

**IMPACT OF CLIMATE CHANGE DISASTERS ON THE EDUCATIONAL SECTOR  
OF COASTAL AREA, BANGLADESH**

**BY**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of  
Master of Science in Management Information System (MIS)

Supervised By

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**DAFFODIL INTERNATIONAL UNIVERSITY**

**DHAKA, BANGLADESH**

**JANUARY 2025**

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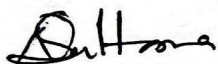
This Project titled “Impact of Climate Change Disaster on the Educational Sector of Coastal Area, Bangladesh”, submitted by Md. Abdulla Almamun to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Management Information Systems and approved as to its style and contents. The presentation has been held on 11<sup>th</sup> January 2025

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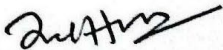
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## DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Dr. Md Zahid Hasan, Associate Professor, Department of CSE Daffodil International University**. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

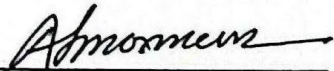
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## ACKNOWLEDGEMENT

First, I express my heartiest thanks and gratefulness to almighty God for His divine blessing making me possible to complete the final year thesis successfully.

I am really grateful and wish me profound indebtedness to **Dr. Md Zahid Hasan, Associate Professor**, Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of “Impact of Climate Change Disaster on the Educational Sector of Coastal Area, Bangladesh” to carry out this thesis. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts, and correcting them at all stages have made it possible to complete this project.

We would like to express our heartiest gratitude **Dr. Sheak Rashed Haider Noori, Professor & Head**, Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

I would like to thank my entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patients of my parents.

## **ABSTRACT**

Moheshkhali, situated in southeastern Bangladesh, is highly vulnerable to natural disasters, especially cyclones and saline water surges intensified by rising temperatures due to climate change. These events contribute significantly to river erosion, property loss, heightened poverty, and various socioeconomic challenges. This study aims to evaluate how climate change-induced natural disasters impact the district's education sector, causing difficulties in resource allocation, infrastructure maintenance, and resulting in issues such as student dropout, early marriage, and livelihood shifts. Despite extensive research on climate change impacts in Bangladesh's coastal regions, there is a notable lack of publications specifically addressing these issues in Moheshkhali. The study utilizes content analysis to examine relevant books, articles, journal publications, and online media features. Coding of the content analysis is meticulously aligned with the research questions to comprehensively explore causes and effects. The findings underscore climate change's profound influence on student dropout rates, driven by infrastructure damage, population displacement, increased poverty, early marriages, and changes in livelihoods. Addressing these challenges necessitates significant intervention, capacity building, and community adaptation efforts.

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# CHAPTER 1

## Introduction

### 1.1 Introduction

Bangladesh, often described as a vulnerable victim of climate change, faces significant challenges such as sea level rise, increasing salinity, frequent floods, and intense heat waves. These environmental stresses have profound impacts on various aspects of life in the country, exacerbated by a high frequency of natural disasters.

Climate change particularly affects Bangladesh's education sector, where schools frequently close due to extreme weather events like heat waves, floods, and cyclones. These disruptions often result in the postponement of board exams, further complicating the educational landscape.

In this thesis, the focus is on investigating how climate change specifically impacts the education system in Bangladesh, with a research area centered on Moheshkhali. The study aims to uncover the specific challenges faced by schools and communities due to climate-induced disruptions. It also seeks to propose effective strategies and interventions to mitigate these impacts, enhancing the resilience of educational infrastructure and processes in the region.

### 1.2 Motivation of the Research

The motivation for this research arises from the urgent need to understand how climate change impacts the educational sector in vulnerable coastal areas of Bangladesh, particularly in Moheshkhali Upazila, Cox's Bazar. As climate change intensifies, coastal regions like Moheshkhali face frequent and severe natural disasters such as cyclones, floods, and rising sea levels. These events significantly disrupt education by damaging infrastructure, causing prolonged school closures, and forcing families to prioritize immediate survival over their children's education. Additionally, displacement due to these disasters leads to higher dropout rates and challenges in maintaining continuous enrollment.

This study aims to explore the specific challenges posed by climate change to the education system in Moheshkhali and identify effective strategies to mitigate these impacts. By focusing on this region, the research seeks to contribute valuable insights into how climate-induced disruptions

affect educational access and quality. The ultimate goal is to inform policies and interventions that can enhance the resilience of the educational sector, ensuring that children in Moheshkhali and similar coastal regions can continue to learn and thrive despite the growing threats posed by climate change.

### **1.3 Objectives of the Research**

The primary objective of my study is to observe how climate change affects Bangladesh's education system. Especially the research aims to:

1. Assess the specific challenges posed by climate change to Bangladesh's education system.
2. Propose strategic responses and policy recommendations to mitigate the impact of climate change on education in Bangladesh
3. Explore empirical evidence from the Moheshkhali area to understand localized impacts.
4. To find the dropout rate and completion level of education due to climate change impact in Moheshkhali.

### **1.4 Research Questions:**

The research question of my study is to

1. What is the impact of climate change disaster on the educational sector of the coastal area in Bangladesh?
2. What is the dropout rate due to climate change disaster and what educational levels do students typically drop out at primary level?

### **1.5 Problem Statement**

Bangladesh, known for its high population density and limited land area, is acutely vulnerable to the effects of climate change. Frequent and severe climate-related disasters such as cyclones, floods, and rising sea levels have a profound impact on the country's infrastructure and livelihoods. Among the sectors most affected, education faces significant disruptions that threaten the access, quality, and continuity of learning for millions of students.

The education system in Bangladesh is particularly sensitive to these climate challenges. Schools are often damaged or destroyed by natural disasters, leading to prolonged closures. Families

experiencing economic hardship due to climate impacts may prioritize immediate survival over long-term educational goals, causing students to drop out. Additionally, displacement from climate events makes it difficult for children to remain enrolled and consistent in their studies.

Understanding the extent of these challenges and developing effective strategies to mitigate their impact is crucial. Protecting educational outcomes amidst these environmental pressures is not only vital for individual students but also for the sustainable development of the nation. Addressing the impact of climate change on education will help ensure that future generations in Bangladesh can continue to learn and thrive despite these adversities.

### **1.6 Significance of Study**

This research provides a focused analysis on the education sector's vulnerability to climate change in Bangladesh, particularly in coastal and island communities. By examining the specific impacts of climate-related disasters on educational infrastructure, student attendance, and dropout rates, this study offers valuable insights into the urgent challenges faced by these regions. The findings contribute to a broader understanding of how climate change affects education in similar contexts globally, informing policymakers, educators, and community leaders working to enhance educational resilience. These insights are crucial for developing effective strategies to safeguard educational opportunities and support sustainable development in climate-affected areas.

### **1.7 Research Gap**

Although there has been extensive research on the impact of climate change across various sectors, including the education sector, both in Bangladesh and globally, my thorough search did not reveal any studies, articles, or reports specifically focused on the unique challenges faced by the education system in Moheshkhali due to climate change. This indicates a significant gap in the existing literature and underscores the need for targeted research on this critical issue.

### **1.8 Scope for Future Researchers**

Future researchers focusing on climate change, development, and related fields have significant opportunities to explore the impacts of climate-induced disasters on education in coastal areas beyond Moheshkhali. While this study highlights the unique challenges faced by the education system in Moheshkhali, there is ample scope for further research in other coastal districts of

Bangladesh. These regions may have varying degrees of vulnerability and different socio-economic contexts, offering a rich area for comparative analysis and deeper understanding. Investigating how climate change affects educational infrastructure, student enrollment, dropout rates, and overall community resilience in other districts will contribute valuable insights and inform more effective, localized strategies to support educational and developmental outcomes amidst ongoing environmental changes.

## **CHAPTER 2**

### **Literature Review**

#### **2.1 Preliminaries**

The coastal region of Bangladesh, including Moheshkhali Upazila, faces increasing vulnerability due to climate change. Rising sea levels, frequent cyclones, and salinity intrusion are key environmental issues that exacerbate the challenges faced by local communities. The adverse impacts of climate change in this region are not limited to infrastructure damage and economic loss but also extend to sectors like education, which is vital for the development and long-term sustainability of the area.

Education plays a crucial role in empowering communities, fostering resilience, and providing opportunities for socioeconomic development. However, the education sector in coastal areas like Moheshkhali is constantly under threat from climate-induced disasters. Schools are damaged, students face displacement, and educational continuity is disrupted. These challenges highlight the need for a focused study on the impact of climate change on the education system, as it directly affects the future generations of this vulnerable region.

In this context, the study seeks to explore the extent to which climate change-related disasters affect the educational infrastructure, access, and quality of education in Moheshkhali. Understanding these issues is crucial for designing interventions and strategies that not only mitigate the impacts but also enhance the resilience of the educational system in the face of ongoing environmental challenges.

#### **2.2 Related Works**

Several studies have examined the impact of climate change on education in coastal regions of Bangladesh, offering crucial insights into the challenges faced by these vulnerable areas. Bhuiyan, Md Zafar Alam, Nasreen Sarker, Mohammed Kamal Hossain, and Naznin Afrose Huq et al. (2024), in their study "Impact of Climate Change Disasters on the Education Sector of Coastal Bhola District, Bangladesh," investigate how climate-induced disasters, particularly in Bhola, disrupt the education system, drawing parallels to similar challenges in Moheshkhali. Similarly,

Ummay Marzan Jui, in her articles "How Climate Change is Undermining Education in Coastal Areas of Bangladesh" published by Earth Journalism and The Business Standard, highlights how frequent storms, cyclones, and salinity intrusion damage school infrastructure and hinder student attendance in coastal regions.

Mustafa Tevfik Hebebcı (2023), in the 3rd International Conference on Social Science Studies, discusses the disruption of learning in disaster-prone regions, particularly focusing on how extreme weather events lead to prolonged school closures and high dropout rates, a situation mirrored in Moheshkhali. On a broader scale, Marcellus F. Mbah, Ayesha Shingruf & Petra Molthan-Hill et al. (2022), in their study "Policies and Practices of Climate Change Education in South Asia", propose frameworks for effective climate change adaptation, which are vital for building resilience in education systems across coastal Bangladesh.

M. Salim Uddin, Emdad Haque, David Walker, & Mahed-Ul-Islam Choudhury et al. (2020) in "Community Resilience to Cyclone and Storm Surge Disasters: Evidence from Coastal Communities of Bangladesh", emphasize the need for bolstering educational systems in response to climate disasters, providing valuable evidence for regions like Moheshkhali. Sowmen Rahman (2014) also highlights infrastructure challenges in his study "Climate Extremes and Challenges to Infrastructure Development in Coastal Cities in Bangladesh," addressing how climate extremes directly affect the functionality of schools during and after disasters.

Together, these studies lay the groundwork for understanding how climate change disrupts education in coastal areas and underscore the need for targeted interventions to protect and sustain educational infrastructure in vulnerable regions like Moheshkhali.

### **2.3 Comparative Analysis and Summary**

A comparative analysis of existing research highlights common patterns and unique challenges faced by coastal regions like Moheshkhali in the context of climate change and its impact on education. Studies such as those by Bhuiyan et al. (2024) and Jui (2021) reveal that coastal districts like Bhola and Moheshkhali face similar disruptions due to frequent natural disasters, with direct consequences for school infrastructure, student attendance, and dropout rates. Both studies

underline that extreme weather events such as cyclones, flooding, and salinity intrusion severely damage schools, making it difficult to maintain regular educational activities.

In a broader context, Hebebcı (2023) and Mbah et al. (2022) extend the discussion to South Asia, presenting how natural disasters affect learning environments and proposing adaptation policies to minimize disruption. These works offer insights into how regional approaches to climate education and resilience frameworks can be applied to local contexts, like Moheshkhali, for improving the education sector's response to climate impacts.

Studies focusing on community resilience, like Uddin et al. (2020), emphasize the importance of strengthening local education systems to withstand climate shocks. Similarly, Rahman (2014) highlights the pressing need for improving infrastructure in coastal cities, directly aligning with the infrastructural challenges in schools caused by climate extremes.

In summary, the research collectively points to the urgent need for adaptive strategies that not only protect education infrastructure but also ensure continuity in learning during and after disasters. By drawing on comparative insights from various coastal regions, these studies underscore the necessity for targeted policy interventions, improved infrastructure, and community resilience in regions like Moheshkhali, where the effects of climate change on education are increasingly pronounced.

## **2.4 Scope of the Problem**

Moheshkhali Upazila in Cox's Bazar, Bangladesh, is a coastal region that epitomizes the vulnerability of many areas worldwide to the effects of climate change. This upazila faces a confluence of environmental challenges including rising sea levels, frequent cyclones, and increased salinity, all of which significantly disrupt daily life and economic stability. The educational sector in Moheshkhali is particularly hard-hit by these climatic changes, which cause prolonged school closures, damage to infrastructure, and heightened dropout rates among students.

Schools in Moheshkhali are often forced to close or operate under difficult conditions due to the impact of natural disasters. Cyclones and floods not only destroy school buildings but also displace communities, making it challenging for children to continue their education. Economic pressures

exacerbated by these environmental events push many families to withdraw their children from school to help with household survival, thus increasing the dropout rates. Furthermore, the disruption of educational continuity has long-term effects on literacy rates and overall educational attainment in the region.

The scope of the problem extends beyond immediate educational disruptions. It encompasses the broader socioeconomic impacts on the community, such as increased poverty and reduced opportunities for future generations. Addressing these issues requires a comprehensive understanding of how climate change affects education and developing resilient strategies to ensure that educational systems can withstand and adapt to these challenges. This research aims to provide a detailed analysis of these impacts and propose strategic responses to mitigate the adverse effects of climate change on the education sector in Moheshkhali.

## **2.5 Challenges**

Conducting research in Moheshkhali, a remote and vulnerable coastal upazila, presents significant challenges. The area's geographical isolation and limited transportation infrastructure, often disrupted by adverse weather and natural disasters like cyclones, make access difficult. Frequent damage to local infrastructure further complicates communication and data collection. The scarcity of reliable and current data necessitates a reliance on qualitative methods and direct community engagement, which can be hindered by language barriers, distrust, and the local population's focus on recovery from recent disasters. Unpredictable climate events can delay or disrupt research activities, requiring flexible planning.

Additionally, understanding the impact of climate change on education in Moheshkhali demands an interdisciplinary approach, encompassing environmental science, socio-economics, and educational policies. It requires capturing the broad and multifaceted effects on economic stability, family decisions, and social resilience. Ethical considerations, especially concerning the safety and confidentiality of vulnerable populations like children and displaced families, are paramount. Moreover, securing adequate funding and resources, and overcoming technical and human resource gaps, are essential yet challenging. Addressing these issues is crucial for successful research in such a disaster-prone and socioeconomically impacted area.

## CHAPTER 3

### Research Methodology

#### 3.1 Research Subject and Instrumentation

##### 3.1.1 Research Subject

The focus of this study is on the education sector in Moheshkhali Upazila, Cox's Bazar, Bangladesh, particularly examining how climate change-induced natural disasters, such as cyclones, floods, and rising sea levels, affect educational infrastructure, student enrollment, dropout rates, and overall community resilience.

The research targets various stakeholders within the education sector of Moheshkhali Upazila. This includes:

- **Students:** Primary and secondary school students who are directly affected by climate-related disruptions.
- **Teachers and School Administrators:** Educators and staff who experience and manage the impacts of climate events on schooling.
- **Parents and Community Leaders:** Individuals who provide insight into the broader community effects of educational disruptions due to climate change.
- **Local Government and NGO Representatives:** Officials and organization members involved in policy-making, support, and interventions aimed at addressing educational challenges in the context of climate change.

##### 3.1.2 Instrumentation

To gather comprehensive data for this study, a combination of qualitative and quantitative research instruments will be employed:

#### 1. Surveys and Questionnaires:

- **Student Surveys:** Structured questionnaires designed to capture students' experiences, challenges, and responses to climate-related disruptions in their

education. This includes questions on attendance, dropout reasons, and adaptability.

- **Teacher and Administrator Surveys:** Questionnaires targeting educators and administrators to understand the operational impacts of climate events on schools, such as infrastructure damage, resource needs, and administrative responses.
- **Parent and Community Surveys:** Surveys aimed at parents and community members to gather their perspectives on how climate change affects educational access and quality in Moheshkhali.

## 2. Interviews:

- **In-Depth Interviews:** Conducted with a select group of students, teachers, school administrators, parents, and community leaders to obtain detailed qualitative insights into their personal experiences and perceptions regarding climate impacts on education.
- **Key Informant Interviews:** Interviews with local government officials and representatives from NGOs involved in educational and climate resilience initiatives, to gain expert opinions and insights on policy and intervention strategies.

## 3. Focus Group Discussions (FGDs):

- Facilitated discussions with groups of students, parents, teachers, and community leaders to explore collective experiences, concerns, and suggestions regarding the educational impacts of climate change. These discussions provide a platform for diverse voices to share their views and propose community-driven solutions.

## 4. Document Analysis:

- **School Records and Reports:** Examination of school records, including attendance logs, dropout rates, and infrastructure damage reports, to provide quantitative data on the impacts of climate events.

- **Government and NGO Reports:** Analysis of policy documents, project reports, and research studies relevant to climate change and education in Moheshkhali, to contextualize primary data and understand existing interventions.

## 5. Observations:

- **Site Visits:** Conducting observations at schools and community settings to directly assess the physical condition of educational facilities, and observe ongoing challenges and coping mechanisms related to climate impacts.

This mixed-methods approach ensures a comprehensive understanding of how climate change affects education in Moheshkhali, allowing for a nuanced analysis of both the quantitative impacts and the qualitative experiences of those involved. The integration of diverse data sources and perspectives is critical for developing effective strategies to enhance educational resilience in the face of climate change.

### 3.2 Data Collection Procedure

This research employs a content analysis approach to investigate the impacts of climate change on the education sector in Moheshkhali. Data were collected from both primary and secondary sources, including research papers, journals, books, and print and electronic media from both local and international contexts. The collected data were then systematically coded according to the research questions and objectives.

#### 3.2.1 Primary Data

Gathered directly from observations, interviews, surveys, or other fieldwork conducted within the study area.

#### 3.2.2 Secondary Data

Sourced from existing literature, including academic research papers, journals, books, and credible print and electronic media sources.

### 3.3 Data Coding and Analysis

#### 1. Data Coding:

- **Quantitative:** Survey data will be coded numerically for analysis using software like SPSS or Excel, focusing on variables like attendance, dropout rates, and climate disruptions.
- **Qualitative:** Interviews, KIIs and FGDs data will be analysis manually to identify patterns related to the educational impact of climate change.

#### 2. Data Analysis:

- **Quantitative:** Descriptive statistics (mean, frequency) will analyze trends in education data, and inferential statistics will determine significant differences.
- **Qualitative:** Thematic analysis will highlight key issues like infrastructure damage, social challenges, and resource gaps.

3. **Triangulation:** Both quantitative and qualitative data will be compared to validate results and ensure consistency.

4. **Interpretation:** Findings will be interpreted based on research questions to assess climate change's impact on education and guide recommendations.

### 3.4 Applied Methodology

The proposed methodology for this research combines both qualitative and quantitative approaches to effectively examine the impact of climate change on the education sector in Moheshkhali. This mixed-methods approach will provide a comprehensive understanding of the challenges and potential strategies for resilience in the region's education system.

#### 1. Data Collection:

- **Quantitative Data:** Surveys will be conducted among students, teachers, and community members to gather information on school attendance, dropout rates, and infrastructural challenges due to climate disasters. Statistical data from local government reports and educational institutions will also be analyzed.
- **Qualitative Data:** In-depth interviews and focus group discussions will be carried out with key stakeholders, including school administrators, local government

officials, and parents, to gain insights into how climate change is affecting education in their communities. Case studies of schools severely affected by climate events will be documented to highlight specific challenges and responses.

**2. Secondary Data Analysis:**

- Existing literature, including government reports, NGO publications, and previous research on climate change's impact on education in coastal regions, will be reviewed to draw comparisons and contextualize the findings from Moheshkhali.

**3. Geospatial Analysis:**

- Geographic Information System (GIS) tools will be used to map areas in Moheshkhali most affected by climate change-induced disasters. This spatial analysis will help identify correlations between disaster-prone areas and school disruptions or closures.

**4. Impact Assessment Framework:**

- An assessment framework based on the Sustainable Development Goals (SDGs), specifically Goal 4 (Quality Education) and Goal 13 (Climate Action), will be used to measure the broader social and economic impacts of disrupted education due to climate change. This framework will aid in understanding how climate-related factors hinder educational access and equality.

**5. Data Analysis:**

- Quantitative data will be analyzed using statistical methods to identify trends in school attendance, dropout rates, and resource availability before and after climate events. Qualitative data will be thematically analyzed to understand the lived experiences of those affected by climate-induced disruptions in education.

This methodology will provide a holistic view of the climate-related challenges faced by the education sector in Moheshkhali, while also offering data-driven insights for formulating strategic responses.

### 3.5 Implementation Requirements

#### 1. Human Resources:

- Trained data collectors for surveys and interviews.
- Local field staff familiar with Moheshkhali's educational landscape.

#### 2. Technological Tools:

- Data collection tools such as tablets or smartphones with survey apps (Kobo Toolbox).
- Computers with MS Office for data analysis.
- Reliable internet access for remote collaboration and data management.

#### 3. Logistical Support:

- Transportation for field visits to schools and communities in Moheshkhali.
- Communication equipment (mobile phones, internet access) for coordination with stakeholders.

#### 4. Financial Resources:

- Budget allocation for training, data collection, analysis, and reporting.
- Funding for printing materials, field expenses, and compensating staff.

#### 5. Ethical Compliance:

- Secure informed consent from participants.
- Ensure data privacy and protection, adhering to research ethics.

#### 6. Stakeholder Engagement:

- Collaborate with local educational institutions, NGOs, and government bodies for data access and policy integration.
- Regular updates to community leaders and stakeholders to maintain transparency.

## CHAPTER 4

### Experimental Results and Discussion

#### 4.1 Experimental Setup

The experimental setup for this research aims to assess the impact of climate change on the educational sector in Moheshkhali, Cox's Bazar, through a comprehensive data collection and analysis process. This setup includes the following key components:

1. **Study Area Selection:**

- Moheshkhali Upazila in Cox's Bazar, Bangladesh, known for its vulnerability to climate-related disasters such as cyclones, floods, and rising salinity levels, will be the focus area.
- A selection of schools and communities within this Upazila will be identified for data collection.

2. **Data Collection Tools:**

- **Surveys:** Structured questionnaires will be developed for teachers, students, and parents to gather quantitative data on school attendance, dropout rates, infrastructure damage, and educational disruption due to climate-induced events.
- **Interviews:** Semi-structured interviews will be conducted with local education officials, teachers, and community leaders to capture qualitative insights into the broader impacts of climate change on education and resilience strategies.
- **Focus Group Discussions (FGDs):** FGDs will be held with students and parents to explore the local perceptions and experiences of climate change impacts on education.

3. **Sampling Strategy:**

- **Random Sampling:** Schools and households within Moheshkhali will be selected randomly to ensure diverse representation across different communities.
- **Purposive Sampling:** Key stakeholders, such as local education officials, disaster response teams, and NGOs working in the education sector, will be selected based on their relevance to the study.

4. **Data Storage and Management:**

- All data collected will be securely stored in a digital format and backed up regularly to prevent loss.
- An organized database will be created to track responses and monitor the progress of the study.

#### 5. **Analysis Techniques:**

- **Quantitative Data Analysis:** Descriptive statistics (mean, percentages, frequency distributions) will be used to analyze survey responses. Inferential statistics may be employed to identify correlations between climate events and educational outcomes.
- **Qualitative Data Analysis:** Thematic analysis will be applied to interview and FGD transcripts to identify key themes, patterns, and insights related to climate change's impact on education.

#### 6. **Timeline and Milestones:**

- The data collection phase will last for three months, followed by two months of data analysis and report writing.
- Key milestones include the completion of the survey distribution, interview scheduling, data entry, and final report preparation.

This experimental setup is designed to comprehensively assess how climate change disrupts education in Moheshkhali and identify effective strategies for building resilience within the education sector.

## **4.2 Impact of Climate Change on Bangladesh**

Climate change profoundly impacts multiple critical sectors in Bangladesh, including agriculture and fisheries, water resources and hydrology, coastal areas, forestry and biodiversity, human health, urban areas, and the education sector. Shifts in rainfall patterns, rising temperatures, and sea level rise threaten agricultural productivity and fisheries, endangering food security and livelihoods. Water resources face increased variability, with heightened risks of flooding and erosion affecting availability and quality. Coastal regions suffer severe impacts from rising seas and intensified cyclones, leading to land loss, displacement, and economic disruptions. Biodiversity and forests are vulnerable to habitat changes, impacting ecosystem services. Health

risks escalate due to heat stress, vector-borne diseases, and compromised water and air quality. Urban areas, grappling with rapid growth, are further stressed by climate-related challenges. In the education sector, climate events damage infrastructure, disrupt learning, and contribute to student dropout rates. Addressing these interconnected challenges is crucial for fostering resilience and sustainable development in Bangladesh amidst ongoing climate impacts. The annual mean temperature in Bangladesh is projected to increase by 0.22 degrees Celsius by 2050 and 0.41 degrees Celsius by 2100, reflecting the persistent influence of climate change. Bangladesh's average annual rainfall varies widely from 1400 to 4500 mm (MoEF, 2021), highlighting the diverse climatic conditions affecting agriculture, water resources, and overall ecosystem dynamics across the country.

### 4.3 Impact of Climate Change on Education in Moheshkhali

Moheshkhali, a coastal upazila in eastern southern Bangladesh, faces heightened vulnerability to natural disasters like cyclones and saline water upsurges due to climate change-induced rising temperatures. These environmental challenges exacerbate river erosion, asset loss, poverty, and socio-economic disparities in the region. The education sector in Moheshkhali is particularly impacted, grappling with significant challenges and vulnerabilities stemming from these climate-induced disasters. Issues such as resource allocation constraints, difficulties in maintaining infrastructure, and the resultant high rates of student dropout, early marriages, and shifts in livelihoods are prevalent.



Figure 4.1: Moheshkhali Map located in between 21°28' and 21°46' north latitudes and in between 91°51' and 91°59' east longitudes

According to data from the Reaching Out-of-School Children project (ROSC-II) and Additional Finance (AF) in 2018, primary education enrollment rates in Moheshkhali are notably lower than the national average of 98%, with boys at

72.6% and girls at 69.1%. The incidence of children missing school due to storms in Moheshkhali exceeds the national average as well. Dropout rates are alarmingly high, with 28.5% at the primary level and 36.1% at the secondary level, as per ROSC-II findings. Specifically, at the primary level, dropout rates are 39.6% for boys and 22.8% for girls. These figures significantly impact the average literacy rates in the upazila, currently standing at 30.8%, with males at 30.5% and females at 31.1%. These statistics underscore the urgent need for targeted interventions to improve educational access and retention in Moheshkhali amidst the vulnerabilities exacerbated by climate change.

#### **4.4 Educational Institutions at Moheshkhali Upazila**

In Moheshkhali, the number of educational institutions is insufficient to meet the needs of the population. The Upazila has 10 colleges, 33 secondary schools, 70 primary schools, 12 kindergartens, and 33 madrasas, which fall short in addressing the educational demands of the area. Moreover, the existing schools are not structurally equipped to withstand the frequent natural disasters, such as cyclones and floods, that are increasingly common in this coastal region. These climate-induced events pose significant risks to the safety and continuity of education, as most educational institutions lack the infrastructure needed to endure extreme weather conditions.

The buildings in many schools are vulnerable to damage during cyclones and flooding, leading to prolonged closures and disruptions in learning. In addition, these schools often lack essential facilities such as safe classrooms, proper sanitation, and a reliable water supply, further diminishing the quality of education. As a result, many students are unable to attend school regularly, and dropout rates remain high. The vulnerability of the educational infrastructure underscores the urgent need for resilient schools that can withstand natural disasters. To ensure the continuity of education and the safety of students, it is crucial to invest in disaster-proof educational facilities that can function even in the face of climate change-related challenges.

#### **4.5 Damage Educational Institutions by Natural Disaster at Moheshkhali**

Over the years, educational institutions in Moheshkhali have been repeatedly damaged by natural disasters, particularly cyclones and storm surges, highlighting the region's vulnerability to climate-induced events. In 1991, one of the most devastating years, 41 schools were either fully or partially damaged by severe cyclones and storm surges. Similarly, in 1997, another 33 institutions were

affected. The trend continued with varying severity, as 7 institutions were damaged in 1998 and 3 during the catastrophic Cyclone Sidr in 2007.

Table 4.1: Damage Educational Institutions by Natural Disaster at Moheshkhali

Year	Name of the Disaster	Fully/Partial Damage of Educational Institutions
1991	Cyclones and storm surges	41
1997	Cyclones and storm surges	33
1998	Cyclones and storm surges	7
2007	Cyclone Sidr	3
2009	Cyclone Aila	5
2019	Cyclone Bulbul	4
2022	Cyclone Sitrang	1
2023	Cyclone Mocha	9
2024	Cyclone Hamoon	8
2024	Cyclone Remal	5
2024	Cyclone Dana	3

In 2009, Cyclone Aila caused damage to 5 educational institutions, while Cyclone Bulbul in 2019 damaged 4 more. More recently, Cyclone Sitrang in 2022 led to the destruction of 1 institution, followed by Cyclone Mocha in 2023, which damaged 9 schools. In 2024 alone, the area experienced multiple cyclones: Cyclone Hamoon damaged 8 institutions, Cyclone Remal affected 5, and Cyclone Dana damaged 3 more.

This continuous destruction of educational infrastructure not only disrupts the academic calendar but also results in long-term setbacks for the community, as schools often take time to rebuild or repair. The persistent damage underscores the urgent need for building disaster-resilient educational facilities to protect students and ensure the continuity of education in the face of frequent and severe natural disasters.

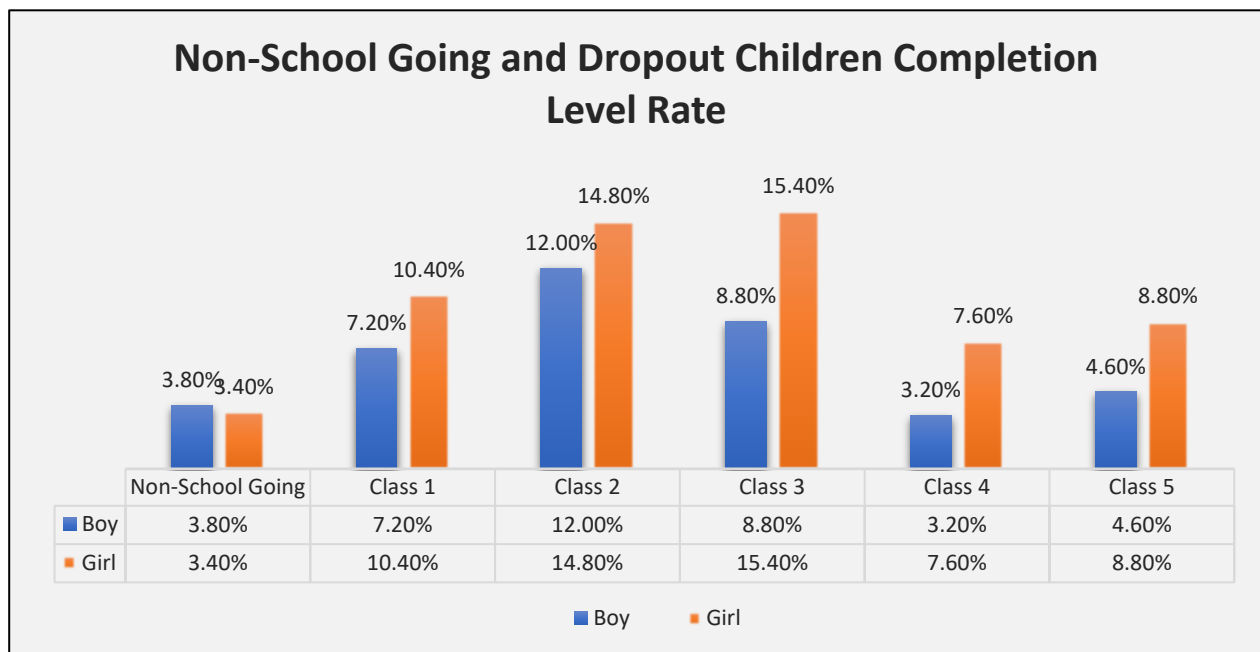
#### 4.6 Non-School Going & Dropout Children Completion Level at Moheshkhali

The data reflects a concerning trend in school attendance and enrollment across different classes in Moheshkhali, revealing distinct gender disparities. Among boys, 3.80% are not attending school, and their enrollment gradually declines from Class 1 (7.20%) to Class 5 (4.60%). This steady drop in enrollment indicates a significant issue with retaining boys in school as they progress through grades.

**Table 4.2: Non-School Going & Dropout Children Completion Level at Moheshkhali**

Sex	Non-School Going	Class 1	Class 2	Class 3	Class 4	Class 5	Grand Total
Boy	3.80%	7.20%	12.00%	8.80%	3.20%	4.60%	39.60%
Girl	3.40%	10.40%	14.80%	15.40%	7.60%	8.80%	60.40%
<b>Grand Total</b>	<b>7.20%</b>	<b>17.60%</b>	<b>26.80%</b>	<b>24.20%</b>	<b>10.80%</b>	<b>13.40%</b>	<b>100.00%</b>

In contrast, the data shows that a slightly lower percentage of girls (3.40%) are not attending school, but their enrollment percentages are higher than boys in every class, particularly in Class 3 (15.40%). However, while girls exhibit stronger attendance, the overall dropout rates remain high, as seen by the gradual reduction in enrollment by Class 5.



**Figure 4.2: Non-School Going and Dropout Children Completion Level Rate**

The Grand Total of 100% demonstrates that girls represent a larger proportion of school-goers compared to boys, with a significant margin of 60.40% to 39.60%. This indicates a need for targeted interventions to improve school retention, especially for boys, and to address the underlying causes of dropouts, such as economic hardship, child labor, or early marriage. The data suggests that while girls have higher school participation, both genders face significant challenges in sustaining education through to completion, reflecting the broader impact of socio-economic and environmental factors on education in coastal areas like Moheshkhali.

#### 4.7 Age-wise dropout rate at Moheshkhali

The data on school enrollment and retention across different age groups in Moheshkhali provides a clear picture of the gender disparity in education. Among boys, the highest percentage of school-going students is observed at the age of 9 (15.60%), but the numbers steadily drop with age, reaching a low of 0.60% by the age of 12. This indicates a sharp decline in school retention as boys grow older, possibly due to factors like economic pressures, child labor, or migration for work.

**Table 4.3: Age-wise dropout rate at Moheshkhali**

Sex	8 years	9 years	10 years	11 years	12 years	Grand Total
Boy	11.60%	15.60%	8.00%	3.80%	0.60%	39.60%
Girl	18.00%	15.80%	14.80%	10.40%	1.40%	60.40%
<b>Grand Total</b>	<b>29.60%</b>	<b>31.40%</b>	<b>22.80%</b>	<b>14.20%</b>	<b>2.00%</b>	<b>100.00%</b>

Girls, on the other hand, show a higher rate of school attendance at every age compared to boys, peaking at 18.00% at age 8. However, similar to boys, there is a gradual decline in school retention as they grow older, with only 1.40% of girls still attending school by the age of 12. Despite this decline, girls consistently maintain a higher enrollment rate across all age groups, contributing to their overall dominance in the Grand Total of 60.40%, compared to 39.60% for boys.

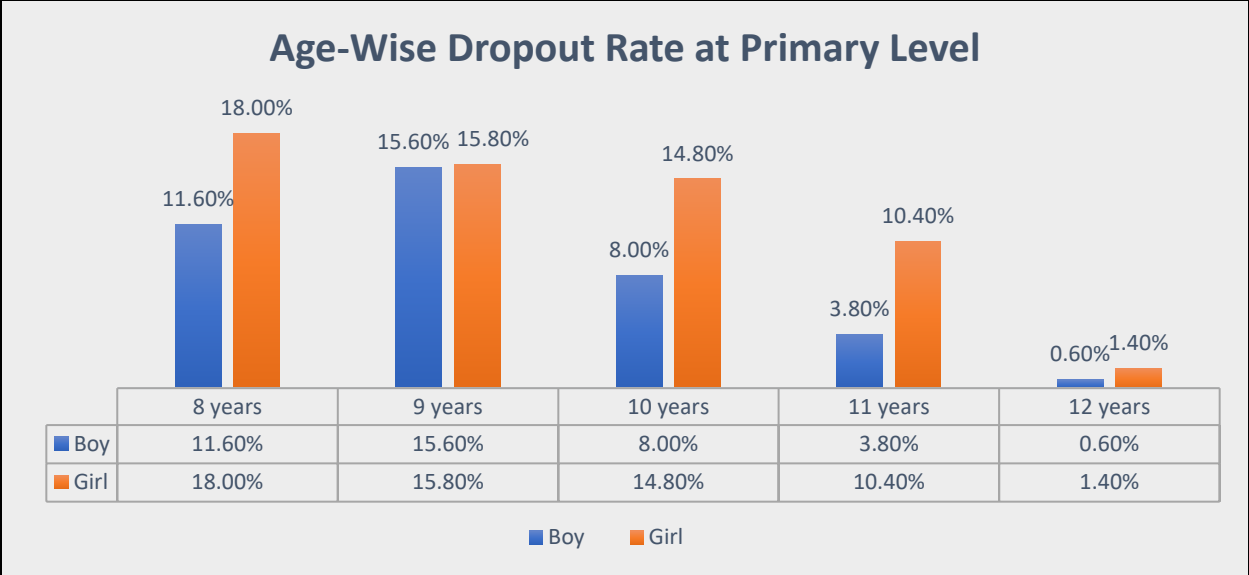


Figure 4.3: Age-Wise Dropout Rate at Primary Level

This data highlights the significant gender gap in education, where girls are more likely to attend school but still face high dropout rates as they age. The steep decline in school attendance for both boys and girls after the age of 10 suggests that socio-economic factors, such as early marriage for girls or economic hardships for boys, are playing a crucial role in limiting their access to continued education. Addressing these challenges is critical to improving overall educational outcomes in the coastal areas like Moheshkhali.

**4.8 Dropout rate compare with Moheshkhali and National Level**

At the national level, primary school dropout rates are relatively low at 9.36%, with 5.06% for boys and 4.3% for girls, indicating a more stable educational environment for younger students across Bangladesh. However, the situation in Moheshkhali presents a concerning contrast, with a 23.12% dropout rate at the primary school level. The dropout rate for boys in Moheshkhali is particularly high at 16.2%, while for girls it stands at 6.92%.

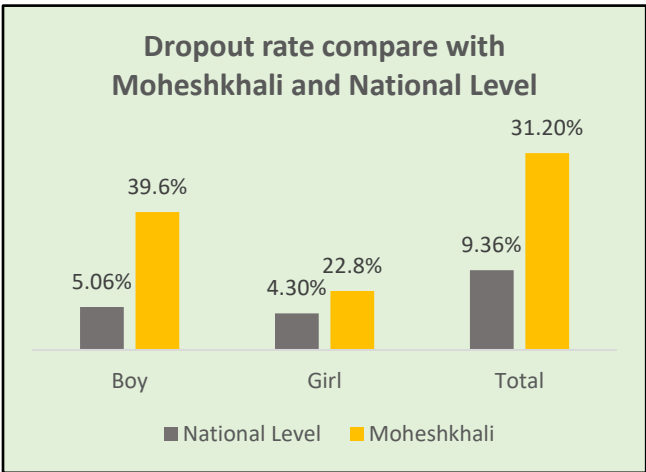


Figure 4.4: Dropout rate compare with Moheshkhali and National Level

This significant gap highlights the challenges specific to Moheshkhali, where factors like frequent natural disasters, financial hardship, and early marriages disproportionately impact students, especially boys. These disruptions often push children out of school, with families prioritizing immediate survival over education. To address these disparities, focused interventions are needed to ensure the continuity of primary education in Moheshkhali, especially for boys, who face higher dropout rates than girls in this region.

#### 4.9 Literacy Rates Comparison Between Moheshkhali and National Averages

According to the preliminary report of the Population and Housing Census 2022, the national literacy rate in Bangladesh stands at 74.66%, with a higher rate among males at 76.56% and females at 72.82%. These figures reflect significant progress in improving literacy across the country, particularly in urban and rural areas where educational infrastructure has been more accessible.

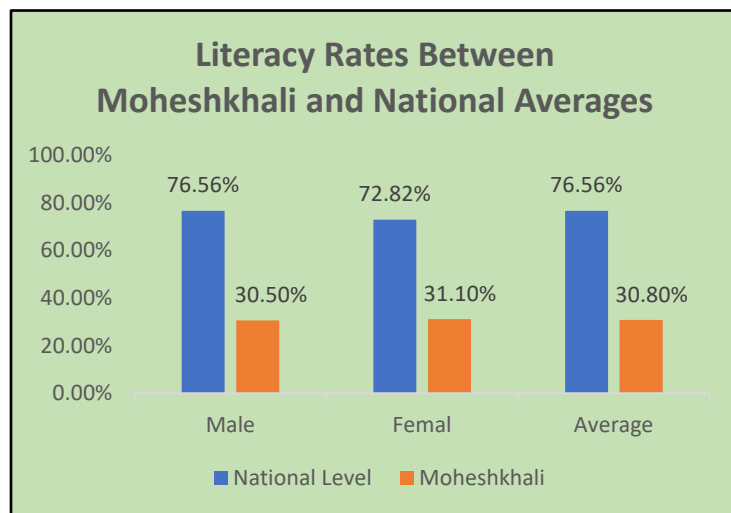


Figure 4.5: Literacy Rates Between Moheshkhali and National Averages

However, Moheshkhali presents a stark contrast, with an average literacy rate of just 30.8%. The literacy rate for males in Moheshkhali is 30.5%, while for females it is slightly higher at 31.1%. This low literacy rate highlights the ongoing challenges in the region, where frequent natural disasters, financial instability, and socio-cultural factors hinder educational access and outcomes.

The significant gap between Moheshkhali’s literacy rates and the national average underscores the need for targeted interventions to improve education in the region. Efforts to enhance literacy must focus on building resilient schools, increasing community awareness about the importance of education, and addressing the socio-economic barriers that limit access to learning.

#### 4.10 Key Factors Contributing to the Rising Dropout Rates in Moheshkhali

**Post-Disaster Financial Crises:** Families face severe financial hardships following natural disasters like cyclones and floods. Children, especially boys, are forced to leave school to help support their families through work.

**Frequent Cyclones and Floods:** Moheshkhali is prone to cyclones, tidal surges, and floods, which frequently damage schools and lead to prolonged closures. Many students, unable to keep up academically or forced to relocate, end up dropping out.

**Family Migration:** Climate disasters often force families to migrate in search of safety or better livelihoods. This displacement disrupts children's education, as they may not be able to enroll in new schools or continue their studies.

**Loss of Income Due to Death of Family Head:** The death of a family's primary income earner due to natural disasters leaves households in severe financial distress. Children, particularly boys, drop out of school to take on jobs and support the family.

**Vulnerable School Buildings:** The structural integrity of schools is often inadequate to withstand frequent natural disasters. Schools located in low-lying areas face waterlogging and storm damage, leading to regular interruptions in the academic calendar.

**Destruction of School Records:** Disasters frequently destroy school infrastructure, including student records, making re-enrollment difficult for displaced students, contributing to dropouts.

**Early Marriages:** In economically strained communities, early marriage remains a cultural and economic coping mechanism, especially for girls. Many girls drop out of school to get married, contributing to a gender gap in educational attainment.

**Increased Household Responsibilities:** After natural disasters, children, particularly girls, often assume greater household responsibilities, such as caring for siblings or helping with rebuilding efforts, which makes it difficult to continue attending school.

**Trauma from Disasters:** Children who experience traumatic events during natural disasters, such as the loss of a family member or home, may suffer from psychological distress. This often leads to a lack of motivation to attend school, increasing the likelihood of dropping out.

**Waterlogging and Flooding:** Many areas in Moheshkhali suffer from recurrent flooding and waterlogging, particularly in low-lying zones. This not only damages school buildings but also makes it difficult for children to commute, leading to absenteeism and eventual dropout.

**Impact of COVID-19:** The COVID-19 pandemic severely impacted the fishing industry, which is the primary source of livelihood for many families in Moheshkhali. Lockdowns and reduced market access resulted in significant economic setbacks, forcing many children to leave school to help support their families. Prolonged school closures during the pandemic further compounded the issue, as students lost motivation to resume formal education. Children who took on work or household responsibilities during this period found it difficult to return to school after such an extended break, ultimately leading to permanent dropouts for many.

**Others:** Additional factors such as political instability, lack of community awareness, and cultural barriers further contribute to the dropout crisis in Moheshkhali.

## CHAPTER 5

### Impact on Society, Environment and Sustainability

#### 5.1 Impact on Society

This research aims to provide a comprehensive understanding of how climate change affects the educational sector in coastal regions like Moheshkhali Upazila, Cox's Bazar, Bangladesh. The findings and insights from this research have the potential to significantly impact society in several ways:

1. **Policy Development:** A detailed analysis of the challenges faced by the education sector due to climate-induced natural disasters can inform policymakers. The research will provide evidence-based recommendations for developing policies and frameworks that enhance the resilience of educational infrastructure and ensure continuous learning despite environmental adversities.
2. **Educational Planning:** School administrators and educational planners can use the findings to implement effective strategies for disaster preparedness and recovery. This includes designing disaster-resilient school buildings, creating emergency response plans, and ensuring that education is prioritized even during crises.
3. **Community Awareness and Engagement:** The thesis highlights the broader socioeconomic impacts of climate change on education, raising awareness among communities about the importance of education in building resilience. Engaged and informed communities are better equipped to advocate for resources and support necessary to sustain education during and after disasters.
4. **Support for Vulnerable Populations:** By identifying specific vulnerabilities and challenges faced by students in Moheshkhali, this research can lead to targeted interventions that support the most affected populations. This includes programs to prevent dropout rates, support displaced students, and provide economic assistance to families prioritizing education.
5. **Long-Term Societal Benefits:** Ensuring that education continues despite climate challenges contributes to the long-term development of the region. Educated individuals are better

positioned to contribute to the economy, advocate for sustainable practices, and drive community development, ultimately leading to a more resilient society.

6. **Academic Contribution:** This thesis fills a gap in existing literature by focusing on a specific, under-researched area. Future researchers can build on this work to explore similar issues in other vulnerable regions, creating a broader understanding of the global impact of climate change on education.

By addressing these critical issues, this thesis not only contributes to academic knowledge but also provides practical solutions and strategies that can be implemented to safeguard the future of education in climate-vulnerable regions.

## 5.2 Impact on Environment

This research on the impact of climate change on the educational sector in Moheshkhali Upazila, Cox's Bazar, Bangladesh, extends its influence beyond the academic and social realms, contributing significantly to environmental awareness and action in the following ways:

1. **Raising Environmental Awareness:** By focusing on the tangible impacts of climate change on education, this research brings attention to the broader environmental issues affecting coastal regions like Moheshkhali. Understanding how climate-induced disasters disrupt education highlights the urgency of addressing environmental challenges and motivates communities to engage in sustainable practices and disaster preparedness.
2. **Promoting Sustainable Practices in Education:** The research advocates for integrating sustainability into the educational infrastructure and curriculum. This includes the adoption of eco-friendly building materials and energy-efficient technologies for school construction and renovation. Additionally, incorporating environmental education into the curriculum can foster a generation of environmentally conscious students who are more likely to adopt and advocate for sustainable practices in their communities.
3. **Supporting Disaster-Resilient Infrastructure:** The findings of this research can guide the development of resilient educational infrastructure capable of withstanding environmental stresses such as cyclones and floods. Promoting the construction of disaster-

resistant schools not only ensures continuous education but also serves as a model for building other community structures to better cope with climate change impacts.

4. **Encouraging Community-Based Environmental Initiatives:** The research underscores the importance of local communities in mitigating and adapting to climate change. By identifying the specific environmental challenges faced by Moheshkhali, the study can inspire community-led initiatives to protect and manage natural resources more effectively, such as coastal reforestation, mangrove restoration, and sustainable water management practices.
5. **Advocating for Climate Action and Policy:** Highlighting the direct link between environmental degradation and educational disruption makes a compelling case for urgent climate action. The research can be used to advocate for stronger environmental policies and regulations that address the root causes of climate change, emphasizing the need for global and local efforts to reduce greenhouse gas emissions and support sustainable development.
6. **Contributing to Environmental Research and Knowledge:** This study adds to the growing body of research on the intersection of climate change and human systems, particularly education. By providing data and insights specific to Moheshkhali, it contributes to a deeper understanding of how environmental changes affect different aspects of society and underscores the interconnectedness of environmental health and human development.

In summary, this research not only addresses the educational challenges posed by climate change but also promotes broader environmental awareness and action. By linking educational disruptions to environmental degradation, it underscores the need for sustainable development practices and resilient infrastructures that can withstand the impacts of climate change, thus benefiting both the environment and the community.

### 5.3 Ethical Aspects

Conducting this research on the impact of climate change on the educational sector in Moheshkhali Upazila, Cox's Bazar, involves adhering to several key ethical principles to ensure the integrity and respectfulness of the study:

#### 1. **Informed Consent and Voluntary Participation:**

- **Informed Consent:** All participants will be fully informed about the research objectives and methods, ensuring they understand how their data will be used.
- **Voluntary Participation:** Participation will be entirely voluntary, and participants can withdraw at any time without any repercussions.

#### 2. **Confidentiality and Anonymity:**

- **Confidentiality:** Personal data will be securely stored and kept confidential.
- **Anonymity:** Participant identities will be anonymized in all reports to protect their privacy.

#### 3. **Cultural Sensitivity and Respect:**

- The research will respect local customs and values, ensuring that community perspectives on education and climate change are honored and accurately represented.

#### 4. **Minimizing Harm and Ensuring Safety:**

- Efforts will be made to minimize any potential distress or discomfort to participants.
- Data collection will be conducted in a manner that does not expose participants to additional risks, especially in disaster-prone areas.

#### 5. **Transparency and Accountability:**

- The research process will be conducted transparently, with participants kept informed about the study's progress and outcomes.
- The research team will be accountable for maintaining high ethical standards and addressing any issues promptly.

#### 6. **Beneficence and Justice:**

- The study aims to benefit the community by providing insights to improve the resilience of the educational system.
- Fair and equitable treatment of all participants will be ensured, including the voices of marginalized or vulnerable groups.

#### 7. **Ethical Use of Data and Research Findings:**

- Data will be used only for the stated research purposes and shared responsibly.
- Findings will be communicated to the community and stakeholders in a practical and accessible manner.

By adhering to these principles, this study aims to conduct a respectful and responsible investigation into how climate change affects education in Moheshkhali, providing valuable insights while safeguarding participant welfare and community interests.

### **5.4 Sustainability Plan**

The sustainability plan for this research is focused on ensuring the long-term resilience of the education sector in Moheshkhali amidst the ongoing impacts of climate change. To achieve this, the following strategies are proposed:

1. **Community Engagement and Ownership:** Actively involving local communities, including parents, teachers, and local leaders, in the design and implementation of climate-resilient education initiatives. Building local capacity and ownership will ensure that communities continue to support and maintain educational activities even in the face of future climate disruptions.

2. **Collaboration with Local Government and NGOs:** Establishing strong partnerships with local government bodies, non-governmental organizations (NGOs), and international donors to secure ongoing financial and technical support. These collaborations can help scale up successful interventions and provide a continuous flow of resources for infrastructure improvements and educational programs.
3. **Capacity Building for Teachers and Administrators:** Providing continuous professional development for teachers and education administrators on climate adaptation, disaster preparedness, and educational continuity. Empowering educators with skills and knowledge will ensure that they can adapt to changing conditions and continue delivering quality education.
4. **Incorporating Climate Resilience into Policy:** Advocating for the integration of climate resilience into local and national education policies. Long-term sustainability will require education systems to be designed with climate risks in mind, ensuring that future investments in infrastructure, curriculum development, and teacher training are aligned with the challenges posed by climate change.
5. **Monitoring and Evaluation:** Establishing a robust monitoring and evaluation (M&E) framework to track the progress of interventions and adapt them based on feedback and changing circumstances. Regular assessments of educational resilience can help ensure the sustainability and effectiveness of climate adaptation strategies in the education sector.

By focusing on these key elements, this sustainability plan aims to create lasting improvements in the educational infrastructure, processes, and policies of Moheshkhali, ensuring that the education system remains resilient in the face of future climate change challenges.

## CHAPTER 6

### Summary, Conclusion, Recommendation and Implication for Future Research

#### 6.1 Summary of the Study

Titled "Impact of Climate Change Disasters on the Educational Sector of Coastal Area, Bangladesh," this thesis explores how climate change-induced disasters like cyclones and rising sea levels affect education in coastal Bangladesh. It investigates challenges such as infrastructure damage, resource constraints, and socio-economic impacts, leading to higher dropout rates and disrupted learning environments. By analyzing enrollment data, dropout rates, and literacy levels, the study underscores the urgent need for targeted interventions and resilience-building strategies to safeguard educational access and quality in vulnerable coastal communities.

#### 6.2 Conclusion

In conclusion, this study has underscored the severe impact of climate change on the education sector in Moheshkhali, Bangladesh. As a coastal upazila highly vulnerable to cyclones and saline water upsurges exacerbated by rising temperatures, Moheshkhali faces significant challenges in maintaining educational continuity and quality. The findings reveal that climate-induced disasters disrupt school operations, damage infrastructure, and contribute to high dropout rates, particularly among girls. These disruptions not only affect enrollment rates but also hinder educational attainment and perpetuate socio-economic disparities.

The study has highlighted the urgent need for targeted interventions to enhance the resilience of Moheshkhali's education sector against climate impacts. Effective strategies must include improving infrastructure resilience, enhancing resource allocation mechanisms, and implementing adaptive educational policies. Furthermore, community engagement and capacity building are crucial for fostering sustainable solutions that can mitigate the adverse effects of climate change on education.

By addressing these challenges, stakeholders can work towards ensuring equitable access to education and fostering a conducive learning environment despite the climatic vulnerabilities faced

by coastal communities like Moheshkhali. This study aims to contribute valuable insights to policymakers, educators, and community leaders striving to build resilient educational systems capable of withstanding the challenges posed by climate change in Bangladesh and similar contexts worldwide.

### 6.3 Recommendations

1. **Infrastructure Resilience:** Invest in climate-resilient school infrastructure in Moheshkhali to withstand cyclones, floods, and saline water surges. This includes retrofitting existing buildings and constructing new ones with disaster-resistant materials and designs.
2. **Resource Allocation:** Ensure equitable and sufficient allocation of resources to schools in Moheshkhali, prioritizing those most vulnerable to climate impacts. This includes funding for emergency preparedness, maintenance of facilities, and provision of educational materials.
3. **Community Engagement:** Foster community participation and awareness in climate resilience initiatives for education. Engage local communities, parents, and students in disaster preparedness programs and awareness campaigns to enhance resilience at the grassroots level.
4. **Educational Policy Adaptation:** Develop and implement adaptive educational policies that incorporate climate change considerations into curriculum development, school planning, and teacher training. This ensures that educators are equipped to address climate-related challenges in their teaching practices.
5. **Gender-Sensitive Approaches:** Implement gender-sensitive strategies to reduce dropout rates among girls in Moheshkhali. Provide targeted support such as scholarships, safe transportation options, and awareness programs to promote girls' education and combat early marriages.
6. **Research and Monitoring:** Encourage ongoing research and monitoring of climate change impacts on education in Moheshkhali. Establish data collection mechanisms to track educational outcomes, climate trends, and adaptation strategies, enabling evidence-based decision-making and continuous improvement.
7. **International Cooperation:** Facilitate international cooperation and partnerships to support climate resilience in Moheshkhali's education sector. Collaborate with global

organizations, donors, and educational institutions to leverage expertise, funding, and best practices in climate adaptation.

Implementing these recommendations will contribute to building a resilient education system in Moheshkhali, ensuring that students can access quality education despite the challenges posed by climate change. By fostering adaptive strategies and community empowerment, stakeholders can work towards sustainable development and enhanced educational outcomes in the face of ongoing environmental pressures.

#### **6.4 Implications for Further Study**

1. **Longitudinal Studies:** Conduct longitudinal studies to track the long-term impacts of climate change on educational outcomes in Moheshkhali. This would provide insights into how resilience measures and policy interventions evolve over time and their effectiveness in mitigating climate-related disruptions.
2. **Comparative Studies:** Undertake comparative studies across different coastal regions of Bangladesh to assess variations in climate impacts on education. Comparing resilience strategies, educational policies, and community responses can yield valuable insights for tailored interventions.
3. **Qualitative Research:** Expand qualitative research to explore in-depth the socio-cultural factors influencing educational resilience in Moheshkhali. Qualitative methods such as focus groups and interviews can provide nuanced understandings of community perceptions, adaptive behaviors, and local knowledge systems.
4. **Gender Analysis:** Conduct gender-focused studies to investigate specific challenges faced by boys and girls in accessing education amidst climate impacts. Analyzing gender dynamics in dropout rates, educational attainment, and socio-economic vulnerabilities can inform targeted interventions.
5. **Policy Evaluation:** Evaluate the implementation and impact of educational policies addressing climate resilience in Moheshkhali. Assessing policy effectiveness, stakeholder engagement, and institutional capacity building can guide policy refinement and scaling up of successful interventions.

6. **Economic Impact Studies:** Explore the economic implications of climate change on education in Moheshkhali. Assess the costs of infrastructure damage, resource reallocation, and loss of educational opportunities, and compare these with investments in resilience and adaptation measures.
7. **Cross-Sectoral Studies:** Undertake cross-sectoral studies to examine the interconnectedness of climate impacts between education and other sectors such as health, agriculture, and infrastructure. Understanding these interdependencies can foster integrated approaches to climate resilience.

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