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Disaster Awareness and Risk Reduction Knowledge among School Students in Beemdatt Municipality, Nepal

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Abstract

Natural disasters such as floods, earthquakes, landslides, and hailstorms have become more frequent and dangerous in recent years, especially in developing countries like Nepal. School students of Bheemdatt municipality are at high risk of natural disasters, especially when they are in school and at home. This study focuses on Bheemdatt Municipality of Kanchanpur District. The main objective of the study was to assess disaster awareness and risk reduction knowledge among school students in Bheemdatt Municipality, Nepal.

The research was conducted using both primary and secondary sources of data. A Simple random sampling method was used to select respondents. Data were collected through surveys and interviews conducted in 14 schools of which six were government and eight were private. The sampled schools represent different levels of disaster risk. A total of 110 students participated in the study, along with teachers and school principals.

The findings indicate that the majority of students had acquired knowledge about disasters mainly through school textbooks, while other sources such as television, radio, and the internet were reported to be less frequently utilized. Among the types of disasters experienced, earthquakes, floods, and hailstorms were the most common in the study area. Many students understood disaster preparedness and mitigation, some remained unclear about the specific actions required before, during, and after a disaster.

The study finds that strengthening disaster education in schools helps students gain

a clearer understanding of disaster risk reduction (DRR). It emphasizes the crucial role of youth education in safeguarding lives and communities. Additionally, the study examines the current status of disaster education in Nepal and offers recommendations to improve community resilience through educational initiatives.

Keywords: Disaster, risk, management, mitigation, recovery, awareness, school, student

Introduction

Natural disasters are global phenomena that cause significant harm to human life, property, the environment, and economic systems (UN, 2021). In recent years, the frequency and intensity of natural disasters have increased worldwide (Pamidimukkala et al., 2020). On average, more than 400 national-level disasters occur annually, resulting in approximately 74,000 deaths and affecting over 230 million people (CRED, 2008). Economic losses are also rising sharply, with global disaster-related losses expected to reach USD 415 billion annually by 2030. Developing countries are disproportionately affected, facing higher mortality rates and limited resources for recovery and resilience (UNISDR, 2015).

Nepal is considered one of the most disaster-prone countries in the world. It ranks 4th in terms of climate change vulnerability, 11th for earthquake risk, and 30th for flood risk. Over 80% of the population is exposed to multiple natural hazards, including floods, landslides, windstorms, hailstorms, fires, earthquakes, and glacial lake outburst floods (GLOFs) (MoHA, 2015; Chhetri, 2001). These recurring hazards pose serious threats to both lives and livelihoods across the country.

Among the most vulnerable groups during disasters are school students, largely due to their limited experience, awareness, and preparedness (Shiwaku & Shaw, 2008). This knowledge gap can significantly increase their risk in times of crisis. Strengthening disaster education in schools is, therefore, a crucial strategy for reducing disaster-related vulnerabilities and fostering long-term community resilience. Educating young people not only enhances their individual safety but also contributes to broader community-level awareness and preparedness (Sonak et al., 2008).

Disaster Risk Reduction (DRR) is a systematic approach to identifying, assessing, and minimizing disaster risks. By incorporating DRR education into the school curriculum, it is possible to build a culture of safety and preparedness from a young age (Maxwell & Buchanan-Smith, 1994).

This study aims to assess the level of disaster awareness and knowledge of disaster risk reduction among school students in Bheemdatt Municipality, Nepal. It seeks to

identify existing gaps in knowledge and recommend educational strategies to improve resilience among young populations in disaster-prone communities.

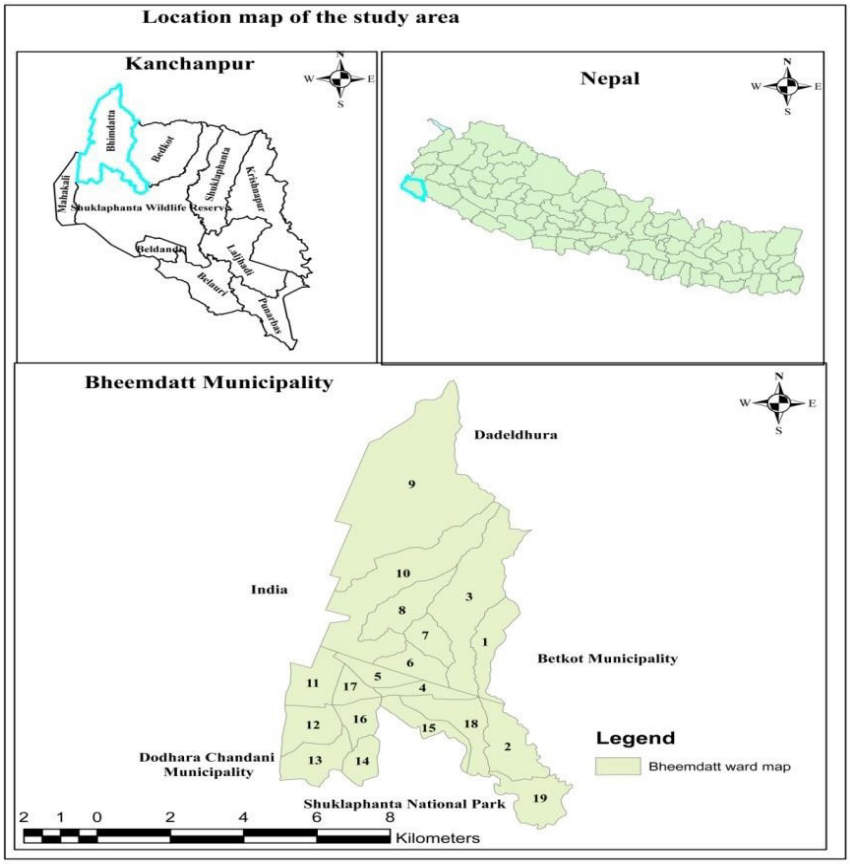
The Study Area

The Bheemdatt municipality lies in the kanchanpur District of Sudurpaschim Province. Geographically, it is located between 28°52' to 29°08' north latitude and 80°06' to 80°15' east longitude. The municipality has covered 196.5 square kilometer area with an elevation ranging from 176 m. to 1000m elevation and divided into 19 wards. This is bounded by Betkot Municipality to the east, the Uttarakhand state of India to the west, Parshuram Municipality of Dadeldhura District to the north, and Dodhara Chandani Municipality to the south. The municipal headquarters, Mahendranagar, also serves as the headquarters of Kanchanpur District. Topographically, the study area lies in the northern part of the indo-gangetic alluvial plains a few kilometers south of the Siwalik Hill.

According to the 2021 census report, the population of Bheemdatt Municipality is 122,320, with 47.6% male and 52.4% female (CBS, 2021).

Figure 1

The study area



Research Methodology

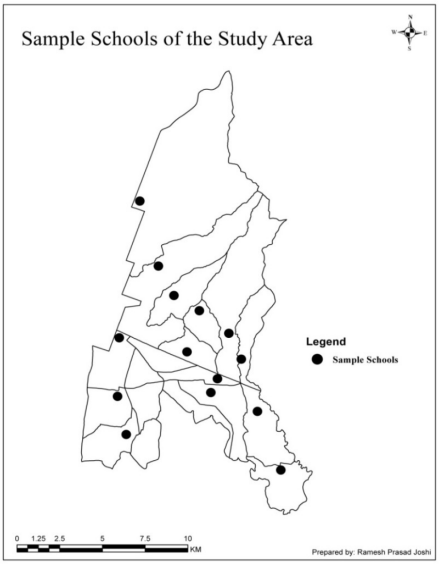
This study is based on mixed research design. The research was based on both primary and secondary data. Primary data were collected through structured questionnaires and field observation. The secondary data were collected from various sources including government offices and online platforms. Arc GIS software was used for preparation of disaster maps and to show the location of sample schools in the Bheemdatt Municipality. The data were processed and analyzed using computer software packages such as Microsoft Excel. Descriptive statistics, frequency distribution, mean, and percentages were used for presentation of data. The results were presented in text, tables, and figures and interpreted accordingly.

Sample size and sampling procedure

Simple random sampling method was used for the selection of sample. Out of the total high schools 6 government and 8 private schools were randomly selected for the study. 5 schools were selected from the very high disaster risk wards, 4 from the high disaster risk wards, 4 schools from the moderate disaster risk wards and 1 from the low disaster risk ward of Bheemdatt municipality. A total of 64 boys and 46 girls were randomly selected for the study. 5 teachers and 5 headmasters or principals were also selected randomly to know the subject matter of the disaster in the school curriculum. This helped in understanding how disaster risk levels may influence awareness and education in schools. Schools from different disaster risk wards were selected to ensure a balanced understanding of the situation across the municipality.

Figure 2

Sample schools of the study area



Results

Disaster risk wards of Bheemdatt Municipality

Floods, earthquakes, drought, landslide, fire, lightning, hailstone are common natural disasters are in the Bheemdatt municipality. Flood is the main disaster of the municipality. The municipality has divided the four disaster risk zones.

Table 1

Disaster risk wards of Bheemdatt Municipality

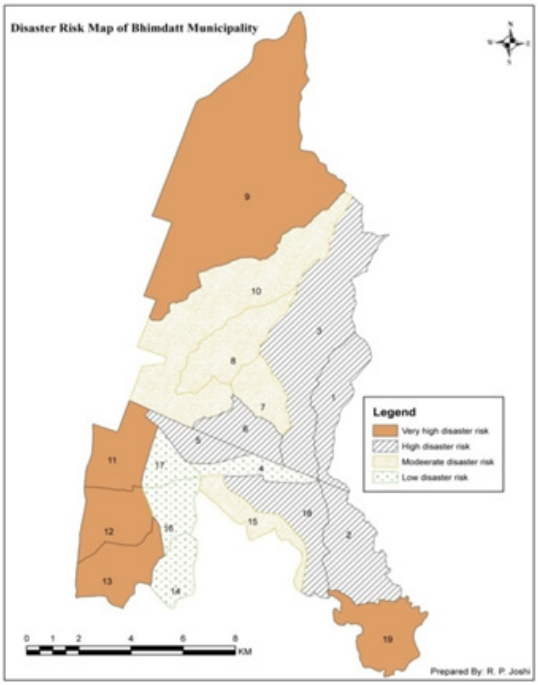
S.N.	Types of disaster risk	Ward No.	Total No.of wards
1	Veryhighrisk	9, 11,12,13, 19	5
2	Highrisk	1, 2, 3, 5,18	5
3	Moderaterisk	6,7, 8, 10 15	5
4	Lowrisk	4, 14, 16, 17	4

Note. Source: Bheemdatt Municipality 2021

Table 1 shows the risk of disasters into four categories: extremely high, high, moderate, and low-risk wards. Out of the 19 wards, Ward no. 9, 11, 12, 13, and 19 are identified as very high risk. Ward no. 1, 2, 3, 5, and 18 are classified as high risk. Wards 6, 7, 8, 10, and 15 are placed in the moderate risk category. Meanwhile, Wards 4, 14, 16, and 17 in Bheemdatt Municipality are considered to be at low disaster risk.

Figure 3

Disaster Risk Map of Bheemdatt Municipality



Sources of Disasters Knowledge

Table 2

Sources of disaster knowledge

S.N.	Sources	Total Number of Students		Total
		Boys	Girls	
1	Books	64	46	110
2	TV	12	14	26
3	Radio	20	23	43
4	Newspaper	2	3	5
5	Internet	1	2	3

Note. Source: Filed survey 2021

All respondents stated that they had acquired knowledge about disasters through textbooks, which are the main source of information. However, a small number of respondents stated that they occasionally use the internet, newspapers, radio, and television to learn about disasters.

Experience of Disasters

The study focuses on the types of disasters experience those students in Bheemdatt Municipality. A total of 110 students were asked to indicate type of disaster common in your residence and school.

Table 3

Experience of disasters

S.N.	Disasters	Experience of disasters				Total
		Boys		Girls		
		yes	No	Yes	No	
1	Flood	50 (45%)	14 (13%)	34 (31%)	12 (11%)	110
2	Landslide	4 (4%)	60 (54%)	1 (1%)	45(41%)	110
3	Earthquake	64 (58%)	0 (0%)	46(42%)	0 (0%)	110
4	Fire	3(3%)	61(55 %)	0 (0%)	46(42%)	11 0
5	Lighting	40 (36%)	24 (22%)	28 (26%)	18(16%)	110
6	Hailstorm	64 (58%)	O (0%)	46 (42%)	0 (0%)	110

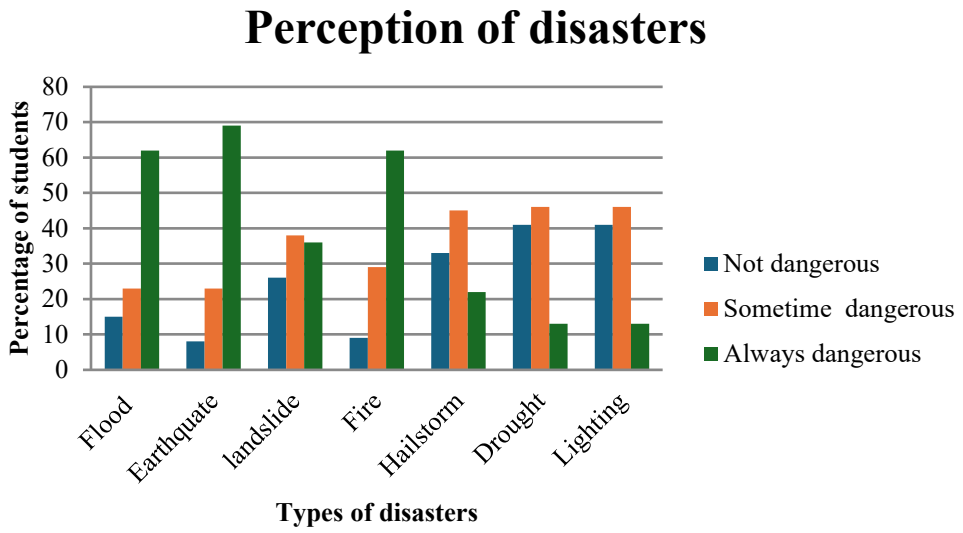
Note. Source: Field survey, 2021

The data shows that all students in the municipality have experienced either an earthquake or a hailstorm. For floods, 45% of boys and 31% of girls have encountered them, while 13% of boys and 11% of girls have not. In terms of landslides, 4% of boys

and 1% of girls experienced them, with most boys (54%) and girls (41%) never facing landslides. For fire, 3% of boys reported experiencing it, while 55% of boys and 42% of girls did not face fire disasters. Regarding lightning, 36% of boys and 26% of girls have encountered it, with 22% of boys and 16% of girls not exposed to it. The data shows that earthquakes and hailstorms are the most common disasters, while landslides, fire, and lightning are less frequently experienced.

Figure 4

Student's perception toward disasters



Note. Source: Field survey, 2021

The figure presents students' perceptions regarding the severity of various types of disasters. A significant proportion of students identified earthquakes (69%) and fires (62%) as consistently dangerous. Similarly, floods were also viewed as highly hazardous, with 62% of respondents considering them always dangerous. In contrast, disasters such as droughts and lightning were perceived as less threatening, with only 13% of students categorizing them as always dangerous. Overall, 40% of the students believed that disasters are always dangerous, 36% regarded them as sometimes dangerous, and 24% considered them not dangerous at all. These findings indicate that while the majority of students acknowledge the serious risks associated with disasters, perceptions vary notably depending on the type of disaster.

Awarenes and Disaster Risk Reduction Knowledge of Students

It is an important part of the research beacause awareness and DRR knowledge of the students can reduce loss of the disaster. It may help to protect lives, property and

infrastructure of the individual and community.

Table 4

Disaster Mitigation Knowledge of Students

S.N.	Level of Knowledge	Disaster mitigation knowledge of students in percent		Total
		Boys	Girls	
1	Well understood	17 (15%)	14 (13%)	31 (28%)
2	Understood	32 (29%)	23 (21%)	55 (50%)
3	Not clear	8 (7%)	6 (5%)	13 (12%)
4	Confusing	4 (4 %)	2 (2%)	7 (6%)
5	No idea	3 (3%)	1 (1%)	4 (4%)
	Total	64 (58%)	46 (42%)	110

Note. Source: Field survey, 2021

The above table shows that 50 percent respondents are understood the disaster mitigation, 28 percent are well understood, 12 percent not clear, and 6 percent confusing and 4 percent have no idea about the disaster mitigation.

Table 5

Disaster Preparedness knowledge

S.N.	Level of Knowledge	Disaster preparedness knowledge of students in percent		Total
		Male	Female	
1	Well understood	8 (7%)	6 (5%)	14(12%)
2	Understood	31 (28%)	24 (22%)	55 (50%)
3	Not clear	17 (15%)	12 (11%)	29 (26%)
4	Confusing	6 (5%)	3 (3%)	9 (8%)
5	No idea	3 (3%)	1 (1%)	4 (4%)
	Total	64 (58%)	46 (42%)	110

Note. Source: Field survey, 2021

The above table shows that out of 110 students, 50% understood disaster preparedness, with 12% having a strong understanding. However, 26% found the information unclear or confusing, and 4% had no idea. Males generally reported a better understanding than females, especially in the "understood" category. However, more females found the material unclear compared to males.

Table 6

Disaster Response knowledge

S.N.	Level of Knowledge	Disaster response knowledge of students in percent		Total
		Total	Girls	
1	Well understood	6 (5%)	3 (3%)	9 (8%)
2	Understood	31 (28%)	23 (21%)	54 (49%)
3	Not clear	11 (10%)	10 (9%)	21 (19%)
4	Confusing	10 (9%)	7 (6%)	17 (15%)
5	No idea	7 (6%)	3 (3%)	10 (9%)
	Total	64 (58%)	46 (42%)	110

Note. Source: Field survey, 2021

The table shows students' knowledge of disaster response, divided by gender. Most students (49%) have a general understanding, with boys having a slightly better grasp than girls. A small percentage (8%) feel they have a clear understanding, while 19% find the topic unclear and 15% find it confusing. Additionally, 9% of students admit to having no idea about disaster response. Overall, boys make up 58% of the responses, and girls 42%. The data suggests that while many students have some level of understanding, a significant number are unclear or confused, and boys tend to report a better understanding than girls.

Table 7

Disaster Recovery and Rehabitation Knowledge

S.N.	Level of Knowledge	Disaster recovery knowledge of students in percent		Total
		Boys	Girls	
1	Well understood	8	4	12
2	Understood	29	22	51
3	Not clear	9	9	18
4	Confusing	8	5	13
5	No idea	4	2	6
	Total	58	42	100

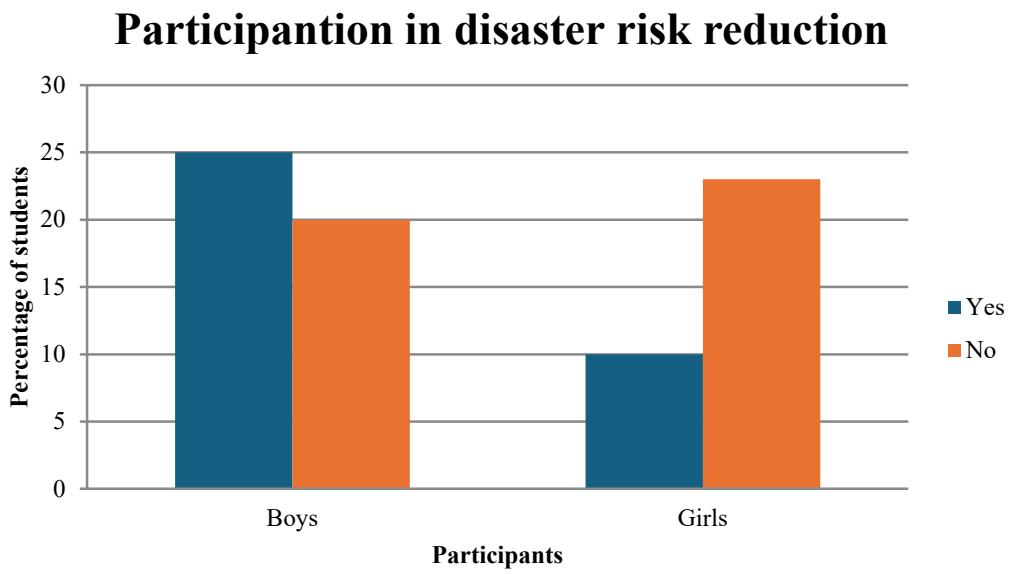
Note. Source: Field survey, 2021

The table presents data on students' understanding of disaster recovery, categorized by gender. It shows that while a majority (63%) of students report either a strong or general understanding of the topic, a significant portion (37%) find it unclear, confusing, or are entirely unaware. Specifically, 12% claim to understand it well (8%

boys, 4% girls), and 51% have a general idea (29% boys, 22% girls). In contrast, 18% find the topic unclear, 13% describe it as confusing, and 6% have no understanding at all. Boys represent a higher proportion of respondents (58%) and generally report a stronger grasp of the topic compared to girls.

Figure 5

Students Participation in disaster risk reduction



Note. Source: Field survey, 2021

The above figure shows that 55 percent of respondent's did not participated in the disaster risk reduction activities in the home, community and school. 45 percent of respondents were participated the disaster risk reduction activities in the school, community and at home. Out of the total respondents, 32 percent boys and 13 percent girls participated in the disaster reduction activities. 26 percent of boys and 30 percent of girls did not participate in any disaster risk reduction activities at home, community and school.

Discussion

Sources of Disaster Knowledge

This study found that textbooks are the main source of disaster knowledge. All of the students replied that textbooks such as Science, Environment; Health and Population, and Social Studies are the sources of disaster knowledge for class 10 students. The teacher played the main role in teaching about the disaster. Few students gain disaster knowledge through radio, TV, Newspapers, and the internet except their textbooks.

The media constantly acts as a transmitter of valuable information throughout the disaster management life cycle (Perez-Lugo, 2004). Seydlith, et al., (1990) suggest that during the mitigation phase, the communication media provide factual information about the approaching disaster and remedies to immediately prepare for its impact.

Media Access and Limitations

Tuladhar et al., (2014) find a higher number of students got disaster information from television and radio, and few numbers use the internet as a source of disaster information. This study was conducted on 124 students who were randomly selected from the selected district of Nepal. This study was conducted in all geographic regions of Nepal. In the study of Bheemdatt municipality, higher numbers of students got disaster information from local FM radio and few students obtained disaster information from the internet. Both studies have the same result of internet access because limited access to the Internet facility in a few selected districts. In the case of Bheemdatt Municipality Internet Provider Company only provide internet service in the city area of the Municipality and is unable to provide the rural people. TV and Radio users are not the same in both studies because there may be differences in the sample of respondents, geographic regions, family background, socioeconomic condition, and educational level of parents. The maximum number of students of Bheemdatt municipality acquired disaster information from local FM radio.

Pre-disaster information can help to reduce the loss of lives and property in disaster-prone areas. Tuladhar, et al., (2020) researched the Assessment of disaster risk reduction knowledge of school teachers in Nepal and found that most school teachers receive disaster information from radio. People in remote rural areas of Nepal mostly get their information from the radio. Maharjan & Shrestha (2017) found that most of the respondents get disaster information from Television and FM radio, the finding of this study is similar to Tuladhar (2014).

Students' Experience with Disasters

The question was asked to the respondents about the experience of disaster. Tuladhar et al. (2014) found that most of the respondents have experienced the disaster. Most of them replied that earthquake, fire, and landslide disasters are the most prominent disasters. Mudavanhu, et al. (2016) reported that most of the children were encountered several times with drought and flood disasters in the Muzarabani District of Zimbabwe. Adiyoso & Kanegae, (2013) found that more than fifty percent of students in Indonesia felt the extremely strong 2006 earthquake of Indonesia. Bheemdatt Municipality students have experience with floods, earthquakes, and hailstorms. This study also found that students have little experience of fire and landslide disasters. It is assumed that landslides mostly occur in the hilly region of Nepal. All of the respondents of Bheemdatt

municipality have experience with three major disasters such as floods, earthquakes, and hailstorms. These three disasters are common in the Bheemdatt Municipality. A study was conducted in Turkey school students reported that all of the school students have experience with the earthquake. This study also found that students have little experience of fire and landslide disasters.

Borromeo, et al. (2017) found that 91.5 percent of the university students of the Philippines experienced earthquake disasters whereas all students of Bheemdatt municipality experienced earthquake disasters. Both studies showed that the experience of earthquake disasters is almost similar in both studies. It might be Nepal and the Philippines are earthquake disaster-prone countries in the world.

Awareness and Disaster Risk Reduction Knowledge

Knowledge and education include awareness and understanding of disaster risks and mitigation measures (Bhandari, et al, 2020). Haddow, et al., (2006) say that mitigation is a key part of disasters management. It includes keeping homes away from floodplains, making strong bridges that can handle earthquakes, and using good building rules to protect properties from hurricanes, earthquakes, floods, and landslides.

According to FEMA (1999), disaster mitigation is defined as "sustained action taken to reduce or eliminate the long-term risk to people and property from hazards and their effects". There are generally four phases of the disaster risk reduction cycle i.e. mitigation, preparedness or readiness response, and recovery. Disaster mitigation means taking steps to reduce the damage and problems caused by natural hazards, so that any future disaster is less severe. These four phases have their own functions that help reduce the vulnerability of disaster.

Kurniawan et al. (2019) found that 37.5 percent UNNES campus community in Indonesia has poor knowledge about disaster mitigation. 22 percent of students of Bheemdatt municipality have poor disaster mitigation knowledge and 78 percent have good knowledge of disaster mitigation. Disaster mitigation knowledge of Bheemdatt municipality and the UNNES campus community is different which might be the difference in the level of respondents and geography of the country.

The activities that are commonly associated with disaster preparedness include developing planning processes to ensure readiness; formulating disaster plans; stockpiling resources necessary for effective responses; and developing skills and competencies to ensure effective performance of disaster-related tasks (Waugh, 2000). Disaster education programs for children will improve the preparedness and resilience among children and families against disasters. The evidence is well-documented in the Hyundai document during 2005–2015 (Lopes, 1999).

Disaster recovery encompasses the process of rebuilding, reconstructing, and

repairing the damages associated with a hazardous event and returning affected areas to a functional condition (Coppola, 2007). Bheemdatt municipality is flood-prone municipality of Kanchanpur district. All of the respondents of Bheemdatt municipality have experience with three major disasters such as floods, earthquakes, and hailstorms. These three disasters are common in the Bheemdatt Municipality. A study was conducted in Turkey school students reported that all of the school students have experience with the earthquake. This study also found that students have little experience of fire and landslide disasters. It is assumed that landslides mostly occur in the hilly region of Nepal.

Conclusion

The study identified floods, earthquakes, and hailstorms as the primary natural hazards in Bheemdatt Municipality, with occasional occurrences of landslides and fire**.** The municipality is divided into four disaster risk zones**,** with Wards 9, 11, 12, 13, and 19 classified as very high risk**.**

Students primarily acquire disaster related knowledge through school textbooks, while access to other information sources such as radio, television, newspapers, and the internet remains limited particularly in rural areas. Among these, FM radio plays a significant role in disseminating disaster information where digital access is poor.

The findings reveal that while students possess a basic level of disaster awareness, their understanding of disaster preparedness and response is limited. Disaster education within the school system is underdeveloped and lacks integration with local media efforts. There is a pressing need to strengthen disaster education by diversifying information channels and linking media platforms, especially FM radio, with school-based disaster risk reduction programs**.** This would enhance student preparedness and contribute to building community resilience.

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