

Flood Vulnerability to the Health of Rural People and Child Education in Bagmati Province of Nepal

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Abstract

The flood of 2021 damaged physical, economic, and social property. The flood mainly impacted people's livelihoods, health, and children's education. The primary impact of floods was on people's health and children's education in rural areas. This study aims to address the gap in health hazards and educational challenges faced by rural people affected by the 2021 floods in Bagmati province, Nepal. Researchers employed a descriptive study along with mixed (qualitative and quantitative) methods. Data was collected through field surveys conducted from June 2024 to August 2024. Semi-structured questionnaires and face-to-face interviews were utilized to gather information. There were 380 samples that were affected by the floods in 2021 were selected using multi-stage sampling. The district was chosen through purposive sampling due to its unique physical, economic, and demographic characteristics. Households of respondents were selected using a simple random sampling method. Nearly 40 percent of respondents experienced physical health problems, while 60 percent faced mental health issues. The primary physical health problems include waterborne diseases, respiratory illnesses, and injuries. About 57 percent faced minor impact, and 42 percent faced moderate impact. The main mental health challenges are trauma, stress, and anxiety. Males were more affected (47.8 percent) than females (34.3 percent) by mental health hazards. More than two-thirds of children faced educational barriers due to the effects of the floods. Reasons for school disruptions include school closures, dropouts, and other factors. The reasons for school dropout were 70 percent school shutdowns, 51 percent changes of parents'

employment, and 47 percent family relocation. Finally, special provisions for classrooms, reading materials, and school supplies are recommended for children in flood-affected areas.

Keywords: Floods, health hazard, child education, social protection, and employment

Introduction

Climate change has led to increase forced migration and displacement due to conflicts over natural resources. Climate change has a direct impact on workers' health, productivity, and earning capacity. Studies show that Nepal has ranked 10th in climate-induced fatalities and fourth as the most climate-change-vulnerable country (Global Risk Index 2021), and has experienced many natural disasters. Climate change also triggers internal displacement and forces mass migration (Bhattarai & Magar, 2023).

It was argued that increased temperatures have the potential to affect food production, and frequent droughts and floods also affect food production. Sometimes droughts and floods force people to move from their place of origin. Sherpa & Bastakoti (2021) argue that erratic rainfall patterns decrease the availability of surface water, which impacts agricultural revenue, and that forces people to migrate from their place of origin.

Climate change impacts agriculture through drought and variability in rainfall. It hampers crop production, and decreases in crop production impact the rural livelihoods. The destruction of harvests influences rural people to choose alternative livelihoods. Singelmann (2019) argues that a variety of coping mechanisms should be developed to reduce food insecurity before migrating people from crop production. Some mechanisms are reducing food consumption, adjusting finances, and selling assets or land.

Shah et al. (2024) show the vulnerability of the devastating 2022 flood in Pakistan. It impacts access to local health facilities. The health centers became non-functional in the emergency response. Women, children, and older persons are particularly affected. Children are more affected by the right to education.

Nepal experienced significant floods and landslides on 15 June 2021, causing significant disruptions to physical infrastructure, social, and productive sectors. The floods mainly affected Helambu rural municipality and Melamchi municipality in Sindhupalchok, Nepal. Parajuli et al. (2023) show that economic loss per household was USD 52113, with damage to non-economic assets like aesthetics, cultural assets, and biodiversity. Nearly 85 percent of respondents experienced mental trauma and anxiety, and 40 percent lack access to basic health services. Nearly 70 percent of children experienced school disruptions, and

20 percent of people migrated to re-establish livelihoods. An assessment of the National Disaster Risk Reduction and Management Authority (2024) shows that nearly 142 schools and 41 health facilities were damaged by the flood and landslide of 2024 in Bagmati province of Nepal.

The emergency health service system in Nepal is very weak. Although the National Health Policy (2019) and the National Mental Health Strategy and Action Plan (2020) have provided for a cooperation and coordination committee to mitigate the adverse effects of climate change on health. They have provided mental health prevention, treatment, and rehabilitation programs for vulnerable people. Pandit (2025) outlined that people suffered from trauma after the Melamchi flood; their families suffered from mental health problems due to human loss from the floods, but they have not received effective treatment on time.

People faced several mental health problems after the loss of property, productive land, and a family member. Asim et al. (2022) outlined that a vast majority (over 90 percent) of respondents have subclinical psychiatric symptoms one year after the flood in Kerala. The psychological impact of the flood is associated with adults who were victims of the 2018 flood in Kerala. The flooding negatively impacts mental health in Kerala. There is a higher prevalence of psychological morbidity, particularly anxiety and depression. Females experience more psychological distress than males, with the primary issues being anxiety, depression, and PTSD.

Many studies on floods show that child education effect in the long run. An impact study of floods on educational outcomes in China shows that flooding had long-term effects on human capital. The flood had long-term impacts on early childhood education. It impacts early exposure and an average decrease of 0.786 years in educational attainment and a 5-percentage point decline in high school enrollment, particularly in rural and low flood risk areas (Huang & Dong, 2025). Another study shows that it impacts the children's learning outcomes and quality of education. There is a relationship between school infrastructure and the quality of education. The disaster damaged the school infrastructure, particularly the classroom, the toilet, and the drinking water. The availability of good sanitation, drinking water, and playgrounds affects the child's school enrollment and continuation of education (Mudavanhu, 2014).

The flood not only impacts the school attainment of children but also impacts the educational outcome of the students. There is a direct relationship between floods and the educational performance of students (Chaudhari & Timsina, 2017). Flood directly impacts the educational performance due to fear of upcoming disastrous events like the collapse of the school infrastructure and their residence. The fear disturbs access to education and reduces the quality of education.

Helambu Rural Municipality lies at the mountainside of Sindhupalchok District, Bagmati province, Nepal. It was heavily impacted by the floods in June 2021. Nearly 300 people were affected by flooding (Thapa & Prasai, 2022). There are 17,497 people in the Helambu Municipality, and they are mainly engaged in agriculture, animal husbandry, local business, foreign employment, and tourism. There is moderate literacy, early marriage, high childbirth rates, and limited access to maternal and child healthcare services. The majority of the population is engaged in agriculture. Helambu is highly susceptible to the effects of climate change, such as floods, landslides, and droughts.

The flood of 2021 has caused significant damage to infrastructure, livelihoods, and homes in Helambu. Nepal is particularly vulnerable to the effects of climate change due to its varied topography and impacts multiple sectors, including agriculture, water resources, health, and infrastructure (ICIMOD, 2011). Due to the 2021 flood, people of Helambu lost their cultivated land, cattle, and households, and faced food scarcity and economic pressure. There is a lack of study on how local people faced several mental health problems after the loss of property, productive land, and a family member. There is a need for a study on child education in flood-impacted localities where disasters have damaged school infrastructure, and the impact of child education on school enrollment and the continuation of education.

This article aims to assess the impact of the 2021 flood on the health and education of people in Helambu Rural Municipality. To fill this gap, it further explores the socio-economic implications of floods on people's movement, livelihood patterns, and access to essential services. Due to time and resource limitations, this study focuses on Helambu Rural Municipality wards 2 and 6 in Sindhupalchowk, Bagmati Province, Nepal, where thousands of people have faced numerous challenges following the 2021 flood.

Methods and Materials

Study Design

This research used a descriptive study and mixed (qualitative and quantitative) method. It employed primary data from field surveys from June 2024 to August 2024. The mixed methods in this study starts with a quantitative study to establish a pattern and relationship, and a qualitative study to delve into the deeper meaning of the context. This approach combines the strengths of both quantitative and qualitative data for nuance exploration. We used a standard cross-sectional research design. Simple random sampling was used to select households from flood-impacted families.

Study Population

The study area of this study was Helambu Rural Municipality, which is situated in the Himalayan region of Sindhupalchok District, Bagmati Province, Nepal. According to

the National Population and Housing Census (2021), there are about 17497 people who are mainly engaged in agriculture, animal husbandry, local business, foreign employment, and tourism. This study mainly focused on 2 Wards (2 and 6) due to the high impact of the 2021 flood. There is a mixed socio-demographic status and low literacy among people.

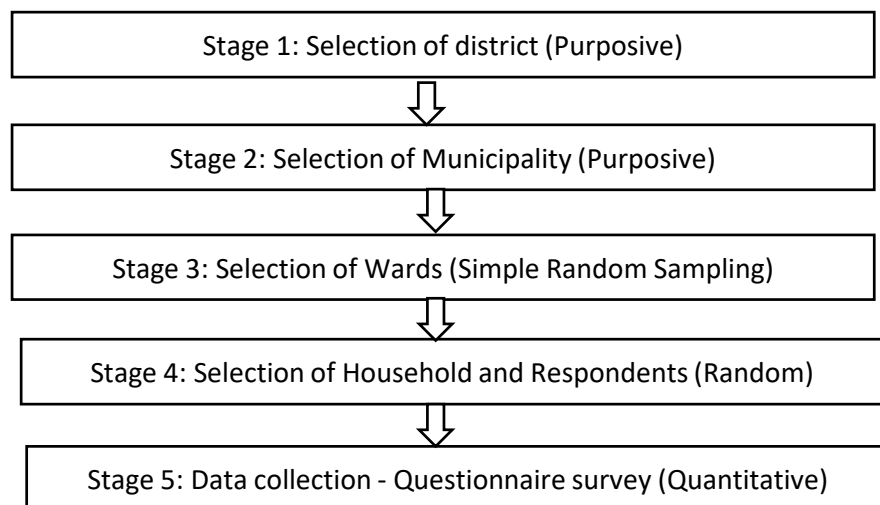
Sample Size

The sample size is calculated using a single population percentage formula and following a presumption. There are 17497 people across 7 wards in Helambu Rural Municipality. The researcher randomly selected two wards (wards 2 & 6) for the study due to being highly impacted by floods in 2021. The two wards comprise 1,374 households. The sample size was determined by considering the population size, confidence level, margin of error, and expected variability. Typically, a 95% confidence level and a 5% margin of error are used. Ultimately, the sample for this research includes 380 households, with ward number 2 containing 56% (215) of respondents and ward 6 containing 44% (165) of respondents for the study.

Sampling and Data Collection Procedure

This study has used semi-structured questionnaires with closed and open-ended questions. Surveys were conducted with a representative sample of households using enumerators. Surveys have been conducted face-to-face to ensure high response rates and clarify any doubts respondents might have. Questions have covered demographic information (age, gender, education, occupation), economic impacts (income loss, asset damage), health impacts (physical and mental health issues), and social impacts (displacement, changes in social ties). To collect mental health data, a specific guideline was constructed before the field visit, and respondents were disaggregated as self-reporting to declare mental health problems.

Secondary Data was gathered from Government records, census data, disaster management reports, and health records. This included reviewing reports from local government agencies, NGOs, health institutions, historical flood data, demographic profiles, economic statistics, and health records

Figure 1:*Sampling Procedure of the Study*

Stage 1: The district for this study was chosen using purposive sampling because Sindhupalchowk is a mountain district that was highly impacted by the flood of 2021. The locality of this district is unique than other districts due to the physical, economic, and demographic character of the district.

Stage 2: There are 12 local levels (3 municipalities and 9 rural municipalities) in the Sindhupalchok district. A purposive sampling method is used to select the rural municipality because Helambhu is more backward in terms of roads, health, and education, and it was more affected by the floods in 2021.

Stage 3: Out of 7 wards in the rural municipality researcher has selected two wards (2 and 6) using a random sampling method. About 30 percent people lived in two wards.

Stage 4: A Survey was conducted with a representative sample of households using enumerators. The selection of the household used a simple random sampling method

Stage 5: This study has used semi-structured questionnaires with closed and open-ended questions. Surveys have been conducted face-to-face to ensure high response rates and clarify any doubts respondents might have.

Statistical Analysis

After the field survey data was coded, edited, and tabulation. Collected data was entered in SPSS software, and analyzed in descriptive as well as analytical ways. Data was analyzed by using Chi-square tests.

Ethical Consideration

During the data collection for this research, verbal consent was obtained from the respondents by introducing the objective of the survey. All respondents were informed about the voluntary nature of participation. Participants were informed of the study's purpose, procedures, risks, benefits, and rights. Respondents were assured that the information they shared during the interview would be kept confidential and anonymous. This research followed all ethical guidelines during the completion of the study, and finally, verbal consent and assent were obtained from all participants.

Results and Discussion

Socio-Demography

Sindhupalchowk district is spread from the hills to the mountains in the Bagmati province, Nepal. There are 2 municipalities, and 9 Rural Municipalities with 103 wards within 12 local bodies. According to the national census 2021, the district has 262624 population, where 49.2 percent are males and 50.8 percent females. This district has a negative population growth rate (-0.88 percent) with an average family size of 3.6 persons and a 96.8 percent sex ratio. Total literacy of the district was 68 percent, where 75.3 percent of males and 61.1 percent of females were literate. The district has 602 schools and 128 health institutions, including one district hospital. It is a multi-lingual and multi-ethnic district where 58.8 percent are Hindu, 38.1 percent Buddhist and 1.8 percent Christian, and 1.2 percent other religions (NSO, 2023).

The researcher has interviewed 380 respondents using random selection in Helambu Rural Municipality from two wards (wards 2 & 6). There was 17,497 population of two wards, who were highly impacted by floods in 2021. The majority of respondents were males. The reason for male domination among the respondents is that the head of the household, or females, are unwilling to disclose their flood vulnerability situation. The community was a multilingual, multi ethnic society. There were 43.7 percent of Janajati, 25 percent of Brahmins, 22 percent of Chhetri, and Dalit and other minority groups. Hinduism appears to be the majority (64 percent) religion in the study area. Nearly 65 percent of respondents were literate, and 35 percent were illiterate in the study area. Primary Education was prevalent in the study area, with about 36 percent having completed their primary education. Agriculture is a leading source of income in the study area. Nearly 80 percent of households were engaged in the agricultural sector. There were 96 percent of households that used basic/ordinary toilets, 3 percent used modern flush toilets, and 2 percent of households had not used any toilet. All people have access to drinking water, and electricity/solar as a source of light. Only 31 percent of households use radio, 19 percent use television, and 97 percent use a mobile phone (Table 1).

Table 1:
Distribution of Respondents by Socio-Economic Status

Description	Number	Percent
Source of Income		
Agriculture	302	79.5
Business	30	7.9
Animal husbandry	5	1.3
Service	14	3.7
Wage labour	15	3.9
Remittance	4	1.1
Others	10	2.6
Total	380	100
Use of the Toilet		
Modern with flush	11	2.9
Ordinary	363	95.5
Non	6	1.6
Total	380	100.0
Sources of Drinking Water		
Piped water	380	100
Total	380	100
Electricity/Solar		
Yes	380	100
Total	380	100
Use Radio		
Yes	117	30.8
No	263	69.2
Total	380	100
Use Mobile		
Yes	367	96.6
No	13	3.4
Total	380	100
Use of Television		
Yes	71	18.7
No	309	81.3
Total	380	100

Source. Field Survey, 2024

Impact of floods on livelihood

Among literacy groups, the majority (58.3 percent) of respondents with primary education experienced a greater impact on their employment status from the flood of 2021. This was followed by those with primary and secondary education (47.4 percent), while

individuals with higher education felt the least impact (33.3 percent) on their employment status from the same flood.

Among different occupation groups, farmers and laborers have the highest impact (47.5 percent) in the employment status that was followed by government employees (46.2 percent), and other occupations 44 percent. It shows that unemployed people have the highest impact from the flood on their employment status (Table 2).

Table 2:

Distribution of Respondents by Impact on Employment Status

Background variable	Yes %	No%	Total
Education			
Primary	47.4	52.6	137 (100)
Lower Secondary	58.3	41.7	24 (100)
Secondary	47.0	53.0	66(100)
Higher Secondary and above	33.3	66.7	21 (100)
Illiterate	43.9	56.1	132 (100)
Occupation			
Farmer	47.5	52.5	295 (100)
Laborer	47.5	52.5	40 (100)
Business owner	21.1	78.9	19 (100)

Source. Field Survey, 2024

Health Hazards in Flood-Impacted Areas

According to WHO, health is a state of complete physical, mental, and social well-being, and mental health is a state of well-being in which an individual realizes his or her abilities, can cope with the normal stresses of life, can work productively, and can make a contribution to his or her community. Mental health issues are increasing due to various factors like social, economic, and environmental changes (APA, 2019). The flood of 2021 increased multiple health hazards in the study area. It impacts people's physical and mental health. Physical health is mainly related to waterborne diseases, respiratory infections, and injuries during evacuation and clean-up. Mental health is like trauma of losing homes, the uncertainty of displacement, and financial strain, increased levels of stress, and anxiety, particularly among children and vulnerable groups.

The study shows that about 38 percent of respondents faced a physical health hazard due to the 2021 flood. They faced mainly three different (minor, moderate, and severe) impacts on their health. Among the physical health hazards, 57 percent faced minor impact, 42 percent faced moderate impact, and 1 percent faced severe impact. Nearly 62 percent of respondents have faced mental health problems due to the 2021 flood in the study area. Among mental health hazards, 61 percent faced anxiety, and 39 percent faced stress from the flood (Table 3). This indicates that anxiety is more prevalent than stress in the study population.

Table 3:
Distribution of Respondents by Flood-Affected Health Problems

Description	Number	Percent
Physical health problem	144	37.9
Mental health problem	236	62.1
Total	380	100.0
Types of Physical Health Problems		
Minor impact	82	56.9
Moderate impact	60	41.7
Severe impact	2	1.4
Total	144	100.0
Types of Mental Health Problems		
Anxiety	145	61.4
Stress	91	38.6
Total	236	100

Source. Field Survey, 2024

The health hazard from floods in 2021 varies based on people's socio-economic status in the study area. Males were more severely affected health-wise (47.8 percent) than females (34.3 percent). According to caste/ethnic group, Janajati people were more severely impacted (51.1 percent) than other groups. Regarding employment status, unemployed individuals were more affected than employed ones, and laborers were more severely impacted (67.6 percent) than other groups (Table 4).

Table 4:
Distribution of Respondents by Health Impact from the Flood of 2021

Background variables	Minor %	Moderate %	Severe %	Total
Sex				
Male	18.1	34.1	47.8	293 (100)
Female	22.9	42.9	34.3	35(100)
Caste/Ethnicity				
Brahmin	10.6	42.6	46.8	94(100)
Chhetri	36.6	33.8	29.6	71(100)
Janajati	16.8	32.1	51.1	131(100)
Dalit	23.1	30.8	46.2	13(100)
Others	0.0	26.3	73.7	19(100)
Employment Status				
Employed	19.4	38.8	41.8	263(100)
Unemployed	10	16	74	50(100)
Occupation				
Farmer	18.1	35.9	45.9	259(100)
Laborer	5.9	26.5	67.6	34(100)

Source. Field Survey, 2024

According to the person in charge of the local PHC post of the study area, patients who felt stressed and anxious during the floods and landslides were provided psychological counseling through skilled psychiatry by conducting health camps, and the situation became easier than before. To address these challenges, various strategies were implemented, including mental health screening, temporary housing, food distribution, and health counseling.

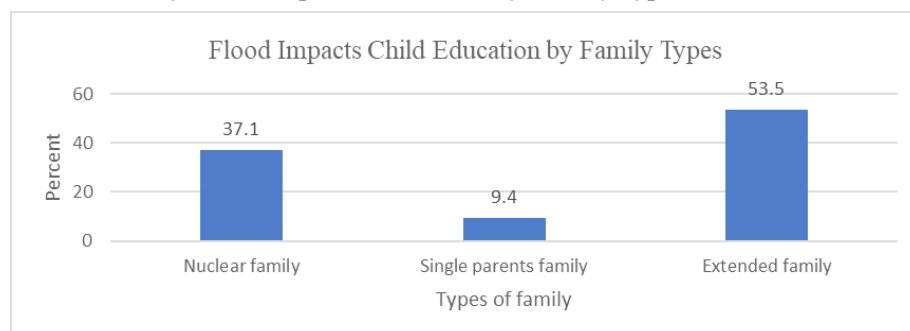
Child Education in a Flooding Area

In the study area, many children from different families are affected by the flood. Those children who were from extended families were more victims (54 percent) of the flood; they cannot continue their education currently, which was followed by the nuclear family, 37 percent, and the single-parent family, 9 percent, were affected in their education by the flood of 2021.

An impact study of floods on educational outcomes in China shows that flooding had long-term effects on human capital. The flood had long-term impacts on early childhood education. It impacts early exposure and an average decrease of 0.786 years in educational attainment and a 5-percentage point decline in high school enrollment, particularly in rural and low flood risk areas (Huang & Dong, 2025)

Figure 2:

Distribution of Flood-Impacted Children by Family Types



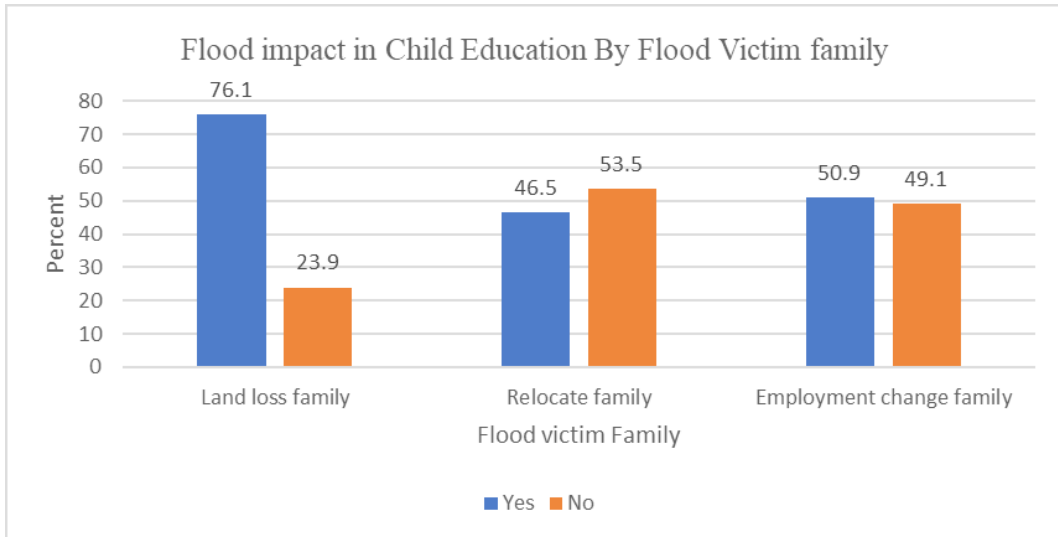
Nearly 42 percent of respondents said the flood of 2021 impacted their children's education. The majority of them agree that the impact of a flood on child education encompasses disruptions like school closures, temporary or permanent dropouts, or other educational challenges resulting from the flood. The predominant impact reported is school closure, with 71 percent of respondents indicating that the flood resulted in schools being shut down. A substantial 25 percent reported that children experienced temporary dropouts from school. The very low rate of permanent dropouts (0.6%) suggests that, despite the challenges posed by the flood, the majority of children are likely to remain in the educational system.

According to the municipality representative of Ward 6, many children were unable to attend school due to the fear of floods and landslides that affect their education. After the bridge used to go to school was washed away, some students migrated to urban areas for their studies. One student dropped out of school after losing both parents in the flood. However, many students continued their studies despite not attending school for some time. About 74 percent of families received support during the floods, which helps to improve their health and to continue their children's education (Table 5).

Table 5:
Distribution of Respondents by Child Education and Flood in 2021

Description	Number	Percent
School Disruption		
Yes	159	41.8
No	221	58.2
Total	380	100
Causes of School Disruption		
School closure	113	71.1
Temporary dropout	40	25.2
Permanent dropout	1	0.6
Other	5	3.1
Total	159	100
Get Support		
Yes	280	73.7
No	100	26.3
Total	380	100

Studies show that women, children, and older persons are more affected by the flood-related disasters. The schooling children are more affected by the damage to schools from the floods (Shah et al., 2024). The floods and landslides have caused significant disruption to physical infrastructure, the social sector, and productive sectors in the study area. Nearly 142 school buildings were damaged, and more than ten thousand students were affected in Bagmati Province, Nepal (NDRRMA, 2024). An impact study of floods on educational outcomes in China shows that flooding had long-term effects on human capital. The flood had long-term impacts on early childhood education. It impacts early exposure and an average decrease of 0.786 years in educational attainment and a 5 percentage point decline in high school enrollment, particularly in rural and low flood risk areas (Huang & Dong, 2025).

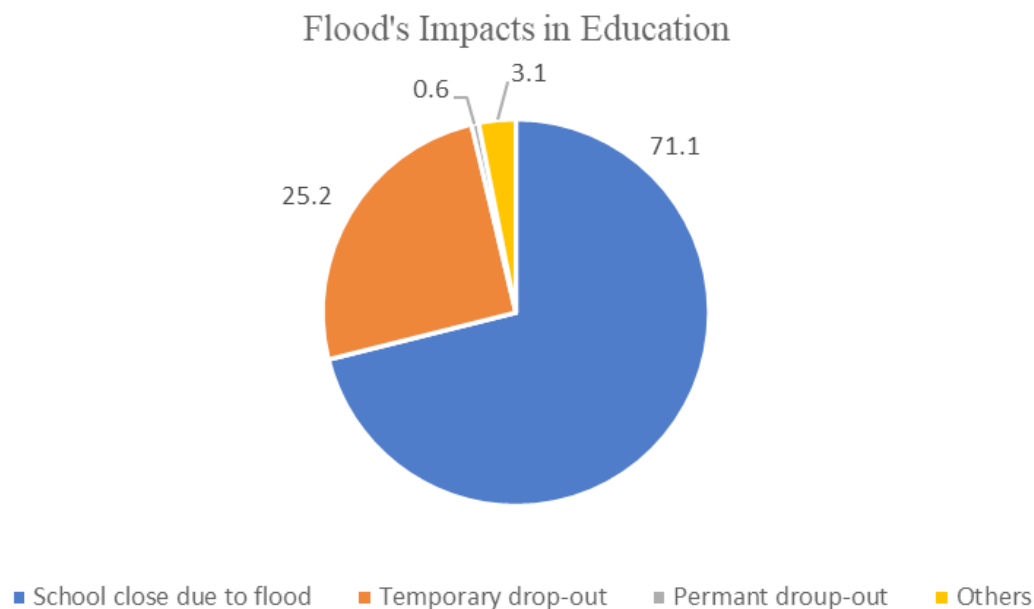
Figure 3:*Distribution of Flood-Impacted Family and Child Education*

The Chi-square value indicates that there is statistical significance between the effect of floods on parents' household economy and child education. The Chi-square value is 0.81 for the land loss family, 0.71 for the relocated family, and 0.64 for changes in the family's employment status.

Table 6:*Distribution of Child Education by Flood-Impacted Family*

Description	Impact on Child Education (n=159)				P
	Yes	Percent	No	Percent	
Land Loss Family	121	76.1	38	23.9	0.81
Relocated Family	74	46.5	85	53.5	0.71
Employment Status Changes the Family	81	50.9	78	49.1	0.64

In the case study area, nearly 42 percent of children's education was disrupted due to the 2021 flood. The reasons for the school disruptions are school closures due to the flood at 71 percent, temporary student dropouts at 25 percent, and other factors at 3 percent. About 75 percent of respondents received support from various agencies to help continue their child's education during the flood period.

Figure 4:*Causes of Child Education Disturbance During the Flood 2021*

Studies show that the socio-demographic status and economic status of parents have significant effects on children's education. There is a relationship between the caste/ethnic status of parents, education, employment status, and current occupation of parents, which has a direct relationship with the continuation of child education. The chi-square value for education in this study is statistically significant at 0.93, followed by parents' employment status at 0.72, parents' occupation at 0.52, and family caste and ethnicity at 0.52. However, the religious status of the family (0.46) is not significant in affecting child education in the flood-impacted area (Table 9).

Table 7:
Distribution of Respondents by Impact on the Education of Children

Description	Impact on Child Education					P value
	Yes	Percent	No	Percent	Total	
Caste/ethnicity						0.52
Brahmin	46	12.1	48	12.6	94	24.7
Chhetri	38	10.0	46	12.1	84	22.1
Janajati	61	16.1	105	27.6	166	43.7
Dalit	9	2.4	8	2.1	17	4.5
Others	5	1.3	14	3.7	19	5.0
Religion						0.46
Hindu	106	27.9	136	35.8	242	63.7
Buddhist	46	12.1	83	21.8	129	33.9
Christian	7	1.8	2	0.5	9	2.4
Education						0.93
Primary	56	14.7	81	21.3	137	36.1
Lower secondary	12	3.2	12	3.2	24	6.3
Secondary	28	7.4	38	10.0	66	17.4
Higher Secondary and above	8	2.1	13	3.4	21	5.5
Illiterate	55	14.5	77	20.3	132	34.7
Employment Status						0.72
Employed	126	33.2	179	47.1	305	80.3
Unemployed	24	6.3	26	6.8	50	13.2
Self-employed	5	1.3	13	3.4	18	4.7
Retired	4	1.1	3	0.8	7	1.8
Occupation						0.52
Farmer	121	31.8	174	45.8	295	77.6
Laborer	19	5.0	21	5.5	40	10.5
Business owner	6	1.6	13	3.4	19	5.0
Government employee	4	1.1	9	2.4	13	3.4
Unemployed	4	1.1	0	0.0	4	1.1
other	5	1.3	4	1.1	9	2.4

Discussion

Bagmati Province was impacted by floods and landslides, which mainly hurt the women, children, and elderly. Nearly 142 schools and 41 health facilities were damaged by the flood and landslide (NDRRMA, 2024). The 2021 floods in Helambu Rural Municipality impacted land, employment, and relocation of the people. The event mainly affects people's health status and the child's education.

Natural Disasters' Impact on Livelihood

The flood of 2021 significantly impacted the different sectors that affected people's livelihood by damaging physical infrastructure, and productive land, and social relations of people in Helambu Rural Municipality of Bagmati Province. The floods of 2021 mainly impacted people's property, business, health, and children's education. Among literacy groups, the majority (58.3 percent) of respondents reported the impact on their employment status. Among different occupation groups, farmers and labours have the highest impact (47.5 percent) in their employment status. Parajuli et al. (2023) outlined that the average property loss per household was USD 52113 in the Melamchi flood of 2021.

Nepal is particularly vulnerable to the effects of climate change due to its varied topography and impacts multiple sectors, including agriculture, water resources, health, and infrastructure (ICIMOD, 2011). Due to the 2021 flood, people of Helambu lost their cultivated land, cattle, and households, and faced food scarcity and economic pressure.

Health Hazards in the Flood of 2021

There is a significant number of respondents who lack access to local health facilities due to the 2022 flood. In general, there are physical and mental health issues due to the impact. Physical health includes injuries and waterborne diseases. About 38 percent of respondents have faced a physical health hazard. Among 57 percent faced minor impact, 42 percent faced moderate impact, and 1 percent faced severe impact. Parajuli et al (2023) outlined that the common health problems of the flood of 2021 in Melamchi were fever, waterborne disease, and skin-related issues.

Nearly 62 percent of respondents have faced mental health problems. Among them, 61 percent faced anxiety, and 39 percent faced stress from the flood. This indicates that anxiety is more prevalent than stress in the study population. The local health post in charge outlined that those who felt stressed and anxious during the floods were provided with psychological counseling through skilled psychiatry. Pandit (2025) outlined that families who have suffered from human loss due to floods have experienced trauma from losing loved ones. Floods, landslides, heavy rain, and droughts affect physical and mental health. According to Parajuli et al (2023), major mental health issues of the Melamchi flood of 2021 are anxiety, trauma, and mental stress. More than 85 percent were facing mental health problems. Reasons for Anxiety and mental stress are loss of business, agricultural land, and sleeplessness.

Although the National Health Policy (2019) and the National Mental Health Strategy and Action Plan (2020) outlined that cooperation and coordination will be done to mitigate the adverse effects of climate change on health, but people are not satisfied with the government's mental health service during the 2021 flood in Helambu rural municipality.

Child Education and Flood 2021

The ward representative outlined that many children were unable to attend school due to the fear of floods and landslides during the 2021 flood in Helambu rural municipality. The situation was very bad; the bridge and road to school were damaged due to the flood. Some students migrated to urban areas for their studies. Student drop-out and the number of absences increased, which impacted the educational achievement of the students. About 76 percent of children have faced educational barriers due to the loss of their parents from the flood, 51 percent of children were impacted due to the employment change of their parents, and 47 percent of children were impacted by the relocation of their families due to the flood. Upadhyay (2024) outlined that due to the floods, many families have been left without their homes and essential resources, and which has impacted to continue their child's education.

There is a relationship between the caste/ethnic status of parents, education, employment status, and current occupation of parents, which has a direct relationship with the continuation of child education. The chi-square value for education in this study is statistically significant at 0.93, followed by parents' employment status at 0.72, parents' occupation at 0.52, and family caste and ethnicity at 0.52. However, the religious status of the family (0.46) is not significant in affecting child education in the flood-impacted area

Conclusion and Recommendations

The damage to physical, economic, and social property from the flood and landslide significantly impacted people's livelihoods in Helambu Rural Municipality, Bagmati Province, Nepal. The floods of 2021 mainly impacted on livelihood of the people. It damaged people's property, business, health, and children's education. Among literacy groups, the majority (58.3 percent) of respondents' impact on their employment status.

The flood affects access to essential health care services in Helambu, it increases several health hazards. Nearly forty percent of people faced physical health issues, while sixty percent experienced mental health problems. The major physical health issues are associated with waterborne diseases, respiratory infections, and injuries. About 38 percent of respondents have faced a physical health hazard. Among 57 percent faced minor impact, 42 percent faced moderate impact,

Mental health challenges include the trauma of losing homes, the uncertainty of displacement, financial strain, stress, and anxiety. About 61 percent faced anxiety, and 39 percent faced stress from the flood. The health hazard varied based on people's sex, socio-economic status, and employment status, where males were more affected (47.8 percent) than females (34.3 percent).

The loss of property, agricultural land, and the relocation of family's impact children's education. Nearly 42 percent of respondents accepted that the flood of 2021 impacted their children's education. More than 70 percent of respondents indicated that the flood resulted in schools being shut down. It was found that 51 percent of children's education had been affected by changes in their parents' employment, and 47 percent were impacted by their family's relocation. A significant Chi-square value was observed for families facing land loss (0.81), families that were relocated (0.71), and changes in employment status (0.64).

Finally, there is a need for appropriate health facilities to address both physical and mental health issues during this specific crisis period, along with a dedicated mental health camp aimed at supporting vulnerable individuals affected by flood-related circumstances. Additionally, immediate employment assistance is crucial for those who lost their jobs, farmland, and housing in the primary victim area. Children in the affected region require dedicated classrooms, reading materials, and support for those who lost their books, clothing, and school supplies in the aftermath of the floods

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