

WWJMRD 2015; 1(6): 16-20
www.wwjmr.com
e-ISSN: 2454-6615

Ramesh Prasad Singh
PhD Scholar, Dr. K. N. Modi
University, Newai, Rajasthan,
India

People's understanding about the earthquake risk: A case study of core settlements of Kathmandu valley

Ramesh Prasad Singh

Abstract

Kathmandu Valley, the capital of Nepal, is specifically vulnerable to earthquakes. There have since been earthquakes causing severe human and physical loss in 1934, 1980, 1988 and 2011. The city and townscape of Kathmandu Valley is chaotic and city planning does not seem to exist. The recent destructive earthquake which was occurred on 25th April, 2015 has caused thousands of deaths and injuries and extensive damage to the buildings and properties demolishing all the social, political and economic development of the entire country. The destruction was widespread covering residential and government buildings, heritage sites, schools and health posts, rural roads, bridges, water supply systems, agricultural land, trekking routes, hydropower plants and sports facilities. The devastating consequences and uncontrollability of earthquake bring us many difficulties in dealing with it. For this, it is crucial to understand the people's understanding about the earthquake risk. The earthquake risk has been tried to achieve through stakeholder's perspectives. In this paper, people's understanding about the earthquake risk has been analysed to realize how a society or target population perceives its risks and what importance they place on the reduction of specific risks through the interview of 300 respondents in core settlements of Kathmandu, Patan and Bhaktapur Durbar Squares. Through the questionnaire, an investigation was conducted on people's cognition and response to the earthquake. The survey shows the people's awareness, preparedness and mitigation towards the earthquake risk is poor and their knowledge about the knowledge of building code and emergency response is limited.

Keywords: Awareness, Earthquake, Preparedness, Questionnaire, Risk Perception

Introduction

Earthquakes have always been a serious threat for the population of Nepal. Entire Nepal where most of the land is covered by the Himalayan Mountains falls under the highly seismic zones. Because the Himalayan mountain range was formed by the collision of the Asian and Indian plates that started about 50 million years ago (UNDP, 1994). Universities of Alaska and Colorado have made precise measurements in the Nepal Himalayan and Tibetan Plateau since March 1991 with the help of Chinese universities and authorities. According to the measurement, the Indian plate moves 53-63 mm closer to Asia as Tibet moves 34-39 mm to the same direction each year which means that the Kingdom of Nepal is rowed by 19-24 mm every year. Steady movement of the Indian plate towards Tibet over periods of centuries is accommodated by sudden slip events (great earthquakes) on a gently north-sloping surface beneath the Himalaya (Hyrkas, 1999).

The country has experienced large number of devastating earthquakes in the past. The deadliest earthquake occurred during 1934 A.D. The magnitude of 8.34 R-scale killed 8519 people, collapsed 80,893 buildings and severely damaged more than 1,26,355 houses. The earthquake of 1988 A.D of magnitude 6.6 R-scale mainly affected the eastern development region and some parts of central development region of Nepal. It caused 721 deaths, 6553 injured and damage of more than 64174 houses (Dixit, 2003). The earthquake of 2011 of magnitude 6.9 R-scale killed 6000 buildings collapsed completely and 20000 buildings collapsed partially. In addition to the above, several earthquakes of small to medium sized magnitude R-scale were also observed in between 1934 and 2011. Around 11,000 people have lost their lives in major earthquakes of Nepal in this century (ibid).

The earthquake of similar size magnitude of 1934 A.D. occurred in 19th Century are: 1810, 1833 and 1866 (KVERMP, 2000). The seismic records of the region suggest that

Correspondence:

Ramesh Prasad Singh
PhD Scholar, Dr. K. N. Modi
University, Newai, Rajasthan,
India

the earthquake of the greater magnitude size occurs approximately every 75-80 years indicating that a devastating earthquake is inevitable in the long term and likely to take place in the near future.

On 25th April 2015, 7.6 –R scale earthquake as recorded by Nepal’s National Seismological Centre (NSC), struck Barpak of Gorkha, Nepal had not faced a natural shock of comparable magnitude for over 80 years. The catastrophic earthquake was followed by more than 300 aftershocks greater than magnitude 4.0 (as of 7 June 2015). Four aftershocks were greater than magnitude 6.0, including one measuring 6.8 which struck 17 days after the first big one with the epicentre near Mount Everest.

To date, there are over 8,790 casualties and 22,300 injuries. It is estimated that the lives of eight million people, almost one-third of the population of Nepal, have been impacted by these earthquakes. Thirty-one of the country’s 75 districts have been affected, out of which 14 were mostly affected through this earthquake. In the last few decades, rapid urbanization and building construction has been occurring in this area. According to the National Census report 2011, the population is 17, 44,240. The population cover around 3.5 million if the floating population is also included. Due to increased population, poor sub-soil condition and haphazard development, the seismic vulnerability of the valley has been increasing.

It needs to have a solid grasp of the target population’s specific vulnerabilities and capacities to help them

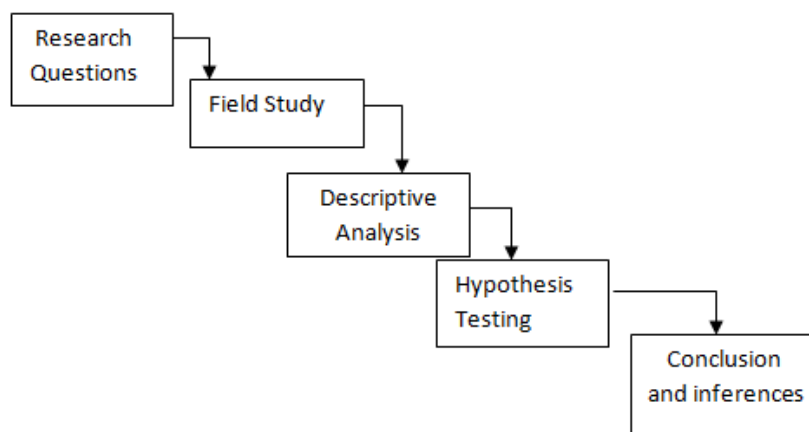
effectively choose and design meaningful risk reduction measures that utilize and build on the target population’s strengths while reducing their vulnerabilities. It is also crucial to understand how a society or target population perceives its risks and what importance they place on reduction of specific risks. The impact of the risk can be reduced if people adopt the impact hazard adjustments.

The purpose of this research paper is to understand the perceptions of local people about the earthquake vulnerabilities, the reacting behaviour during the risk and preparedness.

Method

The research methodology was based on the interviews of different stakeholders like people at various sections of the community i.e. local people (head of the family, senior citizen and women) people involved in NGOs, craftsman and school teachers. The sample distribution was 100 each in three settlements. Inductive method of research has been followed. People were made open to express their open views about the earthquake threats.

- Personal experience about the earthquake
- Perception about earthquake
- Familiar with earthquake
- Reacting Behavior in emergency
- Preparedness



Study Area

The study area was conducted between October 2012 and June 2013 in core settlements of Kathmandu Durbar Sqaure, Patan Durbar Sqaure and Bhaktapur Durbar Sqaures of Kathamndu Vallley World Heritage Sites. During the Malla ruling period, Kathmandu, Patan and Bhaktapur were independent city-states. In the past, most of

the inhabitants belong to indigenous newar community. The socio-cultural development of the newars allowed incorporating this diversity, thereby creating an urban society with highly developed craftsmanship and social structures. Inhabitants of the area are of mixed races that have migrated from different parts of the country mostly from 1970s onwards.



Map showing study area

Theoretical Framework

In the eighties and nineties, seismic research took a new meaning in the field of social sciences with research on the societal understanding to various disasters including the earthquake. Luhaman, 1993 cited in Jigyasu, 2002 provided a vocabulary for analyzing how highly differentiated social systems attempt to deal with the uncertainty created by disruptions. His analysis examines the language of risk and danger as part of a general social process by which social systems reduce complexity in their environments.

The social approach arises from recognition that hazards have an impact on people that is independent of their effect on the natural and built environment and is directed towards facilitating individual and collective changes in behaviour (e.g. encouraging support and/or adoption of protective measures) and increasing their capacity to adapt to adverse circumstances. In contrast to the engineering approach, in which relatively objective analyses of known data regarding the likelihood of hazard occurrence and its consequences informs the process, the latter occurs in a context defined by considerable social, political, economic and psychological diversity (Kuban, R. and Carey, 2001).

Recently a lot of debate has been generated among sociologists on various perspectives on the question ‘What is disaster?’ However, the focus of research again has been on societal responses to hazards and not on the processes that produce disasters (Blaikie, 1994). Blaikie states that the vulnerability of the people is primarily rooted in social processes and underlying causes which may be ultimately quite remote from the disaster event itself. It is a means for understanding and explaining the causes of disaster.

Accordingly, disaster can be defined as an expression of social vulnerabilities. It is the result of underlying community logic of an inward and social process.

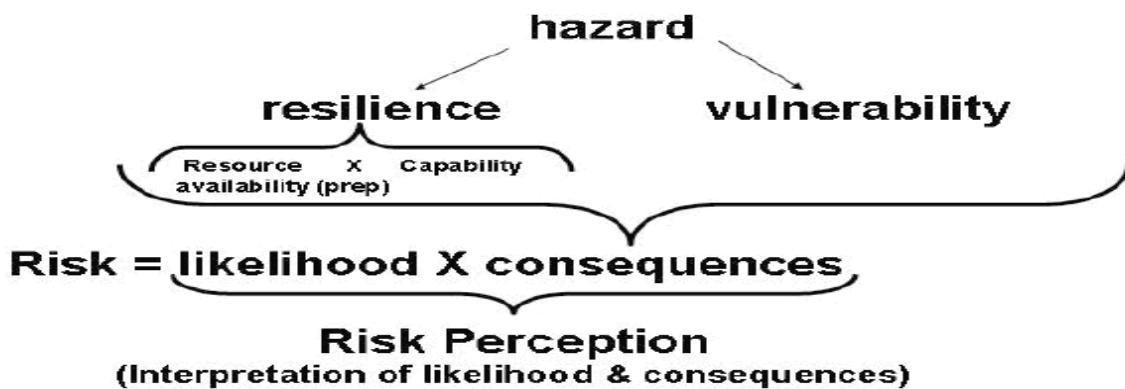
Hewitt (1997) describes the new approach to disaster:

“The new approach to disaster not only reverses the old hierarchy of factors, but also gets rid of the overwhelming

notion of agent. Starting from an analysis of disaster seen as a process tightly tied to social vulnerability, the new paradigm considers that the causes of disaster are to be explained on structural as well as contextual grounds. When social risks explode that are totally raised inward to the community, then there is disaster. As a result of the first conceptual shift, disaster is no longer experienced as a reaction; it can be seen as an action, a result and more precisely as a social consequence”.

Mitigating risk through social and behavioral routes must accommodate the fact that people interpret the information presented with regard to their expectations, experience, beliefs and misconceptions (Cutter et. al., 2000, Kuban et. al., 2001) and these, in turn, influence their decision-making and behaviour. That is, people’s understanding of, and response to, risk is determined not only by scientific information about risk, but also by the manner in which this information interacts with psychological, social, cultural, institutional and political processes to influence outcome. If they are to be effective, these factors must be understood and accommodated in risk communication strategies. Furthermore, with respect to their relationship with hazards, these processes cannot be regarded as neutral. Some will contribute to a capacity to adapt, but others may amplify the detrimental consequences associated with hazard activity.

In the context of people’s understanding at the societal level, Hazard consequences cannot be understood in terms of the direct effects of the actions of the hazard. Rather they reflect the interaction between hazard characteristics and those individual and community elements that increase susceptibility to experiencing loss from exposure to a hazard (i.e. increase vulnerability) and those that facilitate a capacity to adapt or adjust (i.e. increase resilience). In this context, risk management can be described in terms of the choices made regarding the reduction of vulnerability and the development of resilience or adaptive capacity.



The relation between risk, resilience and vulnerability (Source: Singh, 2007)

Results and Discussions

1. Personal experience

When people were asked about the earthquake, 74 % people had previous experience about the previous earthquake where as 100 % people have experience of the

recent earthquake of 25th April, 2015. Most of the people had experience of 1988 earthquake and 2011 earthquake. Only 2 people still remember the event of 1934 earthquake and some people the people had heard about 1934 earthquake from their relatives.

Table 1: Personal experience

Personal Experience (Before 25 th April, 2015)	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Square
Yes	74	65	77	80
No	26	35	23	20

Source: Field Survey, 2015

2. Familiar with the earthquake

About 1/3rd of respondents have not read any materials and

they responded nothing while 47% people were familiar with reading newspaper and radio.

Table 2: Familiar with the earthquake

Familiarity	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Square
Radio	29	34	31	22
Newspaper	18	21	19	14
Researcher coming in the site	5	4	5	6
School	13	15	11	13
Family elders	5	4	1	8
Self-experience	6	7	6	5
Do not read	24	15	27	32

Source: Field Survey, 2015

3. Perception of the earthquake

When they were asked, about 29% of the respondent still

thinks that earthquake is due to god’s wish and 5% people still donot know about the earthquake risk.

Table 3: Perception of the earthquake

Perception	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Square
God’s Wish	29	20	31	36
Natural Phenomenon	66	76	65	56
Do not know	5	4	4	8

Source: Field Survey, 2015

4. Reacting Behavior during emergency

They were asked what they would do during the earthquake when they were inside the building. Around half of the people would run out of the building. Some other said they would run in panic or take shelter under table. From the

below table, only few of them choose the correct answers “unde the table or chair”and ”in the corner”. A large portion of the people choose the wrong answers “out of the building”, “jump from the window”, “on the balcony” and “run to the staircase”.

Table 4: Reacting Behavior during emergency

Precautions	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Durbar Square
Out of building	33	25	34	40
Jump from window	5	0	9	6
Under the table or chair	20	24	28	8
Precautions	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Durbar Square
In a corner	13	15	12	12
On the balcony	5	1	3	11
On the bed	1	0	2	1
Run in Panic	6	3	8	7
Do-not know	10	5	9	16
Run to the staircase	7	5	8	8

Source: Field Survey, 2015

5. Preparedness about the earthquake

Most of the residents were interested in more than one activity when they were asked preparedness for an impending earthquake. Most of them mentioned the awareness raising activities and making strong the existing houses. Some of other activities mentioned were open space and escape route maintenance for escape,

rescue/relief as well as settlement planning activities. More than 50% of the respondents think the making house strong would be the best option for the seismic resistant but 15% of people still don't know what to do about the earthquake threat. Making house strong and awareness raising are the important activities dor risk mitigation

Table 5: Preparedness about the earthquake

Possible earthquake activities	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Durbar Square
Make House strong	51	60	48	45
Awareness raising	25	32	21	22
Open space and escape route maintenance	12	10	9	17
Settlement planning	2	3	3	0
Do not know	10	6	11	13

Source: Field Survey, 2015

6. Understanding about National Building Code

When they were asked, only 31 % of the respondent only

hears about the national building code and 69 % people still do not know about it.

Table 6: Understanding about National Building Code

Perception	Percentage	Kathmandu Durbar Square	Patan Durbar Square	Bhaktapur Square
Yes	31	30	28	35
No	69	70	72	65

Source: Field Survey, 2015

Conclusion

The finding of this study showed that the core setting of Kathmandu Valley is becoming vulnerable from the earthquake threat is due to low level of Knowledge and technical capabilities in the community for earthquake mitigation. This brings not only the negative ends of the scale (vulnerabilities), but also how they can constitute the positive capabilities of an individual or group to survive and recover from a given hazard impact of a given severity. In my study area, the earthquake risks can be minimized by organizing the community level committee among people with most vulnerable groups which changes in their own attitudes toward and understanding of their position in society. These changes have to do with an increased awareness of their rights. The implications of this approach may produce innovative policy approaches.

Based on the individual interviews with local people and joint interaction among people, following are their main perceptions about earthquake vulnerabilities, capabilities and precautions undertaken by them.

- 1/3rd of people think that earthquake is due to god's wish.
- Around half of people will go outside of the building (i.e. in the open courtyard) during the earthquake.
- Most of the residents' emphasis on more than one activity for local earthquake mitigation activities. However, 42% of them mentioned for making house strong while 45% mentioned the awareness raising together with education /training activities. Some of other activities mentioned were open space and escape route maintenance for escape, rescue/relief as well as settlement planning activities.
- More than 50% of the respondent thinks the making house strong would be the best option for the seismic resistant. Making house strong and awareness raising are the important activities for risk mitigation
- Still about 1/3rd of the people hear about the national building code

References

1. Blaikie, P., Canon, T., Davis, I. and Wisner, B. (1994), *At Risk: Natural Hazards, People's Vulnerability and Disasters*, Routledge, New York.
2. Cutter, S., Mitchell, J. and Scott, M. (2000), "Revealing the Vulnerability of People and Places: A Case Study of Georgetown County, South Carolina." In *Annals of the Association of American Geographers* Vol. 90(4): pp.713-737.
3. Dixit, A.M. (2003), "The Community Based Program of NSET for Earthquake Disaster Mitigation", The International Conference on Total Disaster Risk Management, 2-4 December, Thailand, Bangkok.
4. Hewitt, K. (1997), *Regions of Risk: A geographical introduction to disasters*, Essex: Addison Wesley Longman Limited, London.

5. Hyrkas, J. (1999), *The Next Earthquake and Its Effects on Residential Buildings in Kathmandu Valley*.
6. Jigyasu, R. (2002), *Reducing Disaster vulnerability through local knowledge and capacity, The case of Earthquake Prone Rural Communities in India and Nepal*, Dr.Ing. Thesis Town and Regional Planning (NTNU), Norway.
7. Kuban, R. and Carey, H.M. (2001), *Community-wide Vulnerability and Capacity Assessment (CVCA)*, Office of Critical Infrastructure Protection and Emergency Preparedness, Canada.
8. KVERMP (2000), *Project Completion Report, under the Asian Urban Disaster Mitigation Program*, Asian Disaster Preparedness Center, Bangkok, Thailand.
9. Singh, R. (2007), *EARTHQUAKE RISK REDUCTION through an Urban Ecological Planning Approach to Hanumandhoka Durbar Protected Monument Zone, Kathmandu, Nepal*, M.Sc., Thesis Town and Regional Planning (NTNU), Norway.
10. UNDP (1994 a), *Seismic Hazard Mapping and Risk Assessment for Nepal*, HMG, Nepal UNDP/UNCHS Habitat), Subproject NEP/88/054/21.03.
11. UNDP (1994 b), *Seismic Vulnerability Analysis, (Appendix c) Structure, Washington, HMG, Nepal UNDP/UNCHS Habitat), Subproject NEP/88/054/21.03.*