

Mahakali River Flood Impact on the Educational Performance of Students in Bhimdatt Municipality

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ABSTRACT

Nepal's flood risk ranking is 30th out of the 198 counties in the world. Flood is a most common disaster in Terai region of Nepal. The flood events have pushed rivers to overflow their banks submerging urban and rural land. The increase the flood intensity poses the threat to the infrastructure. The schools' buildings and communities are always flooded with water in the rainy season which impacts the academic performance of the students. Mahakali River flood is big challenge for Bhimdatt municipality during the rainy season.

A mixed research design was used in the research. The data were collected through a questionnaire method. The structured questionnaires were distributed to the students, headmaster/principal, and teachers in the Bhimdatt municipality of Kanchanpur district. 210 students, 7 headmasters/principals, and 40 teachers have purposively selected schools from the 7 sampled schools in the municipality. Simple statistical tools and graphical tools were used for the analysis of field-collected data and maps were prepared through Arc GIS.

The research aims to find out the effects of the Mahakali River flood on the residence of students, school infrastructure, and overall impact on the academic performance of the students.

It was found that educational materials destroyed or damaged by floods, as well as the schools served as shelter for flood victims people, reduced the learning and teaching time of students had an effect on their academic performance. The research clearly showed that the Mahakali river flood directly impact the academic performance of students in the Bhimdatt municipality. The study showed that vulnerability to the impact of floods reduces the quality of education.

It is recommended that the government must take strong necessary action to control flooding. Disaster risk reduction technique should be integrated in the syllabus. Each year, disaster risk reduction training must be provided to principals, teachers and students.

Keywords: Flood; Disaster; Vulnerability; Bhimdatt municipality; Kanchanpur district

INTRODUCTION

Floods are the most common and serious natural disasters and happen when a body of water spills on land. Floods claim numerous lives each year and destroy a great deal of property throughout the world [1]. A flood disaster causes significant disruptions to a community or society, resulting in enormous losses related to people, property, and/or the environment [2]. The major flood has increased in recent decades in the world [3].

Nepal ranks 30th in the world and is the second most flood-prone country in South Asia [4]. Human lives and property were lost as a result of the Central Nepal floods in 1993, the Koshi flood in

2008, and the floods in the Midwest and Far West in 2013 and 2014 [5]. Floods have been responsible for the loss of learning hours affecting the quality of education [6]. Flood-damaged students' textbooks, class notes, schools building, teachers teaching material, toilet facilities and drinking water facilities [7]. Flood can be extremely stressful because of its potential physical damages to property, economic loss, community disruption and displacement, death, and injury to people of all ages of life. In addition, these events leave life-long traumatic and profound effects on people's emotional and mental abilities [8]. Floods destroy or wash away roads, making it difficult for teachers and students to go to school. As a result, attendance rates plummet

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and pupils struggle to receive high exam scores [9].

The Mahakali River is a transboundary river originates from Himalayan glaciers and borders both India and Nepal. Nepal's Kanchanpur district is prone to flooding where flood disasters afflict the people living close to the Mahakali River each year [10]. In 2013, a flood severely damaged Darchula and Kanchanpur districts of Far Western Province, the areas most impacted by the flood were wards 11-13 of Bhimdatt municipality, relatives and students from surrounding schools were uprooted [11]. A total of 41,626 homes were demolished and 150,510 homes suffered partial damage as a result of the 2017 floods [7]. In 2021, the Mahakali River achieved its highest discharge of 547,224 cusecs; eight years earlier, in 2013, the record was 544,000 cusec. This flooding impacted to the 9-13 wards of Bhimdatt municipality. The flood of 2013 destroyed school buildings, villages, and settlements in Bhujela village, located in Bhimdatt municipality ward No.11 [12].

MATERIALS AND METHODS

Study area

Bhimdatta Municipality is located in the Kanchanpur district of Sudurpaschim Province. The municipality has a total area of 196.5 square kilometers. It lies between the latitudes 28° 52' north and 29° 08' north and longitudes 80° 06' east and 80° 15' east. It is situated on the Terai plain between 100 and 1000 meters above sea level. Sand, silt, and clay deposits are among the fine sediments that often define land's characteristics of this municipality [13]. The municipality borders the Indian state of Uttarakhand in the west, the Parshuram municipality of Dadeldhura district in the north, the Shuklaphanta National Park and the Dodhara Chandani municipality in the south, and the Bedkot municipality in the east. Mahendranagar serves as the municipality's headquarters, and the Bhimdatt municipality is administratively divided into 19 administrative wards as shown in Figures 1A-1C.

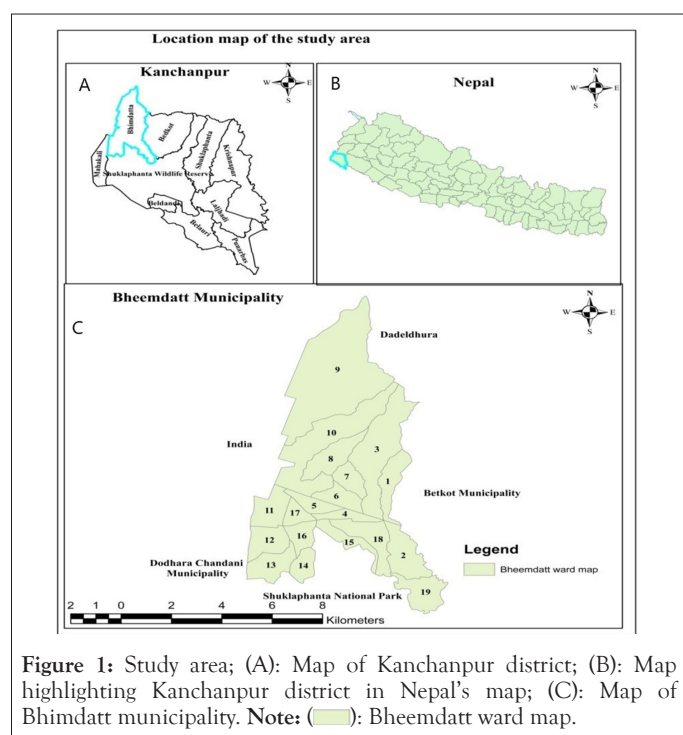


Figure 1: Study area; (A): Map of Kanchanpur district; (B): Map highlighting Kanchanpur district in Nepal's map; (C): Map of Bhimdatt municipality. Note: (■): Bhimdatt ward map.

Sampling and sampling size

The sample units from the study area i.e. five wards of Bhimdatt municipality in Kanchanpur districts were chosen by random sampling [9-13]. A total of 210 students were selected in seven schools, In order to know the flood inundation and school for emergency shelter, 47 teachers were randomly asked. The schools are close to the Mahakali River, and these wards were particularly exposed to the flood tragedy. The sample units were chosen with consideration for the fact that the respondents had lived in the flooded region of the Kanchanpur district's Bhimdatt municipality.

Data collection and analysis

A list of high schools was prepared. The respondents were students, school headmasters or principals and teachers. The key respondents were students but headmasters or principals and teachers were included to verify the response of students. The researcher was prepared a structured or semi-structured question for the respondents to collect information on the impact of flood on the academic performance of students. After the selection of respondents, the researcher went to the respondent to fill up the questionnaire.

A list of high schools was prepared. Teachers, headmasters or principals, and students were listed for questionnaire survey. Although teachers and headmasters or principals were invited to confirm the responses, students were the primary respondents. To gather data on the effect of floods on students' academic achievement, structured or semi-structured questionnaire were used.

Both quantitative and qualitative data were analyzed through standard techniques available and applicable statistical tools were used to prove the defined objective. Arc GIS 10.1 was used for map preparation and to show the location of sample schools in the Bhimdatt municipality. The data were analyzed using computer software packages such as MS Excel 2010. Descriptive statistics, frequency distribution and percentages were used for simplistic presentation. The results were presented in text, tables, maps, and figures and interpreted accordingly.

Both quantitative and qualitative data were collected using accepted methods. The construction of the map and the positioning of the sample schools in the Bhimdatt municipality were done using Arc GIS 10.1. Microsoft Excel 2010 was used for descriptive analysis of the data.

RESULTS

In a total of 210 students, their academic performance was differently affected from the impacts of flood on infrastructures. A total of 14.3%, 31.0% and 48.6% students were affected from flood caused house damage, health problems and drinking water problem, respectively. Table 1 shows the effects of flood on the infrastructures of students.

Flood effects were also found in school's infrastructures. The highest percentage (90.4%) of students shared their experiences about effects of flood on class environment. Majority of them replied about impact of flood in damaging school building (98.1), school furniture (86.6) and damage to drinking water supply infrastructure (57.6%) to the school. Similarly, highest percentage

(67.1%) replied on environmental pollution from the flood. The effect of flood on home and school infrastructures is given in the Table 1.

Table 1: Students views on flood effects in residential and school's infrastructures.

Effects	Yes	No	Don't know
House damage	30 (14.3%)	180 (85.7%)	0
Health problem	63 (31.0%)	138 (65.7%)	9 (3.3%)
Drinking water	102 (48.6%)	97 (46.2%)	11 (5.2%)
Class environment	190 (90.5%)	18 (8.5%)	2 (1.0%)
Damage school building	3 (1.4%)	206 (98.1%)	1 (0.5%)
Damage school furniture	20 (9.5%)	182 (86.6%)	4 (1.9%)
Drinking water supply	86 (41.0%)	120 (57.1%)	4 (1.9%)
Pollution	65 (31.0%)	141 (67.1%)	4 (1.9%)

The adverse impacts of flood was found in school classes and because of flooding schools in study area remained closed for shorter and over a week long period. Students replied differently on school closed from the flood. In a total of 210 students, 160 (76.2%) replied 3-5 days school closed followed to 6-8 days i.e. 25 (11.9%). Students responses on school closed from flood is given in the Figure 2.

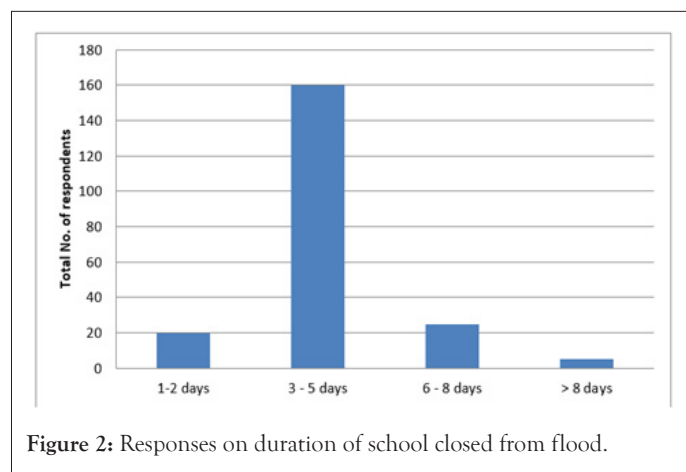


Figure 2: Responses on duration of school closed from flood.

Flood found impacted academic performance of students in various ways. Overall, impacts of flood in attendance, school's closing, electricity cut-off at homes, incomplete study-course at school, low grade of academic result and loss of educational materials were found in 92.9%, 95.3%, 85.7%, 82.9%, 96.0%, 82.9% and 9.5% students. Table 2 shows the effects of flood on academic performance of students.

Table 2: Flood effect on the academic performance of students.

Effects	Yes	No	Don't know
Attendance	195 (92.9%)	8 (3.8%)	7 (3.3%)

School off due to flood	200 (95.3%)	7 (3.3%)	3 (1.4%)
Cut off electricity	180 (85.7%)	25 (11.9%)	5 (2.4%)
Not complete the course of study	174 (82.9%)	30 (14.3%)	6 (2.8%)
Poor academic result	96 (45.7%)	112 (53.3%)	2 (1.0 2%)
Lost educational materials	20 (9.5%)	190 (90.5%)	0 (0.0%)

The effects of flood on the loss of student's educational materials were reported. In a total of 210 students, 20 students had lost educational materials because of flood as shown in Figure 3.

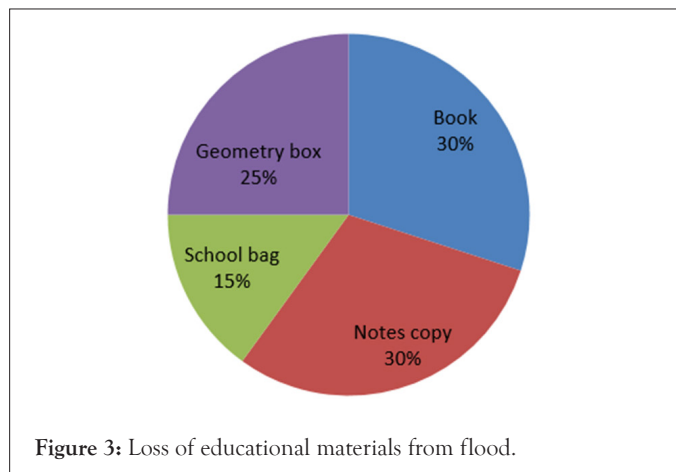


Figure 3: Loss of educational materials from flood.

The observation of study site and information collected from school teachers found that flood inundation was reported differently the schools located in study area. Seven schools were highly inundated from the flood of Mahakali River. The location of schools inundated from Mahakali River flood is given in the Figure 4.

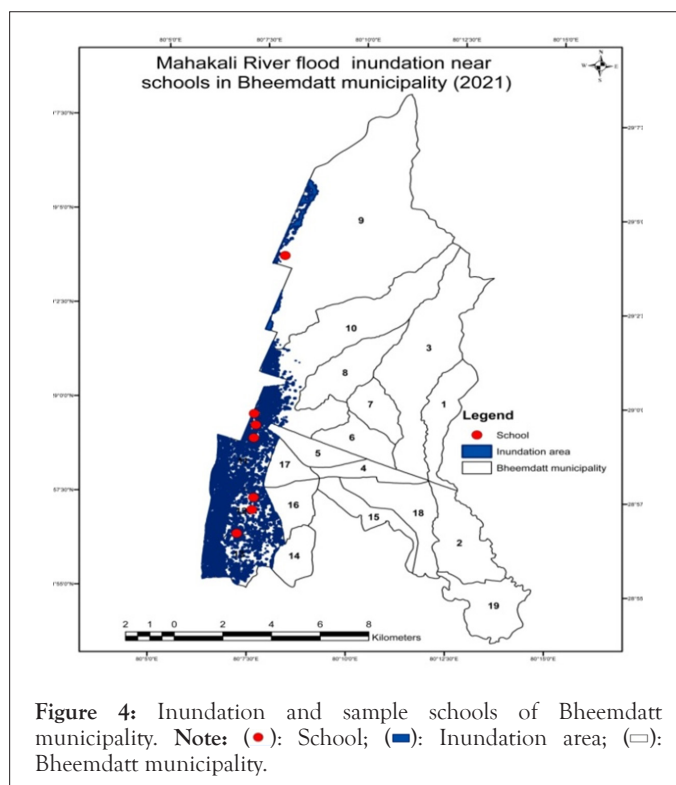


Figure 4: Inundation and sample schools of Bheemdatt municipality. Note: (●): School; (■): Inundation area; (□): Bheemdatt municipality.

Flood inundation impacted on the shelter of students families. The flood affected people used the nearby schools for shelter during emergency. In a total of 47 teachers, 15 (31.9%) and out of 210 students, 64 (30.5%) shared their experiences on the use of school for shelter during flood emergency.

DISCUSSION

Nepal has faced sever kinds of disasters. In Nepal, flood disasters are most common during the monsoon season [14]. The higher the disaster risk associated to floods in the Tarai region of Nepal [15]. Bhimdatt municipality is located in the Far Western Tarai region of Nepal have been frequently affecting from flood disaster each year.

It was found that the surrounding environment of the Bhimdatt municipality near the Mahakali River was polluted by the flood. The polluted environment surrounding the houses, compelled to drink contaminated water cause disease. Still, a major proportion of students have been drinking polluted water. As a result, they have been victimized by water-borne diseases such as diarrhea, typhoid, fever, and other symptoms as headaches. This finding is related with Chaudhary et al. [16].

The schools had to close due to flooding, the students were unable to attain the school and there were greater absenteeism in the schools and it took a week or more days for it to reopen. The reduction of school teaching hour had an impact on the quality of education. The teacher failure to complete student's courses on time had a negative impact on the academic performance of the students. This fact is supported the findings which showed that flood disaster leading to the failure to finish to the syllabus which lead to the poor academic performance of the students [9,17,18].

It was found that students living close to the Mahakali River's bank were experienced to flooding during the rainy season. The students' educational materials, including books and notes, were damaged by the flood. Due to the damaged and lost the educational materials by flood the student were unable to study their course book which might be poor academic performance. Chaudhary et al. research in the Mahottari district of Jaleswor municipality indicated similar impacts [16].

The schools have been used as emergency shelters for Mahakali river flood-displaced people. During heavy flooding, the displaced people stay at school, keep their livestock and use school furniture for cooking.

The above finding was supported by Chang et al. found their research, people displaced by flood shelter in the school used school furniture used for their food cooking [19]. The teaching and learning environment may be disturbed as a result of flood victim family's long time taking shelter in the schools. Finally it may take poor academic performance of students. Gaire reported that 150 households in Bhimdatt municipality stayed at nearby schools due to the Mahakali River flood [20].

Due to flood in the Bhimdatt municipality students and teachers were unable to present in the class as a result course of study could not complete. Schools were closed due to the flood, electricity cut off; educational materials were lost resulting in the poor academic performance of the students may reduce the quality of education [21,22].

CONCLUSION

Flooding and inundation in Bhimdatt municipality have affected school going students and their families. The Bhimdatt municipality experienced flooding, which result in closed schools, damaged infrastructure, lost educational materials and an increased in dropout rate. These factors could potentially negatively impact the learning environment for students leading to poor academic performance.

The following recommendations are suggested to improve the academic performance of students in the flood-affected area of Bhimdatt municipality.

- The government should provide essential learning materials and facilities, including books, uniforms, copy, and laboratory equipment, to flood victim students.
- The course content must include disaster risk reduction.
- The government should to ensure that the guideline in the safety standard manual is implemented in the schools.

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