EARTHQUAKE PREPAREDNESS OF JAYAPRITHIVI MUNICIPALITY, BAJHANG

A Thesis Submitted to the APF Command and Staff College

Faculty of Humanities and Social Sciences, Tribhuvan University

In Partial Fulfillment of Master Degree

in Security, Development and Peace Studies

Submitted by

LAL BAHADUR SHAHI

Seventh Batch (2078-2080)

Roll No.: 28MSDPS40003

TU Registration No.: 17340-95

APF Command and Staff College Sanogaucharan, Kathmandu, Nepal

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DECLARATION

I hereby declare that the thesis entitled **"Earthquake Preparedness of Jayaprithivi Municipality, Bajhang"** submitted to **APF, Command and Staff College,** is entirely my original work prepared under guidance of my supervisor.

I have made due acknowledgement to all ideas and information borrowed from different sources in course of preparing this thesis. The result of this thesis has not been presented or submitted anywhere else for the award of any degree or for any other purposes. I assure that no part of the content of this thesis has published in any form before. I shall be solely responsible if any evidences found against my research paper.

This thesis is being submitted to APF Command and Staff College, Faculty of Humanities and Social Sciences, Tribhuwan University in Partial Fulfillment of Master Degree in Security, Development and Peace Studies.

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Lal Bahadur Shahi

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(July, 2023)

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LETTER OF RECOMMENDATION

This thesis entitled **"Earthquake Preparedness of Jayaprithivi Municipality, Bajhang"** prepared by **Mr. Lal Bahadur Shahi** under my supervision. The researcher has fulfilled the criteria prescribed by Faculty of Humanities and Social Sciences, Tribhuwan University. I hereby forward this for final evaluation and approval.

…….

Prof. Dr. Ramesh Raj Kunwar

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Date:……..

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Date:- 2080/04/08

LETTER OF APPROVAL

This Thesis entitle **"Earthquake Preparedness of Jayaprithivi Municipality, Bajhang"** submitted by **Mr. Lal Bahadur Shahi** to APF Command and Staff College, Faculty of Humanities and Social Sciences, Tribhuvan University in partial fulfillment of Master Degree in Security, Development and Peace Studies has been approved by the undersigned members of the Evaluation Committee.

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ABSTRACT

Earthquakes pose a significant threat to communities worldwide, and Nepal, located in a seismically active region, is particularly vulnerable. The Sudurpaschim Province of Nepal, with its unique geographical and socio economic characteristics, requires specific attention to earthquake preparedness. This research aims to examine the current level of earthquake preparedness in the Jayaprithivi Muncipality of Bajhang and proposes risk reduction measures for enhancing earthquake preparedness in the Bajhang District of Nepal.

Using a qualitative methodology, the study employed in-depth interviews, focus group discussions, and observations to gather rich and nuanced data. Key stakeholders, including community members, local leaders, government officials, and experts in disaster management, engaged to gain diverse perspectives on earthquake preparedness.

The research began by investigating the perceptions and knowledge of earthquake risks among residents in the Jayaprithivi Municipality, Bajhang. Through interviews and focus group discussions, participants' awareness, understanding, and experiences related to earthquakes was explored. Community level participants in disaster preparedness activities seen very low and people are not interested to participate without any allowances. Local level disaster management committee is not fully function and community level awareness program were not conducted regularly. Level of earthquake preparedness was only depending on securities forces and there is not sufficient equipment and emergency stocks in the district headquarters. People have less understanding about structural and non-structural preventive measures, they don't have any disaster plan, and some people have the knowledge about drag, cover and hold on method.

The findings of this qualitative study will contribute to the understanding of earthquake preparedness in the context of the Jayaprithivi Municipality, Bajhang. By exploring the perspectives and experiences of the local population and stakeholders, the research aims to provide valuable insights for policymakers, practitioners, and community leaders.

***Keywords**:* earthquake, Jayaprithivi, preparedness, community, preventive measures.

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LIST OF ACCROYNMS/ABBRIVATION

AD	Anno Domini
APA	American Psychological Association
APF	Armed Police Force
CA	Constitutional Assembly
CBDP	Community Based Disaster Preparedness
CBDRM	Community Based Disaster Risk Management
CCTV	Close Circuit Television
DDMC	District Disaster Management Committee
DIMS	Disaster Information Management System
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction Management
Etc	Et cetera
E-W	East West
FEMA	Federal Emergency Management Agency
FGD	Focused Group Discussion
FM	Frequency Modulation
GDP	Gross Domestic Product
GIS	Geographic Information System
GLOF	Glacial Lake Outburst Floods

GoN	Government of Nepal
HDI	Human Development Index
HFA	Hyogo Framework for Action
HFT	Himalayan Frontal Thrust
ICT	Information and Communication Technology
KII	Key Informant Interview
Km	Kilometer
LDMC	Local Disaster Management Committee
LGOA	Local Governance Operation Act
LSAR	Local Search and Rescue
MBT	Main Boundary Thrust
MHz	Megahertz
ML	Milliliter
MM	Millimeter
MoHA	Ministry of Home Affairs
Mt	Mount
Mw	Moment Magnitude
NDRRMA	National Disaster Risk Reduction Management Authority
NDRF	National Disaster Response Framework
NEOC	National Emergency Operation Centre

NGO	Non-Governmental Organization
NPR	Nepalese Rupee
NRRC	Nepal Risk Reduction Consortium
NSDRM	National Strategy on Disaster Risk Management
NSET	National Society for Earthquake Technology
NSMC	National Seismic Monitoring Center
PDMC	Province Disaster Management Committee
PSA	Public Service Announcement
RI	Remoteness Index
SAR	Search and Rescue
SFDRR	Sendai Framework for Disaster Risk Reduction
USD	United State Dollar
Yr	Year

CHAPTER I

INTRODUCTION

1.1 Background

An earthquake is a violent and abrupt shaking of the ground, caused by movement between tectonic plates along a fault line in the earth crust and it is the one type of geological disaster. A disaster is a serious issue that has a lasting effect on a community or society and results in large losses of people, property, economic resources, or the environment, according to the (UNDP, 2004). Unexpected events or a string of connected tragedies that result in severe destruction, devastation, and mortality are referred to as disasters. Disasters like earthquakes, hurricanes, floods, and wildfires as well as human activity like explosions, terrorist attacks, or industrial mishaps can all result in catastrophes (Gunn, 2007). Disasters can result in a number of detrimental effects, such as the destruction of structures and infrastructure, the interruption of utilities like water and power, the eviction of communities, and psychological suffering. The enormity of a disaster, the population's susceptibility, and the authorities' and organizations' degree of reaction and readiness are all factors that impact how severe it is (Schneider, 1995).

Dilley (2005) defined a disaster is a major interruption to a community's ability to operate that is greater than what can be handled by the community on its own. Natural, man-made, and technical risks, as well as a number of other variables that affect a community's exposure and vulnerability, can all result in disasters. Natural risks are physical occurrences that occur naturally. It includes: Geophysical: (an earth-based danger such as an earthquake or landslide), Floods and avalanches are examples of hydrological events, which are brought on by the occurrence, transport, and distribution of water on Earth. Climate-related: involving the weather (such as droughts and wildfires), pertaining to meteorological conditions (such as storms and cyclones), and biological: brought on by contact with living things and any poisonous compounds they may have (such as plagues of insects or animals). Events that are man-made or technologically induced that take place in or adjacent to human settlements are considered hazards. Complex emergencies, armed conflicts, workplace mishaps, traffic accidents, environmental harm, and pollution are a few of them. More than 95 percent of all

fatalities from risks occur in developing nations, and losses from natural disasters are 20 times bigger (as a proportion of GDP) in developing nations than in developed nations (Dilley, 2005). As a result, developing nations bear the brunt of the financial burden when a disaster strikes.

To lessen the effects of disaster and save lives and livelihoods in the area, it is imperative that adequate disaster risk reduction measures be put in place. This includes boosting community knowledge and readiness, upgrading the ability of local governments and groups to respond to disasters, and improving infrastructure and early warning systems. An essential component of minimizing the effects of disaster on people, communities, and society at large is being prepared for them. It entails adopting preventative measures to lessen the possible damage brought on by disasters. Effective preparedness measures can help communities recover more rapidly from disasters, save lives, and lessen the effect (Nakano et al., 2017).

Creating a disaster preparation plan is one of the key components of readiness. What steps to take before, during, and after a disaster should be specified in this plan. Information about emergency contacts, evacuation routes, and necessary supplies like food, water, and first-aid kits should all be included. Collaboration and participation with all stakeholders, including local government, community leaders, and people are necessary to develop a disaster preparation strategy. Making an emergency pack is yet another essential part of being prepared for disasters. Non-perishable food, water, first-aid kit, flashlight, battery-operated radio, and additional batteries should all be included in the kit. It is also crucial to make sure the gear is in excellent shape and is accessible. Another essential component of disaster preparedness is being informed. Individuals and groups may keep informed about potential threats in their region by following local news and weather updates. It's also critical to be informed of local authorities' evacuation orders and early warning systems (Litcofsky, 2015).

Individuals and families may get ready for the potential that they might need to leave their homes in the case of a disaster by practicing evacuation drills. Everyone should be familiar with the evacuation routes and emergency procedures, and frequent drills should be conducted. A crucial part of disaster preparedness is house preparation. Locking unsecured things, strengthening windows and doors, cutting off utilities, and securing loose goods can all assist to lower the danger of property damage and personal injury. The aged, the disabled, and those with health concerns need special consideration since they are among the most

vulnerable categories. It's important to comply with their wishes since these people could need specialized treatment in an emergency (Kapucu & Khosa, 2013).

At the community level, Nepal has also made efforts to raise awareness and build resilience among its citizens. This has included training local volunteers in disaster preparedness and response, as well as conducting public education campaigns on disaster risk reduction. Despite these efforts, Nepal still faces significant challenges in terms of disaster preparedness, particularly in remote and vulnerable areas of the country. More resources and investments are needed to improve infrastructure, enhance early warning systems, and build the capacity of local communities and institutions to respond to disasters. The presence of active faults in the Sudurpaschim of Nepal is a significant threat, as these faults have the potential to produce large earthquakes in the future (Pandey, 2019).

The most disaster prone country in South Asia, Nepal, is subject to a number of dangers that devastate the built environment and result in the loss of life and property. Floods, landslides, earthquakes, and urban fires are the most dangerous risks in Nepal (Rana & Jha, 2018). Every year, a number of natural disasters occur in Nepal due to the country's young and fragile geology, extremely high topography, steep slopes, changing weather conditions, and active tectonics. Additionally, communities that are poorly designed and overpopulated are the main elements that exacerbate the effects of disaster. For instance, 2,940 disaster incidents occurred between 2015 and 2016 as a result of thirteen distinct categories of dangers. 9,708 people died as a result of these incidents, with the 2015 Gorkha earthquake accounting for 92.5% of them. Additionally, approximately a million homes were either completely destroyed or suffered partial damage, with a total economic loss estimated at close to $ seven billion USD (MOHA, 2016). More than 80% of the population is thought to be susceptible to risks including earthquakes, landslides, windstorms, and floods. Disasters like the flood in 1993, the landslide in 2014, the earthquake in 2015, and the flood in 2017 demonstrate how serious the multi-hazard risk is in Nepal (Dao & Peduzzi, 2004).

In Nepal, there are several instances of one kind of natural hazard leading to another risky activity. For instance, on August 2, 2014, a large landslide at Jure village in central Nepal blocked the Sunkoshi River, forming a landslide dam (Shrestha & Nakagawa, 2016). After 37 days, the dam broke, causing an outburst flood that destroyed several homes more than six km downstream down the valley. Numerous landslides and avalanches were caused by the

2015 Gorkha earthquake and its aftershocks; the most prominent of them was the debris avalanche that buried numerous settlements in the Langtang Valley. Additionally, Nepal is vulnerable to risks that recur often and routinely, such as landslides and floods, which happens every monsoon, season (June to September). The MoHA disaster data archives contain loss and damage information for a total of 16 distinct types of current disasters in Nepal. With the exception of the "other" category, the following disasters are given in alphabetical order: Asina Pani (heavy rain with hail), avalanche, boat capsize, cold wave, drowning, earthquake, epidemic, fire, flood, heavy rain, high altitude, landslide, lightning, snow storm, and wind storm. This shows how Nepal is vulnerable to a variety of dangers and threats. Thirteen different types of disasters have been documented in the past two years (Shrestha & Nakagawa, 2016).

Nepal is ranked 4^{th} and 12^{th} respectively, in the world for its relative vulnerability to earthquakes and climate change (Naraya et al., 2022). This is partly because Nepal is situated in a seismically active region with a high probability of witnessing a strong earthquake. One of the top 20 most disaster prone countries in the world is this one. Out of 21 cities throughout the world with comparable seismic hazard zones, Kathmandu City is under the highest danger in terms of possible consequences on people. Nepal is regularly affected by water induced disasters and hydro meteorological extreme events such landslides, debris flows, and soil erosion, making it one of the nation's most at danger from climate change (Ghimire, 2019).

Both calamities and crises have the potential to do significant harm to particular persons, groups of people, and society as a whole. There are, however, some significant distinctions between the two. A disaster is an occurrence, or a sequence of events, that causes considerable harm, fatalities, and disruption to daily life. On the other hand, a crisis threatens the normal operation of a system, organization, or society. Despite the fact that it may not always result in harm or death, it might nevertheless have negative effects. Financial crises, political crises, and public health crises like pandemics are a few examples of crises. Disasters are frequently unexpected, unplanned events that happen rapidly, as opposed to crises, which can happen over a longer period of time and be brought on by chronic issues or systemic issues. It's crucial in both circumstances to have carefully thought out strategies and plans in place to mitigate the effects of the disaster and to react quickly and effectively to prevent more harm and protect lives (Kunwar, 2015).

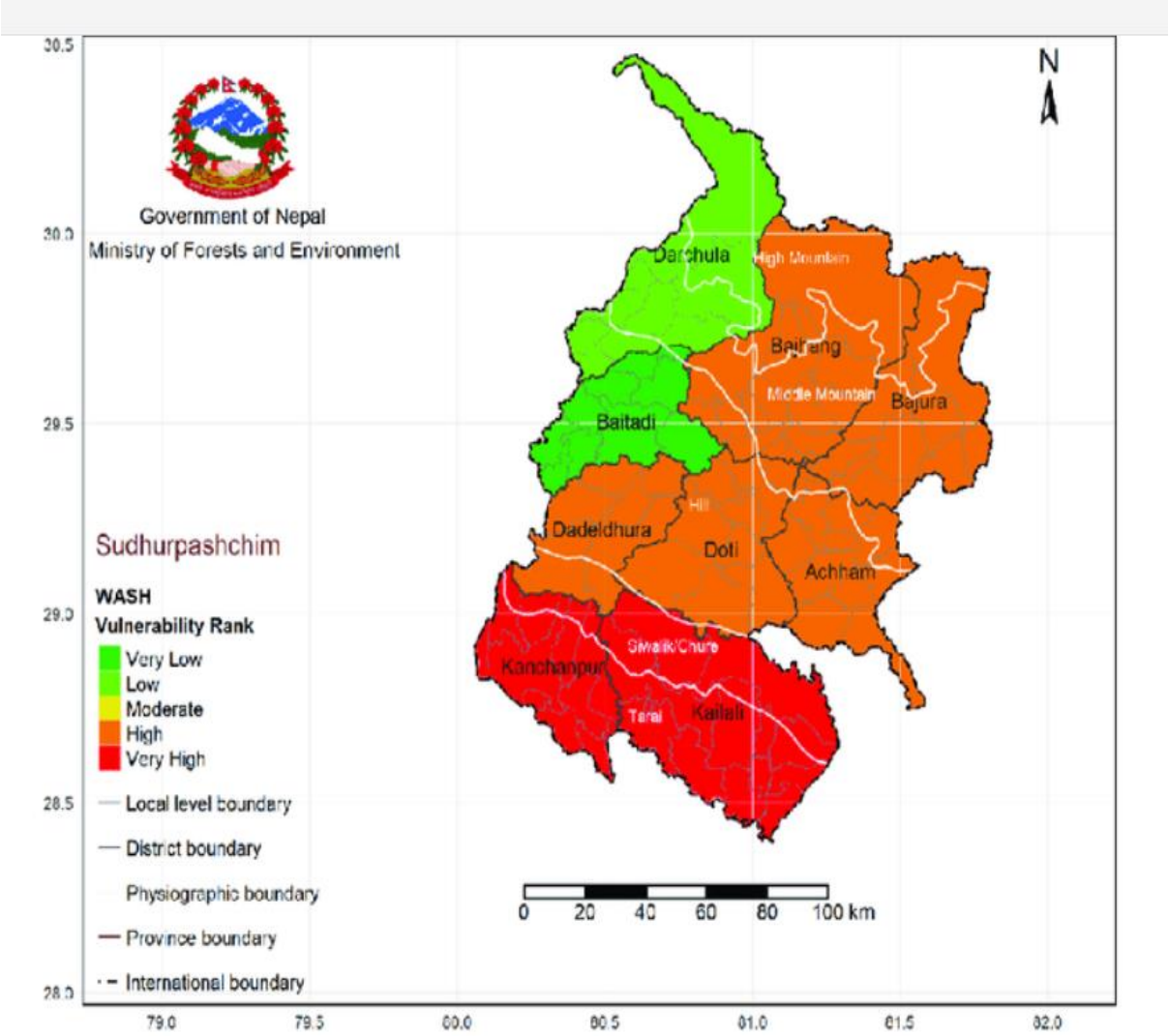
The Sudurpaschim Province of Nepal has been affected by several historical earthquakes that have had significant impacts on the area. On January 15, 1934, a devastating earthquake struck Bihar in India, but its effects were felt throughout Nepal, including the far western region. With a magnitude estimated at 8.0, this earthquake caused extensive damage and loss of life in Nepal, including the Sudurpaschim Province districts. The towns of Dipayal, Baitadi, and Dadeldhura were severely affected (Chaulagain et al., 2018). On July 21, 1980, a major earthquake with a magnitude of 6.5 struck the Sudurpaschim Province of Nepal. The epicenter was located near the district of Bajhang (Khanal, 1997). This earthquake caused significant damage to infrastructure and houses, resulting in casualties and displacements in the affected areas. Although the epicenter of the 2011 Sikkim earthquake was in the neighboring Indian state of Sikkim, its impact was felt in various parts of Nepal, including the Sudurpaschim Province. With a magnitude of 6.9, this earthquake caused widespread damage and loss of life in Nepal. Districts such as Darchula, Bajhang, and Baitadi reported destruction of houses, schools, and other infrastructure. While the Sudurpaschim Province was not at the epicenter of the 2015 earthquake, it still experienced significant shaking and damage. On April 25, 2015, a massive earthquake with a magnitude of 7.8 struck Nepal, resulting in widespread devastation across the country. The districts of Kailali, Kanchanpur, Bajhang, and Bajura in the Sudurpaschim Province reported casualties, collapsed buildings, landslides, and disruption of essential services. These historical earthquakes highlight the seismic vulnerability of the Sudurpaschim Province of Nepal and emphasize the importance of earthquake preparedness and resilience building efforts in the area. Understanding the impact and lessons learned from these past events can inform strategies for future earthquake mitigation and response measures in the region (Chaulagain et al., 2018).

Sudurpaschim is one of Nepal's seven provinces. It was created when Nepal's new constitution, which restored a federal system of government, was approved in 2015. The province has a total area of 19539 square kilometers and a population of over 2.6 million people. It shares borders with Utarakhand to the west, the Karnali Province to the east, the Indian states of Uttar Pradesh and Himanchal Pradesh to the south, and China to the north. The Tarai in the south, the Hilly in the middle, and the Himalayan in the north make up the three different geographic areas of this province. The border is drained by the rivers Mahakali in the west and Karnali in the east. It is the second smallest province in Nepal. Mt. Api (7132 m), Mt. Saipal (7025 m), Mt. Kapahad (6644 m), and Mt. Lassa (6189 m) are the principal

mountain peaks in this region. The lakes of Khaptad and Ghodaghodi are located in the province. Shuklaphanta and Khaptad National Parks have a variety of preserved living and Don-living species. The Api Nampa Conservation Area is situated in the same province. Dhangadhi, Dadeldhura, Mahendranagar, and Dipayal are the main commercial centers in the province. The principal crops grown in this province are wheat, mustard, maize, and cotton. (Pandey V.P. & Pandey R.P., 2019).

Figure 1.1

Sudurpaschim Province Nepal



Source: World Health Organization

The Sudurpaschim province of Nepal is divided into nine districts, according to Suman (2021). Aacham, Baitadi, Bajhang, Bajura, Dadeldhura, Darchula, Doti, Kailali, and Kanchanpur. There are several ethnic and cultural groups residing in the province. The majority of people are Hindu, although there are also large Muslim and Buddhist minorities. The province is home to a number of indigenous groups, including the Tharu, Magar, Gurung, Brahmin, Chhetri, and Dalit tribes, each with its own distinct culture and customs. The three primary languages spoken in the province are Nepali, Tharu, and Doteli (Pandey, V.P. & Pandey, R.P., 2019).

The Sudurpaschim Province is vulnerable to earthquakes since it is situated in a seismically active area. Both the country of Nepal and the surrounding area suffered severe damage and losses as a result of the terrible earthquake that devastated the country in 2015. According to Suman (2021) the province is susceptible to landslides and floods, especially during the monsoon season. Due to its geographic position and topography, Sudurpaschim Nepal is prone to a wide range of natural disaster, including landslides, floods, and earthquakes. This province is also susceptible to climatic disaster such as irregular monsoons, glacial lake outburst floods (GLOFs), and droughts. Due to deforestation, unplanned urbanization, a lack of early warning systems, and a lack of preventative measures, the province may be more vulnerable to disasters. Disasters may affect communities more severely if there is inadequate infrastructure and funding for response and recovery (Acharya et al., 2020).

Bajhang district is located in the Sudurpaschim Province of Nepal and is primarily a rural area with a rugged terrain and difficult geography. The settlement pattern in Bajhang is characterized by dispersed settlements, with villages and hamlets located in various parts of the district. The majority of the population in Bajhang is engaged in subsistence agriculture, with crops such as rice, maize, wheat, and millet being grown in the valleys and hillsides. Livestock rearing, such as goat and sheep, is also a common practice. As a result, settlements are often located near fertile land or areas with easy access to water sources for irrigation. The settlements in Bajhang are generally small, with an average population size of around 300 people. The houses are made of local materials such as stone, mud, and wood, with thatched roofs. The settlements are often located on steep slopes, which can make access difficult, and there are limited infrastructure and basic services available. Despite these challenges, the people of Bajhang are known for their resilience and resourcefulness, and they have developed strong community ties to support each other in times of need.

The settlements are often tightly knit, and people depend on each other for various needs such as farming, animal husbandry, and other daily activities. In recent years, the government and various non-governmental organizations have invested in infrastructure development in Bajhang, such as building roads and bridges, which has improved access to markets and other basic services. However, the settlement pattern in Bajhang remains largely dispersed, and the rugged terrain and difficult geography present ongoing challenges for development efforts (Paudyal et ai., 2021).

The most active and deadly fault systems are those along the Main Boundary Active Thrust system and the Himalayan Frontal Thrust (HFT). In eastern Nepal, the active faults along the MBT (Main Boundary Thrust) combine with those striking E-W along the HFT, with downthrows to the north. The active faults may still be seen across central Nepal, particularly in Hetaunda and south of the Kathmandu valley near the Bagmati River (Shah & Malik, 2017). Along the HFT, active faults may be seen extending northward and downward. Active faulting along the MBT includes the Arung Khola, Hetaunda, and Udaipur faults in the east. In western Nepal, active faults along the MBT frequently appear as a single continuous fault trace with relatively straight linearity and apparent vertical slide down the fault down to the north. This is known as a pressure ridge. The features of active faults along the Himalayan Front Fault vary from place to place in the Nepal Himalaya because to changes in the volume of the siwaliks caused by the underlying conditions of the collision. Near the edge of the Eurasian Plate, the stress trajectories determined from observation and modeling display a disordered pattern that is almost consistent with the direction of relative motion of the Indian and Eurasian plates. According to geomorphic study, the HFT is a structure that is only present in the southern Himalaya, which has absorbed on average 211.5 mm/yr of N-S shortening during the Holocene period (Chamlagain, 2018).

A 6.6 magnitude earthquake with its epicenter in Khaptad National Park occurred on November 9, 2022. When the East Chowki Rural Municipality of Doti's structure fell, six people lost their lives and seven more were hurt. Similar to this, a 5.9 magnitude earthquake on January 14, 2023, killed one person and damaged several homes (The Kathmandu Post 2022). These occurrences demonstrate the considerable seismic danger in Nepal's western regions, particularly the Sudurpaschim. Since 1505, no significant earthquake has occurred in the mountainous area between Gorkha, Nepal, and Dehradun, West India, according to specialists (Joshi, 2023). The area has built up a lot of seismic energy that can only be

released by earthquakes. With the occurrence of both minor and huge earthquakes, the energy will progressively be released. Therefore, it is essential that the municipal, provincial, and federal governments implement a public awareness program to prevent significant financial damage in the event of an earthquake in Western Nepal.

1.1.1 Classification and Role of Local Governments in Nepal

The Local Governance Operation Act 2017 classifies local governments into Metropolitan, Sub-metropolitan, Urban and Rural municipalities with criteria and indicators, some of which are useful to consider capacity to deliver disaster management. The required minimum capacity for DRRM accommodates the specific needs of these jurisdictions. Some of the LGOA criteria for different category of local governments are discussed below.

a) Metropolitan Cities

In Nepal, there are six Metropolitan Cities: Kathmandu, Pokhara, Lalitpur, Bharatpur, Biratnagar, and Birgunj. Kathmandu and Pokhara are in the Hilly Regions. Bharatpur is in the Inner Tarai. Biratnagar and Birganj are in the Tarai Region. As per the criteria determined by LGOA (clause 8 (1) (Ga), metropolitan governments should have an annual internal revenue of at least NPR one billion, access to education, surface and air transport, drinking water, power supply and hospital capacity of at least 500 beds. One of the hospitals should have a minimum of 100 beds. These metropolitans have a higher Human Development Index (HDI) and low Remoteness Index (RI), implying better resilience than others. Conversely, these cities are at higher risk of disasters, such as urban fires, urban flooding, technological disasters, road accidents and others. The complexity of urban disasters stems from the multiple sectors at risk, and the multiple stakeholders involved in shaping risk, such as housing, communication networks, water, sanitation, education, health care infrastructure, and power supply networks.

b) Sub-Metropolitan Cities

There are eleven sub-metropolitan cities in Nepal. Hetauda is the only sub-metropolitan city from the Hilly Region. There are two sub-metropolitan cities are situated in the Inner Tarai. The remaining eight are located in the Tarai, where flooding occurs every monsoon. According to the LGOA (clause 8,1), a sub-metropolis should have at least 0.2

million permanent residents, an annual internal income of at least 250 million NPR and basic facilities such as drinking water, road, power supply, education including higher education and hospital capacity of at least 200 beds. One of the hospitals should have a minimum of 100 beds.

c) Urban Municipality

There are 276 urban municipalities in Nepal. According to the LGOA, an urban municipality must have basic urban infrastructure, such as road side pavements, electricity, water, communication facilities, market, bank, Bus station, Bus Park with toilet, playground, and cremation facility. The LGOA also states that urban municipalities should maintain solid waste management and landfill sites, open space, a park in every ward, and a hospital with at least 25 beds. Urban municipalities are in the process of complying with these legal provisions of the LGOA. The proposed model on required minimum capacity intends to reinforce these provisions on hospital, solid waste management, open spaces and parks (important for temporary shelters).

d) Rural Municipality

There are 460 rural municipalities in Nepal. Many rural municipalities lack full accessibility by roads, particularly in the Himalayan and Hilly regions, which are important factors for response during a crisis. Rural municipalities have comparatively higher social vulnerability, low HDI, high remoteness, and less economic vibrancy compared to urban municipalities because of geographic, social and economic factors. The LGOA has classified 29 districts within the country as Himali Districts. These are comparatively remote, rural and economically weaker than other districts. Similarly, 30 districts are in Hilly regions and 18 are in the Tarai region. The Himali region is prone to avalanches, snowstorms, cold waves, GLOFs, flash floods, landslides and high-altitude sickness, including trekking and mountaineering accidents. The Hilly region is mainly prone to landslides and floods. The inner Tarai and Tarai regions face floods more frequently.

However, the whole country is prone to several hazards, including earthquakes, droughts, windstorms, hailstorms, epidemics, and lightning. Difficult terrain, lack of access roads and lack of infrastructure are some of the challenges demanding enhanced resilience

capacities across the Himalayan region. The urban municipalities in Hilly regions have better access to services compared to rural municipalities. However, vulnerabilities are differentiated by various factors. The role of federal, provincial and local level government on disaster risk management is highlighted in appendix "A".

1.1.2 Existing DRRM Policies

a) Constitution of Nepal, 2015

The 2015 Constitution of Nepal makes reference to disaster risk management for the first time in the nation and clearly designates DRM as a joint duty of all levels of government, notably local governments (MoHA, 2019). The policies that the state must implement are outlined in Article 51. The State shall pursue policies pertaining to, among other things, the protection, promotion, and use of natural resources, according to the Constitution. In accordance with Article 51, the government may also adopt measures to reduce the number of emergency powers are granted to the President by Article 273 of the Constitution. The responsible state government may ask the Government of Nepal to proclaim a state of emergency in respect of the entire State or of any particular part thereof, according to Article 273 (2), "if there arises a grave emergency in a State due to a Natural Calamity or Epidemic." DRM is explicitly stated as being a shared duty of all levels of government in the Nepalese Constitution. According to the Constitution, both the federal and provincial governments have concurrent power and jurisdiction over disaster preparedness, rescue, relief, and rehabilitation of natural disasters, such as those relating to early warning, preparation, rescue, relief, and rehabilitation.

Table 1.1

Constitutional and legal provisions on DRM responsibility

Governance System	Constitution	LGOA, 2074	DRRM Act, 2074 & its Regulations, 2076
Federal	Shared Responsibility	_	NDRRMA
Provincial	_	_	PDMC
District/	No role	_	DMC
Municipality	DRM	Prepare laws and policies	LDMC

Source: Constitution of Nepal, 2015, LGOA, 2017, DRRM Act, 2017.

b) Disaster Risk Reduction and Management Act, 2017

The Natural Calamity Relief Act of 1982 is considered to be much more conservative in comparison to the DRRM Act, 2017 in many ways. First, it takes a more complete approach to handling disasters and acknowledges that risk management and reduction are essential components of the job. Second, the Act has suggested a distinct multi-tier institutional structure of DRM (at the national, provincial, district, local/municipal, and community-based levels) in place of committee based coordination mechanisms. Third, the federal, provincial, and municipal levels all explicitly provide for a Disaster Management Fund. Fourth, under civilian control, the legislation has assigned the security forces the duty of search and rescue. Fifth, if the situation warrants it, the Government of Nepal has the authority to declare a disaster emergency (MoHA, 2016).

The Act has created two different types of DRM structures: one with more implementation focused roles (consisting primarily of the National Disaster Risk Reduction and Management Authority, the provincial, district, and LDMCs), and the other with more policy and administrative focused decision making and supervisory roles. The DRRM Act has envisioned a multi-tiered DRRM organization in keeping with the federal system of the nation, with the DRRM National Council at the top, followed by the PDMC, DDMC, and ultimately the LDMC as the lowest levels. Additionally, there is a provision for the creation of local Disaster Preparedness and Response Committees.

c) Local Government Operation Act, 2017

The duties of rural municipalities, cities, district councils and district coordination committees, and provincial coordination councils are described. In addition to their judicial duties, this Act gives local level entities the authority to create their own laws, by-laws, and regulations as well as to collect taxes and raise money. It outlines the following duties for both urban and rural municipalities in terms of disaster management:

i. DRM related local policy, law, guideline and implementation, oversight and monitoring of plan.
ii. Support, coordination and cooperation between and among federal, provincial and local communities and institutions and private sector.

iii. Establishment of Disaster Management Fund, operation and resource mobilization.
iv. Mapping of disaster risk area and identification of settlements at risk and relocation.
v. Local level disaster preparedness and response plan, early warning, SAR and prepositioning and distribution of relief materials and coordination.
vi. Local river embankment, landslide control, and management and control of rivers.
vii. Formulation, implementation, monitoring and oversight of local level projects on DRM.
viii. Operation of community based DRM programs.
ix. Emergency operation system at local level.
x. Local level Disaster Information Management System (DIMS), research and assessments.

d) National DRR Policy and Action Plan, 2018-2030

The National Strategy on Disaster Risk Management, 2009 (NSDRM), was superseded by it. The National DRR Policy, 2018–2030 follows the SFDRR priorities with a mission to make Nepal a safer and more resilient country by 2030, in contrast to the NSDRM, which was designed in accordance with the Hyogo Framework for Action (HFA). In line with the global SFDRR targets, it aims to significantly reduce disaster related death rates and the size of the affected population. It also strengthens the resilience of key infrastructures and basic services, such as livelihoods, agriculture, industry, roads, communication, water and sanitation, health, and education, to lessen the loss and damage caused by disasters.

By including disaster risk reduction into the development process, it has taken a comprehensive strategy to preserve sustainable development. This action plan comprises 18 priority activities and four priority categories based on the SFDRR's guiding premise. The strategic actions are broken down into three categories under each priority action: short-term interventions for 2018 to 2020, mid-term interventions for 2018 to 2025, and long-term interventions and ongoing actions for 2018 to 2030 (MoHA, 2019).

e) National Disaster Response Framework

The Nepali government adopted the 2019 National Disaster Response Framework (NDRF), which replaced the NDRF from 2013. In the case of a big crisis, it seeks to guide a more effective and coordinated national response. Its range of duties covers emergency preparedness and response at all levels, as well as measures to be taken immediately before, during, and after a disaster in order to save lives and property, uphold law and order, care for the ill, injured, and vulnerable, provide critical services, and protect public property. It clearly spells out the government's responsibilities whenever a big crisis occurs and describes the characteristics of a successful coordination to be maintained through humanitarian clusters and with foreign teams, donors, and teams. Additionally, it describes the specific preparations required for the nation's emergency reaction as well as the responsibilities that various groups would do from the first hour of the crisis until one month later.

f) National Policy for Disaster Risk Reduction, 2018

To make the country safer, more flexible, and more resilient, the National Policy for DRR 2018 was created and supported. It aims to do this by lowering current risks and preventing unanticipated ones in the future. With a focus on achieving the objectives set forth in the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals, and the Paris Agreement on Climate Change, the strategy takes into account both domestic needs and obligations under international agreements. A total of 59 actions covering all sectors have been identified, and sector ministries have been given tasks and obligations to carry them out (MoHA, 2019).

Other sectorial policies, Acts, Regulations, Directives, and Guidelines, such as the Nepal Government (Work Division) Regulations, 2017, Public Health Act, 2018, and Guidelines for the Relocation and Rehabilitation of High Risked Settlements, 2018, among others, place a strong emphasis on disaster risk reduction in addition to these significant legal provisions and policies.

1.2 Statement of the Problem

The Jayaprithivi Municipality Bajhang located in a seismically active zone, is prone to the devastating impact of earthquakes. Despite this high susceptibility, the region remains inadequately prepared to mitigate the potential consequences of seismic events. The lack of comprehensive earthquake preparedness measures and the presence of socio-economic challenges necessitate a thorough investigation of the factors influencing preparedness in this vulnerable area.

The current state of earthquake preparedness in the Jayaprithivi Municipality Bajhang calls for a closer examination of community perceptions and knowledge regarding earthquake risks. Understanding the level of awareness and understanding among residents is crucial to identify gaps in information dissemination and develop targeted educational campaigns.

Cultural beliefs and traditional practices prevalent in the region may influence community behavior and response during seismic events. The extent to which these beliefs and practices contribute to effective or ineffective preparedness requires in-depth exploration.

In addition to community factors, the institutional framework for disaster management in the Far Western Region demands scrutiny. Examining the roles and coordination mechanisms of local institutions, community organizations, and government agencies is vital to assess the effectiveness of existing preparedness initiatives.

Furthermore, the implementation of earthquake preparedness measures faces several challenges, including limited financial resources and accessibility issues in remote areas. Understanding these barriers is crucial in proposing feasible and sustainable strategies to enhance preparedness.

Therefore, this qualitative research seeks to address the overarching problem of inadequate earthquake preparedness in the Far Western Region of Nepal. By examining community perceptions, cultural influences, institutional arrangements, and implementation challenges, this study aims to provide valuable insights and recommend evidence-based solutions to enhance earthquake resilience in the region.

1.3 Research Questions

This research was guided by the following research questions:

a) How the current levels of earthquake preparedness in the Jayaprithivi Municipality of Bajhang district address the challenges faced by local communities?
b) What are the earthquake risk reduction preparedness measures for improving earthquake preparedness in the Jayaprithivi Municipality of Bajhang?

1.4 Objectives of the Study

a) Analyze the activities of current level of earthquake preparedness which, addressing the challenges faced by local community in Jayaprithivi Municipality of Bajhang.
b) Evaluate the earthquake risk reduction measures for improving earthquake preparedness in the Jayaprithivi Municipality of Bajhang.

1.5 Significance of the Study

By identifying the current level of earthquake preparedness, key challenges in earthquake preparedness and earthquake risk reduction measures for improving earthquake preparedness in Jayaprithivi Municipality of Bajhang can contribute to reducing human and economic losses in the event of an earthquake. The study can provide evidence based information that can inform policy development and decision making at the local, provincial, and national levels. The study can contribute to the academic literature on disaster risk reduction, particularly in the context of earthquake preparedness in developing countries like Nepal.

1.6 Limitations of the Study

Sudurpaschim Province of Nepal covers nine districts from Tarai to Himalayn region. Comparatively with other province it is less developed and road infrastructure is not sufficient in the remote areas. It was challenged to gather comprehensive data on earthquake preparedness in the province because some areas were difficult to reach and there was also language or cultural barriers. Due to the shortage of time, the study only focused on the capital city of Bajhang, Jayaprithivi Municipality, which is not representative of earthquake preparedness efforts and challenges in other parts of the country.

CHAPTER II

REVIEW OF LITERATURE

2.1 International Study

Whittow (1980) defined disaster as a part of the environmental process that is of greater than expected frequency and magnitude and causes major human hardship with significant damage. Generally, a disaster is viewed as an extreme event that arises when a hazard agent intersects with a social system. Technically, then, disasters are events that take place as part of normal environmental processes; they are not the principal focus of study.

Shrivastava et al. (1988) describe that the disaster is an occurrence, or a sequence of occurrences, that causes major harm, fatalities, and disruption of daily life. The regular operation of a system, organization, or society is threatened by a crisis, on the other hand. It might not necessarily result in death or bodily harm, but it might still have negative effects. While crises can develop over a longer period of time and may be the consequence of systemic difficulties or continuous problems that have been building up over time, disasters are frequently sudden and unexpected events.

Northey (1998) in his book he maintained that the Sudurpaschim Province is home to a diverse range of ecosystems, from the high mountains of the Himalayas to the tropical lowlands of the Tarai. Researchers could examine the region's geology, climate, vegetation, and wildlife, as well as the impacts of human activities on the environment. Some relevant publications to consider include "Environmental Change and Human Security in the Western Himalayas" edited by Marcus Nusser.

Hoffman and Smith (1999) examined the notion of disasters from an anthropological perspective as well as technical and natural catastrophes, incorporating cultures and communities from several continents. According to editors, a catastrophe is viewed as a process that results in an occurrence that combines a destructive agent from the natural or technical world. Major social and organizational components of a community are impacted by the evolution of processes and events by interrupting or obliterating collective functioning.

DuFrane and Stephenson (2002) explain that disasters and development have a tight relationship that may both thwart and spur development efforts. Similar to this, the Marxist theory of catastrophe shows how development and disaster management simultaneously attempt to decrease and increase susceptibility to disasters. Poor, minorities, and other marginalized groups often reside in unsafe places and are less able to handle and recover from disasters due to economic realities and political weakness.

UNDP (2004) stated that a catastrophe is a catastrophic issue that occurs over a short or long period of time and results in significant losses in terms of people, property, economy, or the environment that are more than what the afflicted community or society can handle on its own. A disaster is a sudden occurrence or a chain of occurrences that results in severe harm, devastation, and fatalities. Natural disasters like earthquakes, hurricanes, floods, and wildfires can also create disasters, as can human-caused events like explosions, terrorist attacks, or industrial mishaps.

UNDP (2004) noted that disaster risk governance includes economic, political and administrative governance considerations. These relate to poverty, equity and growth, the means for laying out policy decisions and legal frameworks and the organizational basis for the implementation of disaster risk management. It further elaborates as the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences. It brings together the actions of state, non-state and private sector actors.

Ritchie (2004) analyzed the concepts of security, safety, and assurance in the tourist industry as well as the potential impacts that risk, vulnerability, crisis, disaster, hazard, emergency, and political unrest may have on the industry. In addition to concentrating on crisis management, disaster management, and innovative marketing techniques for reviving tourism, which are, in the context of Nepal, relatively rarely discussed problems; the study aims to highlight the consequences of disasters on tourism.

Goula et al. (2006) explained that, an essential part of reducing earthquake risk is urban design. Expanding paved roads and areas, poorly designed cities, and population growth all

contribute to urban development and raise the danger of disaster. Rapid urbanization will raise the danger of disasters, but it will also present new chances for resilience-building.

Allen (2006) provides an overview of community based disaster preparedness (CBDP) and climate adaptation in developing countries, highlighting the importance of engaging communities in disaster risk reduction and preparedness efforts.

Shaluf (2007) divided disasters into three categories: natural, man-made, and hybrid catastrophes. He believes that each of the three groups encompasses all types of disasters. Although the characteristics and impacts of disasters vary, they all have one thing in common: intensity. Natural disasters are those that are brought on by natural forces. Human induced disasters are those that occur as a result of human decisions. Hybrid disasters are defined as disasters that result from both natural and human induced sources. Subsequent disasters are those that occur after natural or man-made calamities. He makes it clear that epidemics might be a disaster that happens after a catastrophe.

UNISDR (2009) a disaster is a substantial disruption of a community or society's ability to function that results in widespread human, material, economic, or environmental losses and consequences and that is more than what the affected community or society can reasonably expect to be able to handle on its own.

Paton et al. (2010) discusses the issue of earthquake preparedness and mitigation, emphasizing the fact that earthquakes cannot be predicted but their impacts can be reduced through effective planning and preparation. The text also suggests that improper development activities are contributing to the increasing risk from earthquakes, and that basic knowledge and skills are necessary for individuals to prepare themselves for earthquake events. The article further discusses a study that was conducted to assess the effectiveness of knowledge and skills in mitigating earthquake impacts, focusing on households within a community. The study appears to have been useful for both respondents and institutions/stakeholders involved, helping them to reflect on and assess their own preparedness measures. Finally, the passage emphasizes the need for coordination and recognition of the importance of better preparedness in order to mitigate the impact of earthquakes.

Muttarakand & Pothisiri (2013) examined the level of earthquake and tsunami preparedness among people of Thailand's PhangNga province along the Andaman coast. Several families

were surveyed by conducting interviews when there were earthquakes. The study looked at the emergency response strategies used and came to the conclusion that formal education can improve disaster readiness. In their study, they offered proof that education at the levels of the person, the home, and the village had a major impact on disaster preparation. Education about disasters is crucial since it raises individual preparation levels.

Kollek (2013) focuses on disaster preparedness in the context of health care systems, highlighting the importance of planning, training, and collaboration among health care providers and stakeholders.

Wachter & Uslander (2014) examines the role of information and communication technology (ICT) in disaster preparedness and management. It discussed the potential of ICT to enhance early warning systems, situational awareness, and communication during disasters.

Litcofsky (2015) discusses earthquake preparedness in Nepal, particularly in response to devastating earthquakes in the 20th and 21st centuries. The Nepali government created several earthquake preparedness initiatives, including the Kathmandu Valley Earthquake Risk Management Project and the School Earthquake Safety Program, to simulate emergency situations, provide funding to schools and masons, and promote awareness. The government also partnered with the Japan International Cooperation Agency to assess the possible outcomes of major earthquakes and suggested various policy changes and committee formations to promote earthquake preparedness. The 2015 Gorkha earthquake near Kathmandu killed thousands of people and prompted international organizations to partner with the Nepali government to reconstruct damaged infrastructure using sustainable tactics. Sustainable rebuilding techniques, such as retrofitting hospitals and training locals to build earthquake-resistant buildings, have also been employed to prevent infrastructure devastation. In addition, open spaces are being protected to ensure they are available as places for first responders and humanitarians to set up during crises. Finally, technology such as population tracking programs has been developed to aid rescue efforts during disasters.

Karisson (2015) discusses the importance of planning and preparation for disasters, using the example of the 2015 Nepal earthquake to highlight the need for effective and timely disaster relief efforts. Lack of information on affected peoples' location can jeopardize the success of post-disaster relief operations. Anonymized mobile location data has been used to provide

United Nations and other humanitarian relief agencies with population flow updates, which can help to identify where resources should be allocated and more effectively target new risk areas for outbreaks of diseases. The article also talks about disaster preparedness projects in neighboring Bangladesh that focus on Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR).

Coppola (2015) discussed about understanding of the universal principles of emergency management. According to contemporary demands, disaster management is continually evolving and developing. This book is a compilation of data, figures, checklists, and insightful knowledge for potential problems in the future. Every nation is at risk from known and undiscovered dangers that have negative consequences on its people and environment. It is done to prepare and lessen the impacts. Not every nation has the same hazard characteristics. Disaster occurs suddenly, leaving us with little time to react. Actions performed in advance to guarantee a sufficient reaction to its consequences are considered preparedness. This book's information enables readers to become authorities on disaster readiness and may serve as a manual and resource for anybody interested in or engaged in disaster management.

The International Risk Governance Council (IRGC), a fundamental reference point for risk governance concerns, has indicated that disaster risk governance includes risk assessment, risk management and risk communication. These three elements require an understanding of formal and informal institutions, the social and economic context in which risk is evaluated and the involvement of stakeholders in political and policy arenas that range from the local to the global levels (IRGC, 2017).

Gianisa & Le De (2018) explored the perceptions of local communities on the impact of the 2015 earthquake in the region and found that they perceived it to be a punishment from God. The study highlights the need for cultural sensitivity in disaster risk reduction strategies.

Tkachuck et al. (2018) discussed about disaster readiness to comprehend how well disaster preparedness initiatives are working. This study looked at how prepared students were for disasters and how confident they were in the preparation of their universities. It has to do with how prepared and worried people are about disaster preparedness. This research on predicting how students would think about disaster readiness can benefit from the mixed

findings this paper made regarding the link between perceived danger and preparedness. The conclusion of this article was that academic institutions need to focus more on catastrophe preparedness, which will be done in this research.

Liu et al. (2018) conduct a policy analysis of disaster risk reduction and management in the region and identify the gaps and challenges in the implementation of disaster risk reduction policies. The literature suggests that effective disaster management and risk reduction strategies require a coordinated effort between government agencies, non-governmental organizations, and local communities.

Ghazoui et al. (2019) investigate the occurrence of earthquakes in western Nepal and the seismic risk in the central Himalaya. Specifically, the study aimed to evaluate the seismic activity in the region by analyzing the lake sediment record and earthquake triggered turbidities from Lake Rara. The study found that the last earthquake that ruptured the Main Frontal Thrust in western Nepal occurred in 1505 AD. However, the new lake sediment record revealed eight earthquake triggered turbidities during the last 800 years, suggesting that the region may be more seismically active than previously thought. Based on these findings, the researchers presented a likely scenario that western Nepal may be as seismically active as central Nepal, but more data is needed to reevaluate the seismic risk in the central Himalaya.

Azad et al. (2019) examines various aspects of disaster preparedness, including risk assessment, emergency planning, communication, and education. It also discusses the importance of collaboration and partnerships among stakeholders in disaster management.

Pandey (2019) stated that Nepal is becoming much more vulnerable to disasters every year. It has been negatively affecting infrastructures, livelihoods, and human life. He talks on the economic and human costs of disasters in Nepal and offers institutional and system changes for the nation's successful disaster risk management. This study uses secondary data to make analytical conclusions. The issue is examined using data that has been made public by several governmental and non-governmental groups. The study indicates that extra efforts are required from the federal to the local level at all stages of disaster risk management, despite the fact that the government of Nepal has been consistently making many attempts to combat various degrees of disasters in the nation. A case study of community based disaster risk

reduction initiatives in the Sudurpaschim Province is presented by Pandey (2019), who also identifies the critical success elements for these initiatives.

Irani et al. (2020) sought to assess the level of home readiness for earthquakes and its predictors. They used an observational, descriptive, and analytical study method, conducting it on 933 families in Iran's west-central province of Hamadan. The participants' level of earthquake readiness was poor, and it was significantly correlated with gender, house ownership, marital status, economic position, and prior earthquake experience (Irani et al., 2020).

Several studies have been conducted on the topic of disaster management and risk reduction in the Sudurpaschim Province of Nepal. Dhyani et al. (2020), provide an overview of the disaster risk reduction activities in the region and identify the challenges and opportunities for effective disaster risk reduction.

The Community Disaster Preparedness Guide goes into great length regarding the need of having a plan for the family, pets, and vulnerable groups while preparing for a disaster. It's crucial to get local residents ready to react and lessen their dread of potential calamities. Community preparation increases people's confidence in their ability to lessen the consequences of disasters and manage available resources until help arrives (DaBreo et al., n.d.).

Ruszczyk et al. (2020) studies about empowering women through participatory action research in community based disaster risk reduction efforts provides a systematic review of the literature on community based disaster risk reduction in Nepal, and identifies gaps in knowledge and research related to the Sudurpaschim Province Nepal.

2.2 National Study

According to Disaster Risk Reduction and Management Act 2074 "disaster" means a natural or non-natural disaster causing a threatening situation in any place that results in loss of lives and properties and makes severe impacts on livelihood and the environment. This Act define that earthquake is a natural disaster.

Bista (1991) stated that the Sudurpaschim Province has a rich history and culture, with many indigenous communities and ethnic groups. Researchers could explore the history and

traditions of these communities, as well as their social organization, customs, and belief systems. Some relevant publications to consider include "The Magars of Western Nepal: Their Society and Culture" by Govinda Bahadur Thapa.

Shamsher (1992) explains his experience of the devastating 1990 earthquake in Nepal. He said that practically everything was destroyed in three minutes by an earthquake, which was not even made feasible by years and years of warfare. A total of 8,519 lives were lost as a result of that earthquake, 3,850 of which were men and 4,669 of which were women. In order to save lives and lessen the effects of future earthquakes, he published this book to share his story and educate readers. He has provided a number of preventative strategies that he learned through experience. The author emphasizes the post-earthquake conditions, such as communication challenges, water and food shortage issues, and fire threats. He said that while earthquakes cannot be foreseen, wars can, and that preparedness is crucial, and nothing should be overlooked while making plans.

Lawati (ed) (2007) stated that, the Sudurpaschim Province has undergone significant political changes in recent years, including the adoption of a federal system of government in Nepal. Researchers could analyze the political landscape of the region, including the role of local government institutions, political parties, and civil society organizations.

The Government of Nepal, together with major development partners, launched the Nepal Risk Reduction Consortium (NRRC) in 2009 (Among 5 Flagship Program of the NRRC, the Flagship four Programs focused on Community-Based Disaster Risk Reduction (CBDRR). It initiated this work to define disaster resilience by developing the nine minimum characteristics reflecting a disaster resilient community including organizational base at ward and community level, Reduction management plan at municipality level and Local-level risk/vulnerability reduction measures along with others (NRRC, 2009).

Sharma et al. (2013) explain the Sudurpaschim Province's terrain consists of Tarai, Hills, Middle Mountains, and High Mountains, with the highest point being located at 7,132 meters. The majority of settlements are inaccessible and far away. All district offices are nevertheless connected to the national road system five via paved roads and four via earthen paths. Natural calamities including floods, landslides, and forest fires are common in the area. Every year during the monsoon season, floods in the Tarai region afflict thousands of people, while

landslides brought on by heavy rainfall severely injure the Hill and Mountain regions. Floods severely impacted the Kailali and Kanchanpur districts in 2008, causing several fatalities as well as damage to homes and agricultural crops. Similar to how excessive rains caused landslides that ruined homes, property, and community infrastructure like rural roads, and trails in hilly districts.

The Government of Nepal (GoN) approved the National Disaster Response Framework (NDRF) in 2013, and it serves as a crucial set of guidelines for disaster response. The many stakeholders' roles during disaster are defined under this framework. The NDRF serves as a thorough manual for a coordinated and successful national response that is only restricted to preparation and execution (Ministry of Home Affairs, 2013).

As a national focal point for disaster management in Nepal, MoHA has been taking the initiative to address the problems of disasters and reduce their impacts. In order to lessen the effects of disasters, MoHA is very active in educating the public, providing training, and collaborating with local, national, and international organizations (United Nations Disaster Risk Reduction, 2013).

Chaulagain et al. (2015) investigated the seismic risk and resulting possible economic losses due to future earthquakes in Nepal. Specifically, the study aimed to assess structural vulnerability, seismic risk, and economic losses by using an updated seismic hazard model, structural vulnerability data, and exposure data. The study found that an updated seismic hazard model at the country level is imperative and logical, given the past records of loss of life and property in all parts of Nepal due to moderate-to-large earthquakes. The reliable estimation of seismic hazard and risk can minimize social and economic disruption caused by earthquakes. The seismic hazard and mean economic loss maps revealed that Nepal is at high risk of earthquakes, with the potential for significant economic losses. The distribution of building damage and corresponding economic losses due to the recurrence of the historical 1934 earthquake highlighted the vulnerability of the existing building stock. The seismic risk assessment presented in this study could help in framing public policies toward land-use planning, building regulations, insurance, and emergency preparedness, which can eventually minimize potential losses stemming from future earthquake.

Tuladhar et al. (2015) studies about Disaster risk reduction knowledge of local people in Nepal, which provides a systematic review of the literature on flood preparedness and risk perception in Nepal, and identifies gaps in knowledge and research related to the Sudurpaschim Province Nepal.

Devkota et al. (2015) stated land slide susceptibility maps are crucial for disaster management and for planning development projects in a mountainous country like Nepal. As part of the investigation, the Mugling-Narayanghat road and its surroundings were evaluated for their susceptibility to landslides. The landslide inventory was first mapped out using earlier reports, aerial photographs, and on-the-ground investigation. In order to create models of landslide susceptibility, 241 (or 75% of the total number of landslides) were randomly selected from the 321 that were mapped. The remaining 80 (or 25% of them) were used for model validation. The correct identification of the variables that significantly influence slope stability is the foundation for the success of landslide susceptibility assessment using GIS and statistics. The research, which had a fair amount of accuracy, might serve as the perfect model for hazard mapping in Nepal at all levels of government.

Adhikari et al. (2016) study about “Community Preparedness for Earthquake Risk in Rural Nepal" which investigates the preparedness of rural communities in Nepal for earthquake risks, and the effectiveness of disaster risk reduction programs in these communities.

Kunwar, & Chand (2016) highlighted the importance of the heritage industry and its vulnerability in the event of a natural disaster like the earthquake in 2016. In order to compare what has been done to what still needs to be done in order to achieve the ultimate aim of tourist recovery; the article first assesses the impacts of the earthquake on tourism in Bhaktapur before examining the process of tourism recovery and the issues with heritage reconstruction.

Community based approaches, such as those identified in the case study by Shrestha et al. (2019), have been shown to be effective in promoting disaster resilience at the local level. However, there are also challenges related to funding, capacity building, and institutional coordination that need to be addressed in order to improve disaster management in the Sudurpaschim Province of Nepal.

Chamlagain (2018) discusses the seismically active nature of the Himalayan belt due to its active tectonic movement, which poses a high risk of earthquakes to millions of people living in the region. The Main Himalayan Thrust is identified as a major seism genic fault that generates most of the earthquakes in the region. The passage also mentions that Nepal is located in the central part of the Himalaya and that the mechanism and causes of earthquakes are similar to those in other adjacent countries. The occurrence of damaging earthquakes in Nepal and adjacent areas in the last decade has pointed to the shortcomings in risk reduction programs. The article suggests that a meaningful program to reduce earthquake risks in the Himalayan region must incorporate research, apposite building codes, and an effective public awareness plan. The initiatives being taken at research and management levels in Nepal are discussed, along with their shortcomings. The technical aspects of seismicity, seism tectonics, and geotectonic are discussed, as well as risk management practices such as legislation, national plans, and awareness programs.

Khanal (2020) describe that in terms of its relative susceptibility to earthquakes and climate change globally, Nepal is ranked fourth and eleventh, respectively. This is due, in part, to the fact that Nepal is located in a region where there is a significant likelihood of a powerful earthquake. The nation is one of the top 20 nations in the world for both natural and man-made catastrophe risk. In terms of potential effects on humans, Kathmandu city is at the greatest danger out of 21 cities across the world that is located in comparable seismic hazard zones. Natural disasters include floods, landslides, windstorms, hailstorms, fires, earthquakes, and Glacial Lake Outburst Floods pose a threat to more than 80 percent of Nepal's entire population.

The Nepal hazard Management Reference Handbook, published in October 2020, goes into great detail regarding the country's hazard profile and presents disaster management policy. Our disaster governance is governed by the Disaster Risk Reduction and Management (DRRM) Act of 2017 and the Local Government Operation Act of 2017. When the National Disaster Risk Reduction Management Authority (NDRRMA) was created under the Ministry of Home Affairs (MoHA), the DRRM Act 2017 was changed as the DRRM Act 2019 in March 2019. The nation's DRRM related operations are managed by NDRRM. The National Council, the Executive Committee, and the NDRRMA are only a few of the structural structures that the DRRM has under MoHA. Through MoHA, the National Emergency Operation Centre (NEOC) manages the coordination of foreign and domestic organizations'

response operations. After obtaining information from the location where an emergency is expected to arise for disaster relief and emergency, the DRRM executive committee and the National Disaster Risk Reduction and Management Authority (NDRRMA) respond (Center for Excellence in Disaster Risk Management and Humanitarian Assistance, 2020).

Khanal (2020) asserted that the DRM statute of 2017 and the consequent transition in Nepal's 2015 Constitution from central to local government handed the 753 newly created municipalities' complete authority for disaster risk management policy and planning. The ability to make more decisions was welcomed by communities and local governments, but many of them felt overburdened by their complicated portfolios, which included how to guarantee a functional governance system.

Thapa et al. (2022) reviewed the disaster risk reduction activities in the region and identify the challenges and opportunities for effective disaster risk reduction. They assess the disaster risk reduction practices in the Sudurpaschim Province of Nepal and identify the challenges and opportunities for effective disaster risk reduction.

United Nations & Field Coordination Office (n.d.) stated that a total area of 19,539 square km, the Sudurpaschim province includes the previous Seti and Mahakali zones. It comprises nine districts, with the Kailali district housing the provincial capital. The area contains intricate socioeconomic systems and a pervasive caste- and gender based discrimination. Traditional religious, cultural, and societal structures have a significant influence on global growth.

2.3 Research Gap

Due to its location in a seismically active area, the Sudurpaschim Province is vulnerable to earthquakes. Since 1505, no significant earthquake has occurred in the mountainous region extending from Gorkha, Nepal, to Dehradun, West India. The area has built up a lot of seismic energy that can only be released by earthquakes. Thus, it is essential that the municipal, provincial, and federal governments implement a public awareness campaign to prevent significant financial damage in the event of an earthquake in Western Nepal. Though available researches and studies are more focused on the different aspects of disaster management, they are found to be less concerned with earthquake preparedness in Sudurpaschim Province to address the challenges faced by local community. Most of the

studies are focused on the earthquake preparedness at national and international level. There is also less research paper on Earthquake Preparedness in Sudurpaschim Province Nepal, so it is more fruitful to study local level preparedness and identify the risk reduction measures for improving earthquake preparedness in the Sudurpaschim Province of Nepal.

After the promulgation of the Constitution of Nepal and other legislations, the responsibility of disaster management largely falls under the domain of local governments. But there is lack of studies on the earthquake preparedness at local government level. This study tried to fulfill the research gap on the current level of earthquake preparedness in the Sudurpaschim Province for address the challenges faced by local communities and risk reduction measures of Jayaprithivi Municipality of Bajhang district.

CHAPTER III

RESEARCH METHODOLOGY

This chapter covers the study's methodology. In essence, this part primarily serves as a guide for how a research or thesis paper is created for the in-depth examination of an identified topic. This study used a qualitative technique and the people's experiences and views as a whole. The purpose of this study was to learn more about the level of earthquake preparedness in the Jayaprithivi Municipality, Bajhang district. To understand the members of 30 households' preparedness for earthquakes, primary data was gathered from them. To gather in-depth information, five key informant interviews and 5 telephone inquiries with connected people were undertaken. 14 women and 16 men were participated in the study. The key respondents' age varied from 20 to 60 year old. All the respondents had a very diverse educational background from illiterate to master degree. Out of 30 respondents 29 were the actual house owners and one was the residents living in a rental house.

In addition, secondary data were studied from a variety of books, journals, news items, handbooks, and reports for making conceptual framework and review of literature. Semi-structured interviews are used to analyze the analysis of readiness level and awareness. The researcher carried out simple observations at various homes and workplaces to comprehend the surroundings and any fundamental earthquake mitigation measures that had been implemented. By combining, summarizing, and interpreting the findings, which are stated and described in headings and subheadings the primary data gathered from this study was analyzed.

3.1 Research Design

The research design refers to the overall strategy that researcher choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring to effectively address the research problem. This study followed qualitative research method. Therefore, qualitative data was explanatory and descriptive to achieve the research objectives. It was based on information gather from a variety of primary sources obtained by the interviews, observation and Focused Group Discussion (FGD). The study also examined relevant secondary sources including journal articles and books.

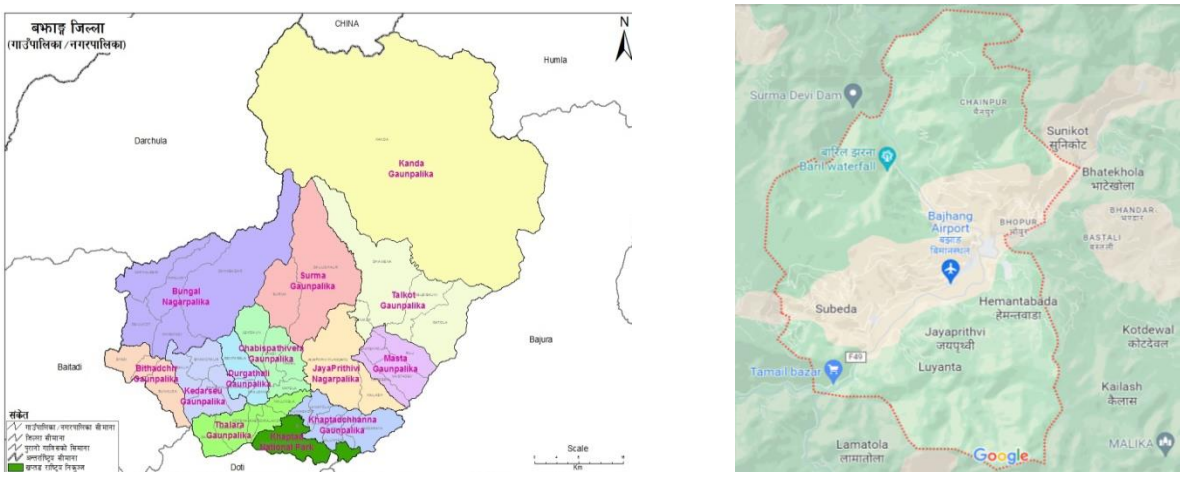
3.2 Area of Study and Site Selection

The study covered earthquake preparedness in Sudurpaschim Province Nepal, focused on Chainpur that is part of Jayaprithvi Municipality of, as its district headquarters of Bajhang district. The Researcher visited Chainpur, Bajhnag seven days (from 20 to 26 May 2023) and collected primary data by semi-structured interview and focused group discussion with elected representatives, bureaucracy officials, I/NGOs and local residents of Jayaprithivi Municipality.

Jayaprithvi municipality is located in the mountainous part of the south eastern region of Bajhang district, which is located in the northern part of the Sudurpaschim province of Nepal. According to the decision of the Council of Ministers of the Government of Nepal on 25th Baisakh 2071, this municipality was formed by merging the five former villages of Chainpur, Rithapata, Suweda, Hemantwara and Luyata. According to the state restructuring report published by the Government of Nepal on 2073, Volume 66, Number 58, Page No. 358 of the Nepal Gazette, Part four, a total of 11 wards have been established in this municipality. It lies on the bank of Seti River. At the time of the 2021 Nepal census it had a population of 21,973 people living in 4,088 individual households. This municipality has been named after the humanist king Jayaprithvi Bahadur Singh, who was born in this land. Appendix "B" shows the ward wise population which explain the density of the area.

Figure 3.1

Map of Bajhang district and Jayaprithivi Muncipality



Source: Map of Bajhang district by MoHA, 2022

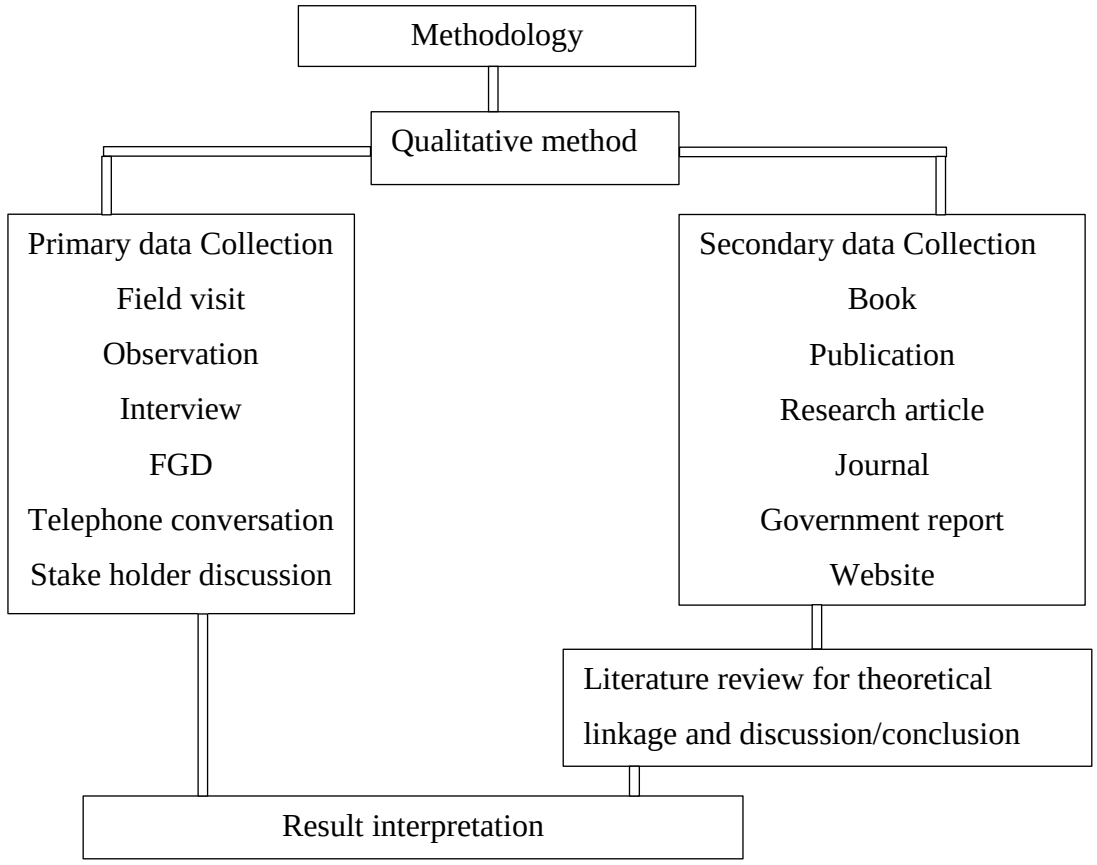
Bajhang District a part of Sudurpashchim Province is one of the seventy seven districts of Nepal. The district, with Chainpur, that is part of Jayaprithvi Municipality, as its district headquarters, covers an area of 3,422 square km. The district is surrounded by Bajura and Humla in the East, Baitadi and Darchula in the West, Humla in the North and Doti and Achham in the South. Appendix "C" shows the impact of July 1980 earthquake (epicenter Bajhang) in the Sudurpaschim Province of Nepal.

3.3 Nature and Sources of Data

The data used in this study are both primary and secondary. Primary data collected through interviews conducted with community members, local leaders, and other stakeholders involved in earthquake preparedness activities. Secondary data collected from book and journals.

Figure 3.2

Data Collection Method



Source: Adapted and modified by researcher own.

3.3.1 Primary Data

The primary data for the study based on the interview questions designed for the representatives of the Jayaprithivi municipality, KII and focused group discussion. The primary data collected by face-to-face & telephone interview using questionnaire by the researcher and FGD. The researcher also collected primary data from the study area observation. The researcher designed the questions well to understand easily by the respondents and asked questions effectively and clearly. The researcher briefed about the purpose of the study to the respondents. Collected data checked and verified at the end of work. To control the data quality, researcher regularly verified the data during the data collection time.

3.3.2 Secondary Data

The secondary data took from journal articles, books, government reports, websites, and the laws and regulations promulgated by the government on earthquake preparedness.

3.4 Techniques and Tools of Data Collection

The primary data collection technique used in this study was interviews. Interviews conducted with the study participants to gather data on earthquake preparedness. In addition, observation also used as complementary techniques to enhance the validity of the data.

The tools of data collection included an interview guided that used to conduct the interviews. The interview contained open-ended questions that allowed the respondents to provide detailed information on their perceptions, experiences, and challenges related to earthquake preparedness.

3.5 Data Analysis

The analysis tools of qualitative data are referenced by descriptive and narrative analysis in this study. These analyses involved categorizing the data collected into themes and patterns. The themes and patterns used to identify the current levels of earthquake preparedness in the Jayaprithivi Municipality of Bajhang, the challenges faced by local communities, and the most effective preventive measures and practices for improving earthquake preparedness in the study area.

3.6 Ethical Consideration

An ethical consideration in research refers the norms and standards for conduct. Norms and values, ethics and discipline, honesty and integrity, carefulness and confidentiality, respect for international property rights, openness and honor, legality and valued to respondents are consider as ethical consideration. During this research, code of ethics of APA 7th edition was followed strictly. This study promises to protect the confidentiality of the individuals and organizations respectively. The sources and data keep confidential as per the fundamental ethic of research. The consent form of respondents is in Appendix "D" for ethical consideration.

CHAPTER IV

FINDINGS AND DISCUSSION

In this section, mostly data is presented in multiple forms like pie-chart, table, bar graph, along with its analysis in the context of the study. For the study, mostly primary data is used followed by the secondary data respectively. As the method of the study, mostly qualitative data are collected to justify the rationale of the study. As the tools of the qualitative data, household visit, interview, key informant interview, focus group discussions are applied in this study. The analysis tools of qualitative data are referenced by descriptive and Narrative Analysis in this study.

This study is based on both primary and secondary data. Mostly primary data are used to make conclusion of the research. The collected data was rationally described, analyzed and presented to demonstrate the Earthquake Preparedness in Jayaprithivi Municipality Bajhang. The data was processed through editing, coding, classification, creating data file and tabulation.

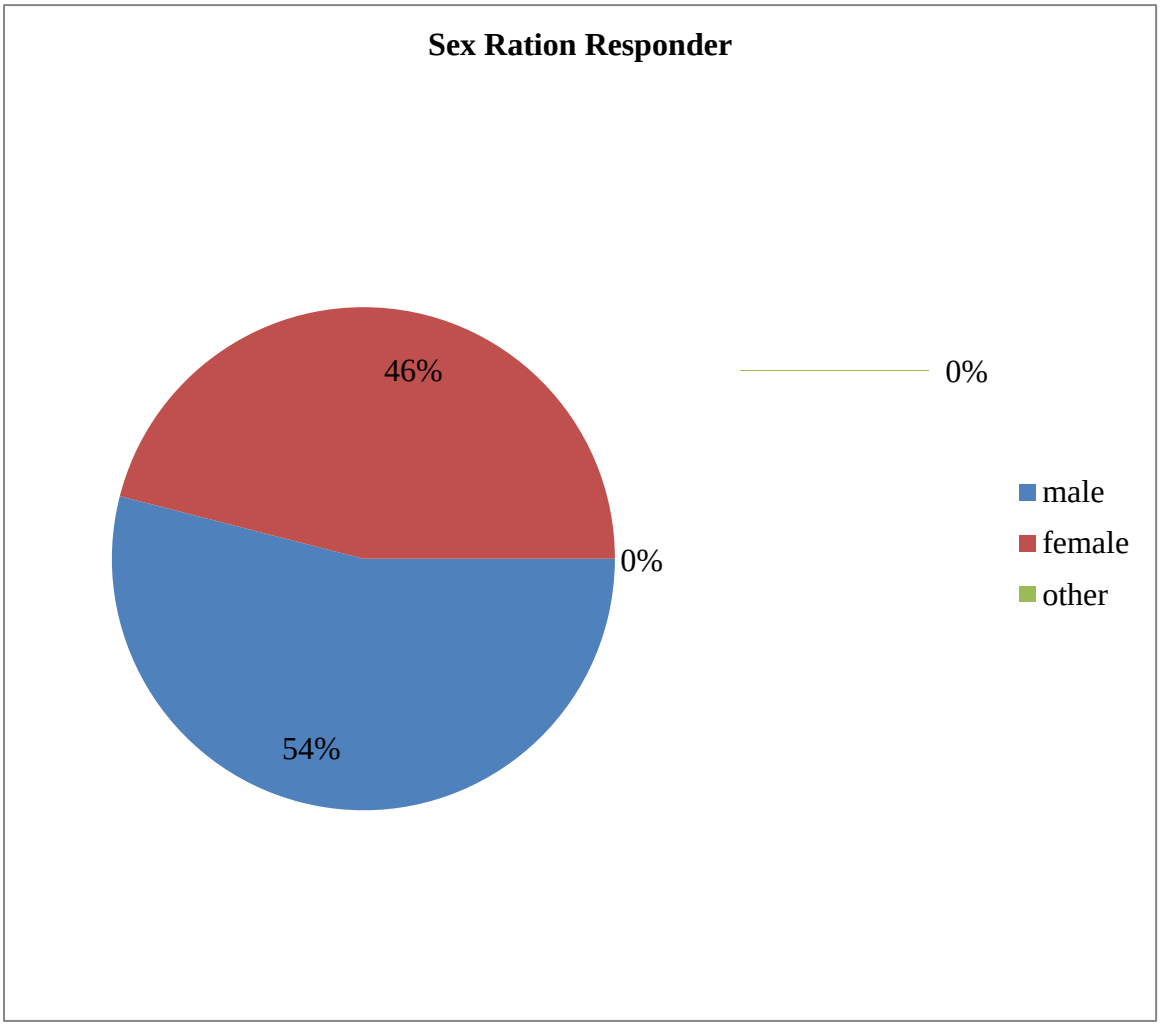
In this study, qualitative method is mostly used for the information collection. After approval from Faculty of Humanities and Social Science, APF Command and Staff College, the researcher visited the field of Jayaprithivi Municipality of Bajhang. Meeting and discussion with the community people of maximum wards of municipality and government officials accordingly. In-person interview with local people on the subject of Earthquake Preparedness in the periphery of Jayaprithivi Municipality was discussed in depth. Approved open-ended question is prepared in English language in very first, and then translated version in Nepali language is taken as the guiding document for the discussion, interview and focused group discussion. The researcher facilitated the discussion based on questions and note taker took the information in details in documents.

The information of Earthquake Preparedness in Jayaprithivi Municipality was collected from 30 individuals of villages and headquarters. The researcher visited their house and asked them some questions which are given appendix 'E'. The researcher visited some wards and interviewed through telephone of others wards and took information which was required. Due

to rainy season and road blocked, the researcher couldn't visit all the wards. The overall findings of the study are presented given below:

Figure 4.1

Sex Ration Respondents

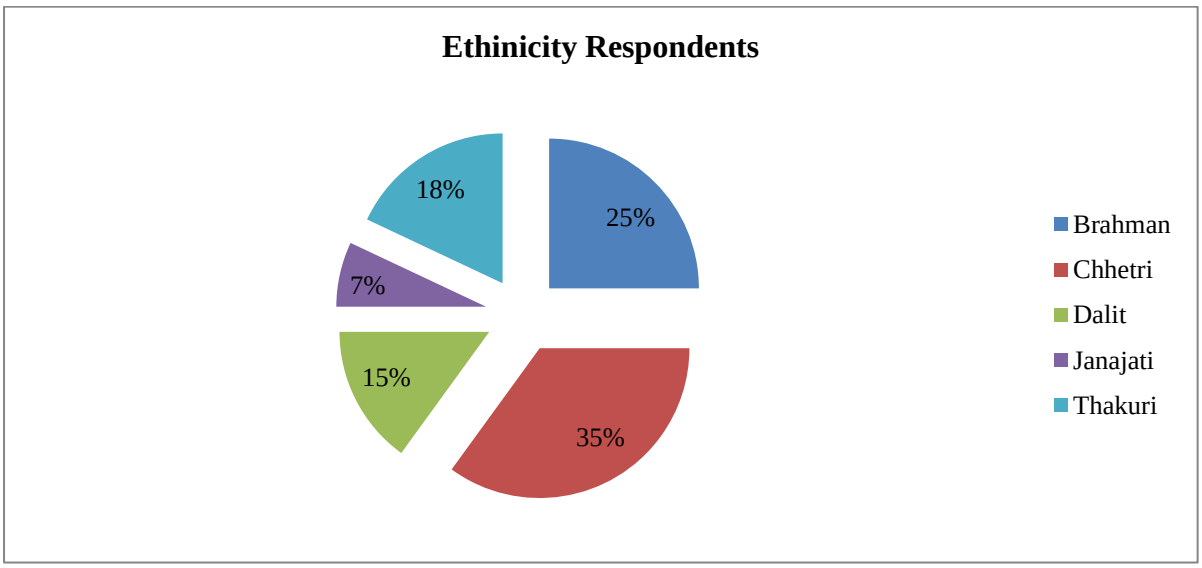


Source: Field research, 2023

The given figure indicates the number of respondents based on the sex. In this study, 54 percent respondents are male; whereas 46 percent are female. And, the group of 'Other' is vacant. This figure simplifies that most of the respondents are male because male are more participated in disaster preparedness activities whereas females are more vulnerable and susceptible due to any type of disaster.

Figure 4.2

Ratio of Ethnicity of Respondents

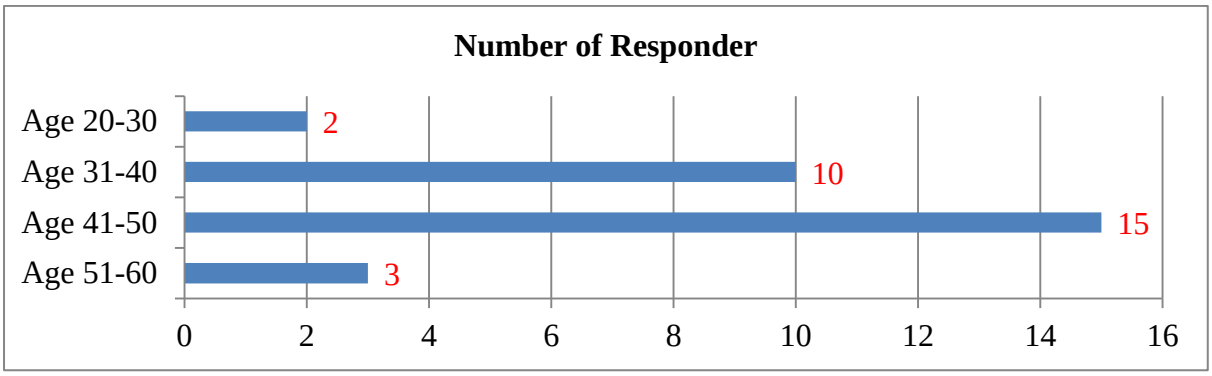


Source*:* Field research, 2023

The above figure states that 35 percent of respondents are from Chhetri, 25 percent respondents from Brahman and followed by Thakuri, Dalit and Janajani community also. The least number of respondents is taken from Janajati community, where Janajati community is less number located in market area. The dense population of Brahaman, Chhetri and Thakuri people in Bajhang is also reflected in this study too.

Figure 4.3

Age of Respondents

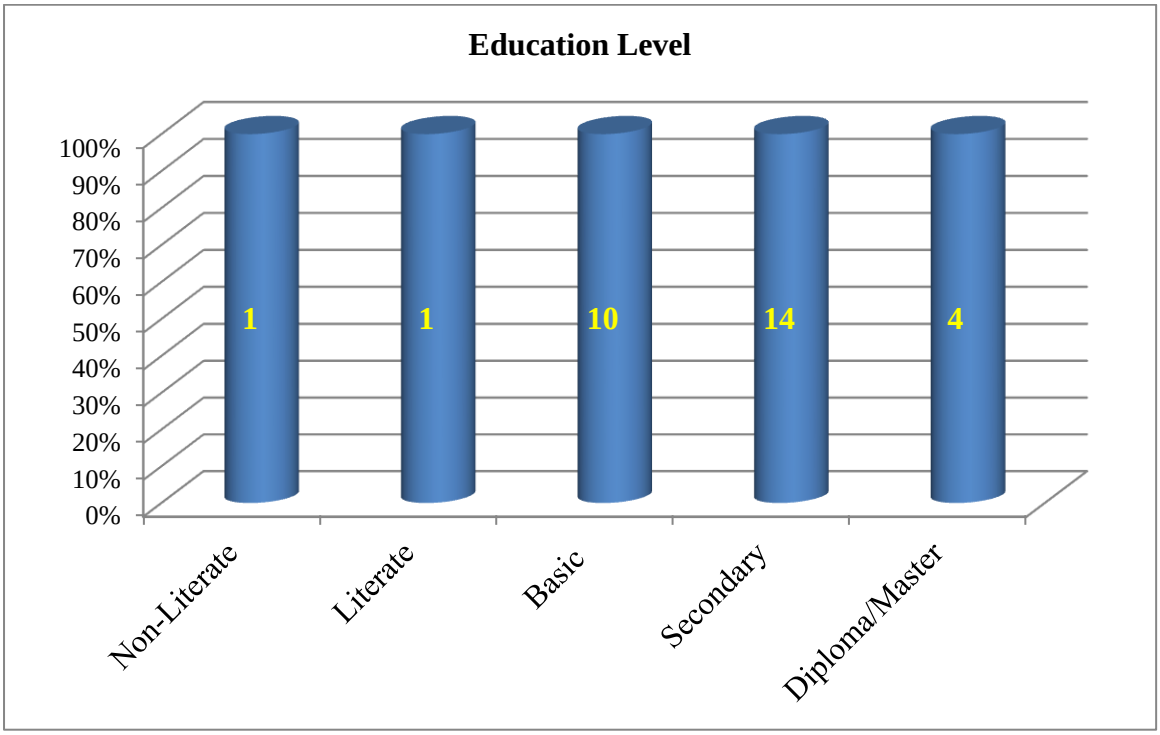


Source: Field research, 2023

The above figure demonstrates the age-group of respondents in this study. It means that it helps to understand the sensitivity of disaster by different age-group. In this study, 15 respondents are involved from the age-group of 41-50 years which people from age-group is the main work force in the community. And, 10 respondents are taken from the group of 31-40 years.

Figure 4.4

Level of Education of Respondents

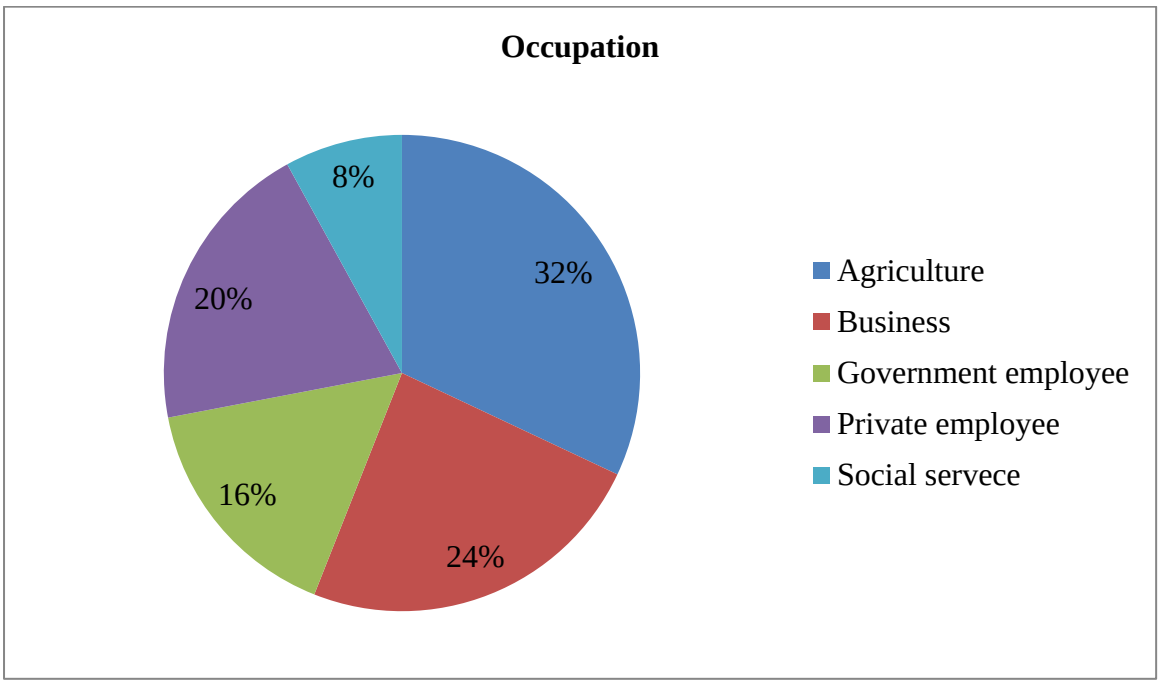


Source: Field research, 2023

The above figure highlights the education status of respondents in this study. The researcher of the study has taken the household visit interview of all respondent whereas 14 respondents are participated who have received a secondary (9-12) level education followed by basic (8 class pass) 10 respondents. The number of respondents simply indicates the overall social structure and represented it through different modes such as education, occupation, age, and ethnicity. Here, the data shows that the researcher is tried to know the sensitivity of Earthquake Disaster from the different group to gauge the difference in-between of them.

Figure 4.5

Occupation of Respondents



Source: Field research, 2023

Above figure shows the occupation of the respondents' population. Maximum of the respondents (32%) depends on agriculture for their livelihood while 24% does business. 16% respondents are engaged in government job while 20% are private employees. The least (8%) are engaged in social service.

4.1 Major Hazards in Jayaprithivi Municipality, Bajhang

Based on the National Data of Disaster, Earthquake is the more fatal disaster than others in the context of Nepal. Flood, Landslide, Fire Outbreak, Road Accident, Wild-animal attack and pandemic are taken as the major prominent hazards in Nepal. To know the major hazards in Jayaprithivi Municipality researcher asked question given in appendix "B". In the context of Jayaprithive Municipality, respondents of community people and the representative from District Administration Office claimed as:

> *In the context of Jayaprithivi Municipality, due to surround by Seti river and other multiple drains and nalas, Flood and Landslide is taken as the mostly-repeated*

disaster in the district. The data of household visit and community group discussion also reported that 25 respondent out of 30 has answered as Flood and Landslide as the key disaster in Jayaprithivi municipality. It means that around 83 percent of sample respondent are mostly suffered by the case of Flood and Landslide. Similarly, in the last two months (April/May 2023) ten earthquakes (4 to 4.5 magnitudes) recorded in Sudurpaschim Province Nepal and it affected in Bajhang districts. And, this study also finds that haphazardly road construction in rural areas is the main reason of landslide in present days in Bajhang districts.

The study also finds Earthquake is repeatedly happen in Suduspaschim Province, Nepal in 2023. The Following table shows the detail of earthquake happen in Sudurpaschim Province Nepal which affect the public life in Bajhang districts also.

Table 4.1

Earthquakes at Sudurpaschim Province in 2023

Date	Time (Local)	Latitude	Longitude	Magnitude(ML)	Epicenter
2023-05-23	04:06	29.66	81.61	4.5	Bajhang
2023-05-22	18:54	29.68	81.61	4.1	Bajura
2023-05-10	05:15	29.73	81.62	4.3	Bajura
2023-05-04	13:17	29.78	81.58	4.1	Bajura
2023-04-28	09:25	29.74	81.63	4.1	Bajura
2023-04-27	01:30	29.78	81.61	5.9	Bajura
2023-04-27	23:58	29.75	81.56	4.9	Bajura
2023-04-23	13:12	29.38	81.34	4.1	Bajura
2023-03-26	22:27	29.42	81.66	4.3	Bajura
2023-03-05	08:35	29.29	81.40	4.4	Aacham
2023-02-22	13:45	29.68	81.67	5.2	Bajura
2023-01-25	01:07	29.64	81.68	4.1	Bajura
2023-01-24	14:43	29.75	81.70	5.9	Bajura

Source: National earthquake research and monitoring center Lainchaur, Kathmandu, Nepal.

Table 4.1 shows that earthquake (almost 4.1 to 5.9 magnitude) hits Sudurpaschim Province Nepal at 13 times up to the 23rd May in year 2023. Among them 1 earthquake's epicenter in Aacham, another 1 earthquake's epicenter in Bajhang and rest 11 epicenter are in Bajura districts. In terms of magnitude the biggest, 5.9 ML earthquake hit Bajura district in two times and recently 4.5 ML hit the Bajhang district during the researcher filed visit time. Due

to those earthquakes there is no any human loss but according to Chief district office Bajhang 75 household got compansatation for damage of the houses. According to National Earthquake Research and Monitoring Center Kathmandu, in 2022 Bajhang was the epicenter of earthquake in three times and in 2021 was two times. These data shows that there is small scale earthquake happening frequently in Sudurpaschim Province Nepal and people are being houseless due to earthquake, so earthquake preparedness activities are mostly importance in this province.

4.2 General Understanding about Earthquake in Jayaprithivi Municipality

Earthquake is known as "Bhuichalo" in local level. The level of awareness about earthquakes in Jayaprithivi Municipality is quite low. People have experienced earthquakes in the past and are little aware of the potential risks they pose. In terms of common beliefs and perceptions, many community members view earthquakes as natural occurrences beyond human control. Some also believe in the influence of supernatural or spiritual factors in causing earthquakes.

What have you common beliefs and perceptions about earthquake?

> *The 90 percent responder understands that an earthquake is a natural phenomenon which happens due to the supernatural or spiritual cause. Some of them believe that earthquake occur when that the big snake wake up then the earth shake, some of others believes that the earth reacts to the collective or individual karmic actions of people, and earthquake serve as a means to restore balance and ratify past actions. Almost all responder know that, earthquakes have had significant impacts on the community, including damage to infrastructure, loss of lives, and disruption of livelihoods. The 10 percent responders are aware that earthquakes occur due to the movement and interaction of tectonic plates. They understand that the Sudurpaschim Province is located in a seismically active area resulting in frequent earthquakes. They also understand that aftershocks are smaller earthquakes that occur after a main earthquake and that aftershocks can continue for days, weeks, or even months following a significant earthquake.*

The local people know that during an earthquake, the ground shakes, causing buildings, trees, and other structures to vibrate. They are aware that earthquakes can vary in intensity, with some causing more severe shaking than others. They also know that in certain cases,

earthquakes can result in ground rupture, where the Earth's surface cracks or splits open. They have knowledge of the impact earthquakes can have on buildings and infrastructure. They understand that poorly constructed or weak structures are more susceptible to damage or collapse during earthquakes. KII also recognize the importance of building codes and earthquake resistant construction techniques. Regarding preparedness and safety measures the local people generally have some knowledge of basic safety measures to follow during an earthquake. They know to "Drop, Cover, and Hold On" during the shaking and to move to open areas away from buildings, trees, and power lines to avoid falling objects.

While the level of understanding may vary among individuals, the local people in the Jayaprithivi Municipality have firsthand experience and cultural knowledge passed down through generations that contribute to their understanding of earthquakes. However, it is important to continue raising awareness and providing education on earthquake preparedness, response, and mitigation measures to further enhance their knowledge and resilience.

4.3 Challenges Faced by Local Community of Jayaprithivi Municipality

Susurpaschim Province is at a high seismic risk, as evidenced by a several earthquake incidences. In the past 518 years, there have been no earthquakes in Nepal's western area. For such a long period, the energy necessary to generate earthquakes has been trapped beneath the ground in western Nepal. There hasn't been a significant earthquake in the mountainous area between Gorkha, Nepal, and Dehradun, West India, since 1505. This mountainous area has built up a lot of seismic energy that can only be released by earthquakes. With the occurrence of both minor and huge earthquakes, the energy will progressively be released (Rajput, et al., 2023). As a result, a public awareness campaign must be run by the local, provincial, and federal governments in order to prevent catastrophic financial loss in the event of an earthquake in Sudurpaschim Province, Nepal. Due to the frequent minor earthquakes, Nepal's Sudurpaschim Province is at a high risk of earthquakes. Old towns and localities in Jayaprithivi Municipality, Bajhang, are more susceptible to earthquakes. More at danger are older buildings and towns that are not earthquake-resistant.

Question regarding challenges faced local community given in appendix "E" and according to the respondents some challenges in earthquake preparedness faced by local community are as follows:

4.3.1 Limited Resources

As per the Key Informant Interview (KII) and almost ninety percent responder stated that the Jayaprithivi Municipality often lacks adequate financial, technical, and human resources to implement comprehensive earthquake preparedness measures. Limited funding and infrastructure hinder the development and maintenance of early warning systems, the implementation of building codes, and the provision of necessary equipment and resources for emergency response.

4.3.2 Geographical Remoteness

Ninety percent responder stated that, Bajhang districts is remote and hard-to-reach areas, which pose logistical challenges for delivering aid and support during and after earthquakes. The inaccessibility of certain wards delay emergency response efforts and limit the availability of critical services, such as medical assistance and search and rescue operations.

4.3.3 Poverty and Socio-Economic Factors

More than 50 percent responder of Jayaprithivi Municipality, Bajhang stated that they are facing economic challenges and struggle with poverty. Due to the poverty, their ability to invest in earthquake-resistant infrastructure, retrofit existing buildings, or procure essential supplies for emergency preparedness is less. Socio-economic factors also affect access to education and information, which may impact the level of awareness and understanding of earthquake risks and preparedness measures.

4.3.4 Limited Infrastructure

Almost all responder stated that, Jayaprithivi Municipality's infrastructure, including roads, bridges, and communication networks, are inadequate or poorly maintained. This can hamper the efficient delivery of aid and support during emergencies, hinder evacuation efforts, and impede coordination among different stakeholders involved in disaster response.

4.3.5 Cultural and Traditional Practices

During KII and FGD, it was find that cultural and traditional practices influence the adoption of modern earthquake preparedness measures. In some cases, traditional building techniques may not adhere to current seismic safety standards, which can increase the vulnerability of structures during earthquakes. Even in market area there were poor constructed old houses, but they do not make it retrofit because they believe their ancient and it was the respect of their ancient.

4.3.6 Lack of Awareness and Education

During field visit it was observed and feels by interviews that local people have limited access to education and awareness programs about earthquake risks, preparedness measures, and response protocols hinder community members' ability to effectively respond to earthquakes. Insufficient knowledge about evacuation procedures, first aid, and other safety practices increase the vulnerability of the local community.

4.3.7 Governance and Institutional Challenges

During field visit it was observed the weak governance structures, inadequate coordination among different government agencies and limited capacity at the local level hinder effective planning and implementation of earthquake preparedness measures. More than 60 percent responder said that there was a lack of clear policies, guidelines, and regulatory frameworks, as well as challenges in the enforcement of building codes and regulations.

Among them Researcher observed that there were lack of young people in community, who are the first responder in disaster and people are not interested to participate in disaster preparedness activities. Local government and other related agencies have limited resources to conduct preparedness activities in the community. To make more participants of local people in disaster preparedness activities, it is needed some allowances for them but the related agencies have not sufficient budget. To addressing these challenges requires multi-stakeholder collaboration, including involvement from government agencies, NGOs, local communities, and international organizations. It is crucial to prioritize resource allocation,

capacity building, community engagement, and awareness raising initiatives to enhance earthquake preparedness in the Sudurpaschim Province, Nepal and promote community resilience in the face of seismic hazards.

4.4 Level of Earthquake Preparedness in Jayaprithivi Municipality

During the field visit by researcher in the Jayaprithivi Municipality, Bajhang, the level of earthquake preparedness was vary depending on various factors, including the availability of resources, infrastructure, awareness, and institutional capacity. Here is an overview of the general level of earthquake preparedness in the region:

4.4.1 Government Initiatives

The government of Nepal has implemented various initiatives to enhance earthquake preparedness across the country, including the Sudurpaschim Province. These include the development of building codes, the establishment of the National Society for Earthquake Technology (NSET), and the formulation of the National Disaster Risk Reduction and Management Framework.

How many security forces are deploying in Jayaprithivi Municipality and are there ration and other thing stock in the district headquarters?

> *In Jayaprithivi Muncipality, Bajhang there is around 220 Nepal Army, around 300 Nepal Police and around 160 APF, Nepal personnel, among them there is only six persons are trained from APF, Nepal and they do not have sufficient rescue equipment in the Unit. Nepal Red Cross has only tent and Kambal in stock for around 100 families. - A KII Respondent.*

4.4.2 Building Infrastructure

Efforts have been made to improve the earthquake resilience of buildings in urban areas, particularly in district headquarters and municipalities. The government has introduced guidelines for earthquake resistant construction and retrofitting of existing structures. However, the implementation and enforcement of these guidelines may vary, especially in rural areas.

Are you applying Building Code and retrofitting system in your houses?

> *24 responder out of 30 stated that they do not know about Building Code and retrofitting technique. They think that it is costly and they cannot afford for this technique. Even the local government not informed them about this. Six responders heard about Building code and retrofitting technique but it is not applied due to the lack of professional technician and insufficient budget.*

As the researcher observation, even in rural areas people are constructing concrete building without applying the Building Code and any other safety measures. Majority of them they do not understand about it and some are doing negligent.

4.4.3 Community Awareness

Awareness campaigns and training programs have been conducted to educate the local population about earthquake risks and preparedness measures. These initiatives aim to disseminate information on safe building practices, early warning systems, evacuation plans, and first aid techniques. However, the level of awareness and knowledge among community members can vary, and there may be a need for ongoing education and outreach efforts.

Is there any community awareness program conducted by government side in your community?

> *Mr Jaya Bdr Singh, (pseudo name) resident from Chainpur bazar, he took participants on monsoon related disaster preparedness activities conducted by security forces on this month (Jestha 2080). There was few numbers of local participants on that program because people are not interested to participate like this program without any allowances. His two children are studying in eight and ten class and they informed him that the security forces like Nepal Army and APF, Nepal conducting earthquake preparedness program in local school.*

4.4.4 Early Warning Systems

The government, in collaboration with national and international organizations, has implemented early warning systems to provide alerts for impending earthquakes. The Nepal National Seismic Monitoring Center (NSMC) operates a network of seismometers to detect

earthquakes and issue warnings. However, the coverage and effectiveness of early warning systems in remote areas of the Sudurpaschim Province are limited. Local people are not aware about early warning system related earthquake but they know little bit early warning system of flood in Jayaprithivi Municipality.

4.4.5 Emergency Response Capacity

The region has established local disaster management committees and emergency response mechanisms to coordinate disaster response efforts. These include search and rescue teams, medical teams, and relief distribution networks. However, the availability of trained personnel, equipment, and resources may be insufficient, particularly in rural and hard to reach areas.

4.4.6 Challenges and Gaps

Despite the ongoing initiatives, there are several challenges and gaps in earthquake preparedness in the Jayaprithivi Municipality, Bajhang. These include limited resources, inadequate infrastructure, lack of awareness and education, weak enforcement of building codes, and limited access to technology and information. Socio-economic factors, including poverty and marginalization, can further exacerbate these challenges.

To improve earthquake preparedness in the Sudurpaschim Province, Nepal, it is essential to address these challenges and gaps. This can be achieved through increased investment in infrastructure, targeted awareness campaigns, community engagement, capacity building, and improved coordination among government agencies, NGOs, and local communities. Ongoing monitoring, evaluation, and revision of preparedness plans and policies are also necessary to ensure effective and sustainable preparedness efforts.

The level of earthquake preparedness directly addresses the challenges faced by the local community in several ways:

a) Awareness and Education

Preparedness efforts aim to raise awareness among the local community about the risks and impacts of earthquakes. By providing information about the causes, characteristics, and potential consequences of earthquakes, community members can better understand

the importance of preparedness measures. Through education and awareness campaigns, the preparedness level helps address the challenge of low risk perception. By understanding the potential dangers of earthquakes, individuals are more likely to take proactive steps to prepare themselves, their families, and their properties.

b) Preparedness Measures

The level of earthquake preparedness provides clear and specific guidelines on how individuals can make their homes and workplaces safer. This includes securing heavy furniture, fastening tall objects to walls, and keeping emergency supplies readily available. Preparedness efforts establish evacuation plans and procedures, addressing the challenge of organized and timely evacuations. Community members are informed about safe evacuation routes, assembly points, and the importance of following instructions from authorities.

c) Early Warning Systems

The implementation of early warning systems helps address the challenge of limited time to react to earthquakes. By providing advance notice of seismic activity, individuals can take immediate actions such as seeking shelter, moving to open spaces, or activating their preparedness plans. The availability of early warnings allows the community to activate their preparedness measures effectively. This includes securing loose items, shutting off utilities if necessary, and gathering essential supplies for immediate needs.

d) Infrastructure Resilience

The level of earthquake preparedness emphasizes the enforcement of building codes that promote seismic resilience. This addresses the challenge of vulnerable infrastructure by ensuring that new constructions are designed and built to withstand earthquakes. Preparedness efforts may also encourage the retrofitting of existing structures to improve their earthquake resistance. This helps address the challenge of older buildings that may be more susceptible to damage during seismic events.

e) Community Engagement and Coordination:

The preparedness level promotes collaboration between local communities, government agencies, non-governmental organizations, and other stakeholders. This addresses the challenge of fragmented efforts by bringing together resources, expertise, and perspectives to develop comprehensive and inclusive preparedness strategies. The engagement of the local community in preparedness activities fosters a sense of ownership, responsibility, and resilience. By actively participating in the planning and implementation of preparedness measures, community members become more empowered and better equipped to face the challenges posed by earthquakes.

f) Effectiveness of Existing Policies and Strategies

Evaluate the effectiveness of current earthquake preparedness policies and strategies in Jayaprithivi Municipality of Bajhang District. Analyze their strengths and weaknesses, considering aspects such as community engagement, infrastructure resilience, early warning systems, and capacity building programs. Assess the extent to which existing policies and strategies have addressed the challenges faced by the local community in terms of awareness, infrastructure safety, coordination, and response mechanisms.

g) Identification of Policy and Strategy Gaps

Identify the gaps and shortcomings in the current policies and strategies for earthquake preparedness in Bajhang District. Examine the challenges faced by the local community that have not been adequately addressed or require further attention. Discuss the reasons behind these gaps, which may include limited resources, lack of community involvement, inadequate infrastructure, or insufficient training and capacity building programs.

h) Community Perspectives and Engagement

Explore the perspectives of the local community in Bajhang District regarding earthquake preparedness. Conduct surveys, interviews, or focus group discussions to understand their knowledge, perceptions, and experiences related to earthquakes and preparedness measures. Analyze the level of community engagement in existing preparedness initiatives and their involvement in decision-making processes. Assess the impact of community participation on the effectiveness of preparedness efforts.

i) Comparative Analysis

Conduct a comparative analysis of earthquake preparedness in Bajhang District with other districts or regions in Nepal or similar geographical contexts. Identify successful case studies or best practices that could be implemented or adapted to address the specific challenges in Bajhang District. Compare the resources, strategies, and outcomes of preparedness efforts in different regions to gain insights into effective approaches for earthquake preparedness.

j) Policy and Strategy Recommendations

Based on the gaps identified and the analysis conducted, provide recommendations for improving earthquake preparedness in Bajhang District. Propose specific policy changes, strategies, and interventions that address the challenges faced by the local community. Discuss the feasibility, practicality, and potential impact of the recommended policies and strategies. Consider factors such as resource availability, local context, institutional capacity, and community involvement in the implementation process.

k) Evaluation and Monitoring

Highlight the importance of continuous evaluation and monitoring of earthquake preparedness efforts. Emphasize the need for regular assessments of policy implementation, community awareness, infrastructure resilience, and response mechanisms to ensure ongoing improvement. Discuss the potential indicators and metrics that can be used to measure the effectiveness of earthquake preparedness in Bajhang District. Consider the establishment of monitoring systems and feedback mechanisms that involve community members and stakeholders.

Overall, the level of earthquake preparedness directly addresses the challenges faced by the local community by increasing awareness, providing specific guidelines, establishing early warning systems, improving infrastructure resilience, fostering collaboration, and enhancing community resilience. By focusing on these aspects, the preparedness level aims to minimize the impact of earthquakes, protect lives and properties, and enable a more effective response and recovery in the aftermath of seismic events.

4.5 Earthquake Risk Reduction Preparedness Measures

Structural mitigation methods refer to actions made to lessen the effect caused by any stationary objects, such as homes themselves, buildings, and other housing structures. They are part of the fundamental preparatory steps for reducing earthquake risk that are based on NSET's varied information kit (pamphlets & brochures). Non-structural mitigation refers to the steps taken to lessen the effects of any moveable objects, such as chairs, tables, closets, table lamps, hanging artwork, hanging lights, mirrors, and similar items. Similar to how NSET defines the earthquake 'GO BAG' (Jhatpat Jhola), this bag should contain supplies to last a person at least three days. This GO BAG should have a personal name on it since it is designed to be readily retrieved during an emergency evacuation from the home or building. The Household Emergency Kit, which is a box or container containing tools, equipment, and accessories, is another piece of advice they offer. All members of the family should be informed of where this kit is because it is only used for Light Search and Rescue (LSAR) operations. The "Drop, Cover, and Hold on" approach, which can save lives during earthquakes, is also listed in their information kit. This is one of the proven methods for earthquake safety that is used all around the world (Arlikatti, et al. 2019).

4.5.1 Structural and Non-Structural Mitigation Measures

Twenty four of the respondents, despite some minor earthquake related damage, were confident in the structural integrity of their home. Five individuals who were not the home's owner were unable to provide thoughtful responses to the question. Only one of the respondents stated that he lacks confidence and needs to enhance his home but was unable to do so due to budgetary limitations. Most respondents said they were unaware of non-structural mitigating options. When questioned, persons who experienced the 2015 earthquake appeared to be unfamiliar with the technical phrase "non-structural mitigation," yet their actions revealed that they had taken care of securing interior movable things.

Have you any experience from past earthquake, if yes then you applied any structural mitigation measures to safe your house?

> *The 2015 earthquake caused damage to my residence. Engineer is a relative of mine. When I summoned him to evaluate my house, he advised me to rebuild it. He claimed that staying at home is exceedingly unsafe. We left the home and spent the night with*

my brother, whose residence is on the north side and is divided from it by a wall. Our financial issues prevented us from renovating the home. We spent several years adjusting in my brother's house before moving back during the epidemic- A Chainpur Bazar respondent.

Ram Bdr Singh (Pseudonym) is a husband of Nepal Police soldier living with two and half year-old daughter in a rented house at Chainpur.

I am not sure how I feel about it because it is not our home. However, this house seems nicer than our home in the hamlet. My wife and I moved into this home only a few months after getting married. I had never thought about earthquake preparedness, even though we never bring it up.

4.5.2 Earthquake Plans

When questioned about basic earthquake preparations, respondents were asked what they would do if they got stranded at home, if an emergency evacuation was necessary, if there was no water or electricity, if communication was disrupted, etc. Twenty nine respondents stated that they don't have any plans and don't talk to their family about the earthquake preparedness procedure. One responder, a merchant, was the only one to say that he sets plans and talks to his family.

My wife and I talk about evacuation arrangements with our two boys, ages 15 and 17. My two boys and various media outlets have both made mention of the significance of taking precautions in case of an earthquake. I learned a few things from the 2015 earthquake, and I also participated in a District Administration Office orientation session. I relocated my mother's room to the bottom floor following the 2015 earthquake. Since my mother needs assistance walking, this is done to allow time for an emergency evacuation.

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 believe Nepalese citizens make advance plans for an emergency evacuation during an earthquake. Planning, in my opinion, is essential for crowd-populated

> *spaces like offices, hospitals, movie theaters, and apartments, but it may not be necessary for a private home - A response from Subeda.*

This study on a chosen sample discovered that 25 out of 30 respondents overlooked earthquake preparedness and planning for the vulnerable. Despite the fact that no physically impaired people were identified for this study, it was discovered during researcher observation that not all homes had accessible environments. Additionally, it was noted that most of the dwellings lacked obvious exits. There were many more domestic things visible that may impede or obstruct your escape path in the event of an emergency evacuation, including shoe racks, indoor plant pots, and staircases that were partially blocked by them.

4.5.3 Emergency Kit

It was discovered that none of the homes possessed a GO BAG or a fire extinguisher. Only the 30 homes where the interview was conducted are included in this. Two respondents were aware of the GO BAG, compared to 28 who had never heard of it. Those two respondents learned about the GO BAG via their kids.

> *During an earthquake drill exercise, instructors had to carry GO BAGs stored in each class, according to my granddaughter, who was talking about her school. The student was also responsible for updating and replacing any things in the GO BAG that needed to be replaced. Each week, a different student would assume responsibility for the GO BAG. - A Chainpur respondent.*

When asked if they had ever considered installing a fire extinguisher in their home, 29 respondents said no, while 1 respondent said he has one since it is a need. All of the respondents did own several common gear including a shovel, pick, bucket, hammer, and torchlight, all of which are more suited to home chores like gardening than emergency rescue operations. In contrast, three respondents who lived in bazar area have a first aid package, whereas 27 respondents didn't have.

The majority of respondents stated that assembling such a kit requires a lot of work and costs a lot of money. The majority of respondents had limited financial resources and lack of expertise, which are the main causes of not owning such essential things.

4.5.4 Stock Ration

When questioned about stock rationing, most respondents indicated they had enough food (rice, wheat, maize, millet) for a month, and very few said they had enough for more than a month. The majority of respondents expressed confidence in the ability of their routine ration storage to function in an emergency.

> *We do have enough ration stored away to last at least a month but we don't have dry ration. In an emergency, it is better to stock dry ration, which is easy to carry and use in emergency. Now we have to plan to use the same supplies before replenishing. – Subeda resident who responded.*

4.5.5 Drop, Cover, and Hold on

12 out of 30 responders who were asked about the "Drop, Cover, and Hold on" approach and they said that they were familiar with it. Ten respondents claimed that their kids had told them about this strategy, while two others said they had learned about it via the social media. 18 respondents have never heard of this strategy. It was discovered that none of the respondents had ever used this method. In contrast to respondents who were living alone or without children, it was observed that respondents who had children appeared to be knowledgeable about this strategy.

4.5.6 Open Safe Space

The majority of responders had no idea about open spaces around the study location. A small number of responders from Chainpur bazar revealed the locations of the shelters they sought refuge in during the 2015 earthquake, which were situated on the grounds of School. It was discovered throughout this research that there aren't many open places in the school grounds that can accommodate an average of 10 to 12 families, but the local authorities must also be aware of this. During an interview, key informants were unable to mention the existence of an open area on the school grounds.

4.5.7 Learning from Past Experiences

When asked, 22 respondents said that they had experienced the 2015 earthquake and that their home had also sustained minor damage. Three of the responders weren't there during the

2015 earthquake since they were abroad at the time. Regarding the effects of the earthquake, none of the respondent's homes suffered significant damage or had to bear any family member or related fatalities. Respondents who experienced the 2015 earthquake described it and claimed they could still remember the dread. According to the responses, the experience of the 2015 earthquake assisted the respondents in identifying current risks as well as in coming up with remedies.

4.5.8 Community Preparedness

According to Federal Emergency Management Agency (FEMA) (2021), communities must cooperate to be prepared. This involves educating individuals about the risks and dangers present in their neighborhood, locating talent, and identifying vulnerable populations. Despite doing door-to-door surveys on behalf of CBDRM (Community Based Disaster Risk Management) members in a few localities or at the request of the local government, they are still unable to reach a wider audience.

Twenty respondents said they were unaware of community activities and had never engaged in any of the initiatives. They all claimed to have little knowledge of local preparation. Due to a lack of time, 10 respondents stated that they are unwilling to participate in any of the community events.

> *We make an effort to hold meetings every month, although it is not always possible due to the 'samiti' members' lack of availability of time. In our meetings, we often talk about things like the availability of clean drinking water, health shelters, construction projects, installing CCTV, creating a safe environment in the neighborhood, and other things. Since we have other priorities, such as drainage issues, a shortage of drinking water, and other things I discussed previously, we never talk about catastrophe preparedness. We must acknowledge the lack of such individuals with understanding of catastrophe management. We must rely on our local police for this. – A Tole Sudhar Samit Chainpur.*

4.6 The Role of Community People and Local Government in Improving Earthquake Preparedness Measures

According to the report, local governments have a critical role in reducing catastrophe risk and post-disaster recovery. Out of the 30 respondents, 95% said the local government should tightly oversee or execute disaster related programs and policies. The relevant organizations and people should closely adhere to the implementation supervision.

The role of community people is also important for mitigating the risk of Earthquake in Jayaprithivi Municipality. Chairperson of local youth club expressed as:

> *Currently, the local population lacks enough awareness on earthquake preparedness. The municipality doesn't have any special programs or activities for improving the abilities of the community's rescue squad, municipal employees, and residents. There isn't currently a community committee in place. The local government must advocate for an earthquake preparation program in the community. Only 3% of the total respondents claimed to be aware of the many community level programs and activities that reduce the risk of disaster.*

The program for lowering the danger of an earthquake disaster is modest when working with municipal and wards office workers and should be expanded to include numerous programs, an awareness campaign, and a skilled team at the municipal level.

Similar to this, community members' roles are taken on as secondary to those of the government and other development groups for the municipality's efforts to mitigate the damage brought on by the earthquake. The following list of tactics is based on the study's findings:

a) In terms of disaster management, Nepal's 2015 constitution stipulates that all three levels of government have equal roles and duties. The Disaster Risk Reduction and Management Act of 2017 have been created and is now being implemented based on a provision of the Constitution. The study also reveals that Jayaprithivi Municipality also has a LDRMC but it is not in functional because of some member are not there. As a result, Jayaprithivi Municipality may experience less loss and the effects of catastrophe if laws and policies are implemented effectively.

b) The proposed city of Jayaprithivi, which might serve to lower the risk of unsettled settlements, should be the focus of the three levels of government. In the context of Jayaprithivi Municipality, efficient urban settlement related policy execution should be used. Municipality play a significant role in facilitating disaster related programs and policies at the community level since they are the local governing body.
c) The government should also execute additional programs and initiatives, such as improving the building code, establishing a specialized team for rescue and operation, building the ability of district and local organizations, and providing technology that is necessary for tracking disaster-related issues.
d) In Jayaprithivi Municipality, community level disaster preparation programs, radio programs, early warning systems, and curriculum creation at the school level may assist to reduce the risk and loss brought on by disasters in general and earthquakes in particular.
e) Disaster Preparedness program should be monitor by government office or it should be made one door policy for effective and efficient implementation.

4.7 Effectiveness of LDRMC in the Disaster Preparedness Activities

In every form of tragedy or crisis, the first rescue squad is made up of members of the community. It takes time for the government led rescue team, security forces, and others to respond quickly to a tragedy (Rodriguez et al., 2007). The local level disaster risk reduction and management committee should be created on a community level, according to the Act and Policies of Disaster Risk Reduction and Management of Nepal. The community level committee on disasters must be equipped by the government. The community level disaster risk management committee has not yet been created in Jayaprithivi Municipality. According to the report, there is also a lack of a local level disaster strategy to reduce the risk of disaster. During the home visit, one of the key respondents mentioned about establishment of LDRMC and its importance in the community level.

> *A functional committee and plan for local disaster risk management have not yet been established. The municipality should take the initiative to create a community level disaster risk management strategy and committee, but this has not yet been done. The risk of disaster is eventually reduced by identifying disaster prone locations, developing a risk reduction strategy, and enhancing capability. If a committee exists,*

it will work well to reduce the earthquake disaster risk factors in the Jayaprithivi Municipality. The main results show that, if LDRMC existed, about 90% of individuals would agree that it would be successful.

The study also reveals that the creation of community level programs and activities based on needs and requirements is aided by the local level's specialized disaster preparedness strategy. The community led initiative is simple to execute and successful in achieving its objective.

4.8 Awareness Campaign on Disaster Preparedness

Community awareness has the important role to raise the knowledge on disaster preparedness in community. This activity is taken as the method under the section of crisis prevention which is the one of the major component of disaster cycle management. To raise or extend the knowledge of community people on disaster prone activities would be the one of the major long-term strategic activities for the mitigation of Earthquake disaster in specific and other disaster in general.

Is local government or district level disaster authorities or civil society organization organize an awareness campaign in your community?

Due to lack of risk reduction skills or awareness of earthquake disaster such as building code, retrofitting houses, open space concept, preparation jhatpat jhola, safe and quality materials for house wiring, aftershock, Drop, Cover and hold on, reconnect and restore is major cause of injury people in jayaprithi Municipality. Around 70 % out of 30 respondent reported that negligence by the community people is the one of the major cause of loss of property and human casualty by Earthquake in Jayaprithivi Municipality and similar per cent has mentioned that "no community level awareness program" is conducted repeatedly in community. No proper use of Disaster Risk Reduction and Management Act (2017) and Policies (2019) respectively.

One of the respondents of KII from municipal level also realized that there is least community awareness program on Earthquake disaster preparedness led by municipality in community level. According to KII on Jestha 2080, one water rescue simulation exercise was conducted by security forces with the participants of Nepal Red Cross Society, local level

government and other related stakeholder, but there were less participants of local community. It shows that the local people are not interested such type of activities without any allowances. The study also finds that the municipality has been broadcasting a radio PSA (Public Service Announcement) regarding fire disaster in the dry season and water induced disaster in monsoon season of the year through local FM radios such as Jayaprithivi FM 96.3 MHz, Saipal FM, and Radio Miteri. The radio PSA helped (20 % respondent 'Yes') to understand about disaster in rural and city areas of Bajhang but it is not sufficient for the mitigation of risk of disaster.

4.9 Discussion

According to UNDRR (2013) rapid urban expansion will raise the danger of disaster. Additionally, unintentionally increasing risk factors in our situation are development efforts. Open spaces are not being maintained and are being exploited for various things. Key interviewees concur that inadequate planning occurred when development activities were being carried out, despite the study's findings that open areas are being replaced by tiny parks and towering structures are being built. According to Marxist theory, it shows how haphazard growth may lead to either an increase or a decrease in disaster. Although earthquakes cannot be stopped, their effects can be reduced by taking precautions that are intended to lessen exposure to risks (Hoffman & Smith, 1999).

This study demonstrated that home members' readiness is poor and that making plans is being disregarded, despite the fact that literature shows that community members are the first disaster responders before the arrival of any other support. To do this, household members must be encouraged to create such strategies for reducing the effects of earthquakes by our government and stakeholders. Community preparation increases people's confidence in their ability to lessen the consequences of disasters and manage available resources until help arrives. There is an urgent need to develop a strategy for improving household members' readiness and preparedness as well as to encourage all families to develop family level preparedness plans at all households' levels. Local authorities are committed to working for the safety of the community despite obstacles, but due to the low participation from household members, they are becoming discouraged.

The research made it clear that a person's financial situation and past earthquake experience were important factors in their preparations. According to Iraniet al. (2020) that those with greater experience were shown to be more prepared. This study explains how respondents' financial constraints appear to have influenced their willingness to take precautions. Poverty is both the source and the effect of disaster in underdeveloped or developing nations and it makes a significant impact in earthquake preparedness.

One of the encouraging finding from this study is that educational institutions are playing a crucial role in disseminating earthquake risk preparedness measures, which is in line with the HFA strategy and Sendai Framework priority to use knowledge and understand disaster risk. In their case study, Muttarak & Pothisiri (2013) noted the significance of formal education in boosting disaster preparedness efforts and lowering susceptibility to natural hazards. According to the school teachers, there aren't enough qualified instructors working in the classrooms. Government should thus urge schools to start providing instructors with appropriate training. There should be an increase in routine plans for awareness, frequent meetings, simulated exercises, alert systems, alternative plans, community members equipped with appropriate emergency equipment, and ability to respond in relation to the activities of the many organizations from this study.

CHAPTER V

SUMMARY AND CONCLUSION

5.1 Summary

The topic of this research is Earthquake Preparedness of Jayaprithivi Municipality, Bajhang. To complete this research, researcher study about earthquake preparedness in Jayaprithivi Municipality, of Bajhang. Jayaprithivi municipality of Bajhang district is located in Sudurpaschim Province of Nepal. Researcher did six days field visit from 19 to 24 May 2023, and collected primary data for qualitative research methodology. Landslide, Flood, Fire outbreak and Earthquake are the major disaster in this region, which engulfed livestock, huge ratio of property, human loss, collapsed the human settlement and wildlife animals.

The objective of this research was to find out the activities of current level of earthquake preparedness, which addressing the challenges faced by local community in Jayaprithivi Municipality of Bajhang district and earthquake risk reduction measures for improving earthquake preparedness. To fulfill these objective researcher study primary and secondary data. Due to time limitation and geographical abstract research could not cover the whole district areas and also some remote parts of Jayaprithivi Municipality.

Disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by natural, human induced and technological hazards, as well as various factors that influence the exposure and vulnerability of a community. Earthquake preparedness in the Sudurpaschim Province of Nepal is of utmost importance due to its geographical location in a seismically active zone. The region is susceptible to earthquakes and faces unique challenges in terms of preparedness. The current level of earthquake preparedness varies across the region, with efforts made to raise awareness and establish early warning systems. However, there are challenges that need to be addressed.

The local community in the Jayaprithivi Municipality faces various challenges related to earthquake preparedness. These challenges include limited awareness and understanding of earthquake risks, inadequate infrastructure resilience, socio-economic vulnerabilities, and

remote and inaccessible terrain. The lack of resources for preparedness initiatives further compounds these challenges.

Improving earthquake preparedness requires strategies that focus on community engagement and capacity building. It is crucial to educate and empower the local community about earthquake risks and preparedness measures. Enhancing infrastructure resilience is also essential to minimize the impact of earthquakes. Collaboration among government agencies, NGOs, and international organizations can contribute to effective preparedness efforts.

This study demonstrated that home members' readiness is poor and that making plans is being disregarded, despite the fact that literature shows that community members are the first disaster responders before the arrival of any other support. To do this, household members must be encouraged to create such strategies for reducing the effects of earthquakes by our government and stakeholders.

By addressing these challenges and implementing appropriate measures, the far western region of Nepal can enhance its earthquake preparedness. A comprehensive approach that prioritizes community engagement, awareness, and infrastructure resilience is necessary to minimize the potential impacts of earthquakes and build a resilient society.

5.2 Conclusion

Disasters include both natural and human induced occurrences that threaten public safety, cause the loss of lives and property, and have a significant negative influence on the environment and human existence. As per the literature Nepal is placed fourth and eleventh internationally in terms of its relative sensitivity to earthquakes and climate change, respectively. This is partly because Nepal is situated in an area where there is a high possibility of experiencing a strong earthquake. The country is in the top 20 countries in the world in terms of the danger of both natural and man-made disaster.

One of the most important aspects of readiness is a disaster preparedness strategy. This plan should outline the actions to be taken before, during, and after a disaster. There should include details regarding emergency contacts, evacuation routes, and essential supplies like food, water, and first-aid kits. A disaster preparedness strategy must be developed via collaboration and engagement with all stakeholders, including local government, community

leaders, and individuals. Making an emergency kit is still another crucial component of disaster preparedness, along with knowledge being another key one.

A disaster is a serious problem that affects a lot of people, a lot of property, or a lot of the environment over a short or long period of time and causes more losses of people, property, or the environment than the affected community or society can probably expect to be able to recover from on its own. Earthquakes do not pose a threat to human life, but crumbling buildings and individual responses to an earthquake do. Building earthquake resilience and raising public knowledge of earthquake risk reduction strategies are thus much more crucial if we are to protect people and property. Family members might not prioritize making earthquake preparedness.

The majority of respondents don't appear to be using structural or non-structural mitigation techniques, so their awareness of these techniques which include preparing an emergency plan, stocking up on food and supplies, and retrofitting homes doesn't seem to be translating into actual behavior. The NSET, the Disaster Management Division, the Nepal Army, Nepal Police, Armed Police Force, Nepal, and local authorities have all actively contributed to educating the public about earthquake mitigation measures throughout the country, according to the study's findings. The collaboration of the community, the local government, and the stakeholders is also thought to be lacking, thus there has to be efficient communication and coordination between them.

Actually, the first people to go forward are the locals. Community members should respond to emergencies as the first responders, thus they must be equipped with all the resources and tools required. This study discovered that residents of the community, people living in homes, and municipal authorities did not cooperate to respond to natural disasters like earthquakes. It is important to build effective strategies, backup plans, channels of communication, and information exchange. Public awareness campaigns regarding the need of earthquake preparedness must be prioritized by all agencies and should not be disregarded at any level.

APPENDICES

Appendix 'A'

Role of Federal, Provincial & Local level Governments on DRM

Federal	Provincial	Local
1.Formulate policy, act and regulations Fund management 2. Plan and Program on DRM 3. Decision implementation of national council and committee 4. Declare disaster crisis zone 5. Coordinate with concerned line agencies through authorities 6. Strengthen and mobilize NDRRMA 7. Conduct national level disaster response activities 8. Backup province and local level disaster response 9. Distribute disaster relief through local administration 10. Mainstreaming DRR 11. Rehabilitation for disaster displaced	1. Formulate policy, act and regulations 2. Fund management 3. Plan and Program on DRM 4. Decision implementation of national council, executive committee, provincial council and committee 5. Recommend to declare disaster crisis zone 6. Coordinate with NDRRMA 7. Conduct provincial level disaster response activities 8. Backup local level disaster response 9. Distribute disaster relief through local level 10. Mainstreaming DRR 11. Rehabilitation for disaster displaced 12. Transparency onward	1. Formulate policy, act and regulations 2. Fund management 3. Plan and Program on DRM 4. Decision implementation of national council, executive committee, provincial council, committee and LDMC 5. Coordinate with NDRRMA, provincial government and DDMC 6. Conduct Local level disaster response activities 7. Remove debris 8. Distribute disaster affected identification card and relief 9. Mainstreaming DRR. 10. Rehabilitation for disaster displaced 11. Transparency onward

Source: DRRM Act, 2017

Appendix 'B'

Ward Wise Population in Jayaprithivi Municipality of Bajhang

S.N.	Ward No.	Population	Remarks
1	Ward no. 1	2452	
2	Ward no. 2	979	
3	Ward no. 3	3304	
4	Ward no. 4	1509	
5	Ward no. 5	2493	
6	Ward no. 6	1568	
7	Ward no. 7	3282	
8	Ward no. 8	2010	
9	Ward no. 9	1408	
10	Ward no. 10	3200	
11	Ward no. 11	3755	
12	Total	25960	

Source: Municipality profile of Jayaprithivi Municipality, Bajhang 2023.

Appendix 'C'

Impact of July 1980 Earthquake (Epicenter Bajhang) in Sudurpaschim Province, Nepal

District	No. of affected panchyat*	No. of house collapsed	No. of house cracked	Death	Wounded (human)
Darchula	26	4135	2743	24	-
Baitadi	41	1257	1949	22	236
Dadeldhura	-	-	120	-	-
Bajhang	35	6137	6380	-	-
Bajura	19	419	654	-	-
Aacham	46	781	1227	-	-
Doti	30	82	225	-	-
Total	197	12817	13298	46	236

Source: (Gupta and Sharma, 1980)

- Small politico - administrative unit

Appendix 'D'

CONSENT FORM OF RESPONDENTS

Earthquake Preparedness in Jayaprithivi Muncipality of Bajhang

Date ……...…… (day/month/year)

I, (Mr./Mrs./Ms.) …….……hereby have signed the consent to declare that:

1. Before signing the certificate of consent, I have been explained the objectives and methods of the study.

2. I have had the opportunity to ask questions about the study and any questions that I have asked have been answered to my satisfaction.

3. I have the right to withdraw from the study at any time if I feel uncomfortable.

4. The investigator will keep the information confidential and my personal data will not be declared in any case except the academic purpose.

5. The investigator will provide additional necessary information about the study, if there are any.

I have read and understand the above information and I consent voluntarily to participate as a participant in this research.

Signature/Finger print….……(Respondent/informant)

Signature……..…… (Researcher)

(DSP Lal Bahadur Shahi)

Appendix 'E'

INTERVIEW QUESTIONS

Research Questions

This research was guided by the following research questions:

1.3.1 How current levels of earthquake preparedness in the Jayaprithivi Municipality, Bajhang address challenges faced by local communities?

1.3.2 What are the earthquake risk reduction preparedness measures for improving earthquake preparedness in the Jayaprithivi Municipality, Bajhang?

Filed Questions

For the thesis paper of **Earthquake Preparedness in Jayaprithivi Municipality, Bajhang.**

Form Serial No: ……..

Date: ……. (DD/MM/YYYY)

Basic Information:

Name of Respondent:
Ms./Mr……
(Optional)

Age: …….Yrs.

Sex:

☐Male

☐Female

☐Other

Ethnicity:

☐ Dalit ☐ Janajati

☐ Brahmin-Chhetri ☐ Thakuri

Education:

☐ Non-literate ☐ Literate Basic (1-8)

☐ Secondary (9 - Plus12)

☐ Diploma/Master

Occupation: ……

General questions for responders

1. What are the common beliefs and perceptions about earthquakes among community members?
2. What are major key Disasters are happening repeatedly in your residential area or village/city?
3. What are the main challenges or barriers in implementing earthquake preparedness measures in your community?
4. What are the activities conducted by local government in earthquake preparedness in your areas?
5. Do you know, is there any policies or local level disaster risk management committee is made in your community related with Disaster?
6. If yes, is it working or been effective to reduce the risk of Disaster, especially an Earthquake disaster in your community?
7. Do you understand about Building Code and retrofitting techniques?
8. Is there any local level disaster preparedness activities conducted in this physical year, if yes did you participate in that program?
9. Have you any experience from past earthquake, if yes then you applied any structural mitigation measures to safe your house?
10. Is local government or district level disaster authorities or civil society organization (CSOs) organize an awareness campaign in your community?
11. How you understand about earthquake plan and did you talk about earthquake preparedness with your family members?
12. Do you prepare any emergency kit or "Go bag" for earthquake preparedness?
13. What is the ration stock system in your society?
14. Have you any idea about "drop, cover and hold on" and where from you know these techniques?
15. Where is the open space in your community, have you any idea about this?

Questions for KII and FGD

1. What are the major disasters in Jayaprithivi Municipality, Bajhang?
2. Could you tell me the disaster preparedness activities that conducted in the community in this year 2079?
3. What are the challenges facing by local community in earthquake disaster preparedness?
4. How many security forces are deploying in Jayaprithi Municipality?
5. Is there any early warning system applied in the community level regarding disaster preparedness?
6. Are there any ration and other logistics stock piling for emergencies in this municipality?
7. Is there open spaces identified for disaster management?
8. What community activities are you conducting for disaster preparedness?

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