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Social impacts and community resilience through recovery: Nepal earthquake 2015

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ABSTRACT

Nepal lies in a high-risk seismic zone making it vulnerable to earthquakes. Around 9,000 people lost their lives in the 2015 earthquake of April 25 (mag: 7.8). In addition to the physical and built environment, the social sector was affected. Social capital present in the community is a valuable resource in the aftermath of disasters. The impact on society immediately after the disaster was different according to the embedded social and economic vulnerabilities before the earthquake. Social capital can be found in the forms of bonding among the immediate kinship, bridging with inter-community and linking with higher authorities. This paper starts with an understanding of existing social capital in Nepalese communities and examines how communities can develop resilience through recovery. During recovery, the community uses social capital to improve the recovery process. The re-creation and restoration of social networks enhance the recovery process. Restoration of social capital should be encouraged, including enhancing networks so that a community can become more resilient to future events. The findings from this paper show the disparity in social capital in three study areas in Nepal. The findings show that bonding capital is high, bridging capital is low and linking capital is the least activated capital. Low bridging and linking capital can slow the recovery process, so enhancing bridging and linking capital would assist with better recovery.

1 INTRODUCTION

A disaster disrupts the normal operation of a society and can lead to significant physical and social loss beyond the society's capacity to survive (Pelling, 2001; Pelling, 2006; Romero Toledo, 2015; Shrestha, 2018). A vulnerable society is one without enough resources to cope against possible hazards. The existing networks within and among the communities are disrupted after disaster impact. Nepal is prone to several

disasters like earthquakes, landslides, floods, avalanches, glacial outburst (Aryal, 2014; Blaikie, Cameron, & Seddon, 2002; Jones, Aryal, & Collins, 2013; Osti & Egashira, 2009). Among all these disasters, earthquake and landslides are most known. Landslide is frequent and is an annual recurring event and hence Nepal is well equipped annually to deal with flooding events, however earthquakes are low frequency events and therefore have less attention. The earthquakes on April 25 (7.8) 2015 and May 12, 2015 (7.3) are the most recent earthquakes in more than 70 years.

Social capital in the form of social networks suffer after disasters but are required at the beginning of the recovery process. In the vulnerable communities, the social sector is most affected in the aftermath of a disaster. The individual houses, families, neighbourhoods, relatives need a recovery collective effort. Without participation and involvement of the community, the recovery process leads to the ambiguity of process and engagement (Valenzuela et al., 2019). To limit the disaster effects pre-event socio-economic vulnerability should be addressed (Mileti, Darlington, Passerini, Forrest, & Myers, 1995).

Post-disaster creates an opportunity to create resiliency through recovery. Recovery is a trajectory of the restoration of pre-disaster networks socially, economically, culturally and built environment with the building of resilience to future hazards. A resilient community will recover quickly, and the daily activities of the community will not be as interrupted as a non-resilient community. To create resilience, strong social capital, across the three capitals of bonding, bridging and linking, is required.

2 OBJECTIVE

This research is based on the case study of three sites affected by the Nepal earthquake of 2015. Examining the social impacts on these sites and assessing how the three sites created a post-disaster resilient community is the aim of this research. This paper emphasises the importance of resilience through recovery. Unlike the traditional methods of reconstruction and restoration, this paper identifies the importance of the creation of a disaster resilient community through the recovery process. The social capitals embedded in these three communities are compared in this study and the implication of these social capitals in the recovery process.

3 METHODOLOGY

The methodology of this research is based on questionnaires to affected residents in Nepal. A case study compared similarly collected data from three sites in Nepal. The researcher is also from the study area and fieldwork were conducted once immediately after the earthquakes, lasting several months and once a year, every year, to observe the recovery process and progress. The three sites are in three different regions of the country. The first site is in Gorkha district, Barpak, near to an epicentre to the first earthquake on 25th April. The second site is in Sindhupalchowk district, near to an epicentre to the second earthquake on 12th May; and the third site is Sankhu, a small traditional town in Kathmandu district. Two of the sites are rural, and one is in an urban site. A questionnaire survey was carried out in the study area at the respondent's place. The total participants from the survey were 456 in total, including 116 from Gorkha, 234 from Sindhupalchowk and 106 from Sankhu. These participants were directly affected by the earthquake.

4 IMPACT OF THE EARTHQUAKE

The impact of the April 25, 2015 earthquake resulted in loss of life and property. Around 9,000 people lost their lives, and more than 23,000 people were injured; about 100,000 private houses collapsed, and more than 256,000 private houses were damaged (PDNA, 2015). The total estimated loss is currently around US\$ 7 billion. Thirty-one out of seventy-five districts were affected with 14 of those under "crisis" (PDNA, 2015). After the earthquake, The Government of Nepal (NPC) published a recovery framework with an aim to "establish well-planned, resilient resettlements and prosperous society" and to "build back better" (PRDF,

2016) based on the Sendai Framework. A people-centred approach was promoted in the documentation with emphasis on consultation with impacted communities with the utilisation of local skills and knowledge with the enhancement of the resilience on the social networks (Lam & Kuipers, 2019). The recovery framework, was, however, a product without the consultation and participation of the affected communities.

4.1 Social Impact

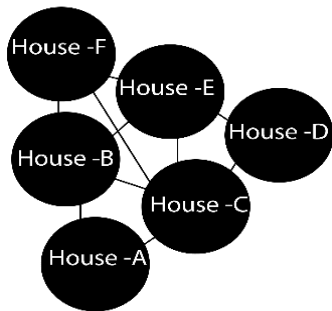


Figure 1: First Community

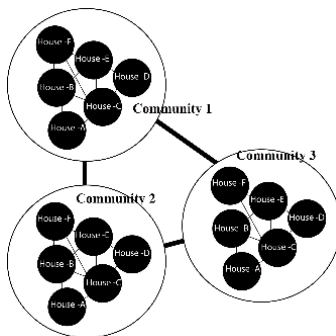


Figure 2: Neighbouring Communities

In Nepal, the social sector is vulnerable to disasters. The Nepalese communities are homogenous, with the agglomeration of respective castes, races and religion. The individual communities are with similar interests. They are bound by similar socio-economic, racial and regional forces. Fig-2 shows the houses from A-F within a typical community with similar communal interests. These group of communities form the cluster of communities within certain boundaries. The community members in each community comprise various professionals with different skills. This diversity within the homogenous community also provides the ground for community cohesion. Post-earthquake, community members were living together for several days after the earthquake using a common kitchen. The earthquake affected the economy of the country. The earthquake caused approximate US\$7 billion affecting productivity and markets (PDNA, 2015). Household incomes were disrupted. Tourism and local markets for agriculture and others were the main sources of income for the inhabitants of the Kathmandu valley (Chatterjee & Okazaki, 2018). The disaster affected both livelihood options. Some communities also worked for each other as an exchange of workmanship between them. The reliance on the neighbouring community for different supports was observed Fig 3 shows how different communities were connected. During the reconstruction phase, as an after effect of the earthquake, trade exchange was common. Rather than the financial income, the commerce of the skills trading existed between adjacent communities.

4.2 Impact on Built Environment

As a consequence of the earthquake, around 500,000 houses were destroyed, and more than 256,000 private houses and 3500 government buildings were damaged (PDNA, 2015), as shown in Table 1. The residential buildings outside Kathmandu are predominantly constructed with low strength concrete masonry (PDNA, 2015). These buildings suffered a higher level of destructions compared to the plain and reinforced concrete structures.

Table 1: Buildings Damaged

	low strength masonry	cement mortared masonry	reinforced concrete	total
fully damaged	474,025	18,214	6,613	498,852
partially damaged	173,867	65,859	16,971	256,697

Housing damage, received through the Ministry of Home Affairs DRR Portal (<http://drrportal.gov.np/>)

Cultural heritage buildings were damaged severely after the earthquake. The Kathmandu valley itself contained seven world heritage sites. Although some intrinsic nature of Nepalese monuments, like

symmetricity, multi-level plinth and the conical distribution of mass improved the seismic performance, the construction of most of these heritage buildings dated back to 12th century and were without the consideration for the seismicity of the buildings (Bhagat et al., 2018). A total number of 750 buildings with cultural importance were damaged including 450 of them housed inside the Kathmandu valley. In most of these damaged buildings, there was a lack of rigid connection between the brick walls and the wooden beams (Shakya, Varum, Vicente, & Costa, 2014).

5 SOCIAL CAPITAL

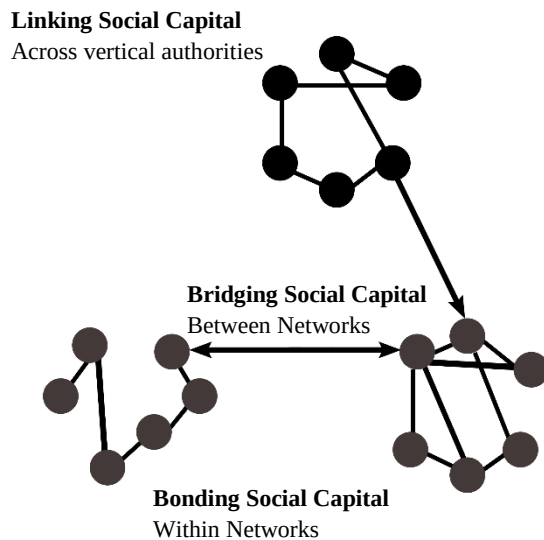


Figure 3: Bonding, Bridging and Linking Social Capitals adapted from Adrich 2012

Social capital is the outcome from the social interactions, networking and other tangible and intangible values inside any society (Fukuyama, 2001) and can add positive value to development and economic growth (Knack & Keefer, 1997; Torsvik, 2000; Woolcock, 1998). Unlike financial capital, it cannot be directly cashed but is very crucial during an emergency (Aldrich & Meyer, 2015). A holistic recovery involves social, institutional, cultural and economic recovery. The social elements of the recovery are often overshadowed (Okada, Howitt, Haynes, Bird, & McAneney, 2018). This has long term effect on recovery and hinders the creation of resilient communities.

The bonding, bridging and linking capitals are the predominant social capitals.

Bonding Social capital is an outcome from the networking within a community. These networks are the reflections of the community. The actual picture of social capital is the existing social networks (Islam & Walkerden, 2014). Social capital is the measure of social cohesion. Whereas, bridging is found in social networks, bonding is an internal resource within a community due to internal networks and familial ties. After disasters, the first support comes from the clans hence the family and family connections are central in the aftermath of disaster (Drabek & Boggs, 1968; Garrison & Sasser, 2009). The relationship within community members is close in the Kathmandu.

Bridging Social capital is due to the networking among the neighbouring communities. It is the relationship between communities. It is often characterised as having weaker ties (Granovetter, 1977) compared to dense and intimate networking of bonding capital. Bridging capital is equipped with more resources as it is an access to external resources and wider number of people (Putnam, 2001; Aldrich, 2011a). The communities in Nepal are bound together across communities through relationships of marriage and friendship.

Linking social capital is the most scarce capital as it is the connection to higher authorities and seen as a vertical connection. It is composed of 'norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalised power or authority gradients in society' (Szreter & Woolcock, 2004). Access to linking capital can enhance the recovery process.

6 RESULTS

The bonding capital was tested through the questionnaire related to the frequency to which people visited their neighbour. The higher number of participants were either always or often in two rural areas (Sindhupalchowk and Gorkha), but, in the urban context, the frequency to which people visited their

neighbour tends to be “sometime” and “rarely”. Fig 4, shows the result from survey for the understanding of bonding capital. In observation, it was clear that the two rural communities were developing better recovery, as observed by buildings being constructed faster, and the active community networks in place. The community members are helping each other. For example, the masons in the community were working together with the carpenters to build their walls and so on. Although the trades are their livelihood, the trade exchange rather than financial benefit has become common in rural settings. However in urban area the bonding capital is not at considerate level and ultimately the recovery is not as expected. The speed of recovery can be attributed to the high level of bonding capital in the communities studied. The rural community participants appeared to know their neighbours well and were actively involved in each other’s lives.

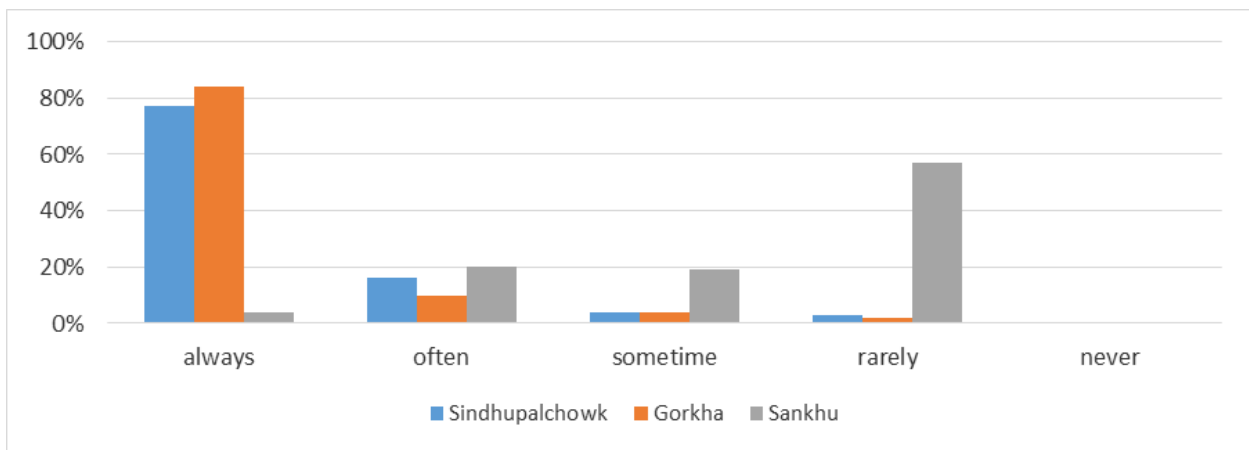


Figure 4: Frequency to visit neighbour

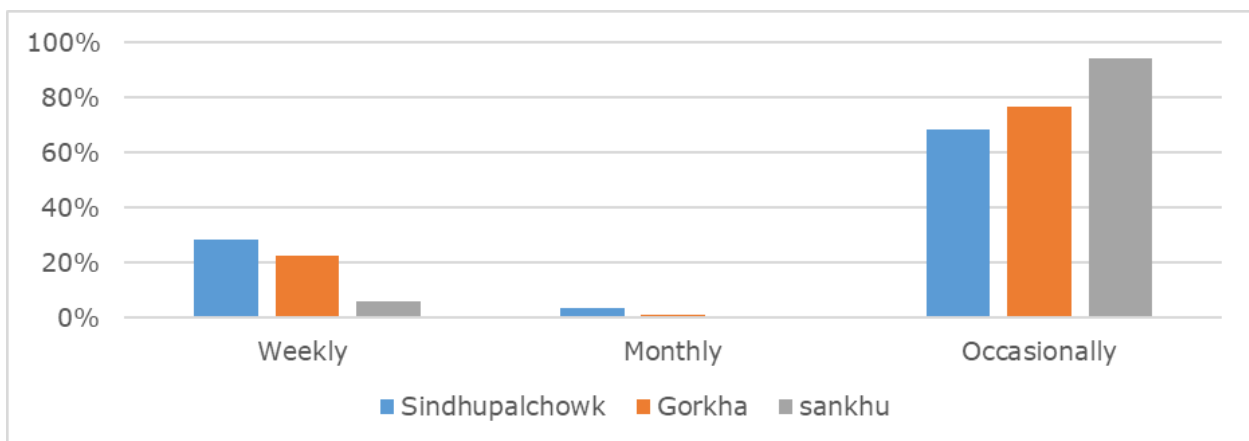


Figure 5: Frequency to visit neighbouring community

Bridging capital is demonstrated by the frequency to which people visited their neighbouring communities (Fig. 5). The weekly visitors and occasional visitors are again higher in the rural communities of Sindhupalchowk and Gorkha. As expected, bridging capital was not as prevalent as bonding capital, but observations showed that the communities of Sindhupalchowk and Gorkha were connected and assisting each other. This was especially the case around agriculture recovery where 90% of participants from Gorkha and 82 % from Sindhupalchowk were dependent on agriculture as a daily livelihood. In observation, the pre-disaster system of human resource exchange within neighbouring communities in terms of agricultural works is going as usual in the post-disaster era. For example, in two communities A and B, the harvesting of corn in community A is done through the community members of both A and B. While, the millet planting in Community B is also from both communities A and B.

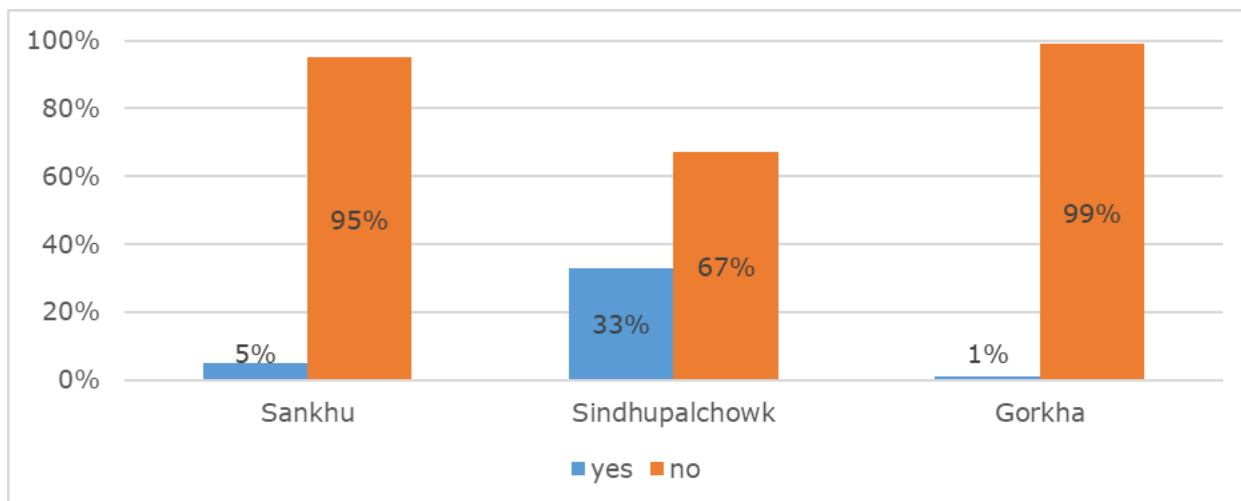


Figure 6: Connection to INGOs and NGOs

Linking capital was tested asking about individual connection to higher authorities like NGOs and INGOs. The connection to higher authorities in all three areas is quite low, where most of the respondents agreed they do not know the NGOs and INGOs (Fig. 6). In the study areas, access to local level NGOs appears relatively low. Communities may be missing out on accessing resources provided by Governments and NGOs/ INGOs. Only in Sindhupalchowk the higher number of respondent's (33%) agreed they have the connection to these organizations. In observation, the connection to NGOs and INGOs are being important in the communities in bringing the external resources as well as the sharing of the disaster knowledge from around the world, which helps the communities to understand the recovery process. These connection to higher authorities also provided trainings and workshops to understand the disaster as an inevitable event.

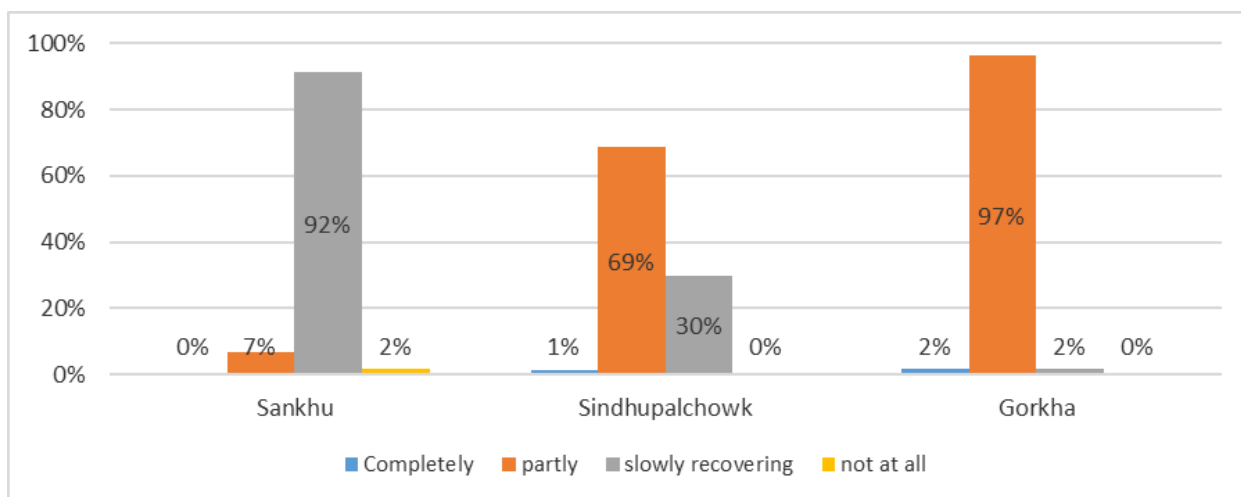


Figure 7: Overall Recovery progress

Also, a question to understand the recovery from the respondent's perspective is asked. Although Sankhu is near to the capital city, overall recovery rating from the participant's survey depicted the higher number recovering slowly (92%). Gorkha is with better recovery in overall with 2% agreed on the complete recovery and 97% on partly recovery (Fig. 7). The enriched social capital whether in the form of bonding, bridging or linking enhances the recovery process in two rural parts. Overall recovery of Sindhupalchowk and Gorkha is more satisfactory to that of Sankhu as from the perspective of the respondents.

7 DISCUSSION

The higher level of social capital is present in the rural parts to that of the urban context. The social networks are often misunderstood with social capitals (Huber, 2009). However, they are not social capitals themselves but due to the embedded resources in these networks. The strong root of social networks prevails in the study area which provides strong social capital for the recovery of the rural areas. Whereas, the weak social networks are there in an urban area and resulted in weak social capital. The bonding capital in the community served well during the immediate response. The immediate family members are the first to respond (Garrison & Sasser, 2009). The higher level of bonding capital is observed in the rural sites and the weak tie is in the urban area. Also, the cooperative recovery programs from the community level are observed in the rural study areas where the people are collectively working for the recovery programs themselves without seeking the external resources. For instance, they are using local building materials and knowledge to restore the built environment without considering external support. However, in the urban context, the lower level of connectedness is not encouraging the inhabitants to do so. The bridging capital brings external resources in the recovery process (Aldrich, 2011a). Also, the bridging capitals in the rural communities are better compared to urban through the networking to the neighbouring communities, and they share a similar kind of support as in the bonding capital. Whereas, the bridging capital in the urban context is more complex and difficult. The urban people are reluctant to visit neighbouring communities, and hence the networking is not active which finally results in the lower level of bridging capital. It is difficult to recover without mutual assistance from neighbouring communities as this lowers the chances of getting external resources. The interaction across formal and informal institutions or authority through community (Szreter & Woolcock, 2004) brings additional support to the community. In all these study areas the association with local leaders is omnipresent, however the leaders themselves are not resourceful. However, the capacity of the authority itself is also important.

8 CONCLUSION

The results of this research show that all three communities are enriched with bonding social capital. The communities were with tightly connected networking which served them well during the emergency phase. Particularly strong relationships were seen in the rural communities where bridging social capital appeared to be providing the communities with significant benefits. There were not linking capitals in the study areas and this needs to be improved if the communities are to recovery better in subsequent events. Collectively, the social capitals of bonding, bridging and linking can facilitate fast recovery and future disaster resilient communities. It is hoped that, by focussing on improving how communities bond, bridge and link, future disaster impacts can be mitigated and recovery improved.

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