Human well-being after 2015 Nepal earthquake: micro-evidence from one of the hardest hit rural villages

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Kwansei Gakuin University

2018

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Abstract: This study assesses the human well-being in one of the most affected rural villages of Nepal, ten months after the 2015 earthquake, which had a magnitude of 7.8 on the Richter scale. Through a survey of 399 households, we found that the earthquake increased the poverty and out-of-school children by 9% and 7% respectively. It also killed 17 people and injured 53 people seriously. Results also revealed that both objective as well as subjective human well-being is significantly associated with the degree of destruction, access to physical and social infrastructure, and the sociocultural identity of the respondents. These results have clear policy implications for the disaster risk reduction and sustainable reconstruction of the ruined rural areas.

Keywords: natural disasters; 2015 Nepal earthquake; human well-being; access to infrastructure; household survey; rural, sustainable reconstruction; Ramche; Sindhupalchok.

1   Introduction

While disaster research is focused more on well-developed countries (Shen, Cheng, Yang and Yang, 2018), and more developed regions within countries (Cutter, Ash and Emrich, 2016), disaster impacts are more severe and recovery is harder in less developed countries and areas, where both physical resources and people's coping capability are limited (Kellenberg and Mobarak, 2007). Further, people in more remote places suffer more than those in less remote areas (Cutter et al., 2016), and the elderly, children and women suffer more than their counterparts (Cutter, 2017). Hence, post-disaster impact assessment of hard-to- reach rural areas contributes to effective disaster risk governance and implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 (Aitsi-Selmi et al., 2015), which is the global policy commitment and guideline to deal with disasters. As Tapsell et al. (2006) argued, better understanding of the changes in human well-being and social capital in natural disasters is instrumental in building future social resilience to such natural hazards. Effective management of disaster risk is essential for sustainable community (Cutter, 2014) development, which is lacking in less-developed and more vulnerable rural areas.

Against this backdrop, Nepal was hit by the 7.8 Mw (Moment Magnitude scale) earthquake on 25th April 2015, followed by strong aftershocks of 6.8 and 7.2 magnitude on 26th April and 12th May respectively. The death toll and injury was higher than ever in the country's history, claiming around 9,000 lives, injuring over 23,000 people, destroying over 500,000 houses, and displacing approximately 2 million inhabitants (Adhikari et al., 2016). This damage

substantially crippled Nepalese development sector by disrupting delivery of basic services such as health and education in 31 (out of 75) districts and worsening the underdeveloped rural infrastructure where human well-being was already fragile (Basnyat et al., 2015). However, there are limited studies that reflect the well-being scenario at the local level in the aftermath of the earthquake. Despite national as well as international attention and scholarly interest in the 2015 Nepal earthquake, there is limited exploration of its impact at the household level, especially in rural areas. This study is an attempt to reduce the research gap by assessing the current situation of both objective and subjective well-being of people across different socio-economic strata at household level, in the rural areas hardest-hit by the earthquake. The results of this study would be useful in the process of disaster risk reduction and sustainable reconstruction of rural areas. For instance, it would help in determining the different types of physical resources and knowledge required for solving short-term and long-term problems. Similarly, it would also assist in streamlining efforts toward the neediest groups or areas, because disasters usually affect a certain segment of society in a disproportionate manner, such as the poorer households, disadvantaged caste/ethnic groups, or specific local businesses (Huang, Wang, & Song, 2018).

To serve the research purpose, one of the hardest hit areas, Ramche village of Sindhupalchok district was selected. The district had suffered the most from the earthquake with the highest record of casualties, i.e., 3,570 deaths (40% of the total death), nearly 96.8% of the total houses in the district were destroyed, and about 88% of its population displaced during peak emergency times (UN Women, 2016). Only one village was chosen for this study to conduct a micro-level analysis, as many of the previous studies accounted for the economic and other impacts at the national or district level (Hall et al., 2017; Welton-Mitchell et al., 2016). Figure 1 shows the landscape of the village and a house destroyed by the earthquake. The village is located at the Central-Northern part of Nepal, just 21 kilometers from Tibet, China. Within the village area of 39.3 square kilometers, the altitudes range from 800 meters to 2,900 meters above sea level.

Sociocultural and economic diversity of the village is also very high. According to the Ramche Village Development Committee (VDC), there were 5,770 people living in 1,083 households in the village before the earthquake. The population of the village is mostly dependent on subsistence agriculture. The population is composed of ten caste/ethnic groups that follow five different religions and speak six different languages. Although some people belong to *Terai* (southern part of Nepal)-based ethnic groups, most of them belong to major caste/ethnic groups living there since generations. Administratively, the VDCs were the smallest local government unit of Nepal until the new local governance system came into effect on 10 March 2017.

Therefore, the VDCs played the central roles of the immediate earthquake response, recovery and reconstruction. Despite the tough confrontation among major political parties to settle the key issues in the process of writing a new constitution amidst prolonged transition after a decade-long armed conflict, the earthquake led them to promulgate the new constitution and manage the crisis after such an unprecedented natural disaster at a national level and increased social bonding at the community level in the affected areas (Mawby & Applebaum, 2018; Manandhar, Varughese, Howitt, & Kelly, 2017).

Figure 1   The landscape of Ramche village showing a destructed house at top right
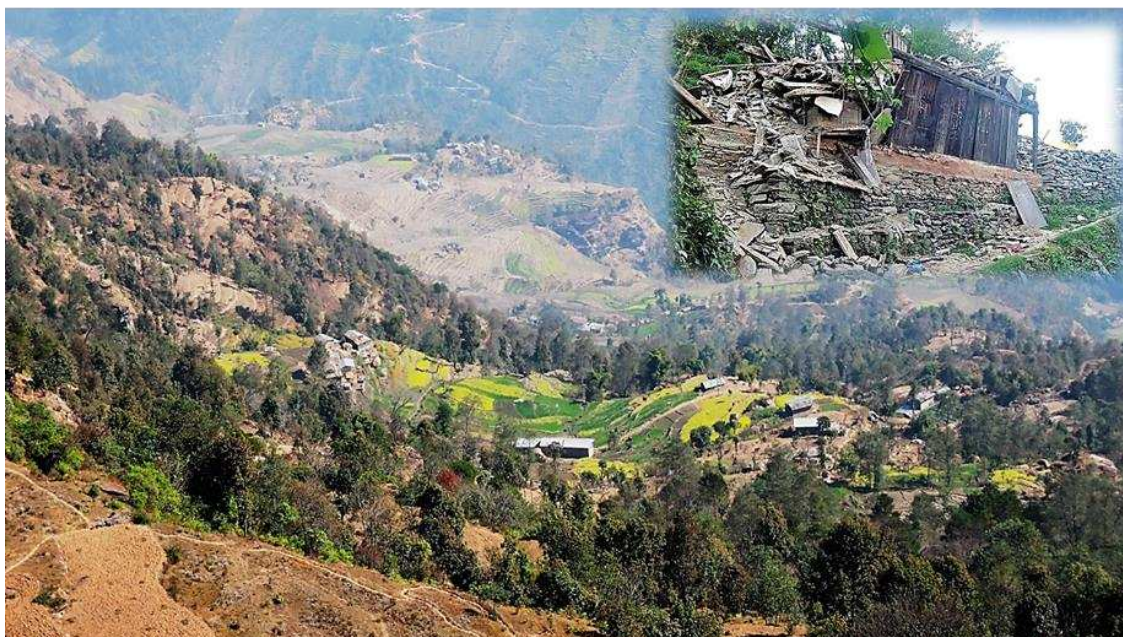
Notes: The photo of the landscape village was taken in 15 March 2014 and the photo of the destructed house was taken in 17 July 2015 nearly three months after the earthquake.
Source: The author

When the earthquake struck at 11:56 local time, most people were out of home for their usual livelihood activities, such as working in agricultural fields, collecting firewood, collecting grass or tree leaves for cattle, or shopping in the nearby marketplace. Therefore, despite the complete destruction of almost 98% houses in the village, only 17 people were killed, and 53 injured severely by the earthquake. Notably, houses in rural Nepal are mostly made of stone and mud, which are very susceptible to earthquakes. As it was a Saturday, all the schools were closed, which prevented casualties in schools, despite all the five school buildings within the village being destroyed by the earthquake. However, nearly 400 cattle and 1,500 chicken were killed, as cattle is typically kept in the cattle-hut which is usually a part of the house. Such an enormous human and economic loss impacted the lives of people and communities in many ways.

There is a huge body of literature about the impacts of natural disasters on different aspects of human well-being and social capital. Natural disasters cause tangible (that can be expressed in monetary terms) economic loss and create intangible (which cannot be expressed in monetary terms) emotional and health-related problems to individuals (Evans and Kantrowitz, 2002; Martin, 2015). They also bring positive changes in people's selves and lives, a phenomenon of post-traumatic growth (type of resilience) (Tedeschi and Calhoun, 1995; Joseph and Williams, 2005; Hefferon Grealy and Mutrie, 2009), such as intangible feelings of social unity and optimism (Silver and Grek-Martin, 2015). Consequently, as Danys (2002) argued, disasters can provide opportunities to create new social capital, defined as "a term that encompasses the norms and networks that facilitate collective action" (p.2). However, most of the literature is based on the studies focused on developed countries. Therefore, exploring the micro impact of

the major earthquake in a mountainous rural area of Nepal, this study provides a unique case from one of the 47 least-developed countries (LDCs) which are defined as "low-income developing countries suffering from severe structural impediments to sustainable development" (United Nations, 2015; p 1). Nepal is also one of the 20 most disaster-prone countries in the world, due to its unstable geography and climatic conditions, where more than 80% of the population is at risk of natural hazards (MoHA, 2017). However, Nepal's capacity to cope with disasters is minimal. Thus, understanding the distribution of such tangible as well as intangible impacts across socioeconomic groups induced by the devastating natural disaster is very important to streamline development interventions towards the sustainable development of vulnerable communities in vulnerable locations, especially rural hills and mountains (Imperiale & Vanclay, 2016).

This study follows the notion of human development (HD) as the objective well-being concept, which was developed by the UNDP in 1990. Since then, the body began publishing annual Human Development Reports (HDRs). The notion of HD equally emphasizes health, education, and income as the three pillars of objective well-being (UNDP, 2016). Therefore, income (including poverty and inequality), health, and education indicators are considered as the measures of objective well-being in this study. At the same time, research interest on the subjective well-being of people has been steadily increasing over the recent decades, as any disaster adversely affects subjective well-being as well (Rehdanz et al., 2015; Danzer and Danzer, 2016). Hall and Helliwell (2014) claimed that the process of evaluating human condition, both subjective and objective, should go beyond pure economic metrics such as income, consumption, or production. In any aspect of development studies, subjective and objective well-being complement each other (Stieglitz, Sen and Fitoussi, 2009). Therefore, with some modification this study used the Oxford Happiness Questionnaire (OHQ), which was developed by Hills and Argyle (2002), to document the subjective aspect of human well-being.

2.   The data and methodology

2.1   Sampling and collecting data

The data was gathered from a survey of 399 randomly selected households of the Ramche VDC of Sindhupalchok district, one of the hardest hit rural areas by the 2015 Nepal earthquake (also called *Gorkha earthquake*). When the survey was conducted in 2016, a VDC was the smallest administrative unit in Nepal. However, after the recent restructuring of the local administrative units in the country, Ramche village is now in ward number 9 of Bahrabise municipality. After the significant increase in geographical size and autonomy of the local bodies under the new Constitution of Nepal 2016, local government bodies were restructured into 481 rural municipalities, 246 municipalities, 11 sub-metropolitan cities and six metropolitan cities across the 75 districts in Nepal. Ramche VDC was chosen because of its huge geographical and cultural diversity. It is a hilly mountainous rural village, where 5,7 70 people reside among a total of 1,083 households. Within this small population, there exist 10 ethnic groups following five different religions and speaking six different languages. The VDC consisted of nine wards, the smallest administrative unit of the local government before the implementation of the new constitution in Nepal. These nine wards were divided on the basis of geography and human settlement and are still not equally developed due to the varied level of access to different infrastructure.

The survey followed the third Nepal Living Standard Survey (NLSS) questionnaire with some modifications to assess the objective well-being or living condition of the households. The survey collected information on demography, access to infrastructure, household income and consumption, health and education, and perception of public services. The income data included the agricultural production from their own land or rented land as well as monetary income, if any. Similarly, the consumption data included the consumption of the household, taking into account all the monetary expenditures. With regard to agricultural income and expenditures, the respondents were asked about the quantity of agricultural production and consumption of their own land, from shared cropping, and other means, if any. Then, the income and expenditure were converted into monetary value using the local market price of each item. Similarly, OHQ was used to assess the subjective well-being. A subset of the questionnaire related to the impact of the earthquake and their responses were included. The questionnaire is further explained in the subsequent sub-sections.

2.2 *Measuring poverty and inequality*

The study followed the CBS (2011) to find out the poverty headcount rates and the inequality measure. In the third round of NLSS, the national poverty line of NPR 19,261 was used as the cut-off line to calculate the percentage of poor households with the help of the consumption data. Thus, the households with the per capita consumption below the national poverty line were considered poor. According to the central bank exchange rate, one USD was equal to 102 NPR on 3rd September 2017 (Nepal Rastra Bank, n.d.).

The Gini index, which was introduced by Gini (1912), was used to measure the income inequality across the households. According to the OECD (n.d.), "the Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution." Inequality on the Gini scale ranges from zero, if the distribution of income or consumption is perfectly equal, to one, if all the income or consumption goes to a single household.

2.3 *Assessing subjective well-being, happiness*

While adverse effects of natural disasters on objective well-being are mostly direct and relatively easy to account for, effects on subjective well-being, such as increased fear and anxiety, are indirect and much more difficult to assess. These intangible effects cannot be examined at the national level or even at the community level. Therefore, they need to be limited at an individual level. Individuals are directly or indirectly exposed to the disaster. It is important to assess both objective and subjective aspects of human well-being because each of them complements development studies (Stieglitz et al., 2009) Therefore, this study also assesses the subjective well-being of the respondents after the 2015 Nepal earthquake using OHQ.

Two psychologists from Oxford University, Hills and Argyle, developed the OHQ in 2002, which is a widely used scale to assess personal happiness. In fact, OHQ is a new version of the original Oxford Happiness Inventory (OHI) (Argyle et al. 1989), which consisted of 29 questions concerning sociability, sense of control, physical fitness, positive cognition, mental alertness, self-esteem, cheerfulness, optimism, empathy, feelings, life satisfactions, and life evaluations to account for the current level of happiness (Hills and Argyle 1998, 2002). These questions were structured into statements on a six-point Likert scale, with '1' being the *'most*

unhappy' score and the '6' being the *'happiest* score*'* (for details, see Argyle and Hills 2002). The respondents were asked to listen to each of the statements (questions) carefully, because some statements were phrased positively and others negatively. To calculate the overall happiness score of each respondent, first, the score of each of the negatively phrased statements were reversed. For example, one was changed to six, two was changed to five, four was changed to three, and vice versa. Finally, summing up the numbers for all 29 questions and dividing the total by 29, the overall happiness scores for each respondent was calculated. The highest possible score is six, and the lowest possible score is one, but the chance to obtain such scores is rare. In fact, many studies show that people are somewhat happy on an average. Thus, most people might register the average score, which is around four. In brief, the interpretation of the happiness score is explained in Table 1. As the score of 3.5 is the exact numerical average of the possible answer, people recording a score higher than 3.5 are considered happy.

Table 1 The interpretation of the happiness score from OHQ

Score	Meaning	Brief interpretation and advice
1-2	Not happy	Respondent is probably seeing their situation as worse than it really is. The person might be in a depression.
2-3	Somewhat unhappy	The respondent may need counselling.
3-4	Not particularly happy or unhappy	A score of 3.5 is the exact numerical average of the range of the possible answer, 1 to 6. People in this group can improve their happiness level significantly with some mental exercise.
4	Somewhat happy or moderately happy	Satisfied. Average person's score remains around 4.
4-5	Rather happy; pretty happy	The person is happy.
5-6	Very happy	Such persons are more likely to get benefits like better health, better relationships achieving life goals.
6	Too happy	This is not a likely score.

Notes: The interpretation is slightly revised to match the local context. Interpretation for scores 4 and 6 are removed as no respondent got this exact score.

Source: Steve Wright's blog, Oxford Happiness Questionnaire, [online] http://www.meaningandhappiness.com/oxford-happiness-questionnaire/214/ (accessed 28 June 2017)

3 Results

3.1 Socio-demographic characteristics

Table 2 presents the socio-demographic characteristics found in the survey. Among the 399 surveyed households, more than two third are headed by male. The mean age of respondents was 46.3 ± 13.6, and the average family size was 6.6, ranging between 1–16. Reflecting the overall composition of the diverse caste/ethnic groups of the population in the sample, *Chhetri* constitute nearly half the sample, followed by *Janajati* (excluding *Newar*) one third, *Brahman*, *Newar*, and *Silpi* all below 10%. In the Hindu caste hierarchy, *Brahman* (traditionally priests) and *Chhetri* (belong to royal family and traditionally work as soldiers) are considered the top

Table 2   Sample distribution by socio-demographic characteristics; sample size=399

Variables	Category	Percent	Variables	Category	Percent
Age	Up to 39 yrs.	32	Gender	Male	71
	40-49 yrs.	28		Female	29
	50-59 yrs.	20	Caste /	Brahmin	10
	60 yrs. & +	20	Ethnicity	Chhetri	47
Religion	Hindu	71		Newar	6
	Buddhist	23		Janajati	33
	Kirat	3		Silpi	4
	Others	3			

Wards no.	1	2	3	4	5	6	7	8	9
Percent	12	13	6	6	15	9	23	9	8

*Notes*: yrs. = Years; Total may not be 100 due to the rounding.

two caste/ethnic groups and *Silpi* (traditionally called *Dalits*, whose main sub-groups are *Kami, Damai, Sarki*) is regarded as highly suppressed. In fact, *Silpi* has the least human development index (HDI) in Nepal (UNDP, 2015). The rest of the groups are indigenous nationalities, who are commonly called *Janajati* (for details, see Jha, 2004). The *Newar* is grouped separately because the overall human development status of this group is the highest (even higher than *Brahmin* and *Chhetri*) within the country, despite its being a part of the *Janajati* group. With regard to religion, Hinduism accounted for more than two-third of the total sample, followed by Buddhism, Kirat, and other religions.

As the population of the village is unevenly distributed across different wards, the sample also varied significantly. For instance, 23% of the sample households belong to ward number 7 because it has a part of Bahrabise Bazar, which is the main market center east of Sindhupalchok district.

3.2   Status of access to infrastructure

Figure 2 shows the poor level of access to different infrastructure services. The average one-way walking time required to reach the three main infrastructure services: road, health center and market center is more than one hour. Therefore, it takes more than two hours to avail of these infrastructure services. The results also indicate that the majority of primary school students walk more than an hour daily for their schooling. Clearly, education and health infrastructures are still not within easy reach of the village people. Drinking water collection time during the dry season is also nearly half an hour on an average.

Figure 2   Access to different infrastructure by ward (hours), 2016
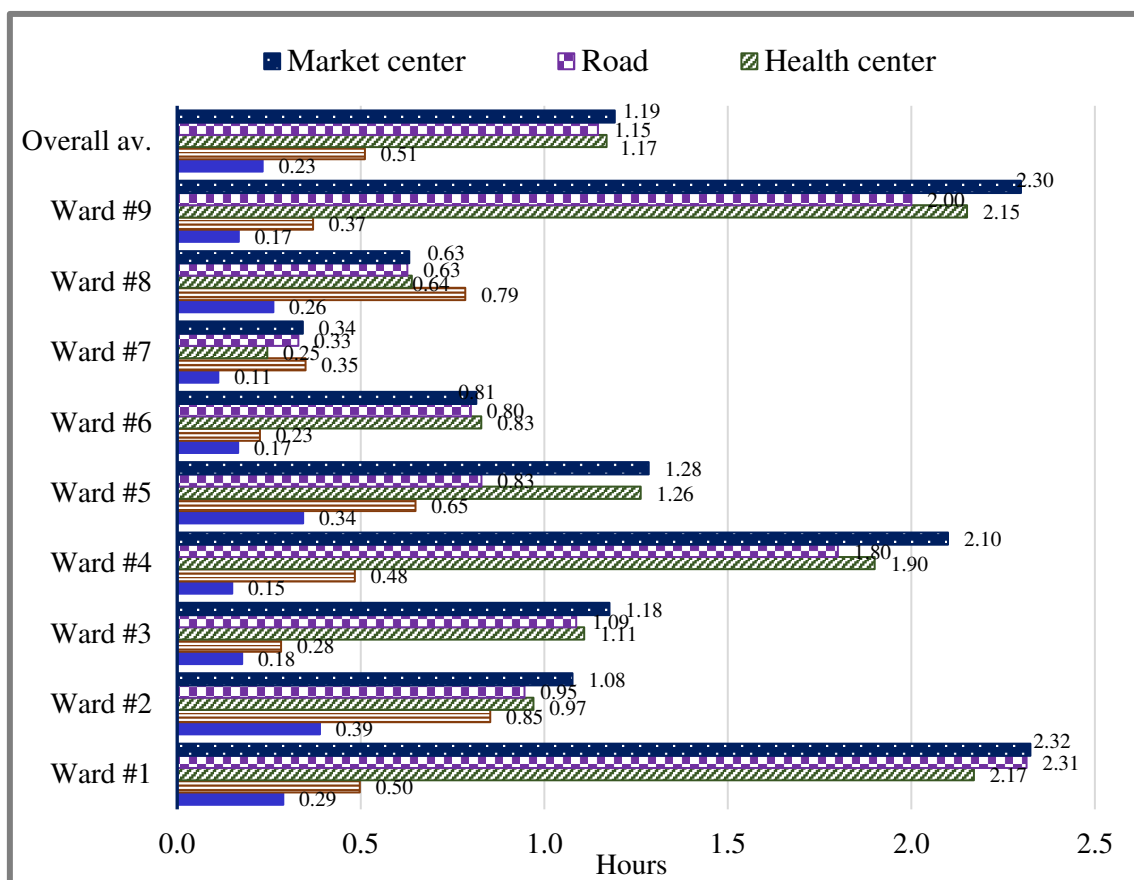
Notes: One-way time required to reach the selected infrastructure services is reported; access to clean water source in dry season is reported.

Ward number 7 is the least remote area as the Araniko highway passes through it, connecting the capital city of Kathmandu, 87 kilometers towards the southwest, and the border with China, 27 kilometers towards the north. The highway also touches some parts of ward numbers 2 and 5. None of the other wards touch any permanent road network. However, a rural road has been constructed recently that passes through each of the remaining wards, but can only be used during the dry season. Ward number 1 is the most remote, followed by ward number 9, as the people residing in these wards need to walk more than two hours, on an average, to reach the local market, road, or the health center.

3.3   Objective well-being and the earthquake impacts

Table 3 shows the economic, health and education status of the respondents, as well as the impact of the earthquake. It indicates that people tend to report less income and more consumption, as the average household income was reported as NPR 60,758 (USD 596), while the average household consumption was reported as NPR 88,666 (USD 869). Notably, the average economic loss per household is accounted as NPR 572,060 (USD 5,608), which is more than nine times their annual income. The total household economic cost of the earthquake to the

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whole village was estimated as NPR 379,847,509 (USD 3,723,995). Consequently, the average household expenditure on health and education remained minimal.

Table 3   Status of objective well-being and impacts of earthquake on it

| *Economic status, poverty, inequality and impact of earthquake*					
Economic status (NPR)		Economic loss by the earthquake (NPR)		Poverty and inequality	
Average HH income	Average HH consumption	Average economic loss per HH	Total economic loss	HH below the poverty line (percent)	Gini index
60,758	88,666	572,060	379,847,508	22	0.5
Health: disability, illness, and treatment seeking behaviour (percent)					
HH with disable member/s	HH suffering from chronical illness	HH suffered by common illness in past 30 days	HH that could not take treatment for common illness	Human loss due to the earthquake	Av. health exp. per HH (NPR)
				No. of Deaths / No. of Disables	
43	36	40	57	17 / 53	19,053
Education: education level of the respondents (percent)					
Illiterate	Literate	Basic	Secondary	College/university	Education exp. per HH (NPR)
33	25	11	26	4	26,921

Notes: NPR = Nepalese Rupees; Central Bank's exchange rate in 3 September 2017 was: USD1=NPR102; HH=Household; Av.=Average; exp.=Expenditure. The disaggregated statistics by wards, caste/ethnicity and other dimensions are available upon request.

Table 3 also includes the results on health and education of the respondents. With respect to health aspects, it shows that 43% of sample households has at least one disabled member, and more than one-third of the households has at least one chronically ill member. It also shows that about half the people went for treatment when they suffered from common illnesses. Notably, nearly one-third of the households faced health problems right after the earthquake. With respect to education, one-third of the respondents were illiterate and one-fourth were just literate. Similarly, almost all respondents reported that after the earthquake, schooling was acutely problematic and expensive, due to the complete collapse of all the school buildings in the village. The VDC record showed that about 7% of the school-going children left schools due to the earthquake.

The earthquake-induced economic loss as a percentage of total capital per household is disaggregated by gender, caste/ethnicity, and ward in Figure 3. While female-headed households endured greater losses than male-headed households, *Silpi* ethnic group and ward number 1 suffered the highest losses among the village population. Most of the losses resulted from the collapsed buildings. Almost all the households were living in temporary shelters during the survey, and the VDC office reported that the earthquake destroyed more than 98% of

the private and public houses, including all the schools and VDC office buildings. While the sample households are grouped by quintile based on the distribution of their total asset holdings, the poorest 20% bore the highest proportion (92%) of economic loss. However, the richest quintile lost only 14% of their total assets.
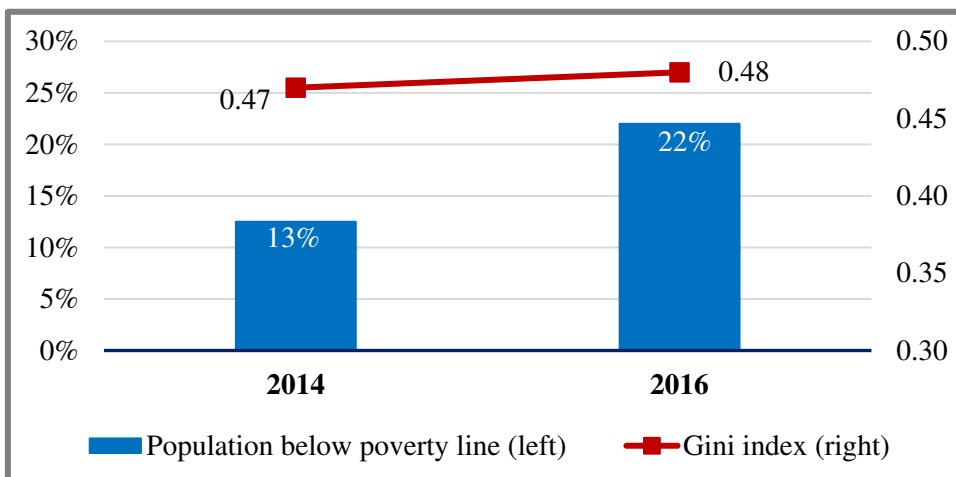
Figure 3 Percentage of household economic loss to total capital by gender, caste/ethnicity, ward and quintile distribution, 2016
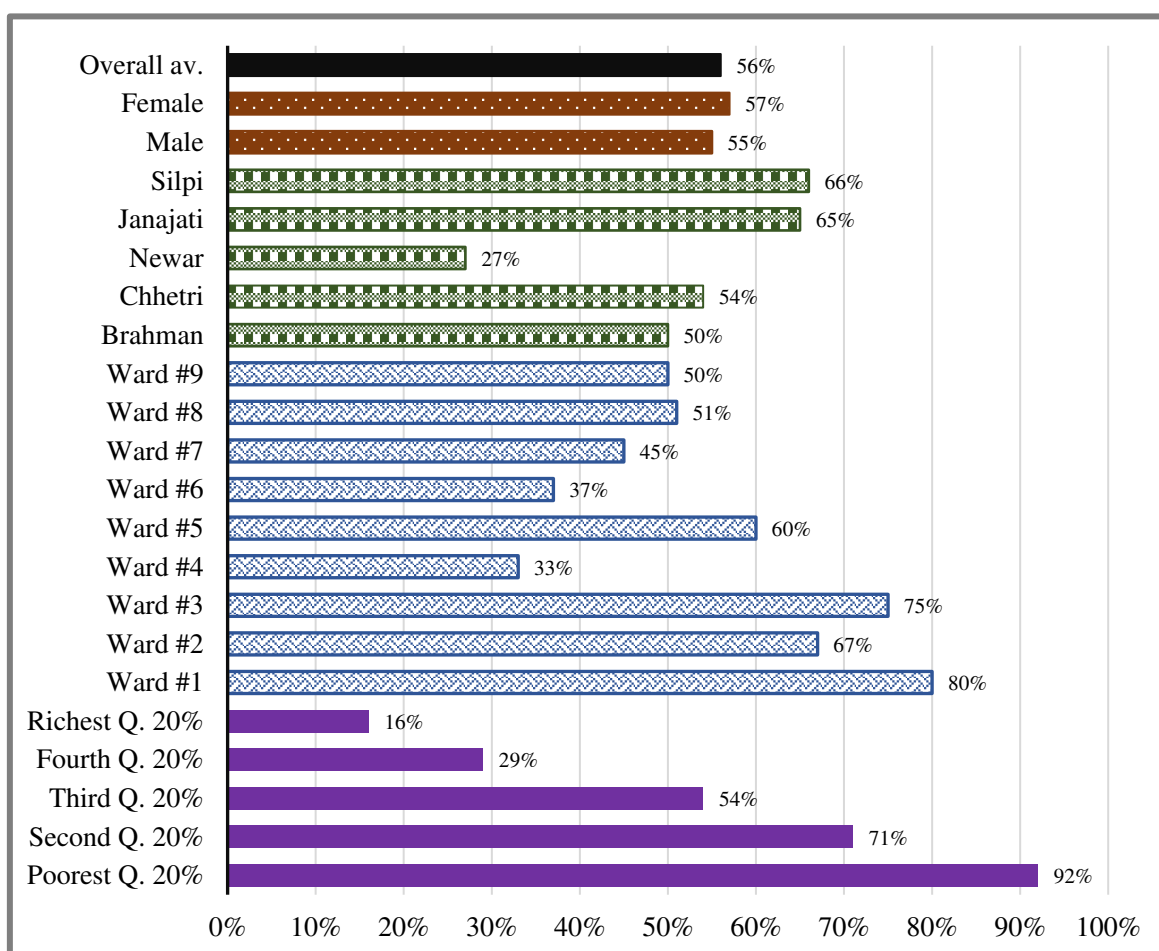
Notes: The percentage of average economic losses to total capital per household is accounted based on the respondents' self-evaluation based on the local market value of their household property. The quintile (Q.) distribution is calculated based on household total capital.

Such a huge economic loss caused by the earthquake dragged an additional nine percent of the population below the poverty line, from 13% in 2014 to 22% in 2016 (Figure 4). The poverty and inequality figures for 2014 were obtained from the previous study conducted by Sapkota (2015). Although the sample size and the coverage of the study areas was relatively smaller than this research, the previous study provided a reliable reference to compare the situations before and after the earthquake.

Figure 4   Poverty and inequality before and after 2015 Nepal earthquake

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The Gini index, a measure of inequality, also increased slightly after the earthquake, from 0.47 to 0.48. The highest and lowest Gini index was recorded as 0.24 and 0.52 in ward numbers 6 and 7 respectively. A precise visualization of the inequality with the Lorenz curve of each ward is presented in Figure 5. If the consumption distribution is more unequal, the Lorenz curve goes farther from the 45-degree straight line, and *vice versa*.

Figure 5   Lorenz curve of Ramche village by ward, 2016
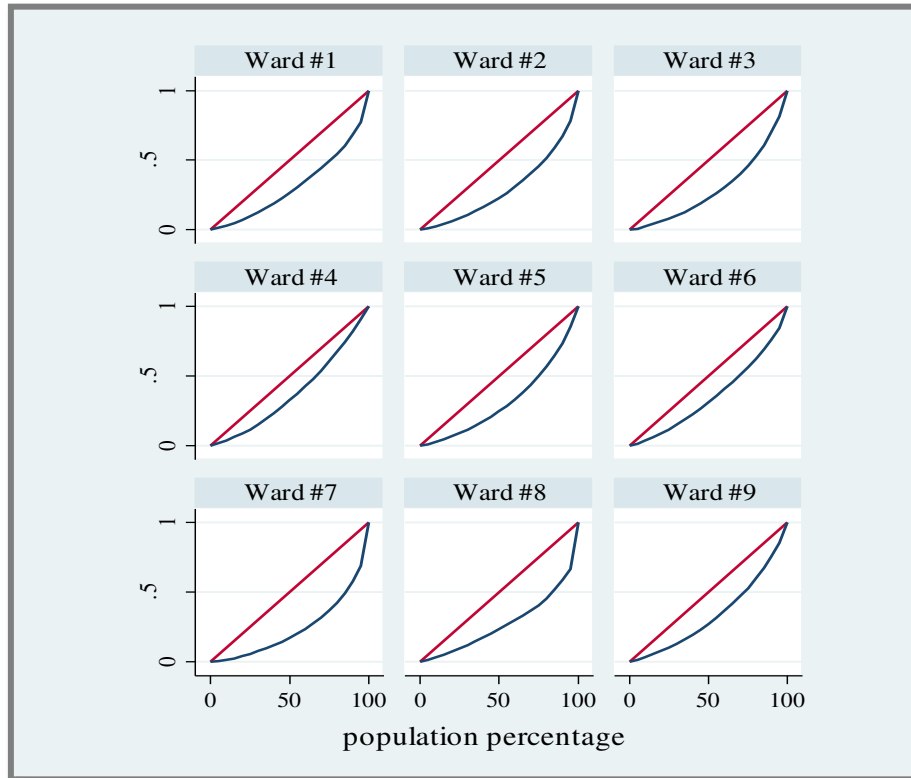
Notes: Blue curve represents the Lorenz curve for respective Ward.

Table 4 disaggregates the average consumption, poverty headcount rate, and Gini index by gender, caste/ethnicity and ward. Female-headed households were poorer than male-headed households by 12%. The poverty rate was the highest among the *Janajati* group, followed by *Newar* and *Silpi*. Interestingly, despite having the lowest average per capita consumption, the poverty rate of *Silpi* households was recorded far below the *Janajati* households. This was because *Silpi* recorded the lowest inequality. Although poverty headcount rate of *Brahman* households was recorded at the lowest lever, they held the highest position on the Gini index. Similarly, ward number 8, located in the middle of the village, had the lowest poverty headcount rate. Ward number 2, which is geographically the most divergent, touching the Araniko highway at one end and the top of the village at the other end, had the highest poverty rates. Similarly, the most well off ward number 7 is found to have the most unequal distribution of income.

Table 4   Consumption, poverty and inequality by gender, caste/ethnicity and ward

		Average per capita consumption (NPR)	*Poverty Rate (percent)*	*Gini index*
Overall village average		84,596	22	0.48
Gender	Female headed HH	77,791	30	0.45
	Male headed HH	87,319	18	0.49
Caste/ ethnicity	Brahman	153,887	5	0.65
	Chhetri	76,575	17	0.43
	Newar	134,977	20	0.39
	Janajati	72,256	33	0.43
	Silpi	36,831	19	0.34
Wards	Ward no. 1	54,766	23	0.37
	Ward no. 2	79,717	44	0.41
	Ward no. 3	44,250	26	0.41
	Ward no. 4	48,840	14	0.24
	Ward no. 5	70,246	28	0.36
	Ward no. 6	56,568	11	0.28
	Ward no. 7	160,372	9	0.52
	Ward no. 8	59,122	3	0.45
	Ward no. 9	57,012	39	0.33

Notes: The national poverty line is Nepalese Rupees (NPR) 19,261 per capita as defined by CBS (2011), which is used as the cut off line to calculate the percentage of poor households. Central Bank's exchange rate in 3 September 2017 was: USD1=NPR102.

Figure 6 shows the human loss caused by the earthquake ward-wise. Although most people were out of their houses and most of the houses collapsed due to the earthquake, 17 people died and 53 were seriously injured. However, huge variations across wards are recorded in terms of death and injury.

Figure 6   The earthquake caused deaths and injuries by ward
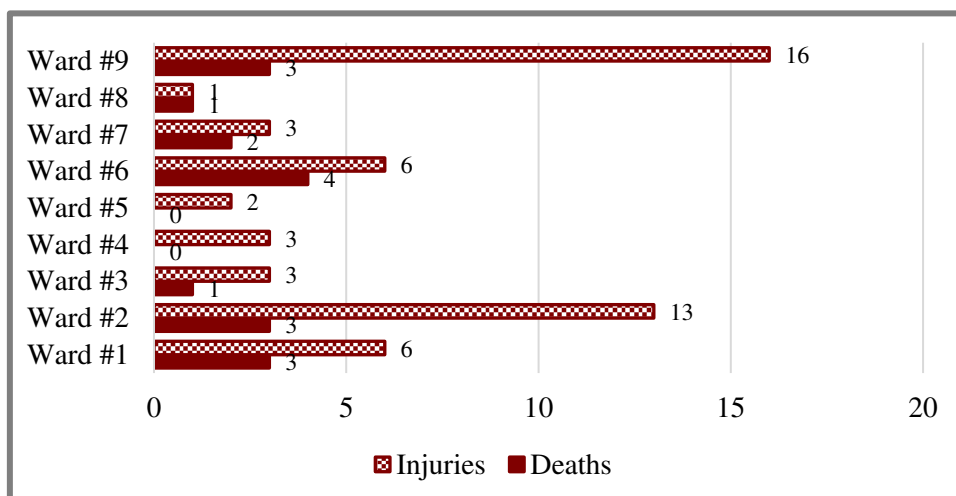

Source: The data are taken from the Ramche VDC office record that covers the whole village.

Apart from economic and human loss, the respondents were asked about the different consequences of the earthquake in terms of its impact on their daily life and their way of thinking. Most of the respondents were unaware of any possibility of such a massive earthquake occurring in their place. Public news media, such as radios and televisions, were ineffective in providing needed information in a timely manner and most of the respondents reported that they received most of the information from their relatives and friends. Similarly, most of the immediate relief materials were provided by the national and international non-governmental organizations (NGOs). Presence of government agencies in support of people at the local level was minimal. Notably, almost all respondents did not know or knew very little, about government support schemes for rebuilding the destroyed houses.

Figure 7 shows the perceived resilience to the disaster. In reply to the question "How much time do you need to return to the same condition before the earthquake?", nearly one-fifth of the respondents said that they "Cannot say" or it will "Never" be possible. However, a large proportion of the respondents said it would take 3-4 years or 5-10 years for complete recovery. Interestingly, about two percent of the households have already returned to the previous condition and 12% were optimistic of recovery within two years. With respect to their risk bearing capacity, nearly one-fifth of the respondents said it has "increased significantly", whereas nearly half reported "not changed".

Figure 7   Perceived time required for recovery from the earthquake, 2016
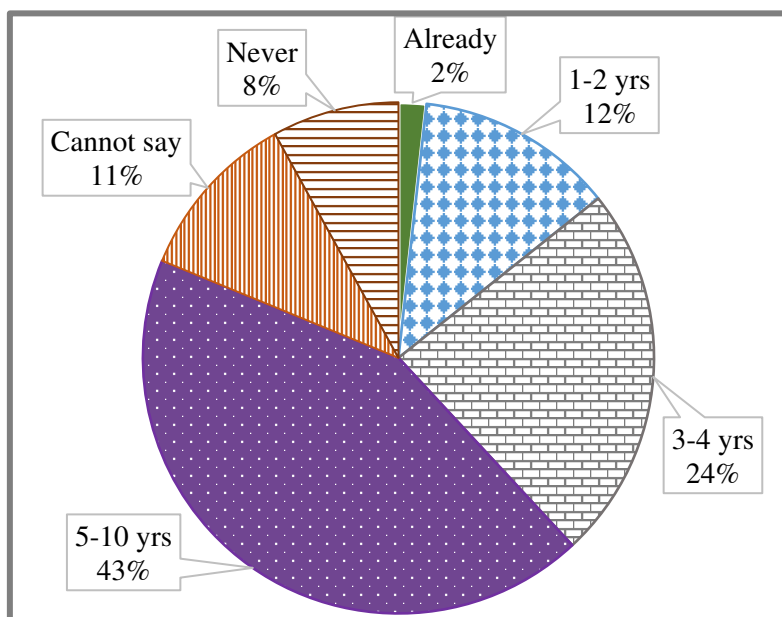

Notes: The distribution of respondents' answers to the question "How much time do you need to return the same condition before the earthquake?" is reported.

Interestingly, about 13% of the respondents felt increased social cohesion, one of the key aspects of social capital. However, a majority of the respondents felt no significant changes in social cohesion after the earthquake. As there were great debates and discussions about nucleated settlement after the earthquake, most of the respondents were in favor and only 10% were against the idea.

3.4   Subjective well-being or happiness

Figure 8 shows the results from OHQ. Despite the massive earthquake, people in the village were found to be *'rather happy'* or *'pretty happy'*. Some variations were observed among different groups, although none of the group scored above five on a six-point Likert scale from 1 for 'most unhappy' to 6 for 'happiest' score. Interestingly, female-headed households were found to be happier than male-headed ones. *Janajati* respondents were the happiest among the caste/ethnic groups, and respondents belonging to ward number 4 were the happiest among all the wards. The happiness score was below four in ward numbers 6 and 7, where the earthquake caused the highest deaths and economic loss.

Figure 8 Level of happiness of respondents (1-6) by gender, caste/ethnicity, ward and quintile distribution, 2016
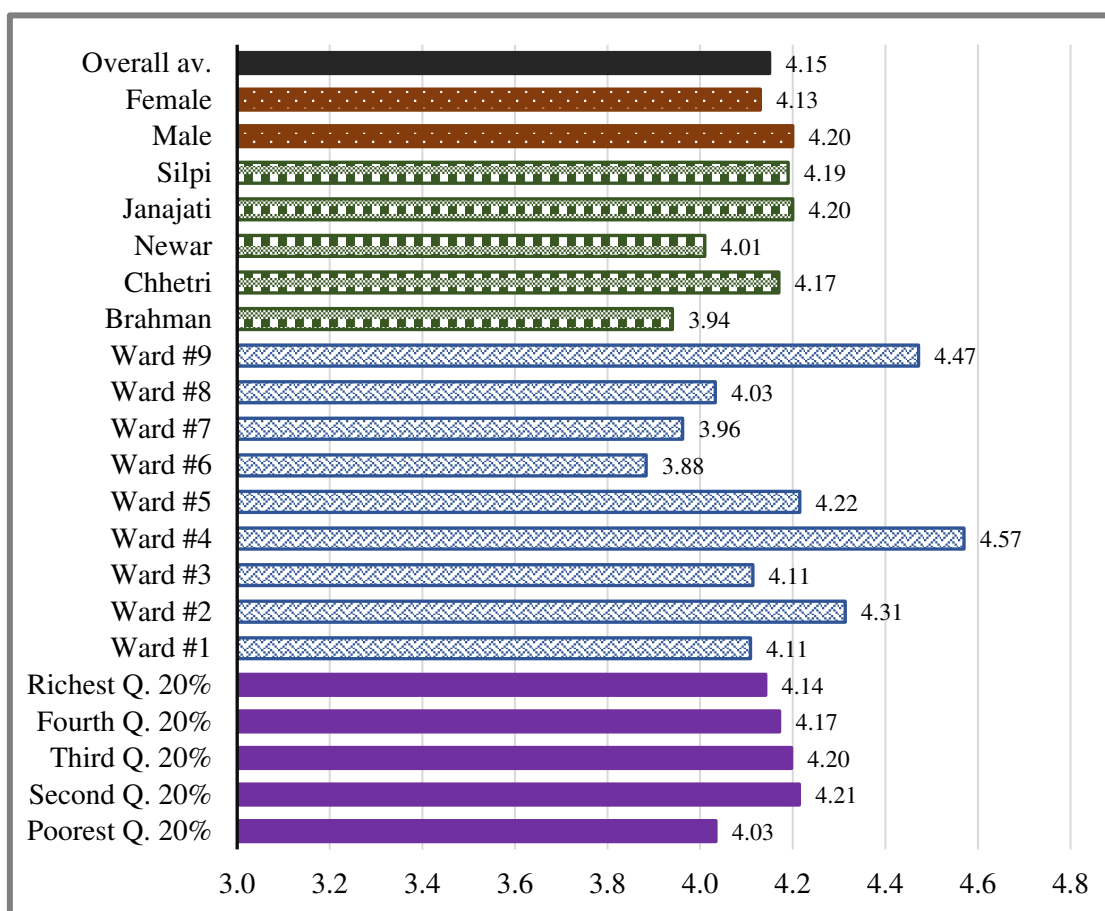
Notes: The happiness score is measure using Oxford Happiness Questionnaire (OHQ) which consists of 29 questions regarding feelings, satisfactions, and life evaluations to account the current level of happiness. Each question is put as statement on a six-point Likert scale, the '1' being the unhappiest score and the '6' being the happiest score for detail see Table 1.

It is interesting to observe a higher level of subjective well-being among *Silpi* (the so-called lowest and most under-privileged caste/ethnic group) and *Janajati* (the under-privileged caste/ethnic group) than the so-called high and privileged caste/ethnic groups. Notably, the average happiness score of *Brahman*s, the so called highest caste/ethnic group, was the lowest, below four, which implied that they were "not particularly happy or unhappy." Similarly, the happiness score remained under 4 for the least remote ward number 7, which was just slightly above the score of ward number 6, where the most casualties occurred.

Table 5 shows that only about 2% of the total respondents were *'somewhat unhappy.'* Similarly, more than one third of the respondents were *'not particularly happy'* or *'unhappy.'* Interestingly, the majority of the respondents were *'pretty happy.'* In fact, most of the people fell in this category, gaining a happiness score between four and five in a normal environment (Wright, n.d.). It is further remarkable that 8% of the respondents reported *'very happy'* despite such a calamity.

Table 5   Grouping of respondents by happiness score

Score range	Interpretation	Frequency	Percent
2-3	Somewhat unhappy	7	2
3-4	Not particularly happy or unhappy	137	34
4-5	Rather happy or pretty happy	223	56
5-6	Very happy	32	8
	Total	399	100

Source: Interpretation is taken from Steve Wright's blog, Oxford Happiness Questionnaire, [online] http://www.meaningandhappiness.com/oxford-happiness-questionnaire/214/ (Accessed 28 June 2017).

4   Discussion

We assessed the impacts of the huge 2015 Nepal earthquake and documented the low level of well-being of a ruined rural community, which has not been explored at household level so far. We now discuss how these results are situated in the existing literature and what policy implications can be drawn for the sustainable reconstruction of such a highly diverse mountain community. In order to understand the implication of the impacts of earthquake on human well-being at the household level, first we should understand the rural nature of the community, especially in terms of their access to basic infrastructure services. On the one hand, overall access to road, health and education facilities are limited on an average, and the level of access is highly diversed in different communities within the village. On the other hand, there is a huge diversity in their well-being across genders and caste/ethnic groups within the same community. Further, the earthquake affected different sociocultural and income groups very unevenly. Therefore, a single policy or same program does not necessarily fit all the local small communities even within a village. For instance, the current cash subsidy program of providing a fixed sum of NPR 300,000 to each affected household regardless of their location (MTDF, 2017) cannot provide the same level of benefits to the household which is located in a more remote area, where construction materials are expensive, where people are also poorer, compared to less remote and urban areas. Here, government policy is based on equality; however, as Dynes and Quarantelli (2008) argued, a sustainable reconstruction program should emphasize equity and promote fairness and justice. Arguably, households living in more critical conditions should get more focus and receive more support, based on their need.

The high level of devastation due to the earthquake can be understood by the economic loss per household, which accounts for more than nine times their average annual income. Even more acute is the finding of very uneven impact of such losses across different sociocultural and economic groups. As literature suggests (e.g. Cutter, 2017), this study also revealed that females, unprivileged caste/ethnic groups, and the poorer are affected more than their counterparts. What is more unique to this study is that it identified the cluster of critically affected group and community. The remotest community within the village and the poorest quantile population lost almost everything they had. Consequently, poverty eradication from such areas becomes more challenging. As "no poverty" is the number one target of the United Nations' Sustainable Development Goals (SDGs) (Costanza, Fioramonti, & Kubiszewski, 2016), and more

importantly in the moral background of justice and fairness, some targeted support program is essential to rehabilitate such groups and communities.

The findings also reveal how national averages mislead the understanding and become useless in the local context. For instance, the nationally estimated earthquake- induced poverty rate of 2.5% to 3% (UN Women, 2016) is far from the reality prevailing in the hardest hit area, as revealed in this study. On the one hand, the government estimate covered the whole country, despite the fact that out of 75 districts of the country (the number increased to 77 in 2016) the earthquake affected only 35 districts, including the severely affected 14 districts. On the other hand, even within the severely affected districts, the impacts vary significantly, not only across different locations but also across different sociocultural groups, as this study demonstrated within a small village. Findings also indicate that the poverty rate is not so much related to the access to infrastructure within the village in general. However, inequality is found to be high in less remote areas and among the most privileged caste/ethnic groups, despite their having relatively high levels of average income. Therefore, post-disaster reconstruction and support system should be based on a clear understanding of local conditions, aiming at the prioritization of the most vulnerable areas and people. More precisely, it is important to streamline the external supports for the economically disadvantaged households within the particular geographical area and within each sociocultural group.

While the village already had poor health and educational facilities, earthquake- induced injuries and the large number of out-of-school children has further threatened these sectors seriously. Recently, the office of the ward no. 9 of Bahrabise Municipality (which used to be the Ramche VDC office before 2016) reported that one of the primary schools has closed due to the shortage of students. Most of the schools in the village are still running in temporary premises, even three years after the earthquake. This implies the government policy toward the reconstruction of health and education facilities needs a complete overhaul, to prioritize the most vulnerable people and areas.

The findings on subjective wellbeing indicate that people enjoying a better social status and living in relatively developed areas felt less satisfied in their life, compared to their less endowed counterparts. It may be due to their limited access to information and outside society, through which they can compare their lives and living situation with others, especially with life in the capital city, Kathmandu, and lifestyles around the world. Some respondents with limited physical assets from remote areas mentioned that some relief materials and post-disaster services provided by the NGOs/INGOs and friends/relatives living abroad made them happy in the aftermath of the earthquake. The existing literature also showed the increased social capital by boosting personal network and community bonding (Mawby & Applebaum, 2018; Bhakta Bhandari, 2014). It is also interesting to find that the subjective well-being condition has not deteriorated in rural areas. It might be because people in rural areas are accustomed to difficult situations, and possess the capability of adapting to new conditions. However, using OHQ in post-disaster context has some limitations, as it is not designed for such a situation. Hence, the original questionnaire has no statements related to the disaster and its effects on respondents' personal and social life. However, OHQ provides a broad measure of subjective well-being in the three main domains of life satisfaction, positive feelings and negativity that capture the state of happiness in any situation (Hills & Argyle, 1998). Moreover, this study modified some statements to fit the post-disaster local context. For instance, the original statement "I feel able to take anything on" is revised to "Despite having suffered from the earthquake, I feel able to

take anything on". Such modification led us to contextualizing the questionnaire to match the local conditions. Therefore, OHQ-based assessment of this study reliably captured the subjective well-being of the respondents.

Finally, from the people's perspective, they are very optimistic on the recovery from the earthquake. Despite the complete destruction of the houses, still leaving most of them in the temporary shelter (Thapa, Rijal, & Shukuya, 2018), people's perceived resilience is found to be high, which is one of the main supportive elements of recovery. The question is whether the government and donor communities are eager to fulfil their needs and aspirations, because the speed of recovery also depends upon effective government policy, implementation mechanism and sufficient funding. However, the progress so far is very slow (Comfort & Joshi 2017), and many scholars are critical of the prolonged recovery process (He, et al., 2018; Epstein, et al., 2018). Against the backdrop of ending political transition in the country after the election of a stable government under the new, fully-democratic constitution, it is expected that the government can understand the local needs and come up with targeted programs and policies to speed up the reconstruction, rehabilitation and recovery sustainably.

5   Conclusion

In the context of limited household-level research of the hardest hit rural areas by the 2015 Nepal earthquake, this micro-study examined the human well-being among the most affected rural villages, which have a high sociocultural and geographical diversity. The population is comprised almost all the major hill castes/ethnic groups and all the major religions practiced in Nepal. Similarly, due to the geographical diversity, access to infrastructure was also highly varies among the different wards of the village. It is, in fact, a typical rural society in the hills and mountainous areas of the country, where the recent major earthquake struck. Thus, the findings of this study can serve as a useful reference to the other villages nestled among hills and mountains.

The huge economic losses of more than nine folds of the average household's annual income in almost all households in the villages indicate an unprecedented economic setback in the disaster hit rural areas. The earthquake pushed nearly 9 percent more of the village population into extreme poverty, reaching a total poverty headcount of 23 percent, which poses a further challenge to achieve the number one target of United Nation's Sustainable Development Goals (SDGs) of ending poverty elsewhere in the world by 2030. Thus, the government's rough estimate of the earthquake, causing poverty among 2.5 percent to 3 percent of the population in the affected areas (UN Women 2016), is far from reality of the severely affected areas. Therefore, more support is urgently needed for the basic living of people residing in the hardest hit rural areas. More importantly, poverty rate differs significantly among wards, ranging from 3–44 percent. Other subjective and objective well-being indicators also significantly differ across sociocultural and geographical groups. Hence, it needs a detailed assessment of the affected rural areas, so that the supports from government and other agencies can be better channeled to more needy people and communities. The current government support of NPR 300,000 to each of the households to rebuild their house in the affected areas is obviously inefficient in sustainable reconstruction and boosting individual as well as community resilience. In fact, 38 percent respondents reported that their risk bearing capacity significantly declined after the earthquake. Arguably, affirmative action or wise allocation of support to the

poorest and most vulnerable group/s is essentially necessary to address the huge income and other inequality across castes/ethnicities and wards (geography) in the rural diverged society.

Acknowledgements

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