, remittance dependent household have a statistically significant and positive impact on the ownership of concrete houses. In contrast, regarding use of engineer and awareness of building code for safe construction, the likelihood of the remittance contributing to better quality and strong house using engineer and awareness of building code for safe construction tends to decrease. Thus, the study shows that remittances are fueling unsafe construction practices in Nepal and increasing earthquake risk.

1. Introduction

Nepal located on a highly active seismic zone, where the Indian and Eurasian plates converge, hit by 7.8 magnitude earthquake on April 25 2015, and big aftershocks on April 26 and May 12 tolled 8898 of death, injured over 22,309 and 893,786 house damaged leaving millions of people displaced, mostly from 14 most affected districts including Kathmandu valley [14]. According to the Post-Disaster Need Assessment (PDNA) report prepared by the National Planning Commission (NPC), housing and human settlement sector suffered loss of Rs 350.37 billion [1]. Most of the houses damaged in the earthquake were *kachhi* (mud and stone bonded houses) and those constructed without following the building code. This earthquake is the worst disaster to hit Nepal since the 1934 earthquake, which is followed by 373 aftershocks with local magnitude ≥ 4. Now, the disaster response as a whole has moved on to a second phase of providing temporary shelter that help people survive the monsoon. Nepal has urbanized at an alarmingly rapid and haphazard pace, becoming the fastest urbanizing country in South Asia. This haphazard urbanization, which has created unplanned cities with high population density, has increased vulnerability to earthquake drastically. With rapid urbanization, a key issue to minimize the creation of new risk is by ensuring new buildings are constructed with earthquake safety standards incorporated. In order to reduce earthquake vulnerability, particularly in urban areas, the current approach has focused on the policy and legislative aspects of earthquake resistant structures and the institutional capacity to enforce these regulations. Nepal has established National Building Codes 2064 but effective enforcement and compliance with these standards is lacking. In particular, there are efforts, supported by the Government of Nepal and international and national organizations, aimed at strengthening capacity on the supply side of earthquake building safety. These initiatives include training engineers and masons in safety standards and developing systems within municipalities to enforce building codes, such as incorporating building codes into the building permit system. There has been less focus on the demand side of construction safe practices, whereby potential homeowners demand that the building of their houses follow earthquake resilient techniques. However, a current gap in this area is understanding the driving force behind building construction, i.e. what group(s) are building houses in Nepal.

Nepal has a long history of labor migration and during the first decade of 21st century, exporting 'Nepalese hands' to different countries to earn remittances became a major focus in Nepal. Lack

E-mail address: manandharbikram@yahoo.com

http://dx.doi.org/10.1016/j.ijdrr.2015.12.003
2212-4209/

of home base employment opportunities and globalization more than 2 million Nepalese have migrated for foreign employment, leaving their family behind to the middle income countries, mostly to Malaysia or the Gulf States or South Korea. According to the Department of Labor and Employment (DoFE), there has been a steady increase in the total number of labor permits issued for foreign employment. A total of 2226,152 labor permits were issued over the six-year period, representing a staggering 137% increase between 2008/09 and 20013/14, which represents about 8% of Nepal's total population [2]. The increasing trend of labor migration for foreign employment makes remittance a significant source of income of Nepalese household which has penetration and coverage across the country, sharing 29.1% of countries GDP. In addition to these formal accounting, there is a large share of money transferred to Nepal through Hundi or other informal transactions. According to an economic survey from 2013/14 remittance inflow has attained a higher growth rate of 34.1% to Rs. 356.72 billion in the first eight months of the current fiscal year as compared to a 22.2% rise in the same period of the previous fiscal year [3]. The last decade has not only seen a significant increase in remittance flows to Nepal; there has also been a tremendous growth of urban areas, with many cities, including the Kathmandu Valley, achieving annual growth rates of 4% [4].

1.1. Remittance's role in disaster response and use in construction practices

There is substantial evidence of how remittances sent by migrants abroad contribute to ex-post responses by which households try to insure against shocks in disaster prone regions. Studies shows that remittance react adverse exogenous shocks positively and play important part in how people survive and recover [11,8,9]. Remittance usually increases in times of crisis and directly contributes to household income. For example; In Pakistan after a devastating earthquake in 2005 migrant remittances were important factors in disaster recovery and reconstruction [6]; In Bangladesh remittance is a key element in the economy's resilience to monsoon floods [5]; In Haiti remittances and other supports from migrants abroad played a more effective role in the post-disaster recovery and rehabilitation [12]. Remittance-receiving households in the Aceh region of Indonesia were found to have recovered faster from the 2004 Tsunami though because of immediate relief provided by migrant remittances [7]. Increased remittances helped to smooth household consumption and compensate for the loss of assets after an earthquake in El Salvador in 2001 [13]. In the Philippines, remittances increase when country is struck by a hurricane shows that remittances inflows from abroad replace about 60% of rainfall- induced losses of household income, consistent with an insurance motive of remittances [10,11]. In Nepal, there is a huge increment in remittance inflow during the tenth and eleventh month of FY 2014/15. Remittances aggregating about Rs. 63 billion flowed into the country during each of those months compared to an average inflow of Rs. 47 billion in the earlier months [30]. A study conducted by Centre for the Study of Labor and Mobility, immediately after the earthquake showed that "money" sent by Nepalese migrant was very important for their family members to deal with the aftermath of the earthquake. This surge has been attributed to migrant workers transferring money to rebuild their damaged houses after the quake.

There is an emerging consensus in the literature that migration and remittances are part of an overall livelihood strategy. But it is still a matter of debate, in the current literature, how remittances, particularly in developing countries, are spent [15] (Adams, 2011). However there is a general consensus across the literature that international remittances do lead to a reduction of poverty [16]. In numerous studies, it has been found that remittances have been used to purchase food, repay loans, pay for health and education, purchase consumer goods and construct or repair houses: Afghanistan [17]; India [18]; Nepal [19]; and Pakistan [20]. With increased disposable income, households receiving remittances have demonstrated higher likelihood of investing in housing construction or expanding current accommodations. A study in Amman revealed that 44% of remittance receiving households were involved in either building a new home or extending current living arrangements [21]. Brendan [22] revealed that remittances in El Salvador were a vital source of income to fund housing improvements or land acquisition for housing compared to non-receiving remittance counterparts. In Kenya, remittances from Africa were primarily used for the construction of new houses, while those originating outside the continent were utilized for investment [23]. In Touba, remittances have also enriched recipient households as they allocate significant shares of remittances received, between 24.9% and 48.2%, into building houses and other economic investments [24]. In Bangladesh, land purchase and homebuilding accounts among the five major areas of near past use of remittance [25].

As globally, in Nepal, remittances are an important contributor to the acquisition of land and housing construction. A study conducted by Sonar, R.K [28] found that larger number of remittance receivers use their fund to purchase land or buildings in town areas over and above any other investment. Similarly, study conducted by Nepal, R [29] in low land of Nepal found that a considerable amount of remittances were used by the migrants households to buy land and to either construct or renovate house than non migrant households. According to Nepal Living Standard Survey 2011, approximately 79% of remittances in Nepal are used for daily consumption needs with another 7% utilized for loan repayments. Additional uses include acquisition of land, education, construction and establishing businesses. Bhubanesh Pant [26], state there is less risk in purchasing land and construction of houses compare to other investment. Similarly, household budget survey 2006 [27] found that remittances in urban centres were used largely to buy land and a house (52%). A study conducted by UNIFEM/NIDS 2006 found that female migrant worker spends 11.6% of saving brought back from foreign countries for construction of houses, thus remittance is fueling construction practices. However, this growth has happened in an unplanned and haphazard manner, resulting in increased level of earthquake vulnerability. In the aftermath of earthquake in April, issues related to the links between migration and disaster-preparedness as well as coping strategies adopted by the affected population have come to the fore. While the impact of an earthquake is well understood, utilizing the process of remittance to influence households' resiliency and preparedness have not been studied yet in Nepal or globally.

There is little evidence that migration and remittances can foster ex-ante preparedness that reduces the extent of damages in the event of a natural disaster through improved economic and social resilience. In disaster-prone regions or countries, ex-ante actions taken by households with migrants (community and the government) in preparation for a possible disaster can substantially reduce the loss of human life and vulnerability in the aftermath of the disaster. For example, remittances can contribute to disaster preparedness by households by making resources available for investments in house improvements so as to increase their disaster resilience. Studies indicate that households with migrants are slightly better off in terms of socio-economic indicators when compared to non-migrant. Mohapatra, Joseph and Ratha [9] found that households in Ghana and Burkina Faso that receive international remittances are more likely to have houses made of concrete as opposed to less resilient mud and brick houses.

As a result of this information gap on the link between remittances and disaster preparedness, there has not been a concerted effort, policy or implementation-wise, from government or international and national organizations to utilize the process of remittances in reducing disaster (earthquake) risk before the disaster occurs. With the value of disaster preparedness clearly identified across the literature, more emphasis needs to be placed on how remittance spending can positively impact disaster mitigation efforts. Thus, this study aims to determine linkage between the use of remittances and earthquake risk reduction measures applied by migrant worker and remittance dependent household in Nepal.

2. Materials and methods

The methodological framework adopted in the course of the study is shown in Fig. 1. The first step of the method involved a review of secondary information that led to the identification of research questions, objectives and tools. A national stakeholder consultation was organized to share the research objective and methodology with wider stakeholder groups and finalize the research tools and study sites. Based on consultations with stakeholders and information from DoFE, the EPS-Korea Section, Migrant Returnee Associations survey population for individual survey with migrant worker in destination were stratified into two categories; low to medium income earner (migrant worker in Qatar) and medium to high income earners (migrant worker in South Korea) and respondents for remittance dependent and remittance not dependent were identified for the household questionnaire survey in Kathmandu valley and Jhapa, Nepal. Both primary and secondary data were collected for the study. Although migrants live and work in different and distant geographical locations, they continue to participate in family decision-making and the familial pooling of resources with far-away relatives [25]. Thus, the primary source of information was collected from individual questionnaire surveys in destination and household questionnaire survey in Nepal. Pretesting of the questionnaire was carried out with remittance dependent and remittance nondependent households in Kathmandu Valley. Data were collected with an experienced research team in the target study sites, coded and entered into SPSS for analysis. Based on the analysis, a draft report was prepared and shared with stakeholders for comments and critique before finalization.

2.1. Questionnaire survey

The study identified four different target groups for the questionnaire survey in order to obtain a clear and well-rounded understanding of remittances and earthquake risk reduction. These groups are:

Category A: low to medium level income earners (Migrant worker in Qatar).
Category B: medium to high level income earners (Migrant worker in South Korea).
Category C: remittance dependent households (household having at least one family member living abroad since last 6 month for foreign labor employment, where remittance is the major source of income) and
Category D: remittance not dependent households (Respondent from Kathmandu valley and Jhapa who do not have any family member living outside from home for more than week for work).

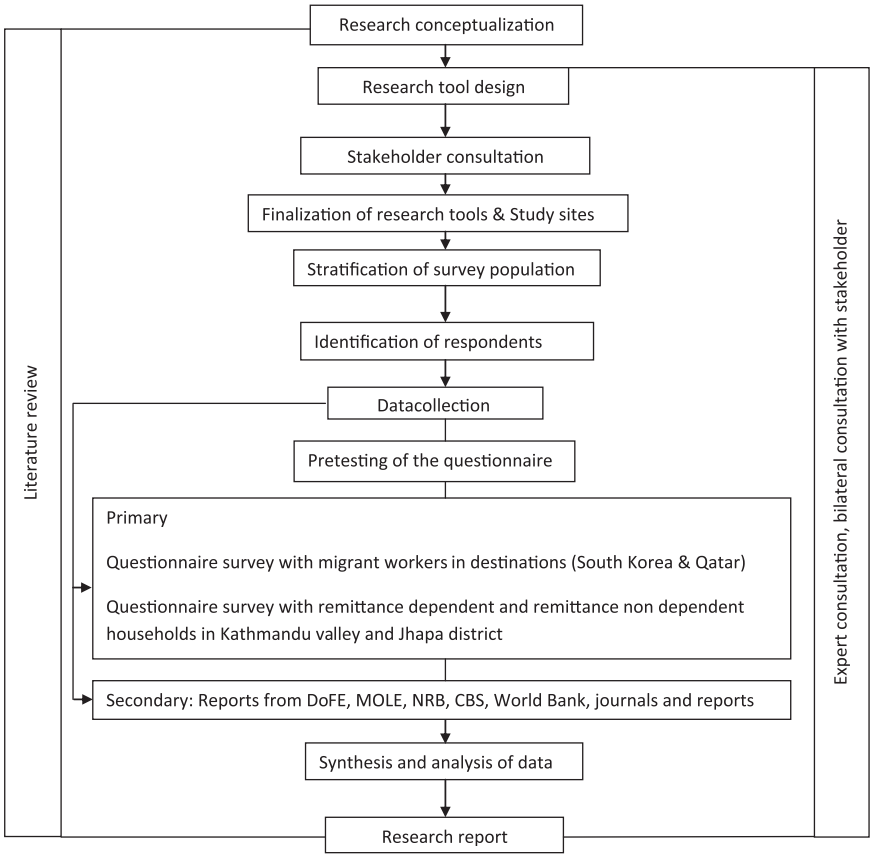

Fig. 1. : Methodological framework of the research study.

Fig. 2. : Study area in Nepal.

This study targeted migrant workers in Qatar (category A), the state that has become the largest labor destination for Nepalese migrants, for medium to low income earners and South Korea for medium to high income earners (category B), which is considered to be one of the best labor destinations for Nepalese migrant workers. In order to draw a comparative analysis and determine the significance of remittances on earthquake risk reduction through building construction, the study also conducted surveys with remittance dependent and remittance not dependent households in well-established urban center of Kathmandu Valley and a small/medium sized but growing urban area of Jhapa District . (Category C and D respectively) (Fig. 2).

2.2. Questionnaire design

A Stakeholder consultation was conducted with organizations related to migration, remittance and disaster preparedness. With participants ranging in background from migrant workers, researcher to media personnel, participants split into 3 groups. Each group was given a draft questionnaire (questionnaire for migrant workers, for remittance dependent households and remittance not households). In these groups, participants went through each question to determine if the question as appropriate and relevant for the objectives of research. The feedback attained from this exercise was invaluable and revised the questionnaire in both substance and structure. Based on consultation finalized the questionnaire for (1) migrant workers in Destination and (2) remittance dependent and remittance not dependent households in Nepal. Questionnaire was divided into 5 different headings personnel information, remittance utilization, building information and remittance utilization decision making process. The questionnaires were translated in local language, tested, revised and then survey was carried out through face-to-face interviews.

2.3. Questionnaire survey in destination

Conducting questionnaire survey in destination was challenging. Finding the suitable organizations and individuals required utilizing professional networks established by NGOs and partners in Nepal. However, once in contact with organizations interested in conducting surveys, we were made aware of the logistical difficulties in each of the countries. For example, in both countries (especially in Qatar), migrant workers work long hours (up to 16 h a day) and live in compounds. Finding the time to reach these migrants to do the survey was a challenge. In addition, there are certain sensitivities in conducting research with migrants in these countries especially in Qatar because of media hype during the research period. Random sampling techniques along with the snow ball approach were used for identifying the respondents in the study sites. In both destinations, questionnaire survey was conducted at labor camps, working sites, company sites and social areas such as parks. Given the time pressure many migrant workers face in these areas (working long hours), some cases required leaving the questionnaire with the migrant worker to be completed and collected a few days later. In Qatar, the questionnaire survey was conducted in Doha, the capital city of Qatar and nearby cities – whereas in South Korea, it was conducted in Seoul, Ghimae, and Bussan. A total of 203 surveys were completed in Qatar and 204 surveys completed in South Korea with migrant worker from Kathmandu valley and Jhapa district during May and June of 2014.

2.4. Questionnaire survey in Nepal

For the household questionnaire surveys in Nepal, the study focused on two destinations; the well-established urban center of Kathmandu Valley and Jhapa District, which ranks as a top remittance receiving district in Nepal. By capturing results from Kathmandu valley and Jhapa district, the study tries to provide insight into two different contexts; a large municipality and a small/medium sized but growing urban area. Stratified random sampling techniques along with the snow ball approach were used to identify respondents. Household questionnaire survey with remittance dependent (category C) having family member as migrant worker in South Korea and Qatar were conducted with the head of household and/or spouse of the migrant worker. In the case of remittance not dependent households, surveys were conducted with the head of household and/or senior member of the household (category D). Questionnaire surveys were conducted at respondent residence during May and June of 2014. A total of 402 and 396 surveys were completed in Kathmandu Valley and Jhapa respectively.

Secondary data were collected from DoFE, MoLE, NRB, Central Bureau of Statistics (CBS), MoF, National Emergency Operation

Center (NEOC) published reports and information materials related to migration, remittances and disasters.

3. Results and discussion

3.1. Respondent profile

3.1.1. Education

Based on the response from migrant workers in South Korea, the majority of respondents (46%) have higher secondary education followed by a Bachelor's degree (27%), secondary level (16%), and Master's degree (6%). In contrast, a majority of respondents in Qatar received only secondary level (38%), followed by higher secondary (24%), and lower secondary (9.5%). The differences in education level is consistent with the study assumption that migrant worker in South Korea will earn higher income and employed in more skilled positions, would have higher education levels.

3.1.2. Age group

The following graph outlines the age groups of migrant workers in South Korea and Qatar.

From Fig. 3 it can be observed that the majority of migrant workers are from the younger age groups. There was an observed age difference among migrant workers from Qatar and South Korea, mainly in the age group of 25–30. This difference may be a result of language test requirements for gaining employment in South Korea where recently graduated college students would have a higher likelihood of passing language tests.

3.1.3. Gender

In South Korea, 95% of the migrant worker participate in questionnaire survey were male with only 5% female and in Qatar, 98% of those surveyed were male with only 2% female. The observed gender imbalance in the study is because of the majority of formal male migrant for foreign employment. According to the DoFE, of all migrant workers who left for Qatar from 2006 to 2014, less than 1% of them were female and according to the EPS Korea Section records, a total of 25,216 labor migrants South Korea under EPS where only 1531 were female since 2008 (Table 1).

There was more balance between male and female respondents in Nepal, which was expected for this study. The following table outlines the gender of respondents in Nepal:

As the above table highlights, remittance dependent households had a higher percentage of female participate in survey than remittance not dependent households. Again, this is consistent with skewed gender balance of migrant workers as the majority of migrant workers surveyed were male, meaning remittance dependent households would be more likely to be headed by a female (Fig. 4).

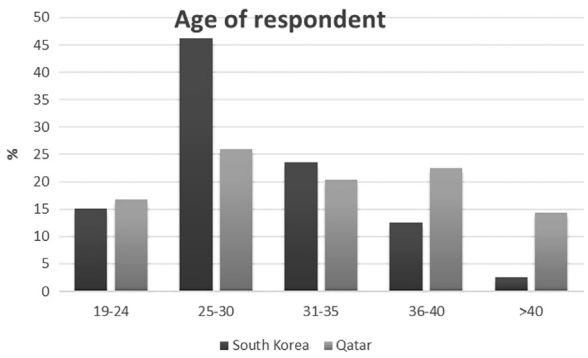

Fig. 3. : Age group of the respondent in destination.

Table 1
Gender of respondents in Nepal.

Study Site	Remittance not dependent household		Remittance dependent household	
	Male	Female	Male	Female
Kathmandu valley	67%	33%	50.5%	49.5%
Jhapa	66%	34%	49.5%	50.5%

3.1.4. Duration in current foreign employment

Figure above shows the migrant workers in Qatar are in current foreign employment for longer duration than migrant worker in South Korea. Among 203 migrant worker surveyed in Qatar, more than 56% respond they have been working in current employment for more than 3 years, 17% from 2–3 years, 13% from 1–2 years, 5% have been working from 6–12 months whereas 8% of them have been in current job for less than 6 months. In case of migrant worker in South Korea, 30% of the respondents have been working in current foreign employment from 2–3 years, 28% from 1–2 years, 21% for more than 3 years, 12% have been working from 6–12 months and only 8% of them have been in current job for less than 6 months.

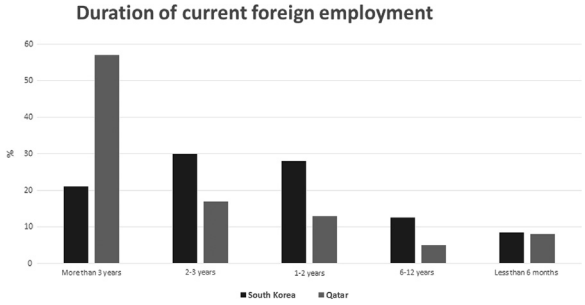

Fig. 4. : Duration of current foreign employment.

3.2. Relationship/link between remittances and building construction

The study identified there is clear linkages between remittances and building construction practices, particularly from migrants in South Korea. Among the 204 respondents in South Korea, 139 provided detailed accounts of remittance investments over the previous 12 months (i.e May/June 2013–May/June 2014). For migrant workers in South Korea, 37% of remittances were used for savings. The term 'savings' is generic and could include allocations towards construction related practices. This is followed by 14% for food, 4% for consumable goods, 13.3% for the construction of a new home, 3.3% for the addition of a floor to the existing home and 1.5% for repairs of an existing home; or a total of 18.1% of remittances explicitly allocated for construction related practices.

In contrast, of the 203 respondents in Qatar, only 106 provided detailed information on remittance investment in the previous 12 months. (Naturally migrant workers who have been abroad for more than a year simply may not have detailed information on contribution of remittance on household investment and expenditure as well as they were reluctant to reporting the amounts and uses of remittances to outsiders). Unlike in South Korea where a large portion of remittances were used for construction related practices, only 7% of remittances were allocated towards construction related practices. This is followed by 23% savings, 9% for food, 13% for consumable goods, 14% for buying motorbikes. The difference in construction practice between migrant workers in

South Korea and Qatar is consistent with the study assumption that medium to high income earners (Category B) would be more likely to invest in construction and housing than lower income earners (Category A).

The overall high allocation of remittances towards construction related practices was reinforced by respondents from remittance dependent households in Kathmandu and Jhapa. In Kathmandu, remittance dependent households stated that, in the previous 12 months (i.e. May/June 2013–May/June 2014)., 18% of remittances were allocated towards construction related practices (building a new home, addition of a floor, and repair of existing home) followed by 19% for food, 14% saving, 12% for repayment of loan. In Jhapa, remittance dependent households stated that, in the previous 12 months, 22% of remittances were allocated towards construction related practices, followed by 19% for food, 19% saving and 9% for repayment of loan.

Based on the response from migrant workers, specifically within the Category B and remittance dependent households, indicating a greater likelihood of investing in construction related activities thus fueling the construction habits.

3.3. Intend to build new house

Just as important as how remittances have been used for construction practices is the intention to build new house. This study set out to determine if remittance dependent households were more likely to build a new home in the short to medium term.

Of the migrant workers surveyed in South Korea, 66% stated that they intend to build a new house in the next two to five years with 34% stating they do not have intention to build a new house during that period. Similarly, 38% of migrant workers in Qatar stated intent to build a new house in the next two to five years with 62% responding that they had no intention to build new house within that period. This highlights the significant difference between the two category migrant workers intend to build a new house where chi square test statistic (chi square=40.456) was $p=.000$, less than the alpha level of significance of 0.005, with medium income earners in South Korea displaying a higher likelihood of utilizing remittances for construction related practices. Although, it should still be noted that a high percentage of migrants from Qatar also intend to build a new house in the next two to five years.

The intent to build a new house is significantly higher for remittance dependent households than remittance not dependent households (the probability of the chi square test statistic (chi square=24.670) was $p=.000$, less than the alpha level of significance of 0.005 which shows evidence of significant difference between remittance dependent and remittance not dependent households), particularly in Kathmandu where 59% of remittance dependent households expressed the intention to build a house in the next two to five years. This is compared with 35% of remittance not dependent households who intend to build a house in the next two to five years. The figures are more balanced in Jhapa, where 52% of remittance dependent households expressed the intent to build a new house in the next two to five years versus 41%. The reason for the large gap between Kathmandu and Jhapa would need further research, but the difference in costs associated with land and construction may play a role where higher costs in Kathmandu would require additional remittance income for construction to take place.

Regardless, the study on migrant workers, particularly the Category B (medium to high income earner/South Korea) and remittance dependent households Category C clearly indicates the critical role remittances play in driving construction and the intention to build new house in the short to medium term.

3.4. Building code compliance and remittance use

With a clear linkage between remittances and construction practice established, study also examine whether this is exacerbating earthquake risk in Nepal where house structures are moving from traditional mud stone/brick wall with wooden piers and beams and sloppy roofs of wooden trusses of light materials to cement mortar and RCC pillar and beam with cemented ceilings. The later has greater dead load, and if not constructed properly as it is happening, increases the susceptibility to hazards. National Building Code of Nepal emphasize use of engineer for design and construction of earthquake-resisting engineering structure as an important aspect of building code implementation. But, appropriate engineers are rarely consulted for supervision and designs are not properly followed in construction. Of those surveyed in Kathmandu, 31% of remittance not dependent households and 35% of remittance dependent households did not use an engineer while constructing their home. These figures are higher in Jhapa where 53% of remittance not dependent households and 58% of remittance dependent households did not use an engineer in the construction of their home. The difference between Kathmandu valley and Jhapa based respondents requires further research but several reasons could be attributed to the difference including implementation of building codes by local government, awareness levels or different stages of urbanization between Kathmandu valley and Jhapa. However, awareness of the existence of building codes remains low with over 50% of households in Kathmandu valley and Jhapa expressing a lack of explicit awareness of building codes. The lack of awareness of building codes would lead to the reasonable assumption that construction of homes is not prioritizing earthquake safe issues. Despite this lack of awareness on building codes, 63% of households in Kathmandu valley and Jhapa expressed confidence that their homes are safe from earthquakes.

The combination of remittance utilization for construction practices with an overall low awareness of building codes and no use of engineer for construction by remittance dependent households along with remittance not dependent households, and high intent to build a new house for remittance dependent households it can be assume that remittances are fueling unsafe construction practice and increasing earthquake risk in Nepal.

This result highlights the need for Government and non-governmental organizations to develop a more concerted effort in ensuring greater public awareness and demand for building code compliance with new construction. Greater public awareness should focus both on remittance dependent and remittance not dependent households and migrant workers, who maintain significant influence on how remittances are used.

3.5. Ex-ante preparedness of remittance dependent households for earthquake

3.5.1. Differential impact of remittances

Using the household questionnaire survey data, ex-ante preparedness of households in well-established urban center in Kathmandu valley and small/medium sized but growing urban area of Jhapa was determined. The endogeneity of remittance receiving status has been controlled for in the analysis. The propensity score matching method has been used to construct comparable households on the basis of observable household characteristics of the respondents.

Materials used in the construction of the house reflects the preparedness of households in the face of rapid-onset disasters – more so in the case of earthquake. Comparatively, concrete houses tend to be more resilient while houses made of mud and stones/bricks tend to be more prone to damage in the event of an earthquake.

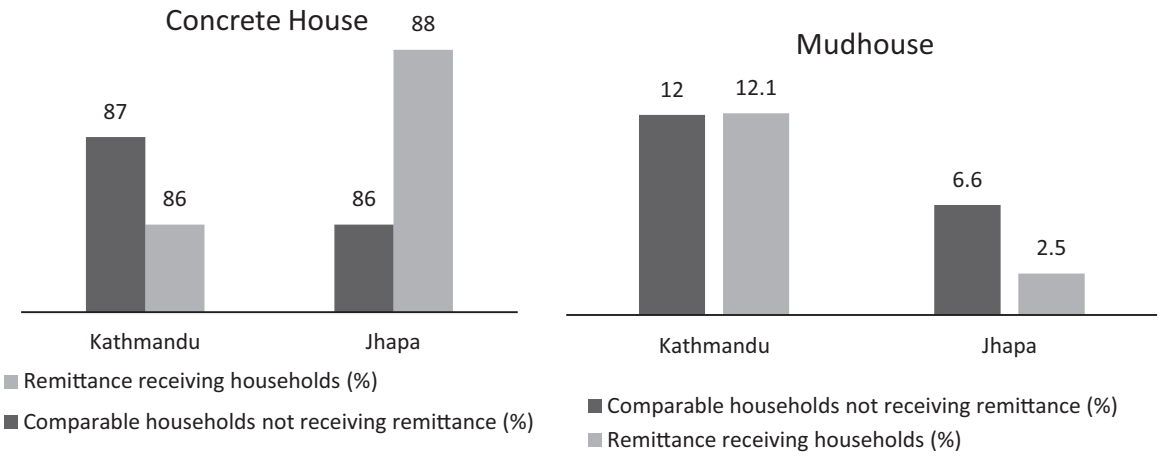

Fig. 5. : Household amenities of remittance dependent and remittance not dependent household.

After controlling for endogeneity of remittance receiving status, it can be observed from Fig. 5 that roughly around 86% of the households with both remittance dependent as well as remittance not dependent household status own a concrete house. In the case of mudhouses, around 12% of remittance dependent as well as remittance not dependent households in Kathmandu valley own a mudhouse. It appears to be different in the case of Jhapa. 6.6% of remittance not dependent households in Jhapa own a mudhouse versus 2.5% in the case of remittance dependent households.

3.5.2. Significance of remittance on owning concrete house and mudhouse

Overall, the probit regressions show that remittance dependent household have a statistically significant and positive impact on the ownership of concrete houses. Similarly, it also shows that remittances have a negative and significant impact on having mudhouses (Table 2).

3.5.3. Resiliency check through use of engineer and building code awareness

In terms of resiliency, it would not be wrong to say that the owners of concrete houses tend to be better prepared to cope with the earthquake in terms of safety. However, it is essential to take the quality of the construction in consideration when judging the resiliency of the house or building structure. Yet, they appear to have been driven less by a concern to construct an earthquake-resistant structure and more with being able to afford a 'modern' house (Table 3).

Here, the odds of a remittance dependent household using an engineer can be calculated as follows:

$\exp(-0.318) = 0.728$. Hence, the odds of a remittance dependent household using an engineer reduces by $(1 - 0.728) = 27.2\%$

The results show that the odds of a remittance dependent household using an engineer to build a concrete house is decreased by 27%. This shows that the likelihood of the remittance contributing to better quality and strong house using engineer tends to decrease.

Similarly, the results of a logit regression shows that the odds of a remittance dependent household being aware of building codes reduces by 61%. This shows that the likelihood of the remittance dependent household being better aware of building codes tends to decrease (Table 4).

$\exp(-0.944) = 0.39$. Hence, the odds of a remittance dependent

Table 2
Probit regressions to check the impact of receiving remittances on housing amenities of remittance dependent households.

	(1) Remittance receiving status
Concrete House	0.298* (2.38)
_cons	-0.253* (-2.19)
N	794
t statistics in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

	(1) Remittance receiving status
Mudhouse	-0.608*** (-4.29)
_cons	0.0721 (1.52)
N	794
t statistics in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Table 3
A logit regression was run to check for the relationship between remittance receiving status and the use of engineer.

	(1)
	use_engineer
Remittance	-0.318*
receiving status	(-2.13)
_cons	-0.433***
	(-4.20)
N	787

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 4
Logit regression to check the relationship between the remittance receiving status and the awareness of building codes.

	(1)
	building_codes
Remittance	-0.944***
Receiving status	(-4.40)
_cons	1.111***
	(7.02)
N	406

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

household being aware of the building codes reduces by $(1-0.39)=61\%$

3.6. Decision making relationship on the use of remittances and migrant communication with households

Migrant workers do not simply transfer remittance income to households; they also maintain strong influence on how the remittances are utilized by the receiving household. Of the migrant workers surveyed in South Korea, 52% described their involvement in household decisions related to remittance use as high, followed by 40% moderately involved, 7% less involved and 1% not involved. In Qatar, 36% of migrant workers indicated high involvement in decision making of remittance use, followed by 35% moderately involved, 22% less involved and 7% not involved. From the above response we can conclude that migrant workers maintain close and influential relationship with households and it can be assumed that income earner have a high involvement in decision making on spending his/her earnings.

While enquired about family involvement in remittance utilization. Among 200 households in Kathmandu valley who respond on their involvement in remittance utilization 16% of them respond have high involvement, followed by 71% with moderate involvement, 9% less involvement and only 5% of households respond they are not involve in decision making process. But in case of Jhapa, more than 53% of remittance dependent households respond family member are highly involved in remittance utilization, whereas 30% are moderately involved, 15% are less involved and just 3% family have no any involvement in remittance utilization. It shows that family member are moderately to highly involve in remittance utilization decision making process in both the study site.

In terms of final decision maker on how money received from remittance is to spent, there observe father and spouse of migrant

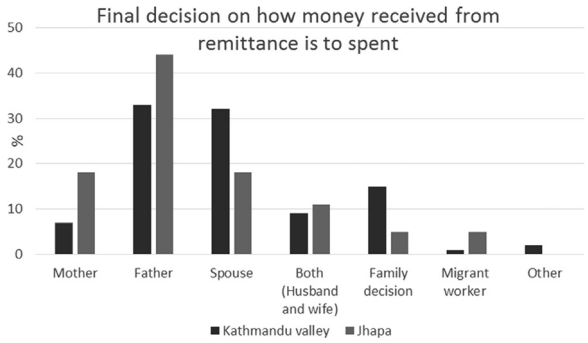

Fig. 6. : Final decision on how money received from remittance is to spent.

member are the final decision maker. In comparison to Jhapa, spouse (female member as most of the migrant family member are male) of remittance dependent household in Kathmandu valley have more significant role on final decision making on remittance spent (Fig. 6).

When it comes to communication between migrant workers and households, the majority of migrant respondents in South Korea and Qatar indicated mobile phone as the preferred method of communicating with households, followed by Facebook/Skype.

When communicating with the household, the focus of the conversation for migrant workers in South Korea and Qatar is on family welfare (health and education) followed by gossip, and general news. In the case of South Korea, migrant workers are more likely to discuss the use of remittances. While communicating with family members, 33% and 1.5% of migrant workers from South Korea and Qatar respectively responded that they communicate about earthquake related topics with family members when they experience earthquake events in Nepal or abroad (Fig. 7).

This research highlights the high involvement of migrant workers and family member in decision making related to remittance use and the high frequency of contact between migrant workers and remittance dependent households through which information related to family welfare, news and remittance use is shared. The strong relationship and communication between migrant workers and remittance dependent households presents an opportunity to promote knowledge transfer and influence remittance use for earthquake safety when building a house.

4. Conclusion

The study provides several important findings that should be considered by Government and development partners. These are:

1) There is a link between remittances and earthquake risk

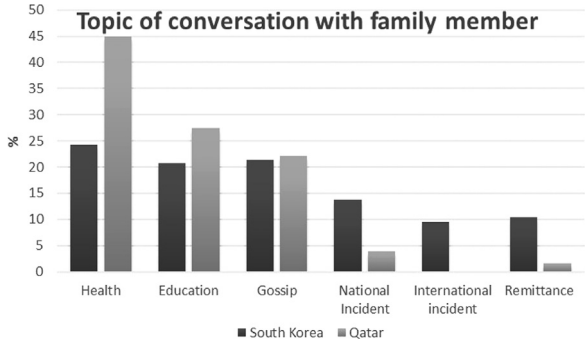

Fig. 7. : Topic of conversation with family member.

Particularly from the Category B (medium income earners/ South Korea), a significant portion of remittances is being invested in construction practices, from building a new home to adding a floor or repairing a home. In addition, migrant workers from the South Korea and remittance dependent households are significantly more likely to build a new house in the next two to five years. With overall low awareness of building codes or earthquake safety practices, the use of remittances to fund construction is very likely to contribute to earthquake risk as newly constructed homes will not be safe from earthquake.

2) It is critical to reach target group to promote building code implementation
   It is not the quake but their poorly constructed houses that kill people. For this, migrant workers as well as remittance dependent and not dependent households themselves need to strictly adhere to the building code in any kind of construction as their security is involved. Thus study highlights the need to focus communications efforts and raising awareness of building codes to support efforts to generate and promote demand for safer building practices and to ensure remittances can be used effectively for safer construction practice and building earthquake resilient society.
3) Migration and Ex ante disaster preparedness
   Remittance dependent household have a statistically significant and positive impact on the ownership of concrete houses. Yet, they appear to have been driven less by a concern to construct an earthquake-resistant house and more with being able to afford a 'modern' house. Similarly, regarding use of engineer and awareness of building code for safe construction, the likelihood of the remittance contributing to better quality and strong house using engineer and awareness of building code for safe construction tends to decrease. With the slight linkage between ex ante preparedness and remittance transfers resulting from migration indicates that improving resilience against natural hazards is not only a function of access to economic resources (e.g., remittance utilization in construction practices) but depends on factors such as use of engineer for safe construction, knowledge about building code, awareness on disaster preparedness programs, etc.
4) Sendai Framework for Disaster Risk Reduction 2015–2030 has recognized role of migrant' worker knowledge and skills in building community resilience. Thus, in line with the broader need to ensure remittances contribute to Nepal's development, it is critical for the Government of Nepal to develop a strategy and corresponding policy that promotes the use of official remittances for safe purposes. Mainstreaming disaster risk reduction into remittance use should not only be a Government priority, implementing agencies that work in the migrant field should ensure risk reduction issues are incorporated within program strategies. In particular, organizations that work with returning migrants on financial literacy training and remittance use should ensure risk reduction is embedded within these approaches.

Acknowledgment

This article is a part of research project 'Understanding the role of remittances in reducing risk to earthquakes' conducted by Practical Action in partnership with Nepal Risk Reduction Consortium funded by Humanitarian Innovation Fund (grant number **181213)**. I express my sincere appreciation and gratitude to research team for their critical review and suggestions on the draft article. I would like to extend my sincere thanks to my colleague Sugat Bajracharya for econometric analysis of survey data and review of the paper.

Reference

[1] National Planning Commission (NPC), Post Disaster Needs Assessment, Vol. A: Key Findings Nepal earthquake 2015, NPC, Government of Nepal, Kathmandu, Nepal, 2015.
[2] Ministry of Labour and Employment, Labour Migration for Employment: A Status Report for Nepal 2013/14, Ministry of Labour and Employment, Nepal, 2014.
[3] Ministry of Finance, Economic survey Fiscal year 2013/14, Ministry of finance, Government of Nepal, Kathmandu, 2014 (Based on Data for the first 8 months of the current fiscal year).
[4] World Bank, Urban Growth and Spatial Transition in Nepal, World Bank, Washington, D.C, 2013.
[5] International Organization for Migration (IOM), Dynamics of Remittance Utilization in Bangladesh, IOM (, Geneva (2005), pp. 31–32 , IOM Migration Research Series. No. 18.
[6] A. Suleri, K. Savage, Remittances in Crises: a Case Study from Pakistan. An Humanitarian Policy Group Background Paper, Overseas Development Institute, London, 2006.
[7] Treena Wu, The Role of Remittances in Crisis: An Aceh Research Study, Overseas Development Institute, London, UK, 2006.
[8] C. Ebeke, J.L. Combes, Do remittances dampen the effect of natural disasters on output growth volatility in developing countries? Appl. Econ. 45 (2013) 2241–2254.
[9] S. Mohapatra, G. Joseph, D. Ratha, Remittances and natural disasters: ex-post response and contribution to ex-ante preparedness, Environ. Dev. Sustain. 14 (3) (2012) 365–387.
[10] D. Yang, H. Choi., Are remittances insurance? evidence from rainfall shocks in the Philippines, World Bank Econ. Rev. 21 (2) (2007) 219–248.
[11] D. Yang, Coping with disaster: The impact of hurricanes on international financial flows 1970–2002, Adv. Econ. Anal. Policy (8) (2008) 1–45.
[12] Athena Kolbe, Robert Muggah, Surveying Haiti's post-quake needs: a qualitative approach, Humanit. Exch. Mag. 48 (2010) 4–6.
[13] T. Halliday, Migration, risk, and liquidity constraints in El Salvador, Econ. Dev. Cult. Chang. 54 (4) (2006) 893–925.
[14] NEOC National Emergency Operation Center, Bulletin 2015 (accessed on 01.12.2015 from ⟨http://neoc.gov.np/en/⟩).
[15] R. Adams, Evaluating the economic impact of international remittances on developing countries using household surveys: a literature review, J. Dev. Stud. 47 (6) (2011) 809–828.
[16] C. Sapkota, Remittances in Nepal: boon or bane? J. Dev. Stud. 49 (2013) 1316–1331.
[17] A. Opel, Bound for the city: A Study of Rural to Urban Labour Migration in Afghanistan, Afghanistan Research and Evaluation Unit (AREU), Kabul, 2005, Working Paper Series.
[18] A. Jain, Labour Migration nd Remittances in Uttarakhand, ICIMOD, Kathmandu, 2010.
[19] J. Adhikari, M. Hobley, Everyone is leaving – who will sow our fields? The Effects of Migration from Khotang District to the Gulf and Malaysia, Swiss Agency for Development and Corporation, Kathmandu, 2011.
[20] G.M. Arif, Economic and Social Impacts of Remittances on Households: The Case of Pakistani Migrants Working in Saudi Arabia, International Organisation for Migration, Geneva, 2010.
[21] A. Findlay, M. Samha, The impact of international migration on the urban structure of Amman. In: Espace, Populations, Sociétés, 1985-1. Migrations et urbanisation - Migrations and cities, 1985, pp. 93–99.
[22] C. Brendan, McBride, Building capital: the role of migrant remittances in housing improvement and construction in El Salvador, Master's Thesis in Urban Management and Development, Rotterdam, 2007.
[23] World Bank, Migration and Remittances Fact book, World Bank, Washington, DC, 2011.
[24] UNCTAD, Maximizing the Development Impact of Remittances. United Nation Conference on Trade and Development, Geneva, 2013.
[25] M.M. Rahman, Gendering migrant remittances: evidence from Bangladesh and the United Arab Emirates, Int. Migr. 51 (S1) (2013) 159–178.
[26] Bhubanesh Pant, Harnessing Remittances for Productive use in Nepal, Nepal Rastra Bank, Kathmandu, Nepal, 2011, Working Paper Series.
[27] Nepal Rastra Bank (NRB), Household Budget Survey, 2006, Nepal Rastra Bank, Kathmandu, Nepal, 2008.
[28] R.K. Sonar, Are Dalit People accomplishing mainstream values of Socio-economic life of Nepal? A study of the role and impact of remittance income. Research report submitted to SIRF/SNV, Nepal, 2013.
[29] R. Nepal, Remittances and Livelihood Strategies: A Case Study in Eastern Nepal, Kassel University Press, Germany (2012), p. 14.
[30] B. Pant, Role of remittances in reconstruction and recovery. A version of this article appears in print on August 24, 2015 of The Himalayan Times. ⟨http://thehimalayantimes.com/opinion/role-of-remittances-reconstruction-and-recovery/⟩.