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**Study of Earthquake Preparedness in Kathmandu City, Nepal**

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**Abstract**

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*Earthquakes cannot be predicted but effective planning and preparation may reduce the impact. Impacts from earthquake risk is believed to be increasing very rapidly mainly due to the improper development activities. People require to have basic knowledge on preparing themselves to mitigate the impacts from the earthquake. This paper studied the effectiveness of implementation of knowledge and skills to mitigate the impact of earthquake by focusing on the knowledge and ability of the household members in the community. This study also helped the respondents and institutions and stakeholders who were the part of this research to reflect, analyse and assess their own earthquake preparedness measure. It is seen that there is a necessity for a sound coordination and realization on importance of better preparedness which is essential to mitigate the impact from the earthquake.*

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## Introduction

Nepal is exposed to multiple hazards and because of its geographical and climatological conditions it is regarded as a disaster-prone country. Vulnerability of the population with regular and frequent occurrence of different disasters claim large number of lives and economic losses every year. Nepal regularly suffers and faces serious threats from disasters due to rapid population growth, unplanned settlements and environmental degradation. Disasters such as earthquake, droughts, floods, landslides, fires, and epidemics affect our country annually (Ministry of Home Affairs, 2019).

Disaster often happens without warning with damaging effects that are sustained from hours to days, and they are measured in terms of lives lost, injuries, damaged or loss of property, and environmental degradation. Centre for Research on the Epidemiology of Disasters (CRED) defines a disaster as “a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering”. Smith (1999) posits that disaster is also the range of effects such as immediate destruction and to the impacts that are not experienced physically for many years. Disasters adversely affect humans since their existence. Individuals and societies have attempted to decrease their exposure to the consequences of such disasters. All these efforts and attempts to decrease disaster consequences all have the same goal which is disaster management (Coppola, 2015).

Kunwar (2012) explains that both terms, crisis and disasters are used interchangeably to indicate major destructive events. Deciding how to respond to a crisis is important, but equally important is implementing that decision (Nystrom & Starbuck, 1984; in Reilly, 1993, p. 132). Crises management starts well before any event boils into a full-blown crisis (Fink, 1986; in Santana, 2009: 307; in Kunwar 2012). Crisis is a term which have different synonyms in the literature: disaster (Gephart, 1984; Turner, 1976; in Reilly, 1993), catastrophe (Mitroff & Kilmann, 1984; in Reilly, 1993), jolt (Meyer, 1982; in Reilly, 1993), problem (Kiesler & Sproull, 1982; in Reilly, 1993), threat (Staw et al., 1981; in Reilly), and turning point (Milburn et al., 1983; in Reilly). Crisis are unexpected, though predictable, whereas disaster is unpredictable (Faulkner, 2006; in Kunwar 2012). Management Study (2022) describes that building earthquake resistant buildings, preparing evacuation plans, taking mitigation measures as precaution can be an example for crisis management.

Mitigation, preparedness, response, and recovery all are equally important to reduce the impact of disaster in a community. All these processes will not prevent disaster from occurrence, but early preparedness may reduce the impact. Kunwar (2012) states that risk is expected and is predictable, so planning before a crisis is

risk management. Risk management, emergency preparedness and response plans save lives and property. It helps to act quickly and reduce the impacts. This is achieved by maintaining disaster management plans and arrangements (Gencer, 2017).

According to the Global Report on Disaster Risk, Nepal ranks the 11<sup>th</sup> position in terms of earthquake risk. When the devastating earthquake struck Nepal on 25<sup>th</sup> April 2015, country suffered heavily and caused impacts on various sectors. 2015 earthquake caused damages and loss of life, properties and infrastructure, and suffered greatly in the aftermath of powerful countless aftershocks. United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage sites such as temples and centuries old buildings in Kathmandu valley were destroyed. Thousands of houses all over the country were destroyed and 8790 people died and 22300 were injured (National Planning Commission, 2015).

### **Area of study**

Area of study stretches Gangalal Hospital towards North, Dhobikhola towards East, residence of Prime Minister and speaker of the House of Representative towards west, and to the South it lies Gyaneshwor covering total area of 403.1 hectare. The total population is approximately 78000. There are 13100 households approximately and total number of 52 schools and colleges in the study area. As per the information provided by the community police, there are 35 different organizations from different sectors which includes NGO/INGO, local clubs, local authorities working in various sectors and engaged for the development and betterment of the local community (Kathmandu Metropolitan City, n.d.).

The objective of this study is to assess earthquake preparedness of household members and to analyze the efforts of stakeholders in enhancing the coping resources of the people. The study address questions like awareness in household members for preparing themselves to mitigate the impact, efforts taken by local authorities and stakeholders in spreading awareness on earthquake preparedness measures.

### **Literature review**

*National Disaster Response Framework (NDRF)* is endorsed by the Government of Nepal (GoN) in 2013 which works as a key guideline for disaster response. This framework defines the role of various stakeholders in times of disasters. NDRF works as comprehensive guide for an effective and coordinated national response and limited to the preparedness and response (Ministry of Home Affairs, 2013).

*Nepal Disaster Management Reference Handbook*, October 2020, covers in depth about country's disaster profile and outlines policies related to disaster management. The Disaster Risk Reduction and Management (DRRM) Act 2017

and Local Government Operation Act 2017 guides our disaster governance under Constitution 2015. DRRM Act 2017 was amended as DRRM Act 2019 in March 2019 when it established National Disaster Risk Reduction Management Authority (NDRRMA) under the Ministry of Home Affairs (MoHA). NDRRM is responsible for managing DRRM related functions in the country. DRRM has several structural arrangements such as the National Council, the Executive Committee, and the NDRRMA under MoHA. National Emergency Operation Centre (NEOC) coordinates response efforts from national and international organizations through MoHA. DRRM executive committee and the National Disaster Risk Reduction and Management Authority (NDRRMA) response after receiving the information from the site where emergency is about to rise for disaster relief and emergency (Disaster Management Reference Handbook, 2020).

MoHA has been taking initiation to address the issues of disasters and mitigate the effects and is a national focal point of disaster management in Nepal. MoHA is highly active in raising awareness among peoples, training and networking with national and international organizations to mitigate the impact of disaster (United Nation Disasster Risk Reduction, 2013).

Nepalese Army has always been committed towards safeguarding the independence, territorial integrity and sovereignty of Nepal. This institution exhibited their professionalism in countless battles fought during the unification campaign of modern. Nepalese Army is committed to support the efforts of the Nepalese government in establishing disaster resilient community (Nepali Army, n.d.).

Armed Police Force (APF) is administered by the Armed Police Inspector General and other armed police officers for the protection of life, property, and liberty of the people by maintaining peace and order. During natural calamities or epidemic in any part of Nepal, APF has played a role by showing highest level of professionalism in emergency needs of disaster victims such as search and rescue, providing shelters, and distributing relief materials (Armed Police Force, n.d.).

Disaster Management Division was established with a vision to provide quality service in the field of Disaster Risk Reduction (DRR). Disaster Management Division comprises expert and trained manpower who are mobilized whenever and wherever necessary. Disaster management division is self-sustained with disaster rescue equipment with trained manpower ready to deal with disasters such as: earthquake, landslide, flood, fire, road, air, and industrial accidents (Nepal Police, n.d.).

For the last 27 years National Society for Earthquake Technology (NSET) has been actively involved in conducting trainings, awareness programs by involving security forces, community people and educational institutions. NSET works to strengthen earthquake preparedness by working with schools, hospitals,

transportation authorities in coordination with the government to conduct risk assessments and to develop a plan (National Society for Earthquake Technology, 2012).

The United Nations organizations, Clusters Humanitarian Organizations, donors, INGOs, and professional groups are appealed by the Government of Nepal (GoN) (Council of Ministers) for international humanitarian assistance in case there is a large-scale disaster. United Nations Development Programme (UNDP), United Nations High Commissioner for Refugees (UNHCR), United Nations International Children Emergency Fund (UNICEF), World Food Programme (WFP), World Health Organization (WHO) are some of the international organizations committed in protecting community resilience against conflict, environment degradation, and challenges raised by disaster and crises (Disaster Management Reference Handbook, 2020). International Federation of Red Cross and Red Crescent Societies (IFRC), International Committee of the Red Cross (ICRC), Nepal Red Cross society (NRCS) are humanitarian organization that provides assistance to victims of disaster, and has been promoting humanitarian activities in affected areas (Center for Excellence in Disaster Management & Humanitarian Assistance, 2020).

There are multiple global initiatives which promotes disaster risk reduction. Amongst multiple initiatives, *Yokohama Strategy, Japan (1994)* is one of the initial international DRR initiative. Nepal participated and presented a national action plan on disaster management in this first world conference on DRR which was held in Yokohama, Japan in 1994. *Hyogo Framework of Action (HFA) (2005-2015)* was drafted and approved by 168 countries in 2005 at the world conference for disaster reduction. HFA is a guidance to achieve a set of outcomes and results by mobilizing stakeholders at all levels to achieve Millennium Development Goals (Capacity for Disaster Reduction Initiative; International Strategy for Disaster Reduction, 2015). *Sendai Framework for Disaster Risk Reduction 2015-2030* was adopted at the Third United Nations World Conference in Sendai, Japan, on March 18<sup>th</sup>, 2015. It was held from 14<sup>th</sup> to 18<sup>th</sup> March, and this is the successor instrument to the HFA 2005-2015 (United Nations International Strategy for Disaster Reduction, 2015).

Goula, Oliveira, and Roca (2006) explained that urban planning is an important component of earthquake risk mitigation. In the name of urban development, expansion of paved roads and areas, inadequately planned cities, rise in population will affect environment and lead to increase in disaster risk. Rapid urban development will increase disaster risk but as a new wave of urbanisation also creates new opportunities for building resilience (United Nations Disaster Risk Reduction, 2013). DuFrane and Stephenson (2002) explains that disasters and development are linked closely that can destroy development initiatives and create

development opportunities. Similarly, Marxist interpretation on disaster reflects development and disaster management both aimed at reducing and increasing disaster vulnerability. Economic conditions and political powerlessness cause poor, minorities, and other marginalized people to live in dangerous areas and also affect their capacity to manage and recover disaster (Shamim, 2016). Hoffman and Smith (1999) also stated that community members are neither unaware nor inactive of the risky situations where they are often placed. The development of the process and events affects major social- organizational components of a community by disrupting or destroying the functions of the group (Hoffman & Smith 1999).

Coppola (2015) discussed about understanding of the universal principles of emergency management. Disaster management is rapidly expanding and improving according to modern needs. This book is a collection of facts, statistics, checklists and insightful information for future challenges and also includes possible solutions. All countries are faced with risk from known and unknown hazards having adverse effects on populations and environments. Actions are taken to prepare and mitigate the effects. Hazard profiles are not always the same in every country. Disaster strikes without warning giving us less time to respond. Preparedness is actions taken in advance to ensure adequate response to its impact. Information from this book benefits readers to act as an expert in disaster preparedness and also can be a guide and reference for everyone interested and involved in disaster management.

Hoffman and Smith (1999) explored both technological and natural disasters including cultures and societies from different continents and the definition of disasters from anthropological perspectives. Editors explain that disaster is seen as a process which leads to an event involving a combination of a destructive agent from the natural or technological sphere. The development of the process and events affects major social- organizational components of a community by disrupting or destroying the functions of the group (Hoffman & Smith 1999).

*How to make cities more resilient*, Geneva 2017 is a handbook designed for the local government leader and policy maker to build a resilient city and support the implementation of activities to reduce the disaster risk. High density of population and critical infrastructure most likely causes severe disaster impact in urban centres resulting in increased economic losses. This handbook also explains why cities are at risk and what it is like to be a disaster resilient city (Gencer, 2017).

*Community Disaster Preparedness Guide* explains in detail about the importance of preparing for a disaster with a plan for the family, pets, and vulnerable groups. Preparing community people to respond and reduce fear of disasters that may occur in their community is important. Community preparedness builds confidence in individuals to reduce the effects of the hazards and manage existing resources until the arrival of assistance (DaBreo, McLean & Thomas, n.d).



Coppola (2015) justifies that there will be no time to decide, to learn new skills, or to get the supplies if you wait for the disaster to strike. Disaster preparedness includes knowing what to do and the actions performed beforehand to prevent such last-minute actions. It is all about knowing how to do and what needs to be done with the right equipment and with information to act effectively. Disaster preparedness activities are conducted by many different organizations and individuals as well as other sector related with disaster management. Disaster preparedness includes planning process, operation plans, exercise, training, equipment, statutory authority, warning, and public preparedness which can be a difficult process and to reach satisfactory level it may take years (Coppola, 2015. pp. 275-307).

Tkachuck (2016) discussed about disaster preparedness to understand the effectiveness of disaster preparedness programs. This paper examined students' preparedness for disaster and their confidence in university preparedness. It is related to how prepared and concerned they are in preparedness for disaster. This paper discovered mixed results regarding the relationship between perceived threat and preparedness which will help for this research on anticipating how students think about disaster preparedness. This paper finding was that there is the necessity for increasing disaster preparedness at academic institutions which will be focused during this research (Tkachuck, 2016).

Muttarakand & Pothisiri (2013) investigate on how well residents of the Andaman coast in PhangNga province, Thailand, are prepared for earthquake and tsunami. A survey was conducted in several households by carrying out interviews during the period of aftershocks. The paper examined what emergency preparedness measures were taken and concluded that formal education can increase disaster preparedness. In their paper, they provided evidence that individual, household, and village education have a significant relationship with disaster preparedness. Disaster related education is important because it enhances personal preparedness level (Muttarak & Pothisiri, 2016).

Bhandary, Dahal, Tuladhar and Yatabe (2015) explore local people's knowledge on DRR. It examines disaster knowledge of people, disaster preparedness, and awareness and evaluates the effectiveness of DRR programs implemented by various INGOs and NGOs in the rural communities of Nepal. Furthermore, they added that natural disasters are attributed to inadequate public awareness, weak coordination of government agencies, lack of financial resources, and technical knowledge for mitigating the natural disasters. This article also suggests that disasters can be significantly reduced if people are well informed and motivated about measures taken to reduce vulnerability.

Irani, Moez, Shahkolai, Shokouhi and Yeganeh (2020), in their research article, aimed to determine the level of earthquake preparedness of households and its

predictors. Methods they applied was observational descriptive and analytical study, which was conducted on 933 households in Hamadan province, located in the west of Iran. The earthquake preparedness of the participants was low and had a significance relationship with gender, home ownership, marital status, economic status, and previous experience of earthquake (Irani et al., 2020).

Shamsher (1992) explains his experience of the devastating 1990 earthquake in Nepal. At the very beginning of his book, he mentioned that the 3 minutes earthquake destroyed almost everything which was not even possible by years and years of wars. From that earthquake, total number of 8,519 lives were lost out of which 3,850 were male and 4,669 female. 2,07,740 number of houses, temples and other heritage sites were destroyed by that earthquake. He wrote this book to share his experience so that people will be prepared for future earthquakes and save lives and reduce the impacts. He has explained many preventative measures which he earned from his experience. Author highlights about the post-earthquake situations such as difficulty in effective communications, water scarcity, and food scarcity problems, fire hazards. He pointed out that war can be predicted but earthquakes cannot and suggests that preparation is a very important issue, and nothing is to be left behind while planning (Shamsher, 1992).

## **Methodology**

This study is based on the author's Master's thesis but it has been thoroughly revised. This study adopted a qualitative methodology using collective opinions and experiences of the individuals. The researcher applied purposive non-probability sampling method. This research was conducted to find out about the earthquake preparedness measures within the study area of Kathmandu municipality. The primary data was collected from 34 household's members to understand their earthquake preparedness and readiness. 8 key informant interviews and 15 telephone inquiry were conducted with related persons to generate in-depth information. 22 respondents were males and 12 were females. The age group of the primary respondents ranged from 25 to 82. All the respondents had a very diverse educational background from illiterate to PhD levels. Out of 34 respondents 25 were the actual house owners and 9 were the residents living in a rental house.

Furthermore, secondary data were collected from various books, reports, previously conducted research papers, journals, internet articles, published literature, news articles, handbook, brochures, and pamphlets. Assessment of preparedness level and awareness are analysed based on semi structured interviews. The researcher conducted simple observation at different household and offices to understand the settings and basic earthquake mitigations measures if they have taken. The primary data collected from this study was analysed by grouping, summarizing, and interpreting the findings which are specified and detailed in headings and subheadings. This study was mainly focused on earthquake preparedness in a



community without considering other phases such as, mitigation, and recovery.

## **Findings and discussion**

### **Earthquake risk reduction preparedness measures**

Earthquake risk reduction basic preparedness measures based on NSET various information kit (pamphlets & brochures), structural mitigation measures mean the measures taken to mitigate the impact cause by any of the stationary things like houses itself, buildings and other house structures. Non-structural mitigation is the measure taken to mitigate the impacts caused by any movable objects like chairs, bookshelves, tables, closet, cabinet, table lamp, hanging pictures, hanging lights, mirrors or similar other things. Similarly, NSET describes the earthquake ‘GO BAG’ (*Jhatpat Jhola*) which should include items sufficient for an individual to survive for at least 3 days. This GO BAG is meant to be grabbed quickly during emergency evacuation from the house or building and should have an individual name on it. They also advise about the Household Emergency Kit (HH Kit) which is a box or a container that contains tools, equipment, and accessories (TEAs). This kit is only used for light search and rescue (LSAR) purpose and all family members should be aware of its location. Also mentioned in their information kit is about adopting safe behavior during earthquakes which can save lives “Drop, Cover, and Hold on” technique. This is one of the effective ways which is practiced worldwide to be safe from earthquakes.

### **Structural and non-structural mitigation measures**

Among all the respondent, 24 were confident about the structure of their house although there were some minor damages from 2015 earthquake. Nine respondents who were not the owner of the house were not able to answer the question confidently. Only one respondent said that he is not confident and need to strengthen his house but was not able to rebuild his house because of financial constraints. Majority of the respondents answered that they are not aware of non-structural mitigation measures. They are seeming not familiar with the technical term of non-structural mitigation when asked but their (those who experienced 2015 earthquake) actions showed that they have taken care of securing indoor moveable items.

*My house was damaged from 2015 earthquake. One of my relatives is an engineer. I called him to inspect my house and I was suggested to rebuild the house. He said that it is very risky to stay in the house. We left the house and stayed with my brother whose house is in the North side partitioned by a wall. We were not able to renovate the house because of our financial problems. We adjusted at my brother’s place for many years and moved back during the time of pandemic. Even though there is a risk we had to move back and we had no any other option except to sell the land. – A respondent from Bishalnagar.*

ParbatiThapa Magar (Pseudonym) is a wife of Nepal Army soldier living with one and half year-old son in a rented house. Her husband lives in the barrack and comes to visit family during holidays only.

*I am not sure about this house because it is not ours. But this house looks good compared to our house in the village. I and my husband moved in this house three years ago just after getting married. I have never thought about earthquake preparedness measures, and we never discuss this matter.*

Respondents who were living in a rental house were asked if they manage to enquire with their landlord about the status of the house after 2015 earthquake before moving in. Among the nine respondents, eight respondents never asked their landlord if the house is still livable after 2015 earthquake. This reflects those respondents who didn't own the house were least bothered about the safety of the house and didn't care to ask before moving in.

### **Earthquake plans**

Respondents were asked about basic earthquake plans which included, what you will do if you are stuck at home, if required emergency evacuation, if there are no water and power supply, if communication interrupts and so on. 33 respondents said that they don't have any plans, nor they discuss about earthquake planning process with their family. Only one respondent who was a shopkeeper said that he makes plans and discuss with their family.

*We discuss about evacuation plans with my wife and two sons (11 and 15 years). I have heard about the importance of earthquake preparedness measures from different media and also from my two sons. 2015 earthquake taught me some lessons and I also took part in one of the orientation programs conducted by Ward No. 5. After 2015 earthquake, I shifted my father's room on the ground floor. This is because to save time for emergency evacuation since my father needs support to walk.*

All the other respondents didn't think about having a plan in case of earthquake emergency for individual as well as for family.

*I don't think that Nepalese people plan ahead for earthquake emergency evacuation. I personally think that planning is necessary for office, hospitals, cinema halls, and apartment where there is a crowd involved but not necessarily needed for a private house. - A respondent from Handigaun.*

This study on selected group found that earthquake preparedness and planning for the vulnerable ones are being neglected by 33 out of 34 respondents. During researcher observation, it was found out that all houses were not seen with physically disabled person friendly environment settings though there were no any such persons identified during this research. It was also observed that majority of

the houses did not have clear pathways to escape. Stairways were partly blocked with household items like indoor plants pots, passages partly blocked with shoe case rack, and there were many other household items seen that may delay or block your escape route in case of emergency evacuation.

### **Emergency kit**

It was found that none of the houses had fire extinguisher and GO BAG. This is only limited to 34 houses where the interview was taken. 29 respondents had never heard about the GO BAG whereas 5 knew and heard about the bag. Out of 5 respondents, 3 of them came to know about the GO BAG from their children.

*I heard my granddaughter talking about her school, that they practise evacuation drill once in a month and teachers had to carry GO BAG kept in each class during earthquake drill practice. It was also the duties of the student to update and replace items included in the GO BAG if needed, and every week, student will also be changed to take over the GO BAG responsibilities.*  
- A respondent from Bishalnagar.

When inquired about fire extinguisher, 27 respondents answered that they never thought about getting a fire extinguisher in the house but 7 respondents who were the owner of the house did answer that it is a must needed item but don't have in the house. All the respondents did have some common items like shovel, pick, bucket, hammer, screwdriver, torchlight which are all for gardening and other household jobs rather than rescue purposes. However, 31 respondents had first aid kit in their house and 3 respondents who lived in rental house did not have.

Most of the respondents said that arranging such kit takes lot of efforts and purchasing equipment causes lot of money. Financial resources and lack of knowledge are found in majority of the respondents which are the main reasons for not owning such useful items.

### **Stock ration**

When asked about stock ration, stocking up on food (dry ration) is done by all respondents enough for a week and few respondents said they have enough for a month. They do it as this had been a trend since past. Majority of the respondent assured that their regular storing of ration will work in case of emergency.

*We do stockpile dry ration enough at least for a month. We have been doing this from long time. If there is an emergency, we will use the same then we can replenish again.* – A respondent from Dhumbrahi.

*I know that we have to be self-sustained for at least 3 days and honestly speaking I've been ignoring this thing. I do store dry ration for at least for a month in our kitchen storeroom.* - A respondent from GahanaPokhari.

### **Drop, cover, and hold on**

When asked about the technique ‘Drop, Cover, and Hold on’, 12 out of 34 respondents answered they know and had heard about the technique. Among others, nine respondents had heard this technique from their children and three respondents said that they heard from the national media. 22 respondents never heard about this technique. It was found that none of the respondents ever practise this technique. NSET suggest that this technique is to be practised inside home or offices by identifying proper place in indoor and outdoor. It was seen that those respondents with children, seems to have knowledge about this technique in comparison with the respondent who were living independently or without children.

### **Open safe space**

Majority of the respondents had no clue on where to find open safe place around the study area which was amicably accepted by Ward Chairman. Few respondents from Maligaun, Sano Gaucharan, and Naxal mentioned about the space where they sheltered after 2015 earthquake which were located at Sano Gaucharan football ground and Brihaspati School premises. During this research, it was found that there are few open spaces suitable to fit an average of 10 to 15 family in the school premises, but this is to be realized by the local authority also. Key informants were not able to mention about the availability of an open space in school premises during an interview. All 14 schools were ready to provide their school premises in case of emergency and said that in 2015 earthquake, their premises were widely used by the community people as shelter.

### **Learning from past experiences**

When inquired, 29 respondents answered that they experienced 2015 earthquake and there were minor damages to their house too. Among all the respondents, five were out of the country during 2015 earthquake hence they didn’t experience that earthquake. Regarding the impacts of earthquake, none of the respondent’s house were severely damaged and had to bear any fatalities in family member and relatives. Respondents who felt the 2015 earthquake shared their experience and said that they could still recall those fear. It was understood from the response that experience of 2015 earthquake helped respondents to identify existing risk and then also in finding solutions.

### **Community preparedness**

When individuals are prepared, communities are also prepared. Federal Emergency Management Agency (FEMA) (2021) suggests that residents must work together as a community to be prepared. This includes awareness about risk and hazards

in their area, finding people with skills and identifying vulnerable groups in the community too. Although members of Community Based Disaster Risk Management (CBDRM) perform door to door surveys in selected communities or as per request from the local authorities, still they are not able to reach for larger audiences. Kabita Khanal (Pseudonym) is an employee from NSET and active member working in CBDRM field. She said that their organization is aware of the fact about many people who are left behind because of the lack of manpower and timeline in reaching out to all individuals.

23 respondents mentioned that they don't know about the activities of the community and never participated in any of the community programs. They all said that they don't have an idea on community preparedness. 11 respondents mentioned that they are not willing to take part in any of the community activities due to unavailability of their time. According to Deputy Chairperson of 'Dhumbarahi Tole Sudhar Samiti' Mr. Ratna Prasad Neupane (Pseudonym), there are few 'Tole Sudhar Samiti' in ward 4 that conduct community meetings once or twice quarterly, but this has stopped during the pandemic. He also said that such meetings have very low participation from community members.

*We try to conduct meeting every month but due to unavailability of the time of 'samiti' members it is not possible. In our meeting, we usually discuss about the supply of safe drinking water, health shelter, development project, installing CCTV, safe environment in the community, and so on. To be frank we never discuss about disaster preparedness because we have other priority like drainage problem, lack of drinking water and other which I had mentioned earlier. We must accept the fact that we don't have such persons who have knowledge of disaster management. For this we have to rely upon our community police.*

### **Awareness activities of key organizations and local authorities**

National Society for Earthquake Technology (NSET), Nepal

Kabita Khanal (Pseudonym) believes that raising earthquake awareness is a major component for reducing damage and this is the reason that they have developed innovative ideas to spread awareness by involving individuals, local authorities and groups.

According to Mrs. Khanal, NSET produces various information, education materials in the form of flier, poster, advisory, brochure, books, information kit and many others which is disseminated in all levels of people and organizations. Researcher was also provided different brochures and pamphlets which was helpful to learn about the activities they have been doing in the past in order to raise the awareness among communities. Out of many activities, few are summarized

below based on interaction with Khanal and various other NSET brochures and fliers to give brief information on their various activities which were conducted in other remote parts of the country in a different period of times.

My village has conducted resilient program intended to establish safer building construction practices including activities like building and infrastructure regulations, multi-hazard risk assessment and planning, and emergency preparedness at community level. Baliyo ghar program is housing reconstruction technical assistance program which focused on many remote areas and more specifically in Kathmandu, Dolakha, Dhading, and Nuwakot which were mostly affected by the earthquake. Capacity enhancement activities are training conducted for mainly construction workers, social mobilizer, contractors, policy makers, and other stakeholders for earthquake safer construction practices. NSET aims to raise awareness among schools and education stakeholders to reduce earthquake risk and enhance preparedness in schools through making resilient school program which started back in 1997 through intervention at schools. Building Code Implementation Program in Nepal (BCIPN) was implemented to raise awareness among local communities, related stakeholders, and representatives from government offices about the importance of building safety regulations for safer buildings to reduce the risk of losses due to earthquakes.

#### Disaster Management Division- Nepal Police

Nepal Police since the beginning have been actively involved in maintaining peace and security throughout the country. Apart from this regular duty, involvement in disaster response and management, involvement such as: search and rescue, investigation, crime control, relief activities in crisis situation are their other major responsibilities. According to Senior Superintendent of Police (SSP) Sudhir Gyawali (Pseudonym) and Superintendent of Police (SP) Aman Poudel (Pseudonym) Disaster Management Division has conducted numerous duties related to disaster which are summarized in below paragraph.

Data collection and dissemination is one of the most important tasks in which the data are collected from all over the country that are analysed to develop an early warning system. They provide training and exercise to locals in coordination with Nepal Army and other stakeholders. They also have training facilities and areas for practical and simulation exercise for group as well. The department has also been conducting orientation and refresher trainings from time to time. The recent awareness program according to SP Poudel regarding DRRM was conducted on 2078/08/03 in Samakhusi where 1100 trainees participated during this interaction programme organised at Gitamata Madyamik School of Samakhusi. All participators were provided with information about Medical First Aid, hands-on exercise on CPR and handling fire from leaked LPG gas cylinder. Similarly, on 2078/09/26 training with same objectives was conducted in Manohar Madyamik



School of Samakhusi with total of 50 trainers within local community.

#### Ward offices

Natural Disaster Management Committee is established as a different component in the ward office and managed by the Ward Secretary. They have relief items and emergency rescue equipment as told by the Ward chairman and time to time orientation program is conducted with the purpose of spreading disaster awareness. Mr. Umesh Sharma (Pseudonym) who is Ward Secretary of ward 5 believes that understanding how to prepare for earthquakes depends upon their surroundings and settings rather than learning from various other resources. In this regard he said that,

*The strategy used in Japan will not comply with our urban settings. I think that the ability to respond to earthquakes depends on the readiness of those particular settings and individual's resources and capacity.*

Ward informant said that they were not able to conduct any type of disaster awareness program except on Pandemic awareness recently due to COVID - 19 lockdown and other movement restrictions. After the lockdown they have been facilitating and managing the government vaccination program.

None of the respondents were satisfied with the role of their respective wards in activities towards spreading disaster awareness but all responded by saying that they are well satisfied of the developmental activities till now. Few respondents expressed their disappointment by saying that these development activities are done without proper planning.

*Our community is getting populated. High apartment buildings are being raised, few open spaces which were available are being transformed into small parks by the wards. -A respondent from Maligaun.*

Majority said that there are no public awareness activities for earthquake in their ward and majority of the respondents accepts that their community earthquake preparedness level is weak for which they indicate that local authorities to take responsibility on the issue.

*There are tall compound walls standing side by the road within our community which is very risky to walk through narrow road. The collapse of these walls will block streets. Local authorities, ward office and other concerned governmental offices should be monitoring and taking necessary actions towards such thing. - A respondent from Baluwatar.*

#### Different local groups and organizations

According to Umesh Sharma and Ratna Neupane (Pseudonyms) there are many other organizations and committees like Tole Sudhar Samiti, Aama Samuha,

internationally affiliated organizations working for the betterment of the community peoples. Various awareness programs are occasionally conducted with the help of community police and recent efforts are on providing drinking water in a community, establishment of health post, road pavement project and continuation of COVID awareness. Some of the common activities done by these organizations and different groups are like collecting relief material from donors and distributing to people in need, free health camp, distributing health items in schools, free help desk in the ward to facilitate cleaning campaigns, various projects and so on.

#### Educational institutions

Two key informant interview was conducted with the school principal and a teacher from Tangal High School and Whiz- Kid International respectively. Telephone inquiry was made with 12 different schools from both Wards. 14 schools were selected to collect data on how they educate their students about disasters. All schools said that they have subject about disaster topic in different classes but due to lack of qualified teachers most of the schools said that they request security organizations, ward office, or other organizations related and arrange a visit in school to share information.

#### Community Police Service (CPS)

As information provided by Maligaun Police Deputy Superintendent of Police (DSP) Man Bahadur Chettri (Pseudonym), the community police are available near doorsteps of every citizen for providing safety and security. DSP Chettri helped researcher to coordinate for a meeting with the community police representative of both Ward 4 and 5. As per the information provided from CPS, regular awareness programs are like: traffic and road safety, drug awareness in schools, cyber security, anti-ragging and bullying, cleaning campaign, crime control and more. Time to time interaction with community regarding safety and security is conducted involving policy makers and other representative from local authorities. Also, hoarding boards with information on various topics are placed in public areas by CPS to spread awareness among community's people.

### **Discussion**

UNDRR (2013) warns that rapid urban development will increase disaster risk. In our context also development activities unknowingly are increasing risk factors. Open space are being used for other purposes and not being maintained. Initiatives to save and maintain remaining open space were not discovered during this study. As this study finds that open spaces are being replaced by small parks, and tall buildings are being raised, key informants also agree on lack of proper planning while development activities are being carried. In line with Marxist theory which illustrate that haphazardly development may result in increased or reduced disaster. Earthquakes cannot be prevented, but by adopting preparedness measures which

are designed to reduce vulnerability to hazards can minimize the impacts (Mileti, 1999; Tierney et al. 2001; as cited in Bhuiyan & Paul, 2009, p. 339; Hoffman & Smith 1999).

As literature explains community people are the first emergency responder before the arrival of any other assistance, this study showed that household members preparedness are low and preparing plans are being neglected. For this, our government and stakeholders need to encourage household members to develop such plans for mitigating the impacts from earthquake. Dabreo et al. already explained that community preparedness builds confidence in individuals to reduce the effects of the hazards and manage existing resources until the arrival of assistance. The local authorities are determined to work for the safety of community no matter what but due to the low participation from the household member they are being demoralized therefor, there is an urgency to develop strategy for enhancing household members readiness and preparedness as well as to encourage all families to develop family level preparedness plan at all households' levels.

It was obvious during the research that financial burden and previous earthquake experience played a key factor in individual's preparedness measures. Iraniet al. (2020); Bhandary et al. (2015) in their article also mentioned that previously experienced were found to be more prepared. Again, in line with Marxist economic theory, it is explained by this study that respondents having financial constraint seems to have affected in undertaking preparedness measures. Bhandary et al. (2015); Irani et al. (2020) also stated that poverty is both cause and consequences of disaster in under-developed or developing countries and significance difference in an earthquake preparedness.

In line with HFA strategy and Sendai Framework priority to use knowledge, and understanding disaster risk, disaster awareness lessons in the school curriculum are already there in educational institutions and one of the positive findings from this study was that educational institutions are playing a vital role in spreading earthquake risk preparedness measures. Muttarak and Pothisiri (2013) already stated in their case study that formal education is important to increase disaster preparedness measures and reduce the vulnerability to natural hazard. As informed by the school teachers, there are lack of well-trained teachers in the schools. Hence, government should draw their attention in initiating proper training to the teachers.

With regards to activities of different organizations from this study, there should be increase in regular plan for awareness, regular meetings, simulation exercises, alarm system, alternative plans, community people equipped with proper emergency equipment's, capacity to respond. It is important for government and stakeholders to draw their attention to all these problems.

## Conclusion

Human lives are not threatened by earthquakes, but highly depend upon structural collapse, and individual's actions taken during the earthquake. For this reason, earthquake resistance building, awareness about the earthquake risk reduction measures are much more important factors to save lives and property. The earthquake does not seem to have had many impacts in the study area compared to other area which might be the reason that the importance of earthquake preparedness measures are being neglected by the household members.

Though many respondents present themselves to be aware regarding earthquake preparedness measures, such as acquiring emergency equipment, stocking of rations, planning emergency escape, retrofitting their house, structural and non-structural mitigation measures are not seen undertaken by majority of the respondents, hence they do not replicate in their actions. In a nutshell based on the findings of this study, we can say that our government, National Society for Earthquake Technology, Disaster Management Division, Nepal Police, local authorities has been highly involved in spreading public awareness of earthquakes mitigation measures throughout the country. Unfortunately, effects of such programs and progress are not visible when it comes to household levels. Coordination among the local authority, community, and stakeholders are also seen lacking, hence it needs to have proper link and coordination among them.

Various stakeholders, local authorities, local government, organizations related to disaster management is supposed to intervene and take on specific tasks in times of emergency. In practice, the community are the first responder. As a first responder to an emergency, community people should be actively involved in, for which most importantly they need to be organized and self-sufficient with all the equipment and resources within their capabilities. As from this study, household members, community, local authorities all have lack of coordination to react to emergency situations such as earthquake. Effective plans, back up plans, communication and exchange of information needs to be established. All authorities are required to give more emphasis in raising the awareness on the importance of earthquake preparedness measures which should not be neglected by all levels.

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