ENVIRONMENTAL SECURITY IN INDIA AND BANGLADESH: A COMPARATIVE STUDY (1990S TO THE PRESENT)

Thesis Submitted for the Degree of Doctor of Philosophy in Arts at Jadavpur University

By

ANUPAM PATRA

Under the Supervision of

PROFESSOR BIJAYA KUMAR DAS

Department of International Relations

Faculty of Arts

Jadavpur University

Kolkata - 700032

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Certified that the thesis entitled Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present) submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the supervision of Professor Bijaya Kumar Das, Department of International Relations, Jadavpur University and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/ elsewhere.

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Introduction Since the late 1970s and early 1980s, several new issues have emerged in the international field, such as

the oil crisis in the Middle East countries , the massive human rights 1

violation, climate change issues, the problem of ozone layer, environmental degradation, the problem of climate migration, etc. Since the 1990s, environmental security issues have emerged as an essential part of human security.

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of human security . Like personal security, community security, health security , economic 80
security , food security, political security, and environmental security. Economic

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List of Abbreviations

BCCRF - Bangladesh Climate Change Resilience Fund

BCCSAP - Bangladesh Climate Change Strategy and Action Plan

CBD - Convention on Biological Diversity

CCAC - Climate and Clean Air Coalition

CCSAP – Climate Change Strategy and Action Plan

CDM - Clean Development Mechanism

CHT - Chittagong Hill Tracts

CM - Climate Migration

COP - Conference of Parties

CSD - Commission on Sustainable Development

DMA - District Management Authority

EC - Environmental Crisis

ED - Environmental Displacement

EG - Environmental Governance

ER - Environmental Refugee

ES - Earth Summit

ETP - Effluent Treatment Plants

GEG - Global Environmental Governance

HDR - Human Development Report

IMF - International Monetary Fund

IOM - International Organization for Migration

IPCC - Inter-governmental Panel on Climate Change

IVR - Interactive Voice Response

MNC - Multi -national Corporations

MoEF - Ministry of Environment and Forest

NCDMB - National Clean Development Mechanism Board

NCDMC - National Clean Development Mechanism Committee

NDMA - National Disaster Management Authority

NDMP - National Disaster Management Policy

NDMP - National Disaster Management Plan

NGO - Non-governmental Organizations

NMC - National Management Council

NTS - Non-Traditional Security

SDMA - State Disaster Management Authority

SLCP - Short - Lived Carbon Pollutants

UNCED - United Nations Conference on Environment and Development

UNCHE - United Nations Conference on the Human Environment

UNDP - United Nations Development Program

UNEP - United Nations Environmental Program

UNFCCC - United Nations Framework Conventions on Climate Change

UNGA - United Nations General Assembly

UNHCR - United Nations High Commissioner for Refugees

UNO - United Nations Organizations

USA- United States of America

WB - World Bank

WCED - World Commission on Environment and Development

WED - World Environment Day

WMD - Weapons of Mass Destruction

WSSD - World Summit on Sustainable Development

WTO - World Trade Organizations

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Introduction

Since the late 1970s and early 1980s, several new issues have emerged in the international field, such as the oil crisis in the Middle East countries, the massive human rights violation, climate change issues, the problem of ozone layer, environmental degradation, the problem of climate migration, etc. Since the 1990s, environmental security issues have emerged as an essential part of human security. Environmental security is an integral part of human security and conceptualized by Amartya Sen and Mahbub ul Haq and also developed by Human Development Report (HDR) in 1994 under the United Nations Development Program (Vogler 2017: 327).

In 1994, the Human Development Report identified the seven elements as the inalienable parts of human security. Like personal security, community security, health security, economic security, food security, political security, and environmental security. Economic security refers to ensuring a minimum income for individuals and groups; food and health security wants to ensure all people have access to their basic foods and protection from various diseases; and personal and community security wants to protect individuals and communities from internal and external violence and safeguard all communities from sectarian and ethnic violence. Political security refers to ensuring the system in which people can live in a society with dignity and that each person and group can be free from the unjustifiable exercise of power by the various organizations, institutions, and governments. Environmental security wants to minimize huge environmental pollution from industrialization and urbanization, natural and man-made disasters, and environmental degradation, as well as ensure the stability of human civilizations through the protection of the environment (Acharya 2017: 335).

The environmental security issue is a global common problem. In the international arena many international agreements, treaties, and conferences are conducted by the United Nations Environment Programme (UNEP), and the United Nations Development Programme (UNDP) for the sustainability of the global environment. Such as Antarctic Treaty in 1959, the United Nations Conference on the Human Environment, Stockholm in 1972 and founding of the United Nations Environment Programme, Convention for the Prevention of Oil Pollution from Ships in 1973, Convention on the Conservation of Marine Living Resource in 1980, Convention for the safety

of the Ozone Layer, Vienna in 1985, Convention on the Regulation of Antarctic Mineral Resource Activities in 1988 and the establishment of the Intergovernmental Panel on Climate Change (IPCC), United Nations Conference on Environment and Development, Earth Summit, Agenda-21, United Nations Conventions on Climate Change (UNFCC) and Convention on Biological Diversity (CBD) and the establishment of the Commission on Sustainable Development in 1992, the United Nations Framework Convention on Climate Change (Kyoto Protocol) in 1997, World Summit on Sustainable Development (WSSD), Johannesburg in 2002, IPCC Fifth Assessment Report in 2014, Convention on Climate Change of Paris Agreement in 2015, Conference of Parties - 28 was held in Dubai, United Arab Emirates in 2023 (30th November - 12 December) for the existence of human civilization etc. These are mentioned in specify in the first chapter (Vogler 2000: 1 and Vogler 2017: 322).

India and Bangladesh are two neighboring states in South Asia. Historically, geographically, and culturally, both countries are very much connected with each other. Especially, West Bengal is connected with the eastern part of India and the Bay of Bengal. On the other hand, geographically, Bangladesh is located near the eastern part of India and is connected to the Bay of Bengal. West Bengal and Bangladesh are both riverine. Particularly, the Bengali language is playing the most significant role in promoting the cultural bond between West Bengal and Bangladesh (Bhardwaj 2014: 1). Also, coastal parts of West Bengal and coastal areas of Bangladesh are geographically located in the Sundarbans, and most of the time, both parts (like islands and coastal areas) of the Sundarbans are affected by various issues of environmental security.

The researcher wants to explore the various issues of environmental security problems in West Bengal and Bangladesh, what are the impacts of climate change in the different parts of the Sundarbans coastal areas of West Bengal and Bangladesh, how climate change will increase climate migration (internal and external), why many Bangladeshi coastal areas people are migrating to India and particularly in West Bengal and what are the roles that West Bengal and Bangladesh governments promote to environmental security, etc.

The few coastal areas of West Bengal and Bangladesh have been identified for the explorative and comparative study. Several areas of West Bengal under the District of 24 Parganas,

such as Sagar Islands (The Ganges delta connected to the Bay of Bengal), Mousuni Island (near Namkhana, West Bengal), and Ghoramara Island (The Sundarbans Delta complex of the Bay of Bengal), and similarly, southern coastal parts of Bangladesh such as Barisal, Patuakhali, Kuakata, (under the Divisions of Barisal), etc have been identified for the collections of primary data.

Most of the cyclones, like Sidr (15th November 2007), Aila (25th May 2009), Fani (May 2019), Bulbul (19th Nov 2019), Amphan (2020), Yaas (May 2021), Sitrang (October 2022), etc. caused severe Cyclones storms that severely affected the coastal areas of West Bengal and the coastal parts of Bangladesh (Ahmed 2019) So, the researcher has identified a few areas for exploring environmental security and the livelihood situations during the cyclones in the coastal areas of West Bengal and Bangladesh.

'Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present)' – the study is attempted to be analyzed based on several research questions such as why, when and how environmental security is a part of human security, what are the theoretical perspectives on environmental security, what are the impacts of disasters and cyclones in the coastal areas of West Bengal and Bangladesh, how climate change will increase climate migrations in the different parts of West Bengal and Bangladesh, and what are the role playing of local administrations, the West Bengal Government and Bangladesh government promote to environmental security, etc. It should be noted that the research questions are mentioned more clearly in the first chapter.

At the same time, based on the research questions - the five chapters have been identified, and those chapters are – first; The emerging issues of environmental security are a part of human security; second; Theoretical framework of environmental security; third; Impacts of climate change in the different parts of West Bengal and Bangladesh: a comparative study, fourth; Climate change and environmental migration in the different parts of West Bengal and Bangladesh; and fifth; The role of West Bengal and Bangladesh governments promote to environmental security. Also, all the chapter's names are clearly mentioned in the first chapter. At the same time, researchers have reviewed a few books, book chapters, journal articles, and reports (which are mentioned in the first chapter) with secondary data and collected primary data from the various parts of West Bengal and Bangladesh for the comparative and explorative study.

Materials and Methods

- **Review of Literature**

Researchers have read many books, book chapters, and journal articles for the research. Like, *Globalization and Human Security in South Asia* edited by Abdur Rob Khan, *Security, and Southeast Asia: Domestic, Regional and Global Issues* written by Alan Collins, *Report of the World Commission on Environment and Development: Our Common Future (1987), Reviewed Work(s): Our Common Future* by World Commission on Environment and Development By Czech Conroy, Environmental Security and Conflict in Bangladesh: Nature, Complexities and Policies in *Peace and Conflict: the South Asian Experience* by Rafiqul Islam, *Non - Traditional Security Implications of Climate Change in Bangladesh* by Abdullah Ar Rafee, *Human Security Threats of Bangladesh: Challenges and Policy Options* written by Sheikh Masud Ahmed, *Environmental Security in South Asia: An Analysis of India and Bangladesh* by Satyendra Sing Narwaria, *Environmental Security of Land, Migration and Violent Conflict: Bangladesh-India* written by Dr. Narottam Gann.

Abdur Rob Khan in his book Globalization and Human Security in South Asia - points out that the concept of traditional security must be reinterpreted in recent times. Military power only guarantees the traditional security of states. According to him, the concept of human security has become more relevant. He pointed out that extreme poverty; illiteracy; economic crisis, and environmental degradation have overwhelmed the states rather than territorial security in third-world countries. According to him, it is now recognized internationally that national security is not the only indicator of human security.

At the same time, Abdur Rob Khan Points out that since the 1980s, the concept of human security has become more relevant and challenged the traditional concept of security. Since the end of the Cold War and the 1990s, the arena of security has been very much associated with social, economic, environmental, and human security. Although military power is a dominant force of the state, it is not the bearer of human security.

According to him, the concept of human security is related to the individual and society. But not all human security issues operate at the same level. Although it originates from the state,

its scope is not confined to the state's boundaries. It is embedded at various levels of individuals and societies, both nationally and internationally. He also noted that human security is more focused but less effective, and, according to him, the state is still a central player in international relations. He mentioned that extreme poverty, internally displaced people, anarchy, social violence, political instability, cross-border movement, etc. are human security issues in Bangladesh. At the same time, he mentioned, the Kashmir insurgency, North-East conflict, terrorism, the flow of small arms, etc. are human security issues in India. He has also mentioned, human security is more concerned with people than states. However, Abdur Rab Khan has not mentioned how environmental security problems affected the coastal areas of West Bengal and the coastal areas of Bangladesh (Khan 2001: 2).

Alan Collins has critically emphasized, (in his book Security and Southeast Asia: Domestic, Regional, and Global Issues) the notions of traditional security. He mentioned that critical security studies have rejected the realistic statement of security. He also criticized the theory of democratic peace and state (states do not fight each other in a democratic system). Alan Collins also points out; critical security studies also seek to transform the hegemonic power of the state. Also, critical security studies want to replace the hegemonic power of the states. He has mentioned that security comes from freeing people from poverty (want) and political oppression (fear). So, both theories, like, traditional notion of realistic theory and democratic peace theory are criticized by Collins.

Alan Collins also points out, environmental degradation, and resource scarcity are closely associated with environmental security issues. According to him, environmental security problems range from the local level (soil erosion) through the regional level (such as acid rain) to the international level (such as global warming) and include issues such as resource scarcity and modern urbanization. Thus, human security concerns are impacting the environment in such a way that the existence of human civilization is increasingly endangered. According to him, the traditional security of the state also often creates an environment of organized violence - which is partly responsible for environmental degradation. According to Collins, environmental problems should be considered human security problems, because people are dying due to living in an unhealthy environment, disease, corruption, natural disasters, etc. At the same time, resource scarcity is another issue of environmental security. He also pointed out that the capitalist economic

system is designed to determine winners and losers, which is very dangerous for the environment (Collins 2005: 1).

The World Commission on Environment and Development: Our Common Future (1987) reports mentioned that few urban governments in the developing world have the capacity, resources, and trained personnel to provide their rapidly growing populations with the land, services, and facilities necessary for adequate human life. Even, there are many limitations in the provision of clean drinking water, sanitation, adequate schools, and transport. As a result, illegal settlements with primitive facilities, a growing population, and the possibility of extensive diseases accompanying the unsanitary environment are also increasing.

Also, the World Commission report mentioned that most Third World cities have severe pressures from the problem of shelter and the burden of the massive urban population. Even so, most of the housing becomes much more dilapidated. Civic buildings are often decrepit and rundown. Also, the condition of roads, buses and trains, transport stations, and public facilities is disgraceful. Public transport is also overcrowded and overused. Again, the water supply system leaks, and the resulting low water pressure can cause sewage to seep into drinking water. A large portion of the city's population often lacks piped water, storm drainage, roads, etc.

According to the Brundtland Commission report on Environment and Development in 1987, out of 3,119 cities in India, only 209 have partial and only 8 complete sewage systems. On the river Ganges, about 114 /cities with 50,000 or more inhabitants discharge untreated sewage into the river every day. For example, several companies, including DDT factories, tanneries, paper and pulp mills, petrochemical and fertilizer complexes, and rubber factories, use the river for the dumping of their waste.

As mentioned in the report, the Hooghly Estuary (near Kolkata) is plagued by untreated industrial waste from more than 150 large factories around Kolkata. 60 percent of Calcutta’s population suffers from pneumonia, bronchitis, and other respiratory diseases caused by air pollution. On the other hand, Chinese industry, most of which uses coal in old heaters and boilers, is concentrated in about 20 cities and ensures high levels of air pollution. Lung cancer death rates in China's cities are four to seven times higher than in the country as a whole, and the cause is excess air pollution. Similarly, in Malaysia, the highly urbanized Klang Valley (which includes

the capital Kuala Lumpur) is affected by extreme pollution two to three times that of major cities in the United States, and the Klang River system is heavily polluted by agricultural and industrial waste and sewage (World Commission on Environment and Development Report 1987).

Rafiqul Islam in his book chapter on Environmental Security and Conflict in Bangladesh: Nature, Complexities and Policies in Peace and Conflict: The South Asian Experience, points out that even though environmental issues do not emerge as direct conflicts in society, they are increasingly becoming threats to human security. He also mentioned that, many conflicts are emerging in society based on environmental security issues. Extinction from sea level rise, extreme floods, droughts, and climate change are the causes of resource scarcity and increasing competition.

Rafiqul Islam pointed out that environmental security is more concerned with human security, including health, drinking water, physical security, livelihood, poverty alleviation, etc. Even, internal conflicts and civil wars are threatening environmental security. Resource scarcity is also increasing conflict in the international social system. According to him, environmental security refers to the management of environmental resources and conflict prevention - which can also reverse environmental degradation.

According to Rafiqul Islam, the main cause of environmental degradation is particularly in developing and underdeveloped societies where there is extreme competition among the people and they are gradually growing to exploit renewable resources (like water, land, forests, valuable trees, etc.). According to him, environmental conflict is most visible in developing and underdeveloped countries. He also pointed out that environmental conflicts are caused by the inadequate distribution of resources in society, the capturing of resources by powerful groups, and the deprivation of marginal people of their expected resources. Also, the scarcity of environmental resources will increase the possibility of conflict, instability, and rebellion between many groups and communities in Bangladesh.

He also noted that more than 50 million people are living in poverty in Bangladesh. Also, people live in remote and ecologically fragile parts of Bangladesh, such as flood plains, coastal areas, coastal islands, and peninsular regions. Rafiqul Islam has mentioned that environmental conflicts are visible in many places in Bangladesh. Internal conflicts are also on the rise due to

resource scarcity and the government's inability to meet people's basic needs, especially in coastal and urban areas. Such conflicts are visible not only in Bangladesh but also in India, Pakistan, and Nepal. Also, government ineffectiveness in the allocation of resources, river water disputes, and sand mining by powerful groups and local political leaders continue to increase violence and conflicts.

Rafiqul Islam mentioned that the Chittagong Hill Tracts (CHT) are an ideal example of a conflict zone. They are continuing to struggle with each other due to environmental resource scarcity and resource capture by powerful elites. The Scheduled Tribes of the Chittagong Hill Tracts are already suffering due to a lack of resources, and their normal lives are becoming more miserable due to the grabbing of resources by the elites of the plains. The state cannot avoid taking responsibility for this kind of conflict in society. Because the government has already arranged for Bengalis people to live in the Chittagong Hill Tracts, they are putting extra pressure on the Scheduled Tribes. So, conflicts are continuously increasing in society.

According to Rafiqul Islam, conflict is not only increasing among the people of the Chittagong Hill Tracts, also increasing among the people of (minorities and scheduled tribes) Madhupur, Dinajpur, Rajshahi, and Sylhet. The Phulbari Coal Mine conflict (2007) is an ideal example of resource scarcity conflict (Islam 2022: 221).

Non-traditional security expert Abdullah Ar Rafee explained in his popular research article Non-Traditional Security Implications of Climate Change in Bangladesh – the various cyclones, such as Tropical Cyclone Sidr in 1991, Cyclone Fani (2019), Cyclone Bulbul (2019), etc., were extremely affected in the coastal areas of Bangladesh. Bangladesh is a riverine country in south Asia and vulnerable due to irregular climate change. He mentioned, Bangladesh is the seventh most vulnerable country in the world due to climate change. Abdullah Ar Rafee mentioned food security problem, crisis of drinking water, the health security problem, the problem of climate migration, disbalances in ecosystem, etc. as the human security problems in Bangladesh.

According to him, as the availability of arable land in Bangladesh continues to decrease, the struggle to extract limited resources is increasing the possibility of conflict in the social system. Although climate change is not directly linked to conflict, it has been called a "threat multiplier," focusing on natural resource extraction and potentially increasing conflict. However, recent studies

have attempted to show the link between resource scarcity and conflict in rural Bangladesh. Even in the resource-rich Chittagong Hill Tracts, home to nearly half a million indigenous people, ethnic conflict has escalated over the past two decades and often continues (Rafee 2019).

Masud Ahmed points out in his article Non-Traditional Security Threats of Bangladesh: Challenges and Policy Options - human security issues have gained special importance and undeniable status in recent times. In the post-Cold War era, experts and analysts have emphasized human security. These security issues have made the global system more interdependent and complex. The past decades have been almost motionless due to increasing terrorist attacks, state failure, toxic epidemics, global economic recession, extreme poverty, and extreme natural disasters - especially Cyclones, earthquakes, floods, etc. They are alternative paradigms to traditional security. Indeed, human security focuses less on conventional military threats, and the concept of human security becomes more important. He also mentioned that environmental security issues are more challenging in the 21st century.

Masud Ahmed mentioned in 2007, Cyclone Sidr affected around 30 districts. He mentioned that the southern coastal areas of Bangladesh, and particularly the Barisal and Khulna divisions, were enormously affected. Cyclone Sidr (2007) was blowing about 240 km per hour. Due to Cyclone Sidr, around 3363 people were killed and 55882 people were hazardously injured. Simultaneously, 1.5 million houses were totally damaged, and around 2.5 million acres of land were destroyed. Two years later, Cyclone Aila (2009) was extremely hit in the coastal areas of Bangladesh and affected more than 14 districts of Bangladesh. Due to Cyclone Aila, more than 190 people died and more than 710 people were enormously injured. At the same time, about 6,000 km of coastal areas were damaged, and about 1,700 km of embankments were deteriorated. Simultaneously, almost 5 lakh people were displaced, and more than 4 million people were in danger after Cyclone Aila (2009).

He also noted that local and regional issues are particularly important in South Asia, as in other third-world developing countries, when it comes to environmental issues. For example, land, forest, marine, and water resources, etc. A majority of the population is dependent on them. According to him, the main environmental problems in South Asia are – (1) overpopulation explosion, (2) extreme poverty, (3) biodiversity disproportions and threats, (4) border migration

issues and conflicts, (5) natural disasters and other calamities (a) river erosion, (b) desertification; (c) floods and droughts, (d) crisis of water and poor quality of drinking water, (e) land degradation, (f) air pollution, (g) climate change, etc (Ahmed 2019: 1).

Environmental Scarcity of Land, Migration and Violent Conflict: Bangladesh-India written by Narottam Gann, and he mentioned that environmental degradation and conflict due to resource scarcity are the major problems in Bangladesh. According to him, conflicts are continuously increasing in Bangladesh due to resource scarcity and resources captured by few people and groups. He also mentioned that climate change is increasing global warming, high levels of sea rise, increasing land erosion, increasing deforestation, etc., and adversely affecting the environment (Gaan 2001:151).

- ## Research Gap

The researcher has identified major research gaps that are mentioned below:

a. Lots of research work has been completed concerning the traditional issues in India-Bangladesh relations. But these studies mainly focused on the issues of traditional security (like border, enclave, military, water sharing disputes, etc.).

b. Human civilization can't be secured without the protection of environmental security, and environmental security problems tremendously affected the coastal areas of West Bengal and Bangladesh, and the life situation and livelihood patterns of the affected people changed thereby. Previous studies did not focus on that.

c. Previous literature did not reveal the responses either of the West Bengal government or Bangladesh government towards environmental security. What are the major hindrances and responses to environmental security on the part of both governments? - The question is not answered.

d. What are the problems and prospects of environmental security in West Bengal and Bangladesh? - The answer to the question was not explored in earlier works.

e. The role of non-state actors in environmental security is quite untouched in the previous studies, and further, a comparative study on environmental security issues in the different parts of West Bengal and Bangladesh has not been discussed before.

- ## Research Questions

The researcher has identified a few research questions as mentioned below –

I. Is environmental security a part of human security? Why, when, and how?

II. How do environmental security problems affect the life situations and livelihoods of the coastal areas people of West Bengal and Bangladesh?

III. How climate change will increase environmental migration in the different parts of West Bengal and Bangladesh?

IV. What is the role of West Bengal and Bangladesh governments promote to environmental security?

- ## Aims and Objectives

The researcher has made an in-depth study. The aims and objectives of the study are cited below:

- To explore how emerging environmental security has become a part of human security; to examine how environmental security affects the coastal areas people of West Bengal and Bangladesh; and to identify the major problems of environmental security in West Bengal and Bangladesh;
- To diagnose the responses of the government and non-state actors in maintaining and promoting environmental security in different parts of the coastal areas and identify major prospects for environmental security in these areas;
- To analyze the life situation of the people of coastal areas of West Bengal and Bangladesh; and
- To examine a comparative study of environmental security in the different parts of West Bengal and Bangladesh.

- **Research Methods**

The research work entitled '**Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present)'** is exploratory and qualitative. In a few cases, the qualitative method may be supplemented by quantitative, if the researcher needs so. A researcher has used the various tools of qualitative methods such as, Interview, Observation, Participant Observation, Focused Group Interview with unstructured questions, Dialogue method, Phone recording, Phone cameras, etc. Discourse Analysis (oral and written texts) and Critical ethnography have also has been followed for the research (Eco 2015: 45, Mcnabb 2021: 9 and Thamilarasan 2015: 94).

- **Data Collection and Data Analysis**

Primary and secondary data has been collected for the comparative study. The researcher has to use the multi-tools of a qualitative method for the collection of primary data. Also, government publications and newspaper reports have been used for the research.

At the same time, the researcher has collected secondary data for the study, such as research-related literature, books, magazines, periodicals, journals, pamphlets, newspapers, websites, etc.

- **Chapterizations**

Introduction

Chapter - I Emerging Issues of Environmental Security as a Part of Human Security

Chapter - II Theoretical Framework

Chapter - III Impacts of Climate Change in the Sundarbans Coastal Areas of West Bengal and Bangladesh: A Comparative Study

Chapter - IV Climate Change and Environmental Migration in the Different Parts of West Bengal and Bangladesh

Chapter - V Role of West Bengal and Bangladesh Governments Promote to Environmental Security

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Chapter - I

Emerging Issues of Environmental Security as a Part of Human Security

1.1 Introduction

The concept of nation-state had been raised from the Treaty of Westphalia (1648). But it was concerned only with the territorial security of the states. Even the emergence of international relations through the establishment of the Woodrow Wilson Chair in 1919 conventionally focused on the nation-states, military power, economic power, and territorial security of the nation-states. Territorial security was the primary concern among the nation-states. But, since the 1970s and after the 1980s, the traditional notion of security has been challenged by several international scenarios, like the oil crisis of the Middle East, unexpected human rights violations, massive environmental degradation in the world, etc. Since 1990, the non-traditional notion of human security issues has become more relevant in global society, like personal security, community security, political security, food security, health security, economic security, women and child security, and environmental security. All these are core issues of human security. Human security is more concerned with people, communities, and societies than states. The concept of human security originated and conceptualized by Pakistani economist Mahbub ul Haq and Nobel laureate Indian economist Amartya Sen. At the same time, the concept of human security was emphasized in 1994 by the United Nations Development Program (UNDP) in the Human Development Report (Acharya 2017: 335).

During the 21st century, environmental security has become an integral part of human society. Human security wants to promote human dignity in global society. Human security actually goes beyond the narrow traditional territorial security of states. Human Security wants to ensure the security of individuals, communities, and society around the globe. The existence of human civilization is extremely dependent on the sustainability of the global environment. The existence of human civilization and human security cannot be secured without environmental

security (UNDP 1994). Environment and security are very much interlinked after the end of the Cold War. Environmental degradation is itself a massive threat to all human life on earth. Environmental degradation or climate change is also increasing the violent conflict in the world. So, environmental security must be protected for the sustainability of human civilizations (Graeger 1996: 109).

How environmental security is part of human security and what are the connections between human security and the environment have been analyzed in this chapter? Without the sustainability of the global environment, it is not possible to ensure human security. Researchers have tried to examine the connection between human security and environmental security. Environmental sustainability, reductions of greenhouse gases, minimization of environmental degradation, deterrence of global warming - without protection of the environment, it is very difficult to protect human security. Environmental security actually seeks to ensure the security of human society through the protection of individuals, communities, and societies. Since the 1950s, environmental security has emerged through several fields of study in political science, international relations, and social sciences, and has developed since the late 1980s and early 1990s. Human security is not concerned only with war, conflict, and weapons (biological, chemical, and nuclear). Actually, human security is more concerned with human dignity (Haq 1995). Human security wants to emphasize human development, promote social justice, develop a democratic environment, minimize the arms race and conflicts, promote human dignity, and ensure the protection of the global environment (Annan 2001).

In 1972, the United Nations Conference on Human Environment (Stockholm) established the United Nations Environment Programme (UNEP) for the sustainability of Environment. The main principle of the United Nations Development Programme was to maintain the balance of environment and ensure environmental security. Most of the environmental activities are maintained by the United Nations Environment Programme. Also, under the initiative of UNEP, the World Commission on Environment and Development (1983), Brundtland Commission Report (1987) was published. Also in 1973, the MARPOL Convention for Control of Oil Pollution from Marine Ship, in 1979 International Convention on the Control of Transboundary Air Pollution, in 1980 Convention on the Conservation of Antarctic Marine Living Resources, in 1982 the United Nations Convention on the Law of the Sea Convention (came into force in 1994), in 1984 Bhopal

Gas Tragedy, in 1985 Vienna Convention for the safeguard of the Ozone Layer, Chernobyl Nuclear Tragedy in 1986, Brundtland Commission Report on Sustainable Development in 1987, Intergovernmental Panel on Climate Change (IPCC) in 1988, Basel Convention on Elimination of Transboundary Hazardous Degradation in 1989, Madrid Protocol on Environmental Protection in 11991,etc. (Vogler 2017: 321). Montreal Protocol (1987) was another global environmental and stratospheric ozone regime. Montreal Protocol wants to reduce and eliminate the emissions of greenhouse gases (mainly chlorofluorocarbons) from the atmosphere (Sprinz and Helm 1999: 359).

In 1992, the Earth Summit was held in Rio de Janeiro (the capital city of Brazil), from 3rd June to 21 June for the protection of the global environment. About 178 countries and more than 100 representatives of non-governmental organizations participated in this conference (Roy 2015: 351)**.** Even many problems were arising on the issues of environmental security and developments. Yet, the UN Convention on Climate Change, the Convention on Biodiversity Protection, and Agenda-21 (sustainable development, poverty alleviation, deforestation prevention, biodiversity conservation, desertification and drought prevention, sustainable agriculture and promotion of rural development, protection of marine resources, protection of the atmosphere, promoting people's participation and responsibility, sustainable living, etc.) are adopted from Agenda - 21 of the Earth Summit (Priyam, Menon, and Banerjee 2009: 212).

In 1994, the UNDP Human Development Report mentioned environmental security as an integral part of human security. In the 1990s, two former classmates of Cambridge University, Indian Nobel laureate and development economist Amartya Sen and Pakistani human development economist Mahbub ul Haq, conceptualized the idea of human security, which was also expressed through the UNDP Human Development Report (HDR) in 1994 (Acharya 2017: 334).

There are many environmental issues in the international arena that are not subject to state jurisdiction. For example, many issues such as sea level rise, ice-covered South Pole or Antarctica (based on the 1959 Antarctic Treaty), Outer Space environmental problems (based on the 1963 Outer Space Treaty), increasing fog days, snow ablation and snow fall, rainfall, increasing monsoon depressions and cyclones, an increase in water crises, deforestation and desertification, environmental degradation, etc. are global common problems. All the issues of the global

atmosphere have been threatened and degraded by the rise of greenhouse gases and due to global climate change (Dash 2007: 94).

Environmental problems can't be solved by the few developed countries. Environmental issues have actually emerged as a global common problem in international relations. Multilateral agreements have been signed globally for the minimization of global environmental problems. Yet environmental security problems are gradually increasing around the globe. Most of the nation states are more concerned about their traditional development, and their multi process development tendencies (like extreme urbanization and excessive industrialization) will increase environmental degradation (Sant and Gambhir 2012: 289)**.** The Stockholm Conference in 1972, the UN Convention on the Law of the Sea in 1982, the United Nations Commission on sustainable development in 1987 (fulfilment of the needs of the present generation without compromising the needs of future generation) Intergovernmental Panel on Climate Change (IPCC), Earth Summit Conference in 1992, United Nations Conference on Environment and Development (UNCED) in 1992, United Nations Conventions on Climate Change (UNFCCC) in 1992 , Conservation on Biological Diversity (CBD) in 1992, Commission on Sustainable Development (CSD), Global Environmental Facility (GEF) for the low carbon, Clean Development Mechanism (CDM) etc. has established for the protection of environment.. The problem of environmental security is not a security problem of a country, or only a problem of developing countries. An environmental security problem is a global common problem (Vogler 2017: 322).

1.2 Kyoto Protocol (1997)

The international environmental conference was held in Kyoto, Japan in 1997, under the initiative of the United Nations Framework Convention on Climate Change (UNFCCC). This convention is known as the Kyoto Protocol. About 178 countries participated in the conference; including 38 industrialized developed countries attended the conference (Gayen 2012: 44). The convention was concerned how to minimize the greenhouse gasses (carbon dioxide, nitrous oxide, methane, ozone glasses, chlorofluorocarbons etc.) and protection of environmental sustainability. The conference representatives have acknowledged, the increase of greenhouse gasses in the atmosphere, especially carbon dioxide (overuse of fossil fuels such as coal, oil, natural gas, etc.) is the main cause of climate change and global warming. The UNEP has also mentioned that, the

developed countries take steps to reduce their greenhouse gasses emissions by 5.2 percent compared to their total carbon dioxide emissions in 1990 and it should be done from 2008 to 2012. Also, European Union countries (EU) will reduce greenhouse gas emissions by 8 percent, United States – 7 percent, Japan – 6 percent, Australia – 8 percent, Iceland – 10 percent.

Simultaneously, UNEP has mentioned that, since the 1870s to 1989, carbon dioxide levels increased by about 21.5 percent, and in 2007, they increased by about 30 percent due to industrialization and urbanization in developed countries. The World Energy Council (WEC) has also exposed that, in the five years from the 1990s to 1995, global carbon dioxide emissions increased by around 12 percent. So, increasing greenhouse gases are very dangerous for the environmental sustainability and protection of human civilizations (Dan 2008: 9).

It is true that, not only developed countries are responsible for environmental security; developing and underdeveloped countries are also responsible. Developing countries, including India and China, were exempt from regulating greenhouse gas emissions. Now, China is the world's top greenhouse gasses emitting country. China signed an environmental agreement with the United States on November 12, 2014, and US President Barack Obama visited Beijing. The joint declaration of US President Barack Obama and Xi Jinping stated that by 2025, the US will reduce its greenhouse gas emissions by 26-28 percent compared to 2005 levels. On the other hand, China will not increase its GHG emissions after 2030. But the deal does not say how many million tons China's GHG emissions will reach. That is, China can do whatever it wants until 2030, which is not an environment-friendly declaration. China has also surpassed the United States in terms of greenhouse gas emissions. Over the past few decades, China has been industrializing at an incredible pace, and pollution has been increasing. China’s Shenzhen, received 136 billion US dollars of foreign capital investment in 1979 - 2006. As a result, the population of Shenzhen city in 1979 was 3 lakh, and in 2021, the population of Shenzhen city stands at 12 crore, 5 lakh, 92 thousand (Roy 2015: 86).

Most nation-states are not concerned about environmental security. They are concerned about how to fulfil their national interest and maximize their profit. So, they are continuously engaging with their urbanization and industrialization processes, which, as a result, will increase greenhouse gases and affect climate change on the earth. The top 10 greenhouse gas emitting

countries in the world (ranked in 2004) are - the USA, China, Russia, India, Japan, Germany, Canada, Britain, South Korea, and Italy.

Table: 1.I List of highest 10 greenhouse gasses emitting countries in the world in 2004

Rank of the Countries	Countries Name	Total CO_2 in Mt	Per Capita Emissions
1.	USA	16,50,020	5.61
2.	China	13,66,554	1.05
3.	Russia	4,15,951	2.89
4.	India	3,66,301	0.34
5.	Japan	3,43,117	2.69
6.	Germany	2,20,596	2.67
7.	Canada	1,74,401	5.46
8.	Britain	1,60,179	2.67

9.	South Korea	1,27,007	2.64
10.	Italy	1,22,726	2.12

[Source: Roy, M. (2015). Visha Ushnayon O Jalobayu paribartan - kichu hiseb nikesh (in bengali). In M. Roy, *Paribesh Charcha: Itihas O Bibartan.* kolkata: Anusthup, pp. 110 -111].

Greenhouse gas emissions and environmental degradation are not affected by only the huge urbanization and industrialization of developed countries. Developing countries are also responsible and accountable for environmental degradation. In 2004, USA was the country with the highest carbon emissions, and India was the fourth carbon producing country in the world. In 2020, China ranked first as a carbon emissions country in world, and India's ranking was third.

Table: 1.II List of highest 10 CO2 emitting countries in the world on 2020

Rank of the Countries	**Countries Name**	**Total CO_2 in Mt**	**Per Capita Emissions**
1	China	11680.42	8.2
2	United States	4535.30	13.68
3	India	2411.73	1.74
4	Russia	1674.23	11.64

5	Japan	1061.77	8.39
6	Iran	690.24	8.26
7	Germany	636.88	7.72
8	South Korea	621.47	12.07
9	Saudi Arabia	588.81	16.96
10	Indonesia	568.27	2.09

[https://worldpopulationreview.com, accessed on 05/02/2023].

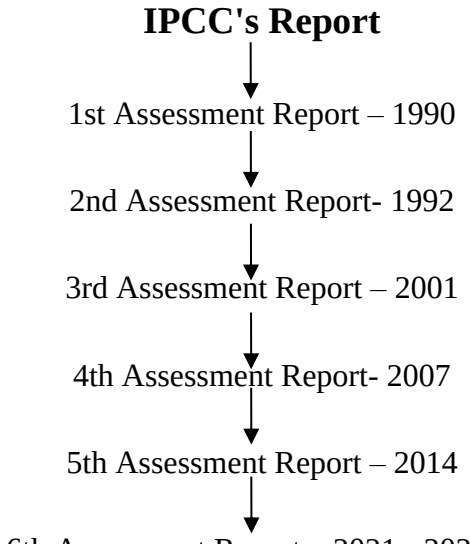
1.3 Post Kyoto Global Environmental Issues

The United Nations Environment Programme (UNEP) has mentioned that at least 55 of the participating countries in the conference must ratify the agreement for the Kyoto Protocol to come into effect, as well as the combined carbon dioxide emissions of these countries in 1990. Its amount should be at least 55 percent. Of these two conditions, 55 countries met the ratification conditions after Iceland ratified it on May 2002. On the other hand, the second condition was fulfilled after Russia ratified it on November 18, 2004, and the Kyoto Protocol entered into force on February 16, 2005. In 2006, it was ratified by around 162 countries. 14 countries have signed the Kyoto Protocol but have not ratified it. Among the two main countries are the USA and Australia. The United States signed the Kyoto Protocol under the leadership of President Clinton (1993-2001) on November 12, 1998, but later in 2001, US President George W. Bush refused (2001-2009) to ratify it, and, according to him, the conditions of the Kyoto Protocol were against US development. In fact, according to him, China, the world's second largest producer of greenhouse gases, is

excluded from the conditions of the Kyoto Protocol. At the same time, India is also a producer of greenhouse gases, but India has also been excluded from the conditions of the Kyoto Protocol for the sake of development - which is not reasonable, so the Bush administration refused to accept the conditions of the Kyoto Protocol (Gayen 2012: 44). In 2007, China established the National Climate Change Program for the control of greenhouse gas emissions and increasing the production of renewable energy (Hurrell and Sengupta 2012: 477). But China is the highest environmental polluting country in the world after 2020.

1.4 Intergovernmental Panel on Climate Change (IPCC) and UNFCCC

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 at the initiative of UNEP and the World Meteorological Organization (WMO). IPCC wants to scientifically explore why climate is continuously changing and what effects climate change can have on human beings. IPCC has also formed multi organs for exploring causes of climate change, like 'Working Groups' and 'Task Forces' etc.



The IPCC usually meets once a year and discusses the reports of working groups and task forces as well as making policy decisions. The first IPCC assessment report was submitted in 1990, and after this report was discussed in the UN General Assembly, The UNFCCC was formed in 1992. About 189 signatories and 5 observer countries are members of the UNFCCC (Ramachandran 2012: 63). The UNFCCC organizes a series of negotiations on the issues of

climate change, and those negotiations are called the 'Conference of Parties' (CoP). The first conference of parties (CoP-1) was held in 1995 in Berlin, Germany. The second conference of this organization, CoP-2 was held in Geneva, Switzerland, in 1996. This was followed by Kyoto (Japan) - CoP-3 in 1997, Buenos Aires (Argentina) - CoP-4 in 1998, Bonn (Germany) - CoP-5 in 1999, The Hague (Netherlands) - CoP-6 in 2000, Marrakech (Morocco) - CoP-7 in 2001, New Delhi (India) in 2002 - CoP-8, Milan (Italy) in 2003 – CoP-9, Buenos Aires (Argentina) in 2004 – CoP-10, Montreal (Canada) in 2005 – CoP-11, Nairobi (Kenya) in 2006 – CoP-12, Bali (Indonesia) in 2007 – CoP-13 (Basu 2014: 40). CoP-14 was held in 2008 at Poznan in Poland, Copenhagen (Denmark) in 2009 – CoP-15, Cancun (Mexico) in 2010 – CoP-16, Durban (South Africa) in 2011 – CoP-17 (Sengupta 2012: 101). Simultaneously, Doha (Qatar) in 2012 – CoP-18, Warsaw (Poland) in 2013 – CoP-19, 2014 in Lima (Peru) – CoP-20, in 2015 – CoP-21 in Paris (France), in 2016 – CoP-22 in Marrakech (Morocco), in 2017 – CoP-23 in Bonn (Germany), in 2018 -CoP-24 Katowice (Poland) , in 2019 - CoP-25 in Madrid (Spain), in the month of October-November 2021 - CoP-26 in Glasgow, (UK, and Northern Ireland) was held for the future "zero carbon" emissions in the world. CoP-27 was held in Egypt from November 6-20 in 2022, to enhance international cooperation in combating climate change. About 190 countries and 35,000 delegates attended the conference. Reductions of greenhouse gases are needed to prevent irregular climate change, minimize global warming, and maximize cooperation among the nation states for the goal of a sustainable environment and conservation of biodiversity. In 2023 (30th November - 12 December), Conference of Parties - 28 was held in Dubai, United Arab Emirates, and it was decided greenhouse gases needed to be cut by 43% by 2030 and compared to 2019 and also to limit global warming to 1.5 for the existence of human civilization, etc. (https://unfccc.int).

1.5 IPCC Fourth Assessment Report (2007)

The IPCC formed the three 'Working Groups' for the detailed study of global warming, greenhouse gasses, carbon trading, etc. -

(i) Working Group I (W-1)

To analyze environmental sustainability issues on the basis of physical science through theoretical perspectives.

(ii) Working Group II (WG-II)

To examine the impacts of global warming, adaptation, vulnerability, and impacts of climate change on human society.

(iii) Working Group III (WG-III)

To provide suggestions for human society, they will be protected from the potential hazards of climate change (Ramachandran 2012: 64).

Much discussion and debate ensued over the preparation of the fourth report of the IPCC. From the 40 countries, about 600 scientists have contributed to the formation of the fourth assessment report of IPCC. About 620 experts and government representatives completed this assignment. The report of WG-1 was adopted in Paris from January 29 to February 1, 2007. Government representatives from 113 countries around the world analyzed this report. The full report of WG-II was published on September 18, 2007, and the third report was also published in September 2007.

IPCC's Fourth Assessment Report was published on 16 November 2007 as the "Synthesis Report". Wherein six important points are mainly emphasized as follows -

(i) To observe the trends and impacts of climate change on human society.

(ii) To analyze the causes of climate change.

(iii) To sensitize human society for the prevention of emerging situations from climate change.

(iv) To notify the impacts of climate change and effects of climate change on human society.

(v) To initiate the socio-economic and scientific steps for sustainable development.

(vi**)** To analyze the uncertainty of nature (Basu 2014: 44).

1.6 IPCC Fifth Assessment Report (2014)

In November 2014, seven thousand reports of the IPCC were converted into a 40-pages 'Synthesis Report' and the most important issues of the ‘Synthesis Reports' are following the below –

i. During the second half of the 20th century, irregular climate changes were the consequence of human activities. The irregular climate change has been raised due to the greenhouse gasses that created over population and maximized profit tendencies of economic development. We have not seen, within the last 800,000 years, an increased level of greenhouse gasses in the atmosphere.

ii. 1983–2012 was the warmest decade in the Northern Hemisphere's 1400-year history of earth. The atmosphere and the ocean's temperature are gradually increasing. At the same time, sharpness of the ocean is increasing. About 26 percent acidity has increased since the industrial revolution.

iii. The sea level has risen about 0.19 meters in the last hundred years. North Pole ice is decreasing at a rate of 4 percent per decade, while South Pole ice is increasing at a rate of 1.5 percent per decade.

iv. Environment protection is possible through the reduction of greenhouse gas emissions. But the question is - how much? According to the IPCC, if possible, 100 percent is dropping. Reducing GHG emissions will not be immediate, as it will take many years to moderate the climate change processes already underway due to GHGs in the atmosphere and oceans. Until then, we have to plan to adapt to these changes and survive (Roy 2015: 80). Environmentalist and Nobel Peace Prize laureate Rajendra K. Pachauri (2002 - 2015), former chairman of the IPCC, and South Korean economist and environmentalist Hoe Sung Lee (2015 - present), the current chairman of the IPCC, have mentioned that if states demonstrate irresponsibility, there is no doubt the environment as well as the existence of human civilization will be threatened and degraded.

1.7 The North vs. South Debate

Since the 20th century, the 'North vs. South debate' has become more complicated in international relations through several issues such as environmental security issues, sustainable development, New International Economic Order (NIEO), etc. Modernist theorists such as Walt

Rostow, Lerner, Deutsch, Almond, Lipset, Rokkan, Weber, Parsons, etc. have explained the economic, social, political, and cultural aspects, but all agree that the capitalist states of the North are not in equivalence with the developing states of the South. There is a gap between North and South countries and also between their relations. In the 1950s-60s, the modernist theory emphasized on the core issues of development (growth first, redistribution later) and in the 1970s, along with economic development, democratization and people can live in a healthy environment also came up. The issue of development is closely related to the recent debate between the North and the South on the issue of environmental security that has emerged in the international arena. Dependency Theorist Andre Gunder Frank has mentioned (in his book 'The Development of Underdevelopment') over-dependency of developing countries on developed countries is the reason for the deterioration of developing countries, and the imperialist hegemonic attitude of developed countries toward developing countries will increase the conflicts between the North-South countries (Kruger: 2).

The traditional state-centered economic development process, extreme levels of urbanization and industrialization in the developed countries of the world have been increasing greenhouse gases and environmental pollution. On the other hand, lack of awareness about the environment and poverty in developing and underdeveloped countries like Asia, Africa, and Latin America are responsible for environmental degradation. The developed countries are blaming the developing and underdeveloped countries for the environmental degradation, and the third world countries are blaming the extreme industrialization and urbanization of the developed countries for the environmental degradation. It is true that developed countries will be more responsible for environmental sustainability, while developing and underdeveloped countries will be responsible for environmental protection. But the problem is who listens to whom in the world.

There is no reason to deny the existence of 'global inequality' in international politics. The disparity between the North and South countries seems to be a structural feature of the international system. The emerging environmental debate on the issues of climate change has become a common issue in international environmental politics. But, that is true not only for the USA, also for China, India, Russia, Japan, Iran, Germany, South Korea, Saudi Arabia, Indonesia, Canada, Brazil, South Africa, Mexico, Turkey, Australia, United Kingdom, Italy, Vietnam, France, Thailand, Pakistan,

Iraq, Ukraine, Bangladesh, etc. countries that are also responsible for environmental degradation (Hurrell and Sengupta 2012: 463).

1.8 World Summit on Sustainable Development

From August 26 to September 4, 2002, the World Summit on Sustainable Development was held in Johannesburg, South Africa. The conference focuses on the reduction of poverty and sustainable development (without any loss of environment) for the promotion of environmental sustainability. The main issues of the conference were-

(i) Halve the number of people living on less than $1 in the world in 2015.

(ii) Ensuring the development of 10 core slum people within 2020.

(iii) Halve the number of people in 2015 who are not getting proper drinking water.

(iv) Halve the number of people within 2015 who are not getting the sanitation facility (Roy and Chakrabarty 2010: 185).

(v) Ensuring the basic needs of people, such as food, energy, shelter, water, health, education, etc., and improving the standard of living.

(vi) To control the overpopulation.

(vii) To control the use of mineral resources and increase the use of renewable resources (Wind power, Hydropower, Solar energy, Hydroelectricity, Biomass, Geothermal power, etc).

(viii) Taking the appropriate measures to the conservation of biodiversity.

(ix) To promote rural development.

(x) Encourage the people to participate in all decision-making processes.

(xi) Enhancing cooperation in the political, social, economic, administrative and international arena for the protection of the global environment (Dan 2008: 61).

In December 2015, UNFCCC signed the Paris Agreement (CoP-21) for the prevention of greenhouse gases in the atmosphere, minimizing irregular climate change, preventing global warming, and controlling 55 percent of carbon emissions (at least 55% of total GHG emissions control). About 190 countries had signed the Paris Agreement. US President Barack Obama has also agreed to the binding regulations of the conference. But, subsequently, the representative of the Democratic Party, US President Donald Trump (January, 2017 - January, 2021), refused to meet the terms and conditions of the conference. President Donald Trump has disagreed with the Paris Agreement and wants to withdraw his consent to the agreement in June 2017. However, Article 28 of the Paris Agreement specifies that a state can apply for consent withdrawal after three years after the agreement, and after one year, any state can withdraw consent. As per the terms of the Paris Agreement, the United States withdrew consent from the agreement on 4th November, 2020. Since then, the USA (under President Trump) has completely undermined environmental sustainability. However, currently under the leadership of US President Joe Biden (January 20, 2021–present), the United States has rejoined the Paris Agreement for the sake of environmental security on January 20, 2021 (Horowitz 2016: and https://www.nrdc.org).

1.9 Nature of the Study

Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present) is entirely environmental and people centric. The study is more concerned with the livelihood security of the people of the people of the Sundarbans coastal areas of West Bengal and Bangladesh than the territorial security of the nation states. Simultaneously, the study is purely humanitarian, pro environmental, and people centric rather than the traditional notions of the security of the state in West Bengal and Bangladesh. At the same time, it is a comparative and exploratory study on environmental security in West Bengal and Bangladesh.

1.10 Conclusion

In the study of the first chapter, the researcher has concluded that environmental security is actually an integral part of human security. Human protection cannot be ensured without environmental security. Environmental security is a humanitarian issue that cannot be secured only through the military and economic power of the state. If states can become more humanitarian and

foster an atmosphere of cooperation in the international arena by controlling extreme industrialization, unplanned urbanization and minimum sacrifice their national interest, that can be possible to ensure environmental security. Environmental security is not possible through several international environmental conferences, agreements, acts, etc,

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Chapter - II

Theoretical Framework

2. 1 Introduction

Environmental security is a part of human security. The researcher wants to explore how the environmental crisis has been affecting the livelihood of the people in the coastal areas of India and Bangladesh, especially since the 1990s. The issue of environmental security has been analyzed through various theoretical perspectives, especially through multiple theories of international relations. But, traditional theories of international relations (such as realism) have not given importance to the issue of environmental security. However, many theories and approaches like Realism, Neo realism, Liberalism, Neoliberal Institutionalism, Marxism, Critical Theory, Constructivism, Feminism, Green Theory, Global Environmental Governance, etc. have been analyzed from the various perspectives of global environmental security.

2.2 Realism and Neorealist Perspectives on Environmental Security

A traditional theory of international relations like realism primarily emerged by Thucydides (460 BC- 400 BC), Kautilya (375 BC- 283 BC), Thomas Hobbes (1588 - 1679), Niccolo Machiavelli (1469 - 1569) and was extended by EH Carr (1892–1982), Morgenthau (1904–1988), and later by Kenneth Waltz (1924–2013). It is true that environmental security is part of human security, and the existence of human civilization depends on environmental security. But realism was not given importance to environmental security as a human security. Realism was given importance only to the state actors and the territorial security of the states. This theory actually believed that without military power and economic power (hard power), the state couldn't survive. So, without military and economic power, it is very difficult to ensure the territorial security of states. At the same time, realism mentioned that those states are less powerful in the world, but they can assure their security through the creation of alliances. According to realism, the strategy of the alliance will create a balance of power and assure the territorial security of less powerful states from the powerful nation-states.

Realism has mainly neglected environmental problems. Realists do not believe that environmental problems will be a threat to nation-states. Classical realist thinker Hans J. Morgenthau, in his book "Politics among Nations: The Struggle for Power and Peace" (1948), analyzed environmental issues as determined by the constituent national power of the states. According to him, economic and military power are the main pillars of the state, and territorial security is the primary concern of the nation-states. So, environmental security problems are treated by the capabilities of nation-states. If nation-states are able to protect their territorial security, environmental problems will be reduced. According to Morgenthau, environmental security issues are a fixed contextual factor, and environmental crises will be reduced by constituent national power (Vogler 2017: 331). But, at the threshold of the 21st century, Morgenthau's idea that the security of the environment depends only on the constitutional power of the state is no longer applicable. Nor is it true that states with more power are better able to ensure environmental security than states with less power. The activities of the United States and China can be highlighted as a shining example. Despite being more powerful in conventional and non-conventional aspects, the United States and China are now the most environmentally polluting countries in the world. Even now, China has surpassed the United States in terms of environmental pollution. In 2004, the United States was the world's number one global warming country, with greenhouse gas emissions of 1,650,020 metric tons and 5.61 metric tons per capita, while China emitted 1,366,554 metric tons and 1.05 metric tons per capita (Roy 2015: 110). After 2020, as the world's first warming country, China's greenhouse gas emissions will be 11680.82 metric tons, and per capita emissions will be 8.2 tons. On the other hand, the United States is the second carbon emission country in the world, producing 4535.3 metric tons, and the number of emissions per capita is 13.68 metric tons (https://worldpopulationreview.com). In other words, it can be said from the example of the two countries that it is not possible to ensure the security of the environment by increasing the economic and military power of the states.

On the other hand, realism in the 1970s - 1980s failed to provide an accurate explanation of international circumstances. At the same time, passionate competition and conflict in nuclear, biological, and chemical weapons production and competitions of arms races created the environment of a security dilemma in the international arena (Basu 2012: 18). In such an unstable situations, structuralism, or neo-realism emerged in the late 1970s as a new form of realism to properly review the international anarchist system. New realist thinker Kenneth Waltz's explained

in his book Theory of International Relations (1979) that international structure is more important than states. States are the only units within the structure. Kenneth Waltz and neo-realism argued that structure can promote international cooperation and security of the whole system as well as security of state (Dunne, Brian and Schmidt 2017: 92).

According to neo-realist scholar Kenneth Waltz, the international structure is anarchic, but the international structure governs states. In this anarchic structure, states are constantly competing to maintain the balance of power against each other. The only possible way to ensure the security of the nation states through a balance of power. That is, when states try to maintain a balance of power within the framework, other states also try to increase their power in order to feel secure against other states. Neo-realism also does not give the same importance to the environmental security determined by the military power of the nation state. This theory holds that environmental security issues or individual security issues are not equivalent to state conflicts, national interests, or state security. If the environmental problem ever threatens the security of the state, then it can be said about the security of the environment. A further view of neo-realism is that, like environmental problems, migration should not be considered a security problem unless it causes intra-state problems or national security problems (unless migration is linked to terrorism) in the state (Ari and Gokpinar 2020: 47). That is, neo-realism does not consider environmental problems or migration problems as security problems. But, in the first half of the 21st century, the problem of environmental security has become more dangerous than the problem of terrorism, intensifying the existential crisis of human civilization.

2.3 **Liberal and Neoliberal Institutional Perspectives**

In the late 18th century, Immanuel Kant's (1724 - 1804) famous book "Perpetual Peace: A Philosophical Sketch" (1795) or, in the first half of the 20th century, Woodrow Wilson's (1856-1924) idealistic thought appeared in the international arena and later developed through Michael Doyle's “Democratic Peace Theory’’. Liberalism in the international field, like realism, recognizes that international society is an anarchic social system. However, liberalism does not consider the state as self-interested, violent, or power-monger as realism does. Liberalism considers that states do not fight against another nation-state in the international arena. According to liberalism, the state is always peaceful. States seek to establish international peace by promoting harmony,

solidarity, and cooperation in the international arena. Traditional liberalism did not attach much importance to environmental security in the early stages. However, liberalism believes that it is possible to solve environmental problems through international cooperation (cooperation between state actors, non-state actors, transnational actors, transnational corporations, international non-governmental organizations, etc.) and subsequently solve environmental problems while creating an environment conducive to healthy living (Dunne 2014: 99).

The international liberal tradition believed that global ethics is very much needed for environmental protection and that it is made through the establishment of global governance. International liberal thinker Immanuel Kant also placed special emphasis on morality. Incidentally, it should be noted that, until the 1950s, the issue of the environment did not receive such importance in the international arena. Even the researchers in international relations did not give importance to the field of environmental security issues until the 1950s. Simultaneously, even the states have not provided any financial support to the universities research for the prevention of environmental problems. However, since the 1970s, neo-liberal institutionalism has emphasized the global environment. According to neo-liberalism, the various environmental issues such as the atmosphere, water crisis, high-level sea rise, global warming, climate change, increase in greenhouse gas emissions, etc. are 'global common problems' and 'transboundary character'. International liberalism has emphasized international cooperation, global governance, and environmental ethics in the solving of global problems (Wapner 1997: 213).

Liberal institutionalism emerged as a branch of liberalism in the 1940s, and since the 1970s, it has become known as neoliberal institutionalism. Robert Keohane (1941- present), and Joseph S. Nye (1937- present) have also enriched neo-liberal institutionalism. This trend emphasizes that the development of various types of international institutions can promote international peace and security rather than states. International institutions have again brought about the emergence of integration theory in the international field. David Mitrani, Ernest Haas, etc. have also emphasized in international organizations (like the United Nations, European Economic Community, European Union, International Monetary Fund, World Bank, African Union, SAARC, ASEAN, etc.) that can be ensured environmental sustainability (Basu 2012: 21).

Until the late 1980s, traditional theories of international relations did not find any solution for how to minimize global environmental problems. Apart from that, there is no eagerness among international relations researchers to write about environmental security. In 1987, the Brundtland Commission report gave the idea of sustainable development (fulfilment of the needs of the present generation without any loss of future generations and without any damage to the environment), and later the global environmental conference was held in 1992 (the United Nations Conference on Environment and Development) for the sustainability of the environment. Again, the study of global environmental politics was started as a sub-discipline of international relations and emphasized international institutions, intergovernmental negotiations, international regimes, etc. Global environmental politics have now become 'global environmental negotiations' and these negotiations (between states and non-state actors) are essential for international cooperation (Jakobsen 1999: 206). Environmental degradation is a 'collective action problem that must be solved by this collective responsibility. So, it is very much necessary for the establishment of multinational institutions, international cooperation, and global regimes for the reduction of environmental degradation (Yong 1990: 339). Since the entire human society is responsible for global environmental changes and the situation of the environmental crisis (Young 1990: 335).

Neoliberal institutionalism also expressed views on global warming as a threat to the environment. International politics is also affected by the problem of global warming. Realism did not provide any concrete ideas about how to prevent global warming. However, neoliberal institutionalism holds that liberal international institutions help build framework conventions through which environmental balance can be maintained. Neoliberal institutionalism asserts that multiple international organizations and international environmental conventions continue to play a positive role in preventing global warming. Such as the Stockholm Conference (1972), the World Climate Conference and World Climate Program (1979), World Meteorological Organizations (earlier it was named International Meteorological Organization-1983), the Vienna Convention (1985 - protection of the Ozone layer), Intergovernmental Panel on Climate Change (1988), United Nations Conference on Environment and Development (1992 - Earth Summit), Kyoto Protocol on United Nations Framework Convention on Climate Change (1997), IPCC 5th Assessment Report (2014), Paris Agreement (2015 - Conference of Parties CoP-21 etc.) Neoliberal institutionalism views international organizations and international conventions as committed to preventing global warming and protecting the environment (Paterson 2017: 59).

Neoliberal institutionalism holds that there is no way to maintain world peace or environmental security without interdependence, especially international cooperation. New liberal thinkers such as Robert Keohane, Joseph S. Nye, James Rosenau, and others have emphasized that international cooperation and interdependence can reduce environmental problems in this anarchical system. Even, since the problems of the international environment are global common problems, solutions are not possible without universal action or joint solutions (Hurrel and Kingsbury 1992: 1). Neoliberal institutionalism recognizes that various international problems (such as environmental problems) are exacerbated by the absence of a central authority in the international arena. New liberal institutional thinkers such as Peter M. Hass, Marc Levy, and Robert Keohane did not rely on the only world government to prevent global environmental problems. They emphasized interstate cooperation to maintain the status quo of the global environment (Hass, Keohane, and Levy 1993: 4).

Neoliberal institutional thinker Oran Young (1994) raised the question of how the global environment can be protected without the cooperation of world governments. For example, he noted that environmental problems cannot be solved without collective solutions, like problems of the ozone layer, atmospheric problems of the atmosphere, high-level sea rise, etc. Therefore, he said to emphasize global governance for the sake of environmental security (Young 1994).

Liberalism and neoliberal institutionalism have not avoided the issue of global environmental security, such as realism. The liberal perspective was more concerned about international cooperation. Actually, liberalism believes that environmental security cannot be achieved without international cooperation. At the same time, the liberal institutional approach has emphasized global environmental governance. New liberal institutionalism is optimistic that global environmental governance (through expansive cooperation between governments and non-state actors) will be much more effective in the prevention of environmental security problems (Vogler 2014: 331).

2.4 Marxism and Global Environment

Karl Marx's (1818-1883) proclamation about the international environment is not accessible directly, but later many Marxist and especially Neo-Marxist thinkers were concerned about the environment. Marxist thinkers John Atkinson Hobson (1858 - 1940), Rosa Luxemburg

(1871 - 1919), Nikolai Ivanovich Bukharin (1888 - 1938), Vladimir Lenin (1870 - 1924), Raul Prebisch (1901-1986), Fernando Henrique Cardoso (1931 - present), Andre Gunder Frank (1929-2005), Immanuel Wallerstein (1930 - 2019), Antonio Gramsci (1891 - 1937), Robert Warburton Cox (1926 - 2018), etc. discussed how the environment was gradually despoiled (Hobden and Jones 2017:110.

Marxist approach blames the deterioration of the global environment on states' intense desire to exploit material resources, consumerist social systems, unrestrained plunder of natural resources, and the unbridled expansion of global capitalism. Karl Marx wrote the book Capital: A Critique of Political Economy (Das Kapital) in 1867, and he extremely criticized capitalism. According to the Marxist perspective, global capitalism, extreme industrialization, urbanization, and free market systems are the main causes of environmental degradation (Newman 2002: 10). At the same time, Lenin in his book Imperialism: The Highest Stage of Capitalism (1916), strongly criticized the imperialist capitalist system. The Marxist approach also sought to resolve conflicts between states by establishing socialist regimes in the international arena that could balance and maintain environmental sustainability. The Marxist ideas were criticized by Kenneth Waltz. According to him, states are running for power, competition, and security purposes in the anarchical world. So, it is very difficult to establish socialist regimes around the world. This idea has been described by Kenneth Waltz as the 'second-image' in the world (Linklater 2013: 113).

Climate change and the crisis of the environment have been discussed by the neo-Marxist school as decisive problems of the existing civilization. Marxism identifies the problem of climate change as a problem of the whole international system, and the main cause of this problem is the growth of global capitalism and the extreme aspiration of a capital system. Therefore, Marxism has given paramount importance to the world socialist system as an alternative of global capitalism for the sustainability of the environment (Satgar, 2).

Marxist and Gramscian authors Paterson and Newell criticized the state system and institutional system in the international field. They mentioned that the state system is the main cause of environmental problems in the world. Most of the time, directly and indirectly, states engaged in the manufacture of various weapons like nuclear, chemical, and biological weapons,

and also states were involved in arms races and arms imports-exports competitions around the world. These circumstances are not only dangerous for states, but simultaneously, it is also undeniably hazardous for environmental security. In 1945, the United States of America's nuclear explosions in Hiroshima and Nagasaki (in Japan) and the recent Russia-Ukraine crisis also threatened the balance of the environment and human sustainability. Marxist and Gramscian writers Paterson (2001) and Newell (2012) have also strongly criticized the expansion of the constitutional powers of the state and the expansion of global capitalism in the world. According to him, the state system is not an environmental problem-solving institution. The state system is part of the problem of global capitalist society. Because states want to promote global capitalism, global capitalism reproduces a class-discriminatory social system and a dehumanizing exploitative class relationship that are extremely damaging to the global environment (Paterson 2001; Newell 2012). In addition to global capitalism and international economic institutions such as the World Bank, International Monetary Fund, World Trade Organization, and other institutions in the name of financial and technical support, multiple conditions of the burden of financial debt on third-world countries are gradually causing the crisis of the global environment. (Vogler 2017: 331).

2.5 Critical Theory and Environment

The origins of critical theory in international relations are derived from Marxist ideology and the many thinkers and researchers of the Frankfurt School in Germany. Critical theory emerged in international relations in the 1920s and 1930s, and critical theory extended into the 1980s. Important theorists and researchers of critical theory are Robert Cox (1926 - 2018), Andrew Linklater (1949 - 5th March 2023), Max Horkheimer (1895 - 1973), Theodor Adorno (1903 - 1969), Walter Benjamin (1892 - 1940), Herbert Marcuse (1898-1979), Jurgen Habermas (1929 -), Axel Honneth (1949 -), etc. (Devetak 2013: 162). Critical theory has strongly criticized material power, hegemonic ideology, and institutions. Because critical theory thinks that all these elements and instruments are dangerous for environmental security.

Simultaneously, critical theory has criticized modernism, idealism, the process of techniques of global capital exchange, global capitalism, corporate capitalism, corporate technocrats, material power, etc. Critical theory argues that artificial modern mechanisms, unconditional expansions of global capitalism, free capital market economy, and exploiting

modern machinery systems has gradually turned the natural environment into 'second nature' for the sake of the expansion of capitalism. According to Robert Cox, the two traditional theories of international relations, realism, and liberalism, were actually developed in the interests of the security of state actors and international institutions, not in the interests of preserving the balance of the ecosystem. Karl Marx, Marcuse, and Gramsci have all strongly criticized the modern economic and social system. Also, critical theory mentioned that the modern capitalist system has gradually destroyed the ecosystem and artificially creates a crisis of nature. Critical theory reminded us that the modern machinery capitalist system is extremely threatening to the environment. Therefore, Critical theory makes a strong claim that, nature is to be free from materialistic, capitalist, artificial technology, economic, social, political and cultural structure for assuring natural sustainability (Luke 2003: 238).

2.6 Environmental Security and Constructivism

Constructivist theory has emerged in international relations since the 1980s, and it has developed since the 1990s in the post-Cold War era. At that time, also emerged human security in the world. The main proponents and scholars of constructivist theory are Alexander Wendt (1958 - present), Nicholas Onuf (1941-present), Martha Finnemore (1959 - present), Peter Katzenstein (1945 - present), John Ruggie (1944 - 2021), etc. The constructivist theory has given special significance to human security (personal, economic, political, community, food, health, and environmental security) in the world. Constructivism has also discussed freedom from fear (political oppression), freedom from want (freedom from hunger, poverty, and free from the threat of environmental degradation), and freedom to live with dignity in a society (Tsai 2009: 19).

Constructivism has given importance to identities, global norms, ethics, culture, and social values (non-material power), etc. instead of material power. Constructivism holds that the identity of nations in the world is socially constructed and that non-material power plays a unique role in the construction of this identity (Reus-Smit 2013: 222). A constructivist perspective can construct human consciousness, and that develops a global sense of life (Barnett 2017: 126).

According to the constructivist view, Britain has 500 nuclear powers and North Korea has only 5 nuclear powers, yet North Korea is more threatening to the United States of America than the United Kingdom. Because the United Kingdom’s identity is a friend state to the United States

of America, rather than North Korea (Chakraborty and Nandy 2014: 157). Simultaneously, Pakistan and Afghanistan have been identified as terrorist states, and many analysts and researchers in international relations have said that these states can be dangerous to international peace and security. Similarly, China, the United States, India, Russia, Japan, Iran, Germany, South Korea, Saudi Arabia, and Indonesia have been identified as the first 10 polluting countries in the world. The identity of these 10 polluting countries has become very dangerous to the protection of global environmental security (https://worldpopulationreview.com).

According to Alexander Wendt, not material powers (economic and military), but identities shape the interests of states (Reus-Smit 2013: 225). Even, the nation's interests have been constructed by the nation's identities, and the construction process in international relations is always dynamic and natural (Wendt 1996: 59). Wendt mentioned that agents (states) and structures (global systems) can build a collective identity and foster cooperation. According to Wendt, human security is derived from the values of collective identity. At the same time, Nicholas Onuf has mentioned how language and norms influence nations' identities and positively promote human security. Again, Peter Katzenstein gives the greatest importance to cultural identity in terms of human security (including environmental security) (Tsai 2009: 25). After the 1990s, as environmentally polluting countries, China and India's identities were reconstructed. Especially, since 2020, China is the highest environment-polluting country in the world, and India is the third environment-polluting country in the world.

2.7 Ecofeminism

Since the late 1970s and early 1980s, feminist approaches have emerged in international relations. Simultaneously, since the 1970s, global environmental issues have emerged around the globe. Although international feminism emerged in the 1970s, it originated much earlier. The Women's International League of Peace and Freedom was established in 1915 as the world's earliest international women's peace organization. The purpose of this international women's organization was to establish economic and social justice on the international stage, to secure the rights of women, and to establish world peace through disarmament. In the 1970s, the Revolutionary Association of the Women of Afghanistan (1977) was established in a country like Afghanistan that suppressed women's independence. The purpose of the women's organization was

to secure women's rights and social justice, to increase the level of women's participation in social, economic, and political spheres, and to transform Afghanistan into a secular democratic state (Kinsella 2017: 150). Similarly, women have played an important role in the environmental protection movements in India since the 1970s, such as Chipko, Silent Valley, the Save Narmada movement, etc.

The most important feminist scholars are Marysia Zalewski, Judith Ann Tickner (1937 - present), Cynthia Enloe (1938 - present), Jan Jindy Pettman (1944 - present), Vandana Shiva (1952 - present), Carolyn Marchant (1936 - present), Ariel Salleh (1944 - present), Maria Mies (6th Feburary1931- 15 May 2023), V. Spike Peterson, etc (Ghosh 2015: 63). Various kinds of feminist approaches have emerged in international relations. Like, Liberal Feminism (establishing equal rights of men and women in all economic, social, political, and cultural fields), Marxist Feminism (want to stop the discriminatory global capital systems and disproportionate social systems), Socialist Feminism (seeks to end the patriarchal social system, the capitalist economic system and the cultural exploitative social system), and Radical Feminism (wants to demand radical change of the patriarchal and gender discriminatory society), etc. Also, Genocentric Feminism (proponents are Susan Griffin, Carol Gilligan, Nancy Chowdorow, Mary O'Brien, Nancy Hartstock, etc.), Anarcho Feminism (L. Susan Brown, Emma Goldman, Federica Montseny, etc.), Post-Modern Feminism (Judith Butler, Donna Haraway) French Feminism (Helene Cixous, Luce Irigaray, Julia Kristeva) Post-colonial Feminism (Chandra Talpade Mohanty, Sarojini Sahoo) Black Feminism (Angela Davis, Alice Walker, Gayatri Chakravorty Spivak, etc.) have also emerged. Simultaneously, ecofeminism has emerged as a new trend of feminism and wants to protect women’s security and global environmental security (Basu 2012: 39).

Ecofeminism primarily originated among white intellectual women in Northern Hemisphere countries but has gradually expanded to Southern Hemisphere countries since the 1980s. The major ecofeminist thinkers are India’s - Vandana Shiva (1952 - present), USA's - Carolyn Marchant (1936 -), USA’s Gloria Marie Steinem (1934 - present), Australia's Ariel Salleh (1944 - present), Germany's Maria Mies (6th February 1931- 15 May 2023), etc. The term ecofeminism was first introduced by French feminist thinker and environmentalist Francoise d'Eaubonne in 1974. He explains that kind of mentality wants to control and exploit women, and the same mentality wants to control and exploit nature (Mies and Shiva 1993).

The first international women's conference was held in Mexico (1975), where Vandana Shiva mentioned what are the connections between women and the environment. According to him, women are much closer to nature than men, so women can also better understand nature than men. But patriarchy wants to control and exploit nature and also wants to control women. Simultaneously, she has mentioned, Women's labor and natural resources are captured for the use of a patriarchal society. Therefore, women and nature can be emancipated only if this system can be changed. According to Vandana Shiva, in fact, the struggle for women's liberation and the struggle for the prevention of environmental pollution are interconnected (Ghosh 2015: 62).

Thomas-Slater and Rocheleau have mentioned that, as per the agricultural production and farming patterns of Kenya, the export-oriented capital-based economy has turned the condition of agricultural land into a crisis. As a result, Kenya's agricultural land has become increasingly infertile, and food production has been reduced to marginal levels. Agricultural people, especially women, have consequently been forced into farming on less fertile land and in the foothills. This has resulted in increased land erosion, falling water levels, and deforestation in Kenya, and women were directly affected by the multi-environmental crisis in Kenya. Because, poor families women are responsible for collecting drinking water, cooking fuel, animal fodder, etc. (Slayter, Rocheleau: 1995).

Indian ecofeminist thinker Vandana Shiva says that the main goal of ecofeminism is to reform how society views land productivity and the power of women. According to Vandana Shiva, patriarchal cultural views of nature and women are both substandard and consider the exploitation of both to be common. In fact, both nature and society are being harmed as a result of the exploitation of the environment and women (Shiva 1989). Also, Maria Mies and Vandana Shiva have criticized industrialization and modern civilizations. They saw science as a continuation of mechanical Western civilization and patriarchal dominance in the West, which wants to control and exploit nature and women alike. Even, the process of industrialization alienates people from their homelands. This results in the deterioration of ecological balance. On the other hand, in developing countries, women became more marginalized. As a result of this continuous destruction of the balance of the environment, the livelihood of the people has come to an increasingly dangerous condition. So, ecofeminism seeks to establish an integrated sustainable green world ((Mies and Shiva 1993).

Ecofeminism states that women are the main users of natural resources in developing countries like water, land, and forests, because they are responsible for the family's food collection and especially collecting fuel and animal fodder. But, in a patriarchal society, men are the owners of lands; even after that, they certainly leave their homelands and move to the city in the hope of a higher income. Even then, women select crops for their nutritional value, not for extreme profit, and they farm without putting any pressure on the environment. Therefore, ecofeminist thinkers Bina Agarwal, Dianne Rocheleau, etc. have made strong demands for legal and practical rights to land in the hands of women. According to them, then it will be possible to control the farce going on in the name of development and minimize environmental degradation. According to Bina Agarwal, women's class position, caste, what rights women have to wealth, and the pattern of production, and distribution of resources in society to determine whether or not women are deprived, similarly determine the possibility of environmental pollution (Agarwal 1997).

Dianne Rocheleau (1997) mentioned that the organization of ecological production and control over it actually determine the relationship between men and women. Along with this, environmental knowledge (which is often separated by the male-female divide) and the changing modern development strategies of science and technology lead to environmental crises ((Rocheleau, Slayter, and Wangari 1996).

Another American ecofeminist thinker, Carolyn Merchant (her famous theory, The Death of Nature),has strongly criticized such divisions of 'women', 'men', 'nature', and 'culture'. She considered this division as a strategy to preserve patriarchal dominance in society. She also criticized the idea that men will subjugate nature and that women will be subservient to men. According to him, a new social structure should be created based on human values, not only considering women and nature as useful resources. Where both men and women work to their full potential and nature is recognized as an integral part of that relationship. If the division of women, men, nature, and culture continues to increase, then there is no doubt that the crisis of women and the environment will increase gradually (Merchant 1980).

From the 1950s to the 1980s, a report was published, on where destruction of approximately 26 to 63 percent of grazing land in Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Tamil Nadu. From 1987 to 1989, only 19 percent of India's

total land area had forest cover. In the 1980s, about 56 percent of India's land areas were affected by severe environmental pollution, particularly erosion by water and the atmosphere. Households, especially rural areas in particular depend on the extraction of common grazing and forest resources for their livelihoods. Poor households in villages collect about 90 percent of their fuel and 70 to 90 percent of their fodder collect from grazing land. So, when the government takes common grazing land for various development projects or comes under the control of zamindars, the livelihood of the poor families and especially the women of the poor families is extremely affected (Ghosh 2015: 68).

2.8 Green Theory and Environment

Since the 1980s, in the international field, many new issues have emerged as human security threats, such as emissions of greenhouse gas, degradation of ozone layer, crisis of ecosystems, natural and men made disasters, bio-diversity crisis, crisis of drinking water, massive human rights violations, irregular climate changes, internal and external climate migration, etc. All these problems have been emphasized by the green theory scholars Jennifer Clapp and Peter Dauvergne. According to them, human society is responsible for the crisis and deterioration of the global environment (Paterson 2015: 266). Environmental security problems are a global common problem, and the lack of collective responsibility is gradually increasing environmental sustainability problems around the globe. Extreme desire of nation state (extremely fulfill the national interest) and irresponsible activities of the common people are responsible for the degradation of the environment. Without collective responsibility, how is it possible to ensure environmental sustainability? Garrett Hardin called issues on environmental security problems a ‘Tragedy of the Commons’ (Hardin 1968: 1243). However, Hardin also emphasized neoliberal institutional ideas on international cooperation through international organizations for environmental sustainability. According to green theory, the climate migration problem has emerged as a new security threat in world.

Due to climate change, more than 80 million people have been forcefully displaced, and more than 26 million people have become refugees around the world. Simultaneously, more than about 45.7 million people have been alienated from their homelands due to climate change, either temporarily or permanently, and more than 4.2 million people have become orphans in the

world. Due to climate change - high level sea rise, extreme floods and droughts, an increase in the crisis of drinking water, an increase in the salinity of sea water, increased deforestation, etc.—the environmental security problem is increasing and the problem of climate migration is increasing around the globe (Ari and Gokpinar 2021: 41). Ken Booth has also mentioned that climate change will increase climate migration and that the problem of climate migration is emerging as a new global security threat (Booth 2007: 109).

Climate migration problem has emerged in world Since the late 1970s and early 1980s, according to green theory. Many international scholars have mentioned that the environmental crisis is anthropocentric, and that human society is responsible for the degradation of environment. Gradually, climate change and environmental crises are threatening the livelihoods of the common people and the sustainability of human environment. At the same time, many international researchers have pointed out that the climate migration problem has emerged around the world in the last two decades as a human security threat (Barnett 2003: 7). International scholar Oli Brown has mentioned climate change is increasing climate migration, and most of time, the poor countries are extremely affected, and livelihoods of the poor countries are dangerously affected, such as in African countries (Brown 2007: 1141).

Based on the United Nations Environmental Program (UNEP) report in 1985, Essam El-Hinnawi mentioned that climate migrants are those people who are forced to be temporarily or permanently alienated from their homeland due to natural and especially human-induced climate change. Due to climate change and environmental crises, the quality of life of the people who were estranged from their homeland deteriorated. Based on the UNEP report (1985), El-Hinnawi also called climate migrants emerged as “Environmental Refugees” (El-Hinnawi 1985: 4). In the 1970s, the term Environmental refugees was first used by Lester Brown (Ari and Gokpinar 2020: 44). In 1993, Norman Myers again detail discussed on Environmental Refugee. El-Hinnawi and Myers discussed the issue of environmental refugees as an international security concern (Myers 1993: 190).

These two terms climate migrants and environmental refugees are the focus of several discussions in a global context. Several international relations scholars believe that the term "refugee" has legal significance and is occasionally utilized to discuss different categories of

migrants. Once again, Stephen Castel believes that the term "climate displacement" is more applicable for environmental migrants than the term "refuge." Because, in his view, migrants involve both those who migrate across boundaries as well as those who migrate within borders (Castles 2002: 8).

The International Organization for Migration (IMO) has stated that environmental migrants are those individuals or groups who deviate from their normal way of life due to environmental threats and are forced to take shelter in a different place, either temporarily or permanently. This separation from home can also be a displacement from one place to another within the country or from one country to another. This organization uses the word “migrants” instead of refugees in a broader sense (Ari and Gokpinar 2020: 44). It also noted that, due to anomalous climate change, there is a shortage of resources in society, and conflicts are also increased in society due to the shortages of resources. For example, conflicts arose due to a lack of resources at Bangladesh's Chittagong Hill Tracts (CHT), Madhupur, Dinajpur, Rajshahi, Sylhet, and Phulbari Coal Mine conflict (2007). Not only in Bangladesh, but the level of conflict has also increased due to the scarcity of resources in countries like India, Pakistan, Nepal, Bhutan, etc. (Islam 2022).

After the end of the Cold War, a new dimension was incorporated as a new security issue in international politics. Before the 1990s, the traditional military power was the protector of security of the state, but these traditional notions were changed after the 1990s. In addition to the security of the state, several security problems have emerged in the world, such as environmental security, which has become a new security problem in the world (Buzan 1997: 8).

While the two significant theories of international relations, like neo realism and neo liberalism want to ensure the sustainability of international structures and promote international institutions, in that case, the green theory wants to promote a global green society for the sustainability of human society. Green theory is not focused on the power of states or promoting institutions but critically discusses global environmental issues. The main focus of this theory is ecology, which discusses environmental issues from an ecocentric perspective rather than power-centric or institutional-centric.

Green theory aims to promote a global green society for the sustainability of human society, in contrast to the two major theories of international relations, such as neo liberalism and neo

realism, which seek to safeguard and promote international institutions and international structure. On the other hand, green theory wants to promote environmental sustainability rather than emphasizing political power or institutional promotion. This theory's primary concern is ecology, and it addresses environmental concerns from an ecocentric perspective.

Green theory explains that the protection of the environment can never be ensured by any individual, specific group, or ruling class, in fact, by ecology as a whole. This theory also holds that if the security of the environment can be ensured, then it will be possible to protect human society, so the ecological order must be conserved. Green theory emphasizes that ecological order is more important than the exercise of traditional or institutional power. Even theoretical discussion and theoretical environmental policy can't reduce the problem of climate migration. At the same time, green theory wants to promote green society and ensure environmental sustainability for the sustainability and well-being of human society (Dobson 2007: 42).

Proponents of the green theory's Ken Conca raise two questions, such as first, what are the causes of climate change, and second, why climate migration problems are increasing internally and externally in the world. According to him, the state is not an environmental-friendly institution, and unplanned industrialization is responsible for the degradation of the environment. Secondly, he mentioned, extreme desire of maximum profit of the nation states is also responsible for the environmental crisis. The survival of human beings also depends on environmental sustainability, and green theory wants to ensure environmental sustainability. In International context, green theory is more significant for the promoting of environmental sustainability rather than realism, liberalism, constructivism, critical theory, etc. (Conca 2005: 181).

2.9 Theory of Global Environmental Governance

Since the 1990s, in international relations, the concept of global environmental governance has emerged. Neoliberal approaches and neoliberal institutionalism have played an important role in the development of global environmental governance. Global environmental governance has evolved through the concept of global governance (global regimes). This perception originated with the neoliberal thinker Oran Young, but Peter M. Hass (1990) is the main thinker. The most important point of global environmental governance is that the global environmental problem is a

global common problem, so, it is not possible to ensure environmental security without collective responsibility (Vogler 2017: 331).

Such problems as the ozone layer, an unbalanced ecosystem, climate change, climate migration problem, increasing the amount of water in the sea, global warming, etc. cannot be solved by a single country or a few institutions. Therefore, Peter Hass called for building epistemic communities (Representative of scientists, environmentalists, representatives of environmental awareness community, states, and non-governmental organizations, representatives of international organizations, representatives of civil society, etc.) for ensuring global ecological security (Williams 2017: 51). According to Hass, this type of organization will be completely transnational, with substantial environmental networks and knowledge about the environment. The supranational organization will create an atmosphere of joint cooperation between all kinds of governmental and non-governmental, national, and international organizations for the sake of global environmental security. Hass is very hopeful that, through epistemic communities, global environmental governance will develop into a global cooperative environmental regime that will ensure the sustainability of the global environment (Hass 1990: 347). It should be noted that the Kyoto Protocol (1997) wanted to establish a kind of environmental regime, but it was not possible to implement it due to the non-cooperation of the United States and some other countries. The leading example of non-cooperation among the states in the field of environmental security is the position of China, the United States, and India as the first, second, and third polluting countries in the world since 2020.

2.10 Conclusion

What is global environmental security, how environmental security is a part of human security, and why environmental security is more significant in the world have been explained through multiple theories of international relations. Particularly, realism, neo-realism, liberalism, neoliberal approach, neoliberal institutionalism, Marxism, critical theory, constructivism, feminist perspectives, environmental feminism, green theory, global environmental governance, etc. have been discussed through various points of view. The most important statement is an environmental problem is a global common problem, so it will be much more necessary to promote collective

responsibility and cooperation with all sectors rather than promoting arms races, conflicts, egoism, war, global capitalism, etc.

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Chapter - III

Impacts of Climate Change in the Sundarbans Coastal Areas of West Bengal and Bangladesh: A Comparative Study

3.1 Introduction

In the first half of the 21st century, every country in the world was affected by climate change. Climate change emerged as a multiple threat to human society, especially a threat to the lives of people in coastal areas in Asia, Africa, and Latin America. Such as resource scarcity, poverty, hunger, floods, droughts, cyclones, extreme wind storms, etc. are continuously increasing due to climate change in the countries of Asia, Africa, and Latin America. India and Bangladesh are two neighbouring riverine countries in South Asia. Climate change is continuously affecting the lives and livelihoods of the people of coastal areas in India and Bangladesh.

Especially in the South 24 Parganas district of the Sundarbans of West Bengal, such as - Gangasagar Island, Ghoramara Island, Mousuni Island, etc. severely affected by many cyclones, floods, storms, etc. At the same time, Khulna, Noakhali, Barisal, Kuakata, Patuakhali, etc. areas of Bangladesh are extremely affected due to climate change. Most of the areas of Bangladesh are surrounded by Ganga, Meghna, Brahmaputra, and Bay of Bengal, and due to climate change, most of the coastal areas of Bangladesh will be submerged under water.

3.2 IPCC Report (2007) and Other Reports

In 2007, the Intergovernmental Panel on Climate Change (IPCC) noted that global warming will increase the number of floods and droughts in the world. At the same time, the IPCC has mentioned that the world is already facing an increase in floods, an increase in droughts, and shortages of fresh water due to human-induced warming (Hommel and Murphy 2013: 507). The extreme population growth and excessive water consumption over the past few decades are putting additional stress on water resources, especially in the regions of Africa, Southern Africa, the Middle East, etc. (IPCC 2007). The IPCC has mentioned that it is also human-induced warming.

A recent study suggests that if the rest of the world's temperature rises by 7°F, more than a billion people will be displaced from their homelands, and more than three billion people will suffer from inadequate access to water (Anderson and Bows 2008). Continuous climate change and environmental degradation are also threatening the agricultural system. Climate change is making arable land increasingly unsuitable, leading to increasing food insecurity in countries such as Asia, Africa, and Latin America (Thornton et al. 2011).

Extreme weather, rainfall, prolonged droughts, floods, etc. are increasing due to the increase in global warming. Even drought levels may reach 1 to 30 percent by the end of the 21st century (Dai 2011; Anderson and Bows 2008). If the global temperature increases, the level of floods, droughts, and desertification will gradually increase, especially in the continental plains, which produce most of the world's food grains (Thornton et al. 2011). Climate change will not only increase droughts but will also increase floods and severely damage agricultural systems (AIACC 2007). At the same time, global warming will be the greatest environmental threat to food security in the world (Brown 2009: 50).

Due to climate change, sea level rise is increasing, and there is massive melting of ice in Antarctica. The coastal areas are extremely affected by sea level rise due to climate change. Most environmental scientists have mentioned that a high-level increase in ocean temperature will lead to an increase in cyclones, storms, floods, etc. (IPCC 2007; Kirshen et al. 2008; Hommel and Murphy 2013). Coastal areas are the most affected by sea level rise, especially countries in South Africa, Southeast Africa, Central Africa, and also south Asian countries such as India and Bangladesh. Even if sea level rise increases by only 1.5 meters, about 17 million people in Bangladesh will be extremely affected by high sea level rise (Mertz et al. 2009; Ali 1996).

In today's world, especially in coastal areas, climate change is emerging as a multiple threat to people's lives and their lifestyles. Due to climate change, sea level rise, water salinity, floods, droughts, and cyclones are increasing. The crises of drinking water, adequate food, lack of energy security, insufficient health security, etc. are increasingly endangered due to climate change. Environmental insecurity due to climate change is threatening human lives and livelihoods around the world (Rabbani et al. 2010).

Coastal areas of the Indian Ocean and the Bay of Bengal are being severely affected by climate change. India, Bangladesh, Vietnam, the Maldives, and most of the countries in East and West Africa are also being especially affected. Most of the people of Bangladesh live in the coastal areas surrounded by the Ganges, Meghna, and Brahmaputra rivers. Due to the rise in sea level, people in the coastal areas of Bangladesh are severely affected by the cyclones created in the Bay of Bengal and the Indian Ocean. For example, in the second half of the 20th century alone, tropical cyclones hit the coastal areas of Bangladesh about 27 times. Besides, 1,38,866 people died as a result of a super cyclone storm (wind speed was about 250km/h) in Bangladesh in 1991 (Dasgupta et al. 2007; Haider et al. 1991).

3.3 UNEP Report in 2007

Also, overpopulation, poverty, lack of awareness of climate risks, unplanned urbanization, etc. are having a fatal impact on countries like Asia, Africa, and Latin America. Currently, about 20 percent of people in South Asia are suffering from water shortages, and more than 27 percent of people are suffering from food shortages (World Bank Report 2010). Also, if the sea level rises by 5 meters due to climate change, about 11 percent of Bangladesh's arable land will be submerged under water, and more than 30 million people will be displaced (UNEP Report 2007).

The average annual sea level rise between 1961 and 2003 due to climate change was 0.34–0.54 mm. However, due to extreme ice melting, sea level rises by an annual average of about 0.32 to 0.68 mm (Lemke et al. 2007). On the other hand, the North Indian sea level is only quite worrying. Between 1998 and 2000, the annual mean sea level rise increased by about 0.31 mm (Rabbani, Rahman, and Islam 2010). Also, in a recent report published between 1977 and 2002, the sea level rise at Hiron Point near Sundarbans has been an average of 5.3 mm per year, and the level of sea level rise is gradually increasing along the coastal areas of Bangladesh (Rahman et al. 2007).

In 2007, the IPCC report mentioned that by 2100, climate change could increase sea level by 0.6 meters or more (Nicholls et al. 2007). However, several reports suggest that climate change may increase sea level by a meter or more by 2100 (McMullen and Jabbour 2009). Also, recent reports suggest that the global average sea level rise is about 3.1 mm per year (Wouters et al. 2008).

3.4 Report of the International Labor Organization (2008)

Tropical cyclones pose a considerable risk to countries bordering the Indian Ocean. A recent example of this is Cyclone Sidr (2007) in Bangladesh. As a result of the Sidr cyclone, about 6 million people in the coastal area of Bangladesh were severely affected, and about 3 thousand people died. In addition, 0.3 million houses were destroyed and about 0.9 million houses were severely damaged, while about 0.35 million hectares of arable land were rendered unfit for cultivation. At the same time, cyclone Sidr has temporarily or permanently damaged the livelihoods of around 56,700 people in Bangladesh, mainly due to damage to the employment environment and income-generating assets. About 14 percent of Bangladesh's population suffered household losses as a result of Cyclone Sidr (International Labor Organization 2008).

Similarly, a super cyclone affected Odisha in 1999. Due to climate change, the water level rises by about 8 meters, and up to 20 meters of water is washed into Odisha. As a result, about 10,000 people died, and about 275,000 houses were severely damaged. About 17,110 km of arable land was rendered unsuitable for cultivation, and about 90 million trees were uprooted (Rabbani, Rahman, and Islam 2010).

Climate change will increase sea level rise and thereby intrude sea salt water into the Indian Ocean and adjacent areas of the Bay of Bengal, damaging the quality of coastal rivers, lakes, ponds, and aquifers. Such degradation will put pressure on drinking water supplies and is already affecting India, Bangladesh, Maldives, and Sri Lanka. Such as result of cyclone Sidr in 2007, more than 6,000 ponds in Bangladesh were salted by saline sea water. Also, high water pollution will continue to increase the prevalence of waterborne diseases such as cholera, diarrhoea, etc. Sea-level rise will simultaneously damage low-lying agricultural systems in the coastal areas of these regions, increase soil erosion, and increase the likelihood of malnutrition (Islam 2004).

Sea level rise caused by climate change will affect more than millions of people, especially in low-lying areas of South Asia. More than 60% of land areas in a year will be flooded in South Asia, especially from Pakistan, India, Bangladesh, and Sri Lanka to Myanmar. The potential impact of a 1-meter rise in sea level would submerge an area of about 5,763 square kilometres in India. Also, by 2050, about 35 million people in the twenty coastal districts of Bangladesh may

be displaced by a maximum of about 45 cm of sea level rise as a result of climate change (Rabbani, Rahman, and Islam).

Figure: 3.1 India – Bangladesh Political Map

[Source: https://www.mapsofindia.com, accessed on 12/01/2024].

About 710 km of coastal area in Bangladesh is connected to the Bay of Bengal. Coastal areas of Bangladesh are prone to floods most of the time due to climate change. Again, the largest mangrove forest in the world is in the Sundarbans area of Bangladesh. Bangladesh's mangrove Sundarbans provide direct employment to around 5 - 6 lakh people a year. Many of them are engaged in fishing, honey collection, cooking fuel, etc. But they also lose their jobs due to continuous climate change (India Resource Centre, 2002). If the sea level rises by only 10 cm,

about 15 percent of the Sundarbans area will be submerged, and if the sea level rises by 60 percent due to climate change, then the Sundarbans will disappear completely (Hare 2003).

Climate change is estimated to have a severe impact on various parts of the coastal areas of India. Rapid urbanization, industrialization, and economic development are extremely impacted by environmental degradation. At the same time, water scarcity, degradation of coastal ecosystems, coastal biodiversity, agricultural systems, etc. will be severely affected due to climate change (Kapur, Khosla, and Mehta 2009).

3.5 Report of the Environment, Food and Rural Affairs in 2005

In Asia, the most dangerous threat due to climate change is water scarcity. It is estimated that the average per capita water availability in India in 2001 was ~1820 m3/year, while the per capita water availability in 2050 will reach an average of ~1114 m3/year. At the same time, it is estimated that fresh water per capita will decline from ~1900 m3 in 2007 to 1000 m3 in 2025. Sea level rise and temperature rise due to climate change will not only decrease of water but also damage the ecosystems of coastal marine areas. Especially the highly populated coastal areas will be at risk due to additional floods, cyclones, etc., and as a result, more than a million people will be forcefully displaced. In addition, the rise in sea level will seriously affect the agricultural system, fishing and extraction, drinking water collection, etc. in the coastal areas and will also disrupt the normal lives of the people (Department for Environment, Food, and Rural Affairs, 2005).

Climate change is estimated to affect India's agriculture system the most compared to other countries, with additional temperature increases and changes in rainfall patterns expected to reduce India's agricultural crop production by around 30% by the second half of the 21st century and further reduce the amount of arable land. As a result of climate change, monsoons are gradually changing, which is expected to increase the severity of droughts, floods, cyclones, etc. in the future. Climate change is seriously affecting health, along with water scarcity, degradation of agricultural systems, extreme droughts, floods, cyclones, biodiversity imbalances, etc. The incidence of various temperature-related diseases, vector-borne diseases, and food insecurity is increasing, resulting in serious health impacts. Also, due to climate change, the number of warm

days, extreme heat waves, extreme floods, natural disasters, severe cyclones, etc. is increasing (Kapur, Khosla and Mehta).

3.6 The IPCC Fourth Assessment Report (2007)

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has noted that the present conditions of climate change will seriously affect all areas, regionally and globally. The IPCC in their report that by 2100, the average global temperature will increase by about 1.4°C to 5.8°C. As a result, coastal areas, especially countries like India, Bangladesh, the Maldives, Nepal, Sri Lanka, and Africa, will be severely affected (Panda 2009: 105). Also, the Inter-governmental Panel on Climate Change argues that developing countries will suffer due to climate change. Also, developing countries have less institutional capacity to deal with disasters and hazards (Adger 2006: 268).

The IPCC estimates that about 2090 sea level will rise from 0.18 meters to about 0.59 meters in India alone, such growth occurred from 1980 to 1999. As a result of continued climate change, the lives of millions and more people in the coastal areas of India will be severely affected by floods, loss of crop production, increase in salinity of drinking water, and drinking water shortages. As a result of climate change, both the lives and livelihoods of coastal areas of India will be severely affected (Klein et al. 2006).

Additionally, climate change will increase more than millions of vector-borne diseases. By 2050, the prevalence of malaria as a vector-borne disease is predicted to increase in all parts of India. Especially the most marginal people of India - due to poor public health infrastructure, high cost of treatment, reduced quality of living standard, etc., will be affected by malaria, dengue, cholera, etc. (Bhattacharya et al. 2006).

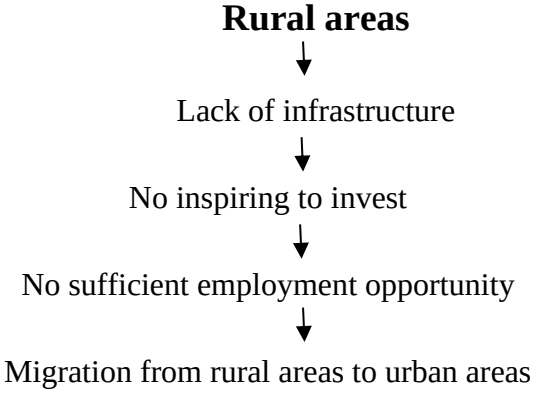
3.7 UN Report in 2009 and Other Reports

As a South Asian country, India has a population of more than 1.13 billion. Whereas India has a population of more than 211 million in West Asia, more than 554 million in Southeast Asia, and even more than 922 million in Africa (United Nations 2009). More than 40 percent of India's population lives on less than one dollar a day (Shaohua and Ravallion 2008). Most of India's poor

people live in rural coastal areas and are directly dependent on climate-sensitive resources such as agriculture, forests, rivers, water, etc. These are severely affected by climate change, whose impact is severely affecting the livelihoods of the poor people living in the coastal areas of India (Padukone 2010). It is also feared that climate change will affect human security to a greater extent. Climate change-induced floods, droughts, sea level rise, increase of temperature, extreme heat waves, and river erosion have all seriously damaged the livelihoods of a large number of people, who are living in coastal areas of India (Parikh 2009).

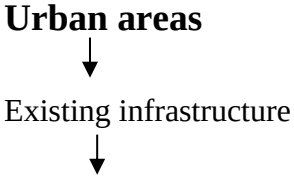
The lifestyle of people in coastal areas is very simple and they are very dependent for their survival on agriculture, fishing, and gathering fuel and honey from forests. In general, rural areas have lack of infrastructure, lack of sufficient investment in agricultural systems, lack of adequate employment, etc. Also, climate change is destroying the life and livelihoods of people in rural

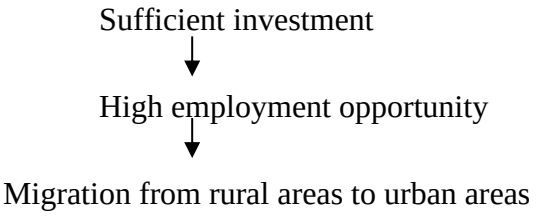
Table: 3.I Visibility of rural coastal areas



coastal areas in various ways, so people are forced to move from villages to cities due to climate change. Several studies by the Inter-governmental Panel on Climate Change have identified several reasons why people are moving from villages to cities. Several reports have revealed that the existing infrastructure,

Table: 3.II Visibilities of urban areas





[Source: Owen, D. (2009). Sustainable Cities. *Business Day, 8 October]* .

adequate investment, employment opportunities, etc. are comparatively more prevalent in urban areas than in rural coastal areas. Therefore, people living in coastal areas are leaving villages and moving to cities (Padukone: 51).

3.8 The IPCC Fifth Assessment Report (2014)

Ever since the Industrial Revolution of the 19th century, man-made emissions of greenhouse gases such as carbon dioxide, methane, nitrous oxide, and greenhouse gases have been steadily changing the Earth's climate. Human activities are mainly responsible for the increase in the average temperature of the atmosphere and the Earth. Current greenhouse gas emissions are the highest in human history since the 1950s, and carbon dioxide levels on Earth have been steadily rising since about 8,000 years ago. In the 20th century alone, global temperatures increased by +0.85°C, and sea level rose by about 19cm. According to IPCC, if global temperature increases by more than +2°C as a result of climate change, about 7 million people will be displaced from Chennai, Kolkata, and Mumbai by 2070. Even in states like West Bengal, Assam, etc., floods, and cyclones are considered annual calamities (Malhotra). Not only the people of India's rural coastal areas are affected, but urban cities are also affected. In 2005 Mumbai, Kedarnath in 2013, Srinagar in 2014, and Chennai in 2015 have extremely affected by floods. Also, the overpopulation of these cities, unplanned urbanization, lack of adequate drainage systems, and natural water supply crisis are largely responsible (IPCC 2014).

More than 166 million people have been forcefully displaced from their homes in the world between 2004 and 2013 as a result of multiple disasters caused by global warming (Brenn 2016). India is one of the most disaster-prone countries in the world, and due to social, economic, and especially environmental degradation, the level of natural disasters and hazards is increasing. About 45 percent of India's people are likely to face hazards due to climate change,

and at the same time, about 45.64 million hectares of land are inundated by floods in India (Malhotra 2016).

Figure: 3.2 Political Map of India

[Source: https:// www.mapsofindia.com. accessed on 12/01/2024].

3.9 UN Report and World Bank Report (2014)

As a result of climate change, almost all parts of the Indian subcontinent will be affected by sea level rise, severe cyclones, extreme floods, drought, temperature rise, etc. As a result of climate change, people living in rural coastal areas are leaving villages and moving to cities in search of safety. For example, in 2014, the population of India's urban areas was about 410 million, and by the year 2050, the population of India's urban areas will reach about 814 million (United Nations

2014). As a result of the rise in sea level, the islands of Sundarbans are gradually sinking under water, thousands of people are being displaced, and the drinking water crisis is increasing (World Bank Report 2014). It is pertinent to mention that the condition of Sagar Island, Ghoramara Island, and Mousuni Island in South 24 Parganas district of West Bengal state of India under Sundarbans is deplorable, and Jambu Island, which belongs to the Bay of Bengal in South 24 Parganas district is submerged under water.

The child mortality rate is quite alarming in India's rural coastal areas as well as urban areas. Also, rising temperatures are expected to increase the number of deaths. Several recent studies have shown that regions with extreme temperatures are more likely to develop chronic kidney problems. Chronic kidney disease caused by global warming has been called the first epidemic (American Society, 2016).

In terms of climate change, it is estimated that its impact will be severe on the global food production system. Due to climate change, increasing droughts, floods, temperature increases, sea level rise, drinking water shortages, agricultural crop production crises, etc., the world is extremely affected. South Asia has most food security problems, such as more than 400 million people are currently suffering from malnutrition. Most rural households in India depend on agriculture, fisheries, and forestry for their livelihood, while their contribution to India's GDP growth is undeniable. Climate change is expected to have an alarming impact on both their livelihoods and GDP growth (IPCC Report 2014).

About 7,500 km of diverse coastline areas are vulnerable in India due to climate change, particularly in silt and sand areas. Due to climate change, natural disasters such as cyclones, floods, and excessive waves in the sea are seriously eroding coastal areas. As a result, the people of these areas are suffering from various disasters and hazards. However, several reports suggest that humans are responsible for the erosion of several coastal areas in India (Black et al. 2021).

3.10 UNEP Report in 2021 and Other Reports

Climate change has emerged as the most dangerous threat to human society in the world today. The recent Inter-governmental Panel on Climate Change (IPCC) has mentioned in their report that several problems caused by climate change, such as temperature increase, sea level rise,

changes in rainfall patterns, etc. are already affecting the entire human society. At the same time, climate change is also challenging human development, economic system, health security, etc. As a result of climate change, resource scarcity in society, increased levels of conflict, and migration problems are also increasing. Therefore, IPCC and UNEP have expressed concern that climate change is actually a multiple threat to human society (Nanthini, Nair 2021; IPCC and UNEP Report 2021).

Research by several institutions, including the IPCC and UNEP, has revealed that the death rate of children and women is much higher in the world rather that men due to climate change. For example, about 55 to 70 percent of women died in the tsunami in Indonesia in 2004. At the same time, 80 percent of women died in India and Sri Lanka, an example of an imbalance between men and women in terms of survival. Again, in 2008, Cyclone Nargis in Myanmar killed about 61 percent of women. Several studies have revealed that women's position is at the lowest level of formal education, at the highest level of the poverty line, at the lowest level in policy-making, almost invisible in policy discussion, and that climate change is making their survival situation increasingly complex, and critical (Nanthini and Nair 2021).

A recent IPCC report also noted that coastal populations are the most affected by climate change. The Inter-governmental Panel on Climate Change has warned that rising sea levels and rising temperatures caused by climate change will continue into the 21st century. As a result of climate change, several problems will arise in coastal areas, especially coastal flooding, coastal erosion, etc., which will seriously damage the livelihoods of people living on the sea coast, shelters, little resources for survival, and infrastructure (IPCC Report 202). At the same time, the IPCC has expressed that the coastal areas of South Asia and Southeast Asia will be the most affected by climate change.

In view of the ongoing climate change, the US National Intelligence Council (NIC) has commented that by 2025, approximately 1.5 billion people in the world will suffer from food, energy, and drinking water shortages (Fingar 2008). Due to climate change, South Asia, Africa, the Middle East, and the South Pacific regions will be most affected, namely Fiji, Cook Islands, Marshal Islands, Chile, Philippines, etc. (American Security Project 2012).

3.11 Impacts of Climate Change in India and Bangladesh

Due to climate change, natural disasters and endemic outbreaks are increasing in South Asian countries. South Asia especially India, Bangladesh, Pakistan, Afghanistan, Maldives, Sri Lanka, Nepal, Bhutan, etc. are the poorest, illiterate, and least developed regions of the world (Haq 1997). About a quarter of people live in South Asia of the world and South Asia are the most militarized region in the world (Najam 2003: 60).

The most vulnerable country in the world due to climate change is Bangladesh which belongs to South Asia. After that, the second most vulnerable country is India and the fourth is Nepal. Additionally, about 135 million people live in the low-lying coastal areas of Bangladesh, India, Maldives, Pakistan, and Sri Lanka.

Table: 3.III Vulnerable countries in the world due to climate change

Ranked	Region	Country Name
1	South Asia	Bangladesh
2	South Asia	India
4	South Asia	Nepal

[Source: Bank, A. D. (2012, March). http://www.adb.org, accessed on 20/07/2023].

South Asian countries are predicted to be more affected by climate change due to their geographical location. However, poverty and underdevelopment are responsible for climate change in South Asian countries. As a result, their ability to cope with adversity and recover from adversity is considerably less. About 80 percent of Bangladesh's land is surrounded by floodplains. It is estimated that if climate change results in a 45cm sea level rise, approximately 10.9 percent of areas of Bangladesh will be submerged and 5.5 million people will be forcefully displaced (Rahman et al. 2003; Barnett 2001).

Figure: 3.3 Political Map of Bangladesh

[Source: https://www.mapsofindia.com. accessed on 12/01/2024].

More than a million people have migrated to India from Bangladesh, affected by climate change. Recently, the normal way of life of the people in the coastal areas of Bangladesh has been disrupted, and the trend of infiltration from Bangladesh to India has increased due to the scarcity of drinking water and environmental degradation. India has even built nearly 210 miles of border fence to prevent this infiltration, and as a result, it will also increase tension between the two countries. South Asia is already an extremely poor and conflict-prone region, and the impact of climate change will further increase the level of conflict and tension (Ali et al., 2011).

Areas adjacent to the Bay of Bengal are particularly affected by climate change. The countries connected to the Bay of Bengal, namely Bangladesh, India, Myanmar, and Thailand is continuously affected by the increase in global temperature. These four countries, namely Bangladesh, India, Myanmar, and Thailand, are among the first ten countries in the world devastated by natural disasters. It should be noted that, despite being the most powerful country in the region, India is an extremely climate-vulnerable country. Among these vulnerable coastal areas, are densely populated cities affected by climate change, such as Chennai and Kolkata in India, Dhaka in Bangladesh, Yangon in Myanmar, and Bangkok in Thailand.

Bangladesh's population is more than 150 million and has a limited capacity to deal with natural disasters, flat lowlands, on the other hand, continuous climate change will make Bangladesh more vulnerable to sea level rise, floods, and cyclones. Cyclone Bhola in 1970 killed around 3, 00000 people in Bangladesh, and cyclone in Bangladesh in 1991 killed around 5, 00000 people. Cyclone Sidr In 2007 killed around 3406 people in Bangladesh.

Table: 3.IV Cyclones deaths in Bangladeshi people

Year	Cyclones	Wind Speed	Deaths
1970	Bhola	about 240 km/h	3,00000
1991	Tropical Cyclone	around 250 km/h	5,00000
2007	Sidr	About 260 km/h	3,406

[Source: Shidore, S. (2023). Climate Security and Instability in the Bay of Bengal Region. Council on Foreign Relations].

The Intergovernmental Panel on Climate Change will estimate that by 2100, sea level rise will increase by about 0.6m and sea surface temperature by about 3°C. But recent states' almost reluctance to act and protect the environment suggests that further and more unusual climate change may occur. It is worth noting that there are coastal regional differences in sea level rise. In addition, humans are extracting excess amounts of water, oil, natural gas, etc. from the surface,

which can also cause changes in sea level (Stimson Centre 2010). Based on current trends in climate change, it is predicted that coastal areas of Asia and Africa will be affected more recently and, in the future, (Harvey and Nicholls 2008).

Asian wetlands have been increasingly threatened in recent decades by global warming. Climate change has led to drought and reduced rainfall in Bangladesh, India, China, and Pakistan. As a result, gradually is increase in dry wetlands and the degradation of ecosystems (Parry et al. 2007). The shortage of fresh water supply and flow and the intrusion of excessive amounts of saline water in the Indus Delta have resulted in the gradual decline of mangroves in Bangladesh. About a third of the world's mangrove forests have been lost in the last 50 years of the 20th century due to human activities. It is also estimated that about 25 percent of mangroves will be lost by 2025 in developing countries, and about 90 percent of mangroves will be lost in some areas of Indonesia (Macleod and Salm 2006).

3.12 Impacts of Climate Change in West Bengal

As a result of climate change, the Sundarbans region of India and the coastal areas of the state of West Bengal are being severely affected. The livelihoods of the people living in the coastal areas of West Bengal, especially in North and South 24 Parganas districts, their livelihoods i.e. agriculture and fishing - are severely affected by floods and cyclones, and they are forced to leave their habitat for the safety of their lives. Due to climate change, even the provision of relief to flood cyclone-affected areas is discriminated against, leading to socio-political tensions (Samanta 1997: 2424).

The coastal zone of West Bengal is about 103 km long, most of which is part of the North and South 24 Parganas districts. There are some parts in the Medinipur and Howrah districts. Geographically, the coastal area of West Bengal is about 15.2 lakh hectares, with about 7.95 target farming families (as per the 1981 census) and a cultivable area of 8.3 lakh hectares (Saha and Haldar).

Also in West Bengal, there are about 59 blocks in coastal areas, of which 35 are between North and South 24 Parganas, which are South Kolkata oriented. There are also 15 coastal areas in the Medinipur district under the Tamluk and Kontai sub-divisions and nine coastal blocks in the

Figure: 3.4 Political Map of West Bengal

[Source: https://www.mapsofindia.com. accessed on 12/01/2024].

Howrah district connected with the Bhagirathi-Damodar River interflow. Bakkhali Sea Beach in the South 24 Parganas district of West Bengal, especially Sagar Island, Ghoramara Island, and Mousuni Island, South Bengal, is seriously affected by climate change. The people of the area depend on agriculture and fishing for their livelihood. Again, it is seen that more than 57% of fishermen are in debt. A number of studies have revealed that fishers only get 20 percent of the fish, and the rest goes to intermediaries (Samanta 1997: 2424).

Cyclone Aila (2009), caused by climate change, severely devastated the coastal areas of the Sundarbans region of West Bengal, especially the North and South 24 Parganas districts. Among them, due to the lack of adequate cyclone shelters in the islands of South 24

Parganas district, such as Sagar, Ghoramara, and Mousuni islands, the amount of damage increased terribly. Sundarbans are a disaster-prone region, but the government has yet to see any management or policies to deal with disasters (Mukhopadhyay 2011: 21).

Figure: 3.5 Political Map of South 24 Parganas

[Source: https:// www.mapsofindia.com. accessed on 12/01/2024].

3.13 Interviews in the Coastal Areas of West Bengal

The researcher has taken interviews from the coastal islands of South 24 Parganas district of West Bengal, such as Gangasagar Island, Ghoramara Island, and Mousuni Island. To understand how climate change has affected the livelihood of people in the coastal areas of Bangladesh, the researcher has interviewed some rickshaw pullers who are living in Patuakhali, Kuakata, and

Dhaka. Due to climate change, they have been forced to leave their homes and migrate to Dhaka from Khulna and Noakhali.

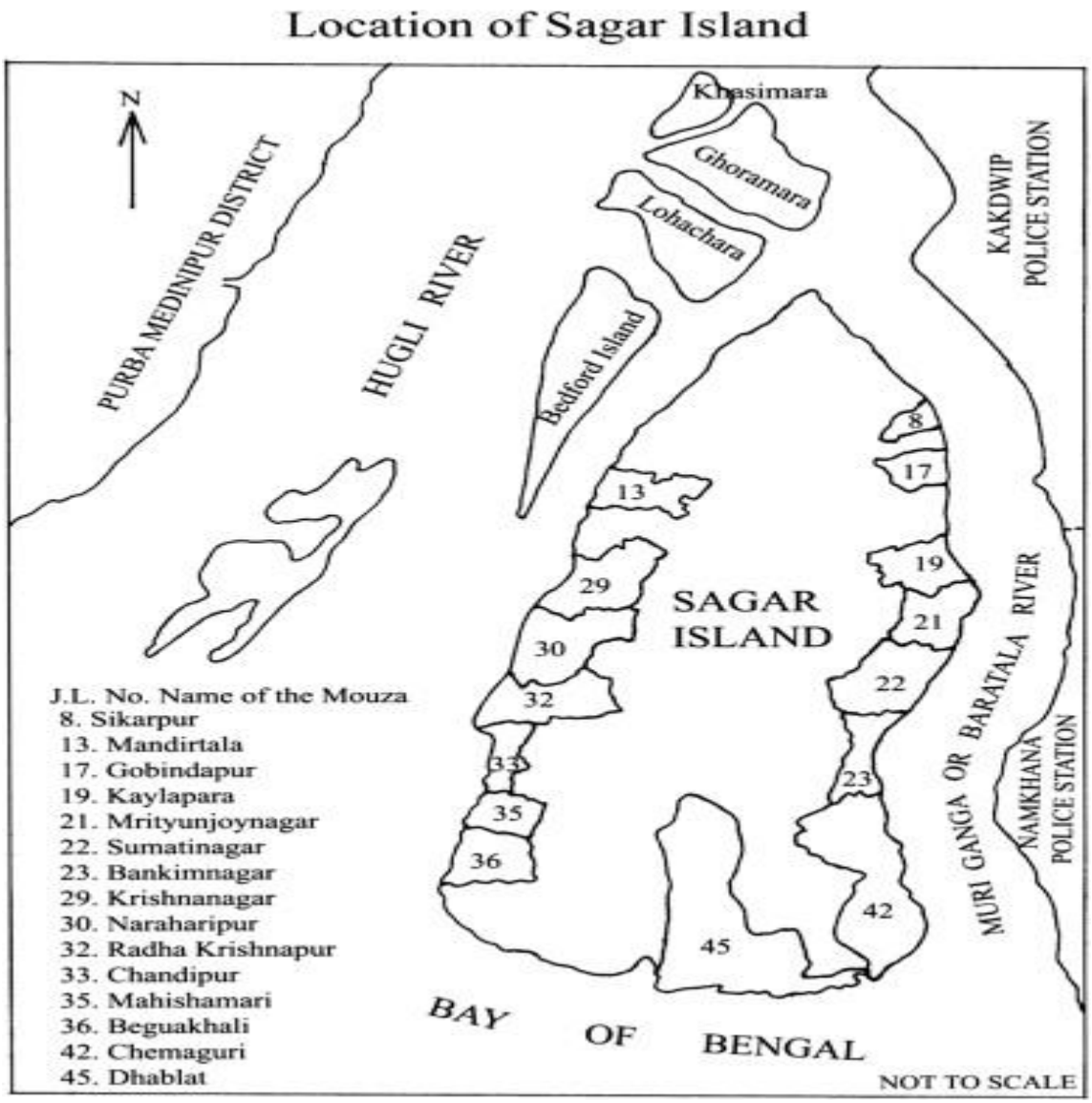
In the first half of the twenty-first century, human societies were enormously affected by climate change. In the present conditions of the global environment, human society is facing major problems; especially those people living in coastal areas, who are extremely affected due to climate change and threats from various natural disasters, human-induced disasters, floods, super cyclones, etc. Most environmental scientists have mentioned that, the climate change problem has become more threatening, and dangerous to human civilizations than terrorism. Several disasters, floods, and cyclones such as Sidr (2007), Aila (2009), Bulbul (2019), Fani (2019), Amphan (2020), Yass (2021), Sitrang (2022), etc. have extremely affected the livelihood of the people of the people of the Sundarbans coastal areas of West Bengal and Bangladesh.

Suresh Pramanik (70) is a permanent resident of Tiner Gheri Para of Beguakhali village under Gangasagar Island in South 24 Parganas district. He was a fisherman and used to earn his living for 10 family members by harvesting fish. In 2009, his small mud house collapsed during the Ayala Cyclone. After Cyclone Aila, he built a mud house with great difficulty without any financial support, but in 2020, their mud house collapsed again in Cyclone Amphan. He said that several cyclones had severely affected his livelihood (Interview, 05/08/2023).

Ambarish Pramanik (50) is a fisherman from the Tiner Gheri neighbourhood of Beguakhali Village on Sagar Island. His 8 family members very much depend on his fishing. But during cyclone Aila in 2009, his small fishing boat was lost. After 2009, he was forced to work as a migrant labourer in Chennai, Hyderabad, Kerala, etc. to support his family (Interview, 05/08/2023).

Naru Mondal (48) is a resident of the coastal area of Tiner Gheri Para in Beguakhali village on Sagar Island. He is a fisherman. He had caught various types of small fish, shrimp, etc. for his family's living. But he mentioned, due to climate change, many cyclones, such as Aila (2009), Bulbul (2019), Fani (2019), Amphan (2020), Yass (2021), Sitrang (2022), etc., have affected his life. He also said that their mud house was severely damaged by Aila in 2007 and Amphan Cyclone in 2020 (Interview, 05/08/2023).

Figure: 3.6 Political Map of Sagar Island



[Source: https://www.researchgate.net, accessed on 12/01/2024].

Gopal Mondal (42) is a fisherman from Tiner Gheri Para of Beguakhali village in Gangasagar Panchayat. He had a small boat with which he earned his livelihood by catching various types of fish from the local Bay of Bengal estuary. But he lost his small boat in the Amphan cyclone in 2020. He is currently a migrant worker. Having lost his occupation due to climate change, he now went to work as a migrant worker in Kerala to support the livelihood of five family members (Interview, 05/08/2023).

Binay Gayen (50), a fisherman in Tiner Gheri Para of Beguakhali village under the Gangasagar Gram Panchayat. He has mentioned that in 2009, cyclone Aila destroyed his small mud house. Even, though there is no Cyclone shelter, it has not been built in Beguakhali Tiner Gheri Para. After the cyclone Aila, he was rebuilding a small house for the family's survival. But in 2021, cyclone Yass and floods again destroyed his mud house. After cyclone Yass, he constructed a small house with his capabilities, and surviving was very difficult (Interview, 05/08/2023).

Badal Gayen (48) is a permanent resident of Tiner Gheri Para of Beguakhali Village under the Gangasagar Islands in South 24 Parganas district. He was a fisherman. He had a small boat, through which he supported 6 members. But, in 2009, the small boat was lost due to Cyclone Aila. Currently, he is a migrant worker and goes to work as a labourer in different states outside West Bengal (Interview, 05/08/2023).

Dinesh Gayen (40), a fisherman from Tiner Gheri Para of Beguakhali village, under Gangasagar Panchayat. He has caught small fish, prawns, crabs, etc. from the estuary of the Bay of Bengal. But during the Amphan cyclone in 2020, he lost his small boat and the small mud house. After the Amphan cyclone again, he built a mud house and a small stationery shop to survive (Interview, 05/08/2023).

Rasbihari Mandal (36) is a fisherman from Beguakhali Village on Sagar Island in South 24 Parganas district. Cyclone Aila (2009), caused by climate change, severely damaged the village of Beguakhali on the Gangasagar coast. He bought a small boat and fishing net in 2005, but it was difficult to support the family. But he lost his small boat in 2007 due to Cyclone Aila. At present, he goes fishing in other boats and supports his family (Interview, 05/08/2023).

Palash Das (44) is an ordinary fisherman in Beguakhali Tiner Gheri village. From the estuary of the river Ganga connected with the Bay of Bengal, various types of small fish, prawns, crabs, lote, and Hilsa fish from the river during the rainy season (July - August) used to make a living for the family. But in the 2009 Aila Cyclone, he lost his medium of fishing, the small boat. He again built a small boat for the livelihood of the family. But again in 2020, he lost his boat and fishing net in Cyclone Amphan. At present, he goes fishing in other people's boats. But

he said the Aila and Amphan cyclones have almost made his family destitute (Interview, 05/08/2023).

Dudhkumar Dhali (70) is a permanent resident of Tiner Gheri Para of Beguakhali village under Gangasagar Gram Panchayat on Sagar Island. He is a simple farmer. The family earns its livelihood through the production of agricultural crops. He lives in the coastal area of Beguakhali village. He mentioned that during the Aila cyclone in 2009, about 4 bighas of arable land were submerged in saline seawater. He mentioned that after cyclone Aila, his 9 family members are living very difficult (Interview, 05/08/2023).

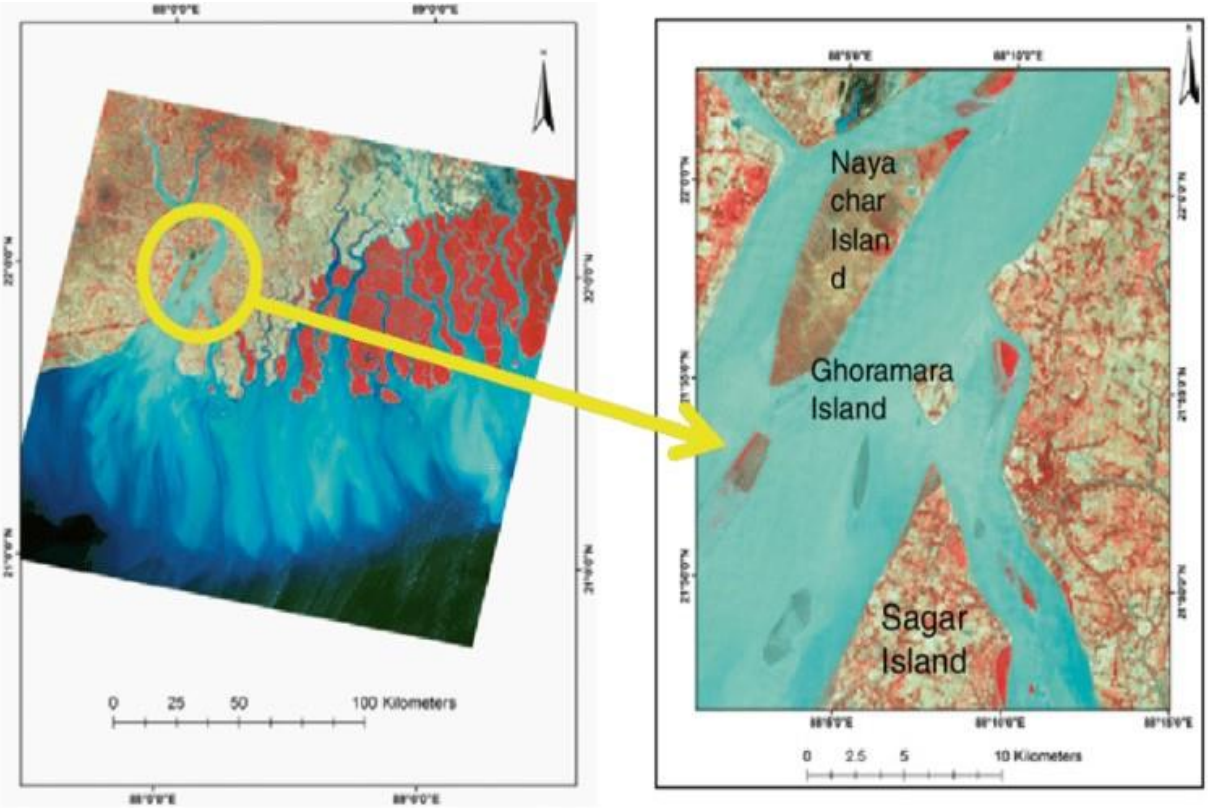
Bhiru Shit (40) is a fishmonger in the coastal area of Tiner Gheri Para of Beguakhali village in Gangasagar Panchayat of Sagar Island. Before Cyclone Amphan in 2020, he used to earn his living by fishing in the Bay of Bengal. But he lost his small boat in Amphan Cyclone in 2020. Currently, he buys fish from the coastal area at a low price and sells it in the local market to support his family. He said he lost his own boat due to climate change and was forced to collect fish from different places and sell it in the local market to support his family (Interview, 06/08/2023).

Manik Das (43) is a local fishmonger from Tiner Gheri Para of Beguakhali village under Gangasagar village Panchayat. He was a farmer before Cyclone Aila in 2009. He came to know that, as a result of Cyclone Aila; about 5 bighas of his land were submerged in the saltwater of the sea. He was forced to buy fish from local fishermen and sell fish in different neighbourhoods to support his family. As a result of climate change, he has turned from a farmer to a fish seller. He has very tragically said that Aila's cyclone due to climate change took away his five bighas land and made him completely poor (Interview, 06/08/2023).

Karna Mandal (36) is a resident of Beguakhali village in Gangasagar Panchayat. He was a fish farmer till Amphan Cyclone 2020. Selling a small amount of cultivable land, he set up two fisheries, where he cultivated fish such as venami shrimp, bagda, barramundi (vetki), etc. But in the Amphan cyclone in 2020, the salt water of the sea entered the fishery in excess, and all the Venami shrimp, bagda; and barramundi were lost (Interview, 06/08/2023).

Farooq Ahmed (65) is a resident of Mandirtala Bazar (North) of Ghoramara Island in South 24 Parganas District. Until the 2009 Cyclone Aila, he was in the southern suburbs adjacent to the ferry ghat on Ghoramara Island. Currently, he is a tea seller, before 2009, he was a fisherman. Destitute in the cyclone Aila caused by climate change, finally 6 families living in the tea shop in Mandirtala local market. But he came to know that Ayala had been displaced by the cyclone from the motherland. He said that climate change is always increasing the insecurity of life (Interview, 19/08/2023).

Figure: 3.7 Political Map of Ghoramara Island



[Source: https:// www.researchgate.net. accessed on 12/01/2024].

Nooruddin Mollah (46) is a resident of Patra Para, Ghoramara Island. Before the Yass Cyclone of 2021, he was trading in chicken and poultry. But as a result of the Yass cyclone, about 2,000 chickens were washed away from the farm in salt water. Currently, he goes to work as a migrant worker in places like Kerala, Chennai, etc. in order to earn a living for his family (Interview, 19/08/2023).

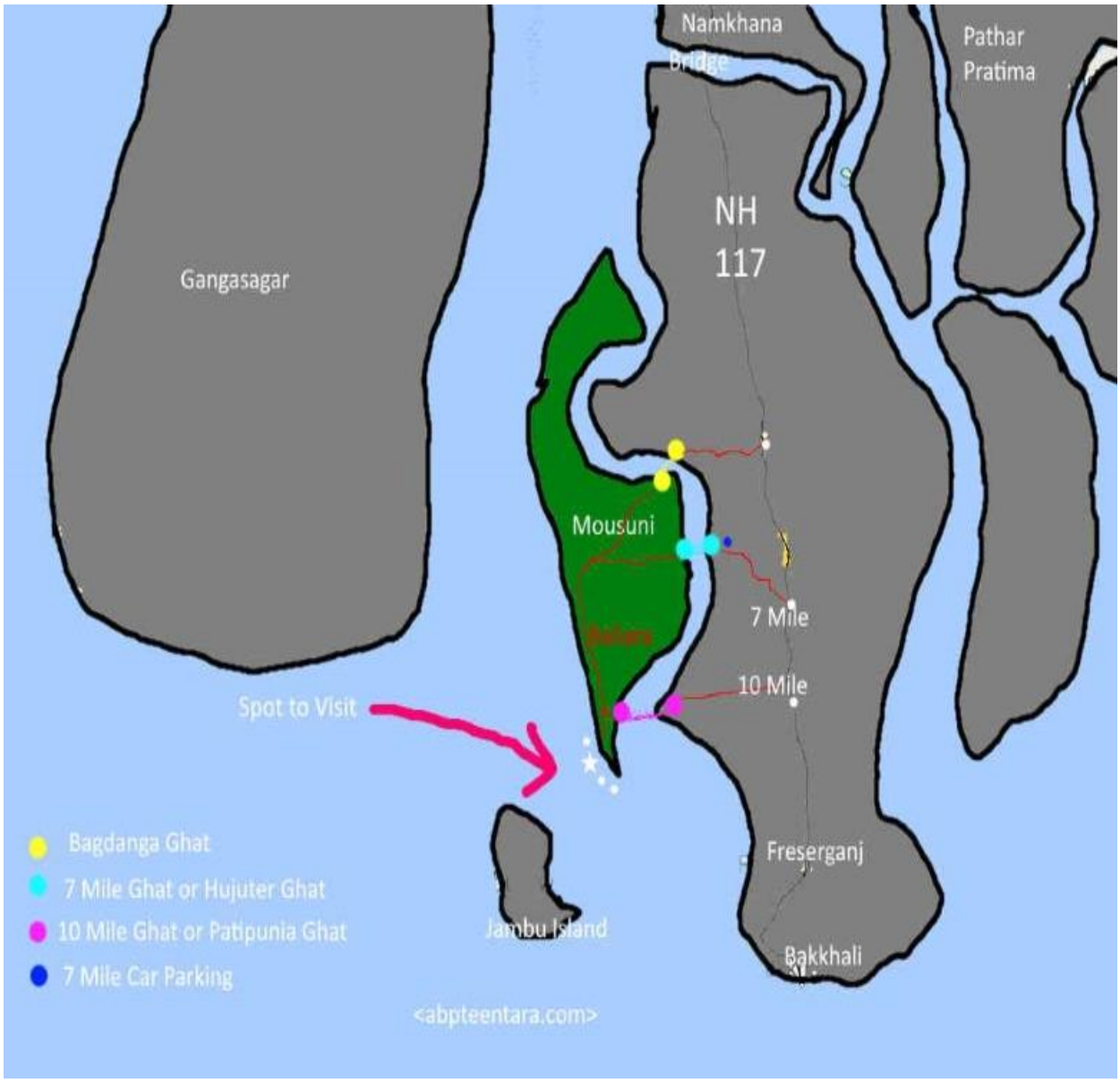
Rabiul Khan (52) is a resident of Hatkhola Village on Ghoramara Island in South 24 Parganas district. Currently, he is a local hawker (selling bangles, ribbons, nail polish, etc.). Before the 2020 Amphan Cyclone, he lived with his family in Khasimara village, and he was a fisherman. Due to climate change, various cyclones, such as Aila (2009), Bulbul (2019), Fani (2019), Amphan (2020), etc., have been extremely affected and lost their occupations. Finally, he sold various types of stationery items in different villages of Ghoramara Island, especially Khasimara, Bagpara, Mandirtala, Raipara, Chunpuri, Hatkhola, Patra Para, etc., to support his family (Interview, 19/08/2023).

Anarul Hossain (68) is a permanent resident of Khasimara village in Ghoramara Island. He is a fisherman. He said that the climate is constantly changing; the security of their lives is becoming more and more dangerous. He has lived in the coastal area of Khasimara village for almost 50 years but has been devastated by several cyclones. Notably, its mud house was broken three times during the Aila cyclone in 2009, the Amphan cyclone in 2020, and the Yass cyclone in 2021. After that, he is making a living by catching fish from the local river while his family lives (Interview, 19/008/2023).

Nazrul Haq (63) is a resident of Mandirtala (North) Market on Ghoramara Island and is a vegetable seller by profession. He had a poultry farm until the Yass cyclone in 2021. But in the Yass cyclone of 2021, caused by climate change, about 2,500 of his chickens were washed away in salt water. So he was forced to buy and sell vegetables like potato, onion, ginger, garlic, pumpkin, shrimp, papaya, tomato, etc. from Kakdwip to the local Mandirtala market, through which he is making a living for his family (Interview, 19/08/2023).

Ramesh Patra (59) is a resident of Patra Para village on Ghoramara Island and he is a fisherman by profession. He lives in the coastal area of Ghoramara Island. He mentioned that his small mud house was destroyed two times due to climate change, and his fishing boat was severely damaged due to cyclones Aila in 2009 and Amphan in 2020. Later, he repaired the house with great difficulty and repaired his boat for a living (Interview, 19/08/2023).

Figure: 3.8 Location Map of Mousuni Island



[Source: http://abpteentara.com. accessed on 13/01/2024].

Mahasin Mandal (49) is a resident of the coastal area near Patibuniya ghat of Mousuni Island in South 24 Parganas district. He was a fisherman. He is currently a rickshaw puller. In 2009, the Aila cyclone caused the water level in the local rivers of the Bay of Bengal estuary to rise by about 7-10 feet. As a result, both his mud house and boat were severely damaged. Finally,

he started driving a rickshaw to earn a living for his family. He earns about 400-500 rupees every day through the driving of a rickshaw (Interview, 26/08/2023).

Sourish Das (55) is a resident of Mousuni Island, and he is a farmer. He mentioned that after the Aila cyclone in 2009, six bighas of land were submerged in saline seawater, and the remaining two bighas of agricultural land were affected during the Amphan cyclone in 2020. After the Amphan cyclone, he was forcefully bound to join as a contract laborer in the brick kiln at Kakdwip for his family's living (Interview, 26/08/2023).

Samaresh Das (50) lives in the coastal area of Patibuniya Ghat on Mousuni Island, and he is a tea seller. He was a fisherman before the Amphan cyclone in 2020. He said that in 2020, his small fishing boat would be submerged in the sea due to climate change. So, he was forced to open a small tea shop at the local ferry ghat on Mousuni Island to support his family (Interview, 26/89/2023).

Batul Jana (58) is a resident of Mousuni Island, and he is a farmer. He cultivates various types of vegetables. He has been associated with vegetable farming for almost 24 years. He said that due to climate change, increasing rains, floods, cyclones, storms, droughts, etc. are severely affected in the case of vegetable production. He mentioned his livelihood conditions are very critical (Interview, 26/08/2023).

Sarojini Mandal (62) is a resident of the coastal area of Patibuniya Ghat on Mousuni Island. She is the owner of a small tea shop near Patibuniya Ghat. He earns about 300 - 400 per day from her tea shop. She mentioned that many times the island has been severely affected by multiple cyclones due to climate change, and a lot of people do not visit from the outside of the island, especially during the monsoon period. She said, that during the rainy season, there is not much profit, and as a result, she is living with an economic crisis (Interview, 26/08/2023).

3.14 Geographical Locations and Impacts of Climate Change in Bangladesh

Most of the areas of Bangladesh are located in the Alluvial River Delta and Bangladesh is only a few meters above sea level. Most of areas are surrounded by rivers, of which the Ganga-Brahma and Meghna rivers are particularly important. Geographically, there are high mountain

ranges in the north and east of Bangladesh, and the warm and humid air currents coming from the southern end cause the heaviest rainfall in Bangladesh. About one-third of Bangladesh is inundated each year during normal monsoons, and there is a strong possibility that about 50 percent of Bangladesh will be inundated as a result of climate change (Porteous 1991: 132).

Bangladesh has more than 120 million people living within 14400 km. On the one hand, lack of land for human habitation, food insecurity, health crises, illiteracy, and, on the other hand, floods, cyclones, land erosion, etc. are critically affecting the lifestyle of the people living in the coastal areas of Bangladesh. Most of the impact of climate change on Bangladesh comes from the southern Bay of Bengal and most likely from the northern Indian Ocean (Ali 1999: 109).

About 36 million people in Bangladesh live in coastal areas. Their livelihood is totally dependent on agriculture, fishing, fuel collection from forests, making salt from saline soil near the sea, etc. However, fishing communities in coastal areas are particularly affected by climate change. About 1.4 million people in Bangladesh are fully involved in the fishery sector and about 12 million people are partially involved in the fishery sector. But floods, cyclones, and landslides caused by continuous climate change are forcing the people of coastal areas of Bangladesh to be displaced from their own habitats (Rahman and Schmidlin 2014; Ahmed and Neelormi 2008).

The total area of Bangladesh is about 147570 km. of which the coastal area is about 32% (about 47222 km). Out of the 64 districts of Bangladesh, 19 are coastal districts, in which about 36.8 people live (Islam 2006). The southern border of Bangladesh is connected to the Bay of Bengal, and tropical cyclones hit Bangladesh mostly from the Bay of Bengal (Rahman and Schmidlin 2014). Also, approximately 10% of the world's tropical cyclones originate in the Bay of Bengal. About 49 percent of the world's total deaths due to climate change-induced cyclones occur in Bangladesh alone (Ali 1996).

From 1877 to 2009, Bangladesh was affected by about 159 cyclones. Tropical cyclone Sidr in November 2007, cyclone Nargis in May 2008, and cyclone Aila in May 2009 severely devastated Bangladesh. Cyclone Sidr killed about 3,406 people; Cyclone Aila killed 237 and left about 8,000 people missing. Besides, Cyclone Aila destroyed about 258.5 km of roads in Bangladesh, about 509 km were completely broken, and about 2155 km of coastal embankments

were severely damaged, especially in the southern and southwestern regions of Bangladesh (Rahman and Schmidlin 2014).

As a result of climate change, the possibility of multiple catastrophic floods is increasing in Bangladesh. For example, in 1987, 1988, 2004, and 2007, hundreds of people died as a result of floods in Bangladesh. Billions of dollars' worth of agricultural crops have been damaged. Even floods submerge about a quarter of Bangladesh each year (MoEF 2008; Penning-Rowsell and Others 2012). Due to climate change, most of the migration is illegal from the southwest of Bangladesh into India, especially through the borders of West Bengal. Due to climate change, Bangladeshis are easily infiltrating across the West Bengal border into India's West Bengal, including Assam and North Eastern states. In this context, former Chief Minister of Assam P. K. Mahanta commented that more people from the Khulna region of Bangladesh cross the border into West Bengal and enter Assam, thereby disrupting the normal public life of Assam (Swain 1999: 194).

Bangladesh mainly experiences four types of climate change seasons. First; the dry winter season - which mainly prevails in Bangladesh from December to March, second is the pre-monsoon hot season - which prevails from March to May; third is the monsoon season - which prevails from June to September; and Fourth: is monsoon Autumn - which occurs from October to November. Rainfall in Bangladesh varies from 1400 mm in the west to about 4400 mm in the east. Due to climate change, floods occurred in Bangladesh in 1988, 1998, 2004, and 2007, and cyclones and floods occurred in 1991, 1998, 2004, and 2007. As a result, the people living in the coastal areas of Bangladesh have suffered severely (Shahid 2010: 187).

3.15 Cyclone Sidr Affected in Bangladesh

The most recent cyclone to affect the coastal areas of Bangladesh due to climate change is Cyclone Sidr (2007). Cyclone Sidr formed in the Bay of Bengal on November 11, 2007 and made landfall in the southwest region of Bangladesh on the night of 15 November. The speed of this supercyclone was around 250 km per hour. More than 27 million people have been affected in about 30 districts from South West to North East. As a result of Sidr, about 3406 people died, about 53000 people in Bangladesh went missing, more than 500000 houses were destroyed, and more than 900000 houses were damaged. Also, 250,000 cattle and poultry died, and 0.89 million

hectares of land became unfit for cultivation (Paul and Dutt 2010: 336; Khan et al. 2015:8). Regarding the severity of Cyclone Sidr, the World Bank estimated that it caused an economic loss of about $1.7 billion to Bangladesh, which is equivalent to about 3 percent of the country's gross national product (GoB 2008).

3.16 Cyclone Aila Affected in Bangladesh

Cyclone Aila in 2009 particularly affected the southwestern part of Bangladesh. Cyclone Aila caused tidal surges of more than 6.5 meters and severely damaged more than eleven coastal areas. Cyclone Aila killed 190 people immediately, with around 7100 injured.

Table: 3.V Affected coastal areas by Cyclones Sidr (2007) and Aila (2009) in Bangladesh

Year	Cyclones	Wind speed (km/h)	Deaths	Most affected areas
May 1970	Cyclone Bhola	About 230 km/h	3,00000	Bhola
May 1985	Tropical Cyclone	About 160 km/h	11,069	Noakhali
April 1991	Cyclone Gorky	About230 km/h	138,000	Cox’s Bazar, Chittagong
May 1997	Tropical Cyclone	About 240 km/h	155	Cox’s Bazar, Chittagong
Nov 2007	Cyclone Sidr	About 250 km/h	3,406	Bagerhat, Khulna, Pirojpur, Barguna, Patuakhali

May 2009	Cyclone Aila	About 100 km/h	190	Satkhira and Khulna

[Source: Afroz, S. R. (2018). Vulnerability and Response to Cyclones in Coastal Bangladesh. *Asian Journal of Social Science, Vol. 46, No. 6* , Brill Publishers, 608].

In addition, about 100,000 poultry died, about 350,000 acres of arable land became unfit for cultivation and several coastal embankments collapsed. On May 16, 2013,

Table: 3.VI Damaged sector by Cyclone Sidr (2007) and Aila (2009) in Bangladesh

Damaged sector	Cyclone Sidr (2007)	Cyclone Aila (2009)
Affected districts	30	11
Affected upazilas	200	64
Affected Unions	1,950	195 (fully), 334 (partially)
Affected households	2,064,026	948,621
House damaged	563877 (fully)	243191 (fully)
Crops land damaged	955065 (partially), 742826 acres (fully)	370587 (partially), 77486 acres (fully)
Livestock deaths	1778507	150131
Road damaged	1714 km (fully), 6361 km (partially)	2233km (fully), 6621 km (partially)
Damaged bridges and culverts	1687	157

Embankments damaged	1875 km	1742 km
Educational institutions damaged	4231 (fully), 12723 (partially)	445 (fully), 4588 (partially)

[Source: Afroz, S. R. (2018). Vulnerability and Response to Cyclones in Coastal Bangladesh. *Asian Journal of Social Science, Vol. 46, No. 6* , Brill Publishers, 609].

Tropical Storm Mahasen of Bangladesh severely damaged the central western districts. Storm

Figure: 3.9 Barisal Division Map of Bangladesh

[Source:3.9 https://www.mapsofworld.com, accessed on 12/01/2024].

Mahasen affected approximately 1.5 million people, killing 10 people instantly and damaging more than 1,500,000 homes (Khan, Khalily and Scheyvens 2015: 8).

3.17 Interviews in the Coastal areas of Bangladesh

Sana ul Haq (59) is a fisherman from the coastal area of Patuakhali district of Barisal Division, Bangladesh. He said he was particularly affected by cyclones Sidr (2007) and Aila (2009) due to climate change. He had a small boat with which he used to catch fish from the river. But during Cyclone Sidr in 2007, his small boat was submerged in seawater. After 2007, he built a small boat again to support the family. However, he said that due to climate change, Cyclones, Floods, Droughts, storms, etc. are increasing, and living in the coastal area has become more difficult and dangerous (Interview, 16/01/2023).

Matiur Rahman (62) is a resident of the coastal area of Patuakhali district under the Barisal division of Bangladesh. He is a papaya-producing farmer in Patuakhali. He said that he has been cultivating 5 bighas of land on lease from a local moneylender for about 30 years. But due to cyclone Sidr in 2007, his papaya garden was severely damaged. Later, he re-planted new saplings, but due to saltwater intrusion, papaya is not being produced as before (Interview, 16/01/2023).

Rashid Ali (61) is a vegetable shopkeeper in Patuakhali district of Bangladesh. He said that his mud house and vegetable shop were severely damaged in Cyclone Sidr (2007) due to climate change. After the cyclone Sidr, repaired his shop, which was very difficult (Interview, 16/01/2023).

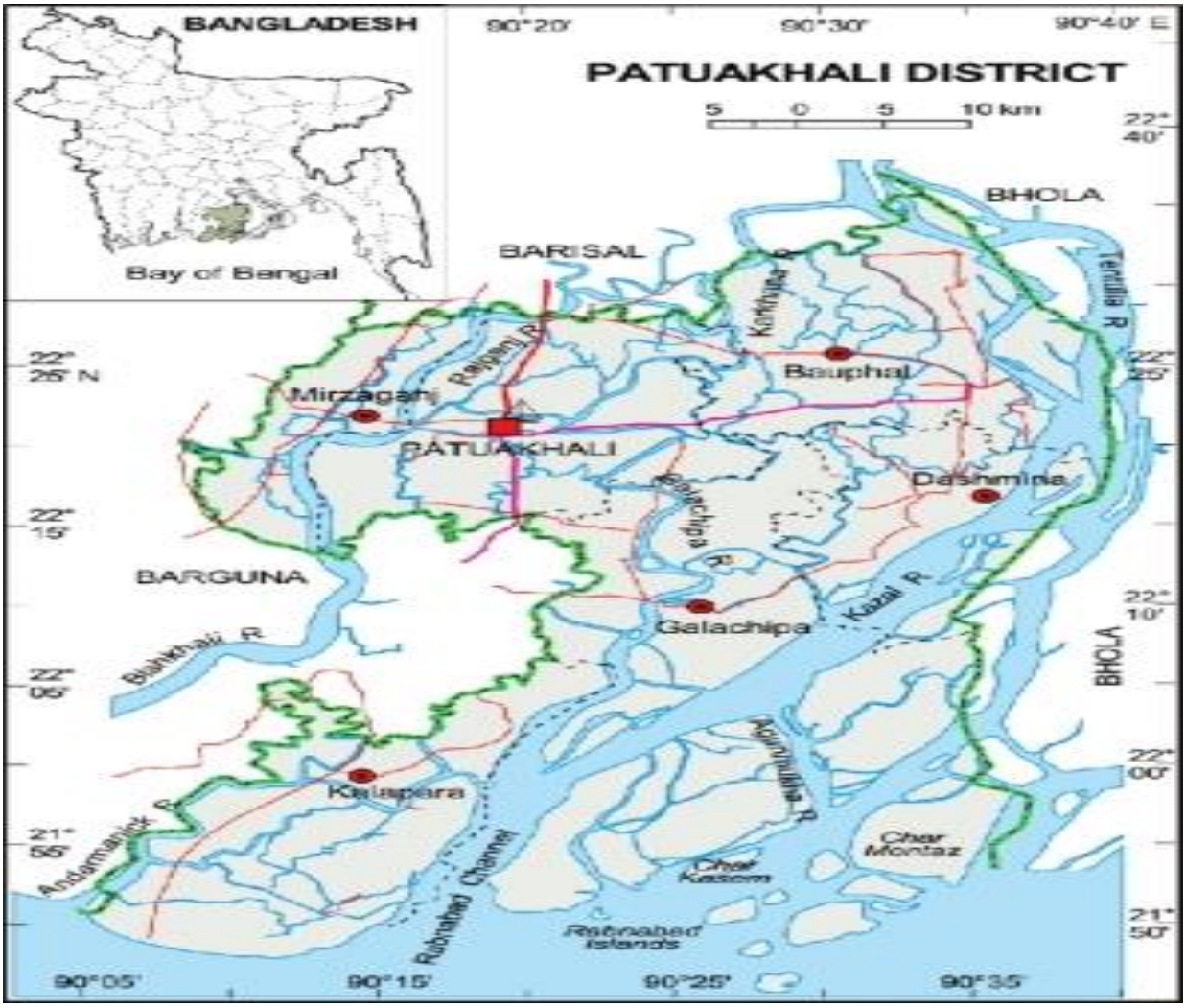
Niranjan Mondal (58) is a resident of the coastal area of Patuakhali district of Bangladesh and he is a vegetable seller in the various parts of Patuakhali. He buys various types of vegetables cheaply from local farmers and sells them in the local market and multi-local areas at Patuakhali for some profits. But he said that due to climate change, soil fertility is gradually decreasing and vegetable yield is also decreasing. As a result, farmers are losing interest in growing different types of vegetables due to low yields. As a result, he is not able to bring a lot of vegetables from the farmers to the market. As a result, currently, vegetable sales do not make much profit (Interview, 16/01/2023).

Achinta Mandal (65) is a resident of the coastal area of Patuakhali district of Bangladesh. He farmed chickens for 45 years, but in 2007, he lost about 4000 chickens due to high-level sea

rise. Again, he started a new chicken farm, through which he is earning for the living of his family (Interview, 16/01/2023).

Qutubuddin Mollah (56) is a local stationery shopkeeper at Kuakata in Patuakhali district, under the Barisal division of Bangladesh. His 7 family members depend on him, and he sells a

Figure: 3.10 Political Map of Patuakhali District of Bangladesh



[Source: http://mapsofbangla.blogspot.com, accessed on 12/01/2024].

variety of stationery items to those who are visiting Kuakata tourist spots. His stationery shop is located right on the beach in the Kuakata coastal area. He had very sadly mentioned that during the cyclone Sidr in 2007, his stationery shop was submerged due to the high-level sea rise caused

by climate change. Later, he again opened a stationery shop, but he said that he always felt the anxiety of natural disasters (Interview, 17/01/2023).

Halim Sheikh (61) is a fisherman from Kuakata in the Patuakhali district of Bangladesh. He has been fishing in the local river for about 30 years. But he lost his small boat during the cyclone Sidr in 2007. In 2007, he again built a small boat through financial turmoil. He also said that his boat is very small, so he has not been able to go far fishing. He earns through the selling of little fish and living with very difficult conditions (Interview, 16/01/2023).

Sheikh Ramzan (54) is a local rice hotel owner at Kuakata in Patuakhali District, under the division of Barisal. He was a fisherman until 2009. But he lost his small boat in 2009 to the cyclone Aila. After cyclone Aila, he opened a small rice hotel in Kuakata. But he mentioned that the number of people traveling abroad is decreasing due to climate change. As a result, little income from the hotel makes it difficult for the family to make a living (Interview, 17/01/2023).

Shatadal Mondal (63) is a local saree shopkeeper at Kuakata in Patuakhali district of Barisal division, Bangladesh. He bought various types of Dhakai Jamdani sarees cheaply from Dhaka and sold them in Kuakata. But he said, that due to climate change, a number of travellers are not coming to Kuakata, especially during the monsoons. He also mentioned that the entire rainy season becomes off-season, and as a result, he has suffered a financial crisis (Interview 17.01.2023).

Alakesh Mondal (54) is a local fisherman at Kuakata in the Patuakhali district of Bangladesh. He has been earning his family's livelihood by fishing in the river for almost 27 years. But he said his small boat was severely damaged by cyclone Sidr in 2007 and cyclone Aila in 2009. He subsequently repaired the boat again. But he mentioned that he always goes fishing in the river with apprehension (Interview, 17/01/2023).

Sheikh Alam (59) is currently a rickshaw puller in Dhaka, Bangladesh. He was a papaya farmer in Barisal before Cyclone Sidr in 2007. But cyclone Sidr in 2007 severely damaged nearly four bighas of papaya plantations and killed most of the papaya trees. After cyclone Sidr, he became disappointed and moved to Dhaka for a driving rickshaw to economically support his family (Interview, 14/01/2023).

Sheikh Rabiul (51) has lived in the Barisal division of Bangladesh for about 42 years, but currently, he is a rickshaw puller in Dhaka, Bangladesh. Cyclone Sidr in 2007 completely destroyed his mud house, and the little arable land was flooded with salt water. So he has moved to Dhaka with his family. Now he is providing for all the basic needs of his family by driving a rickshaw (Interview, 14/01/ 2023).

Manirul Haq (51) is a resident of the coastal area of Noakhali, Bangladesh. He was a fisherman before Cyclone Aila in 2009. But during the cyclone Aila in 2009, he lost his small fishing boat, and their mud house collapsed. Later, he built a small house with much difficulty. Finally, he was forced to come to Dhaka and drive a rickshaw to support his family (Interview, 14/01/2023).

Nabi Khan (59) is currently a rickshaw puller in Dhaka. He was a farmer at Noakhali before Cyclone Sidr in 2007. In 2007, during the cyclone Sidr, he lost about three bighas of agricultural land through the saline sea water due to high sea level rise. So he was forced to move to Dhaka with his family for the sake of safety and is making a living by driving a rickshaw (Interview, 14/01/2023).

Arabul Halim Khan (49) is currently a rickshaw puller in Dhaka, Bangladesh. Before 2009, he was a fisherman in Khulna, Bangladesh. His number of family members is extremely dependent on him. During the Aila cyclone in 2009, he lost his small boat. After cyclone Aila, he moved to Dhaka with his family, and he is driving a rickshaw to support his family (Interview, 14/01/2023).

3.18 Conclusion

The third chapter examined how West Bengal and Bangladesh have been severely affected by natural and men made disasters. Due to climate change, sea level rise and seawater levels are increasing and multiple super cyclones affected Purba Medinipur, North 24 Parganas, South 24 Parganas of West Bengal (especially Sagar Island, Ghoramara Island, and Mousuni Island), Barisal, Khulna, Noakhali in Bangladesh, etc. It is realized that in both coastal areas, people's security of life is gradually decreasing.

Comparatively, the people of Bangladesh are severely affected by multiple supercyclone, floods, cyclone storms, etc. rather than West Bengal and this has been highlighted in that chapter. Most of the cyclones originate on the coast of the Bay of Bengal, but eventually hit Bangladesh via West Bengal and are increasingly endangering the lives of people in Bangladesh surrounded by the Ganga Meghna Brahmaputra. Out of the 64 districts of Bangladesh, 19 are coastal districts; there are 3 coastal districts in West Bengal namely Purba Medinipur, North 24 Parganas, and South 24 Parganas.

About 500,000 people died in the tropical cyclone of 1991. Simultaneously, about 3,406 people died in cyclone Sidr and about 237 people died in Cyclone Aila in 2007, which affected Bangladesh rather than West Bengal. Again, it has emerged from various data that, due to climate change, more than one million people of Bangladesh have migrated to different states of India, especially states like West Bengal, Assam, Tripura, etc. However, due to climate change, there is no evidence that people have migrated to Bangladesh from West Bengal. However, in view of the dire experiences of the people of the various islands of West Bengal and the coastal areas of Bangladesh, it was extremely painful. West Bengal and Bangladesh governments need to be active and responsible for the prevention of disasters, providing sufficient cyclone shelters during the cyclones and post-cyclone periods in the coastal areas, improving technology, increasing joint cooperation, and distributing relief impartially and transparently.

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Chapter - IV

Climate Change and Environmental Migration in the Different Parts of West Bengal and Bangladesh

4.1 Introduction

The problem of climate migration has emerged as a new global security threat around the globe. About 80 million people have been forcibly displaced in the world due to climate change, and about 26 million people have become refugees. Also, about 45.7 million people have been separated from their homeland, and about 4.2 million people have become displaced from their homeland. Due to climate change, sea level rise, drought, floods, drinking water shortages, increasing seawater salinity, deforestation, extreme pollution, etc. are the leading causes of climate migrations in the world (Ari and Gokpinar 2020). The two South Asian countries, India and Bangladesh are no exception. Also, India and Bangladesh have faced an internal migration problem, especially in the coastal areas of both sides of the Sundarbans, such as Sagar Island, Ghoramara Island, and Mousuni Island of the coastal regions at South 24 Parganas District in West Bengal of India, and Barisal, Noakhali, Khulna, etc. of the coastal regions of Bangladesh.

Since the 1970s and after the 1980s, the traditional notion of security has been challenged by several issues in international scenarios, like, the oil crisis of the Middle East countries, unexpected human rights violations, massive environmental degradation, climate migration internally and externally in the world, etc. The extreme level of climate change has forced people to leave their homeland, especially in coastal areas. India and Bangladesh are both riverine countries in South Asia. Both countries' people have been extremely affected by various natural calamities, and man-made disasters, especially in the Sundarbans coastal areas. Particularly, researchers have visited a few coastal areas of West Bengal, such as Gangasagar Island, Mousuni Island, Ghoramara Island, Jambudwip, etc and Coastal areas of Bangladesh like Patuakhali, Kuakata, Noakhali, etc. Those people are living on both sides, and their livelihoods are extremely threatened by climate change and the various cyclones.

4.2 The Statement of the International Organization for Migration

The International Organization for Migration (IMO) has mentioned that environmental migrants are those people or groups who are forcefully displaced from their homeland and normal way of life due to climate change and environmental threats, and they are forced to take shelter in other places either temporarily or permanently (internally and externally). The International Organization for Migration has used the term "migrants" instead of refugees within a broad perspective (Ari and Gokpinar 2020: 44).

4.3 The UNEP Report in 1985

In 1985 report of The United Nations Environmental Program, it was mentioned that climate migrants are those people who are forcefully alienated from their homeland for a temporary or permanent period due to natural disasters or men made disasters. The livelihoods of the common people are also extremely affected by climate change. El-Hinnawi also mentioned climate migrants treated as "environmental refugees" (El-Hinnawi 1985: 4). International scholar Lester Brown first used the term environmental refugees in the 1970s (Ari and Gokpinar 2020: 44). Simultaneously, Norman Myers has since deeply explained the issues of environmental refugees in 1993. Both international scholars El-Hinnawi and Myers also discussed as a global security concern the issues of climate migration and environmental refugees (Myers 1993: 190).

Climate change (natural and human-induced) will increase high sea rise, shortages of drinking water, floods, cyclones, tsunamis, etc. in the world. Asia, Africa, and Latin American countries are extremely affected by climate change. The two neighbouring countries in South Asia, such as India and Bangladesh are both riverine and vulnerable regions. In 2050, about 250 million people will migrate from their homelands due to climate change. Various theorists have mentioned several reasons for climate migration and these are listed below -

(i) Heavy rainfalls can lead to sudden disasters such as floods, super cyclones, or landslides in coastal areas.

(ii) Climate change will increase environmental degradation and high sea rise, increase soil erosion and water salinity, extreme floods, cyclones, droughts, desertification, etc.

(iii) Environmental migration may occur on small islands due to climate change, such as Sagar Island, Ghoramara Island, and Mousuni Island in West Bengal and Barisal, Patuakhali, Kuakata, Noakhali, Khulna, etc. in Bangladesh.

(iv) If the government identifies and restricts any particular coastal areas or small island to living very dangerously for the human being, that time people will migrate from that specific area for their secure lives.

(v) Simultaneously, resource scarcity in society due to climate change has increased hostility, competition, armed conflicts, etc. and as a result, people are forced to leave their homeland (Kalin 2010: 85).

4.4 The IPCC Report in 2007 and Other Statements

The Intergovernmental Panel on Climate Change (IPCC - 2007) has expressed that the consequences of continuous climate change could be very dangerous for the survival of human civilizations. Due to extreme climate change, human survival in coastal areas has become almost impossible. Bangladesh was inadequately hit by cyclones Sidr in 2007 and Aila in 2009. Particularly, people have lost their livelihoods and are displaced from their homeland due to climate change. About 26 million people in Bangladesh have migrated due to climate change. Which would be statistically about 16 percent of the population of Bangladesh has migrated from their homeland internally and externally (Mayers 2012 and Kartiki 2011).

Why so many Bangladeshi people have migrated after the cyclones Sidr (2007) and Aila (2009). It is mentioned below -

(i) Destruction of livelihood conditions such as farms submerged, crop yields destroyed, etc. in the coastal areas of Bangladesh.
(ii) Destruction of households, shelters, and assets by the various cyclone storms.
(iii) Increase of landlessness, extreme property, hunger, and resource scarcity due to climate change.

(iv) Lack of sufficient cyclone shelters in the coastal areas of Bangladesh.

(v) Terrible living conditions within the cyclone shelter, such as congested areas, unsanitary conditions, and lack of privacy for women in coastal areas of Bangladesh.

(vi) Insecurity of children, such as disruption of education, lack of proper education system within the cyclone shelters of the coastal areas of Bangladesh, lack of proper living conditions, etc. for children.

(vii) Lack of better facilities for the sustaining of life in the future within the coastal areas of Bangladesh.

(viii) Due to climate change continuously threatening life through various human induced disasters, Bangladeshi people have to leave their homelands. All the above-mentioned points are also to be called push factors, according to Kotha Kartiki.

At the same time, he has mentioned two pull factors - why people in coastal areas migrate from rural to urban areas of Bangladesh. Those are below

(i) According to him, there are better facilities than villages and multiple work opportunities in urban areas of Bangladesh.

(ii) Their friends and families are living in better places so they are migrated for a better livelihood (Kartiki 2011: 32).

Bangladesh is a riverine country in South Asia and most of the time, Bangladesh affected by natural and human-induced disasters such as Cyclones, wind storms, flooding, droughts, etc. The Padma, Meghna, and Brahmaputra's water levels are continuously increasing, and as a result, about 80 percent of land areas in Bangladesh have flood plains. Various cyclones and floods, such as in 1974, 1987, 1988, 1998, 2004, 2007, 2008, 2009, etc., had extremely affected the coastal areas of Noakhali, Khulna, Patuakhali, Kuakata, Barisal, etc. in Bangladesh. More than 69 percent of Bangladesh's land area was affected by the 1998 flood (Sarrif, Dasgupta, and Adams 2011). Most of the displacements have been due to climate change, and riverine islands formed of silt are also called chars (Zaman and Weist: 1991).

Bangladesh is an environmentally vulnerable riverine country. More than 70% of Bangladeshi people live in the lower reaches of the Ganges-Brahmaputra delta and are constantly affected by floods, cyclones, soil erosion, etc. (Cash et al. 2013, Siddiqui 2003, and MoEF 2009).

Since the early 2000s, due to climate change, a number of people have migrated from Bangladesh to other states in the world (Bangladesh Bureau of Statistics, 2011). In particular, various places in India, such as West Bengal, Assam, Tripura, etc., have become important destinations for the people of Bangladesh (Alam 2003; Donato et al. 2016). At the same time, the number of unauthorized migrants to India has also increased recently.

Although India has pointed wire fences and strict surveillance in border areas, climate change is forcing Bangladeshis to cross into India (Carrico and Donato 2019). Simultaneously, due to climate change, the number of internal migrations has also increased in various parts of the coastal areas of Bangladesh. At the same time, the number of seasonal and temporary migrations is also extensive and it are most common in Bangladesh (Afsar 2003; Kuhn 2000). In Bangladesh, internal family migration is also common due to climate change for their better livelihood from rural coastal areas to urban areas (Khun 2000 and 2005).

The climate change problem is a major human security threat for Bangladesh. Bangladesh has faced the loss of large areas of land from increasing sea level rise, cyclones, floods, hazards, etc. The Inter-Governmental Panel on Climate Change (IPCC) has commented that about 17 to 20% of Bangladesh's land area will go under the sea by 2050 if the climate continues to change. The recent World Bank report has also stated that if climate change continues, results such as water scarcity and reduced crop yields will be seen in Bangladesh in the future. As a result, an increase in resource scarcity, extreme levels of hunger, and poverty will increase the number of climate migrations in Bangladesh (Moniruzzaman 2013).

Bangladesh has been affected by various super cyclones, and floods on a regular basis, such as cyclone Sidr (2007), Nargis (2008), Aila (2009), Laila (2010), Bulbul (2019), Fani (2019), Amphan (2020), Yass (2021), Sitrang (2022), Mocha (2023), etc. Due to climate change, increasing the number of climate migrants is a major challenge for Bangladesh. A large number of people have been forcefully displaced from their homeland due to the emergence of environmental crisis and climate change such as regular inundation, river bank and coastal erosion, sea level rise, super cyclones, and various environmental human-induced disasters (Nayak 2011).

Due to climate change, environmental hazards and crisis has been forcing people to migrate from their homeland to better places for their own survival. Even due to climate change, the

emergence of resource scarcity will create conflict during the migration period, and women and children are also affected by the conflict due to resource scarcity (Litchfield 2012). In the context of continuous climate change, an estimate of the Bangladesh Government's National Climate Strategy states that the number of climate migrants will reach more than 20 million in Bangladesh in the future (Moniruzzaman 2013).

4.5 Climate Migration Due to Climate Change

Most international relations theorists, policymakers, and environmentalists have mentioned that the number of migrations is increasing in Bangladesh due to climate change. Climate change has a deep connection with climate migration. Climate change is forcing people to be internally and externally displaced from one place to another. Also, the problem of climate migration has now become a human security problem in the international arena. Governments should take timely and appropriate measures to minimize the problem of climate migration (Kolmannskog, 2009).

The four causes of Bangladesh's Climate Migration Problem are described below

(i) Extreme levels of natural disasters, such as hurricanes and various cyclone storms, destroyed the livelihood conditions of the coastal and rural areas of Bangladesh.

(ii) Increased global warming, droughts, and extreme floods that affect the farmer’s crop yields and excess drinking water.

(iii) Rising sea levels and excessive flooding are extremely affecting the coastal areas of Bangladesh.

(iv) Increase of natural resource scarcity due to climate change that may lead to conflict and continuously increase migration within the territory of Bangladesh and across the country (Martin 2010: 398).

As a result of climate change, the problem of migration is not only increasing in Bangladesh, but the problem of migration (internal and cross border) is revolving around a humanitarian crisis in India. India has facing multiple problems due to climate change, such as

desertification, sea level rise, shortages of fresh water, melting of ice glaciers, etc. About 3,00,000 labourers migrate from the drought-prone Bolangir district of Odisha every year (Panda 2010: 77).

At the same time, the two megacities such as Mumbai and Kolkata will be crowding metropolitan cities due to the sea level rise and super cyclones in the Sundarbans islands (like Sagar Islands, Ghoramara Island, and Mousuni Island, etc.). About 8693 km of land area in India is affected, 3744 km of agricultural land area is affected due to climate change, and about 7640416 people are at risk due to sea level rise and super cyclones (Dasgupta et al. 2009).

In 2100, about 120 million people in India and Bangladesh will be displaced from their homeland due to climate change and sea level rise. Due to climate change, many people from Bangladesh are constantly migrating to different parts of India, especially West Bengal, Assam, Tripura, Meghalaya, Mizoram, etc. As a result, various cities in India already faced resource scarcity (Ranjan 2008). More than 5 million people live in extremely vulnerable areas of Bangladesh (McGranahan et al. 2007). About 5,00,000 people are displaced every year due to floods in Bangladesh (Warner et al. 2009). Also, about 20 million people migrate from Bangladesh to India every year (Brown 2007). The number of migrants from Bangladesh to India has increased from 12 to 17 million in the last 40 years due to environmental resource scarcity and conflict due to climate change (Homer - Dixon 1994).

Due to climate change, people are migrating from the neighbouring states, especially Bangladesh, Nepal, Sri Lanka, Pakistan, etc., and coming into different parts of India. As a result of this cross-border migration, the "Son of the Soil" of India is facing multiple problems. The migration of people from Bangladesh to India due to climate change can be compared to the migration of people from Mexico to the United States of America in the 1990s and early 2000s.

4.6 The Number of Bangladeshi People Migrants in India

The number of migrations from Bangladesh to India's North East States and West Bengal is quite alarming. As a result, the problem of resource scarcity in Northeast and West Bengal is increasing. About 15 to 20 million people from Bangladesh migrated to Northeast and West Bengal. According to a statistic from Population and Development Review, if climate change continues like this, by 2050, half of the population of Bangladesh will be unsuccessful in making

a living through agriculture, and they will move to cities, and most of them will migrate to India. About 3 million Nepalese have migrated to the northeastern states of India due to resource crises and climate change. Also, as a result of the 2004 Tsunami in Sri Lanka, about 18% of the Sri Lankan population, which is about 20 million coastal area Tamils, migrated across the Palk Straits to Tamil Nadu in India (Panda 2010).

On the basis of recent intelligence reports, the United States' development of defense has mentioned - that the most vulnerable regions in the world are Africa, the Middle East countries, Southeast Asia, and South Asia. These regions will face food crises, shortages of drinking water, droughts, floods, cyclone storms, etc. in the coming decades (Werz and Hoffman 2015: 100).

In September 2012, India's northeastern states of Assam and Sikkim were extremely affected by floods due to climate change. More than 7 lakh people from Assam's Majuli, Jorhat, Dhemaji, Lakhimpur, and Sibsagar villages have been affected by floods and displaced from these coastal areas (India Today, 23.09.2012). Simultaneously, due to the drought of 2012, about 60% of farmers in India were affected, especially in Maharashtra, Rajasthan, and Karnataka, and farmers raised their demand for electric palms for tap groundwater supply to produce agricultural crops (BBC News, 25/09/2012). Also, the metro cities of India, especially Kolkata, Mumbai, and Chennai have been affected by extreme super cyclones, droughts, floods, sea level rise, high temperatures, crises of drinking water, etc. due to climate change (Revi 2008: 207).

4.7 Climate Migration in the Coastal Areas of West Bengal

The researcher has collected the primary data for the study through observation, Participant observation, interviews, etc. Also, the researcher has interviewed people from the various coastal areas of Sagar Island, Ghoramara Island, and Mousuni Island in South 24 Parganas District in West Bengal, India and simultaneously, the researcher has interviewed people from Patuakhali, Kuakata, and the coastal areas of Khulna and Noakhali who have forcefully migrated from their homeland due to climate change and affected from the various cyclones. The various cyclones such as Sidr (November 2007), Aila (May 2009), Fani (April 2019), Bulbul (November 2019), Amphan (May 2020), Yass (May 2021), Sitrang (October 2022), cyclone Mocha (May 2023) etc were extremely affected, especially coastal areas of West Bengal and Sundarbans coastal parts of Bangladesh. Aila’s wind speed was between 120 and 130 km/h, Bulbul’s was about 155 km/h, Fani’s was about

250 km/h, Amphan's wind speed was 260 km/h, cyclone Yass had a wind speed of about 140 km/h, cyclone Sitrang had a wind speed of about 85 km/h, and Cyclone Mocha had a wind speed of about 280 km/h.

4.8 Climate Migration on Sagar Island of West Bengal

Sagar Island is a Sundarbans coastal part of South 24 Parganas in West Bengal. Also, the Island is the largest coastal Island in West Bengal. Due to climate change and various super cyclones like Sidr (2007), Aila (2009), Fani (2019), Bulbul (2019), Amphan (2020), Yass (2020), Sitrang (2022), etc., the Sundarbans coastal areas of Sagar Island have been extremely affected. Researchers have taken interviews from the coastal parts of Sagar Island to explore how and why people in the coastal areas have migrated from their homeland to other places. These are mentioned below -

Figure: 4.1 Photo of the Gangasagar Coastal area on Sagar Island, near the Kapilmuni Temple

[Source: Photo taken by Anupam Patra, 20/06/2023].

Madhusudan Dingal (66) is a fisherman from Gangasagar village near the Ganga temple (North) under the Gangasagar Panchayat on Sagar Island. He mentioned that the super cyclone Aila on May 25, 2009, extremely damaged the Sagar coastal Island and his homeland. He was forcefully displaced from their homeland. Also, he lost his mud house through the cyclone of Aila. Later, he built a small house with great difficulty. Again in 2019, the cyclones of Bulbul and Fani destroyed their small house. Finally, he was migrated with their family from their homeland, Tiner Gheri Para to Gangasagar village near Gangasagar temple (North) under Gangasagar Panchayat for his family's safety (Interview, 04/02/2023).

Sudarshan Bhunia (65) lived as a fisherman in Bhunia Para of Gangasagar Panchayat, Sagar Island. Especially from September to March every year, he catches and sells various types of small fish, shrimps, mud crabs, lote fish (various names boomla, lotta), etc. from the estuary of the Bay of Bengal, through which he earns his living for the seven members of his family.

Figure: 4.2 Photo of the Beguakhali Coastal areas on Sagar Island

[Source: Photo taken by A. Patra, 20/06/2023].

No cyclone shelter has yet been established in the area. So they were forced to take shelter with the family at the local higher secondary school at Sreedham Gangasagar Swami Kapila Nanda Vidya Bhaban. Currently, he has been displaced from his homeland, Bhunia Para (East), due to climate change, and he built a small house near the New Gheri Para of Gangasagar Panchayat for his family's safety. At present, he lives with his family in the sea area of Gangasagar coastal police station. But he lost his small boat in 2009 due to Cyclone Ayala. He again built a small boat to earn a living. But the Sitrang cyclone and floods of 2022 caused the salt water level of the sea to rise so much that their mud house also collapsed ((Interview, 11/02/2023).

SK Rahim (63) is a fisherman. He belongs to Sheikh Para (south) near the 2nd Gheri of Beguakhali village under the Gangasagar village Panchayat at Sagar Island in West Bengal. He has mentioned that his family members are nine, and he is the only earning member in their family. But he lost his small house due to the Yass cyclone in 2021. After the cyclone of Aila, he built a small house in very difficult place for their family's security. But in 2022, during the Sitrang cyclone and storm destroyed his mud house. He was forced to migrate from Bidhan More (west), near Paschim Para to Sheikh Para (south), near the 2nd Gheri of Beguakhali village. Now, he has built a small boat by which he earns his family's living by catching various types of fish, prawns, mud crabs, etc. from the river (Interview, 04/02/2023).

Shashanka Bhunia (55) is a fisherman from New Gheri Para under the Gangasagar village of the Gangasagar coastal police station. Before the Yass Cyclone of 2021, he lived with his family in Bhunia Para (East), near the coastal area in Gangasagar village. In 2021, during the Yass cyclone, he lost everything, such as mud house, cows, goats, poultry farm, etc. He finally migrated with his family from Bhunia Para (East) to New Gheri Para under the Gangasagar Panchayat. At present, he has leased a fishery for five years and is farming prawns, bagda, bhetki fish, etc. Through this, he is hopeful that he will be able to earn a living for his family (Interview, 11/02/2023).

Rabiranjan Shit (52) is a fisherman of Shit Para (west) at Beguakhali village under Gangasagar Panchayat. His family's livelihood was extremely affected due to climate change and the rigorous super cyclones. He mentioned that they lived in a small house near the coastal area of Beguakhali village that was also destroyed during the Aila cyclone in 2009. Finally, they have

been displaced from their homeland, Shit Para to Paik Para at Beguakhali village, under the Gangasagar village Panchayat. Also, he mentioned that after the cyclone Aila, he received some financial support from the Gangasagar village Panchayat for the rebuilding of the house (Interview, 04/02/2023).

Naru Mondal (49) is currently a fisherman in Bhunia Para of Gangasagar village under the Gangasagar Coastal Police Station. He is a fisherman, and he has a small boat. He mentioned that his family is very dependable on him for their livelihood. He catches different types of fish - prawns, mud crabs, etc.—from the river for their family's sustenance. He mentioned that he was a farmer belonging to the Khejuri police station in East Medinipur district until 2009. They had few lands on which they made a living by farming. But in 2009, cyclone Aila flooded their farming

Figure: 4.3 Photo of the Coastal areas of Sagar Island

[Source: Photo taken by A. Patra, 20/06/2023].

land with sea salt water, and subsequently, the land became unfit for farming. So he forcefully came with his family from East Medinipur district to Bhunia Para under the Gangasagar police station of South 24 Parganas district and has been living there since 2009. They have migrated

from their homeland due to climate change. He is currently earning his living by fishing (Interview, 11/02/2023).

Karim Sheikh (57) is a current resident of Gangasagar village (North) near Rana More under the Gangasagar village Panchayat at Sagar Island. His family was displaced from the coastal area of Tiner Gheri Para to Gangasagar village under Gangasagar Gram Panchayat due to climate change. He was a fisherman and had a small boat. But he lost his small boat and small house during the Amphan cyclone in 2020. Finally, he was forcefully migrated from their homeland to another place due to climate change (Interview, 04/02/2023).

Sirajul Khan (71) is a current resident of Sagar Colony Road no. 1 near the Kapilmuni Ashram at Gangasagar village Panchayat. Currently, he is the owner of the hotel restaurant near Gangasagar Mela. Previously, he lived in the coastal area of Sheikh Para in Beguakhali village. He was an owner of fishing trawlers, and he sent the various fish, such as Hilsa, Pamphlet, and Bhola, etc., to various places like Kakdwip Nischandapur Market, Diamond Harbour, Kolkata, etc., for sale and profit. But in 2009, during the Aila cyclone, he extremely damaged his three fishing trawlers and fishing nets. At the same time, his advester's house was also destroyed by Cyclone Aila. He was forcefully displaced from the Sheikh Para coastal area to the Sagar colony near the Kapilmuni Temple due to climate change. After the loss of fishing trawlers, he became disoriented, but at present, he is able to run the hotel comfortably and earn sufficient money from the hotel restaurant for his family's livelihood (Interview, 04/02/2023).

Dulal Chandra Hemram (61) is a current resident of Road No. 4, Sagar Colony, under the Gangasagar Coastal Police Station. At present, he earns his livelihood by catching fish, crabs, shrimp, etc. from the Bay of Bengal estuary. Before the Amphan cyclone of 2020, he lived with his family in the eastern part of Beguakhali village. But in 2020, cyclone Amphan destroyed his small house. Even so, there is no cyclone shelter present near the Eastern Para of Beguakhali. So, they lived in a very difficult situation at a nearby primary school for a few days, and they were completely unsettled. He also mentioned that about 10 feet of saltwater stood in the area where their house was located due to the Amphan cyclone. Then he stayed with Gangasagar Bharat Sevashram Sangha and his family for a few days. Finally, he built a small house on temporary government unused land near Road No. 4 in Sagar Colony for his family's safety. His livelihood

and displacement due to climate change are very heartbreaking and terrible (Interview, 11/02/2023).

Rabin Tudu (40) is currently a resident of East Para of Gangasagar village under Gangasagar Coastal Police Station. Earlier, he was a resident of Charer Gheri (West) of Beguakhali village under Gangasagar Gram Panchayat. In 2019, they lost their little crop yield land and mud house due to cyclones Bulbul and Fani. Then, he works as a labour to build a house and secure the family's livelihood. He said that despite his desire, he could not study beyond secondary school due to a lack of financial stability in his family. But his dream is to make his son and daughter graduate in the future. Therefore, he said that he would go to work in Kerala as a migrant labour for the higher education of his children (Interview, 11/02/2023).

Figure: 4.4 Photo of the Coastal areas of Sagar Island

[Source: Photo taken by A. Patra, 20/06/2023].

Sanatan Hemram (68) is a current resident of Sagar Colony Road no-1 near the Kapilmuni Temple. Currently, he supplies various temple worship items like flowers, Bela leaves, incense, vermilion, coconut, various flower garlands, etc. He earned his family's living by selling various

temple items to the people who came to Gangasagar from different states and abroad. He lived in the coastal area of Gangasagar Village (Southeast) until the Amphan cyclone (2020). Previously, he used to earn his living by rearing pigs and catching crabs in the jungles around Gangasagar Village. But in the Amphan cyclone in 2020, his small mud house and all the pigs (around 200) were washed away. Finally, he was forcefully displaced from his homeland, Gangasagar village (southeast), under Gangasagar village Panchayat to Sagar Colony Road no- 1, near Kapilmuni Temple (Interview, 20/06/2023).

Snehalata Tudu (62) is a current resident of Sagar Colony Road no- 5 (behind the Kapilmuni Temple). Currently, she earns her living by begging in front of the Kapilmuni temple. She said that she lost her husband 10 years ago, and now her three sons are not seen by anyone. She was forced to earn her living by begging. Before the Fani Cyclone of 2019, she lived in Gangasagar Village (southeast) in the coastal area. But her small mud house collapsed during

Figure: 4.5 Photo of the Coastal areas of Sagar Island

[Source: Photo taken by A. Patra, 20/06/2023].

the Fani cyclone (2019). Finally, she became helpless and stayed for a few days in a rest house built for pilgrims who came from different parts of India and abroad. Currently, she has built a small mud house at Sagar Colony Road no-5 near Gangasagar Coastal Police Station. Her life experience is very painful. She was also displaced from Gangasagar Village (southeast) to Sagar Colony near the Kapilmuni Temple on Gangasagar Island due to climate change (Interview, 20/06/2023).

4.9 Climate Migration in Ghoramara Island, West Bengal

At the same time, researchers have taken a few interviews from Ghoramara Island. Ghoramara Island is located near the Sundarbans coastal area and is interconnected with the Bay of Bengal. Ghoramara is also located about 92 km towards south Kolkata under South 24 Parganas district of West Bengal. Until 2020, the population of the Island was about 5,000. But the current population is about 2500 to 3000. Due to climate change, the emergence of various cyclones such

Figure: 4.6 Photo of the Ghoramara Island

[Source: Photo taken by Anupam Patra, 18/06/2023].

as Aila (2009), Fani (2019), Bulbul (2019), Amphan (2020), Yass (2020), Sitrang (2022), etc. has extremely affected the livelihood of the people in the Ghoramara coastal areas. Surprisingly, the Island is gradually submerging under water due to climate change. Their livelihood experiences are mentioned below –

Tamena Bibi (60) is a current resident of Mandirtala (North), near the local market of Mud Point Post Office on Ghoramara Island. She currently earns a living by selling tea. Before the Amphan cyclone in 2020, she lived in Patra Para (south) near the Ferry Ghat of Ghoramara Island. Until 2020, she was living by catching small shrimp, small prawns, mud crabs, etc. from the Bay of Bengal estuary. She lost her mud house due to the Amphan cyclone, and she was displaced from Patra Para (south) to Mandirtala (north) on Ghoramara Island. At the same time,

Figure: 4.7 Ferry Ghat photo of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

she mentioned that after the cyclone in Amphan, she got Rs 20000 from the Ghoramara Gram Panchayat for the rebuilding of a small house in another place (Interview, 18/06/2023).

Azad Rahaman Sheikh (60) is a current resident of Mandirtala village (North) near Milan Vidyapith Secondary School. He is the owner of a small stationer's shop in front of Milan Vidyapith School. He lived in Patra Para (East) with his family (family members 8) till the Amphan cyclone in 2020 (wind speed was about 260km/h). He was a fisherman. He had a small boat and he had fishing beside the local river, which is connected with the Bay of Bengal. But, during the Amphan cyclone (2020), he had lost his small boat and the small mud house they lived in. After the Amphan cyclone, he stayed with his family for 7 days in the cyclone shelter, which is located on the grounds of Milan Vidyapith School. After 7 days, he has built a small mud house in Mandirtala village for his family's safety. Finally, he has migrated from his homeland to Mandirtala village due to climate change (Interview, 18/06/2023).

Figure: 4.8 Only one Secondary School on Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Sheikh Abdul Barak (68) is a current resident of Mandirtala village (north) on Ghoramara Island. He is a fisherman. He was affected by various cyclones, such as Aila (2009), Fani (2019), Bulbul (2019) Amphan (2020), Yass (2021), Sitrang (2022), etc. He mentioned that, especially during the Yass cyclone (2021), the water level on the local river had raised about 20 feet and the river water flowed over their house. He was forcefully displaced with his family (7 members) from Khasimara (south) near Ferry Ghat to Mandirtala Para (North) at Ghoramara Island. After the cyclone of Yass, he built a small house in Mandirtala village (North), near the local market. Also, he mentioned that, after the Yass cyclone, he got Rs 20,000 from the Ghoramara Gram Panchayat (Interview, 18/06/2023).

Figure: 4.9 Cyclones affected area of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Kalu Khan (45) is a resident of Mandirtala Para (North), and he is also a fisherman at Ghoramara Island. Before the cyclone of Yass (2021), he lived in Khasimara Para, near the Ferry Ghat on Ghoramara Island. He had a small boat. Even during the Amphan cyclone (2020), his small boat and mud house were extremely affected. After the cyclone of Amphan, which was very

difficult, he repaired his boat and mud house. But, during the Yass cyclone (2021), he lost his boat and totally destroyed their mud house. He mentioned that, after the cyclone of Yass (2021), his family took shelter in the Cyclone shelter near Mandirtala Para (North). Finally, he was forcefully migrated with his family from their homeland, Khasimara Para, near the Ferry Ghat to Mandirtala Para (North) of Ghoramara Island. He is now a migrant worker. As a migrant worker, he went to work in Kerala, Chennai, Tamil Nadu, Hyderabad, etc. to sustain his family (Interview, 18/06/2023).

Figure: 4.10 Cyclone affected Ferry Ghat photo of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Jahangir Khan (45) is a current resident of Mandirtala village (North) near Ghoramara Milan Vidyapith Secondary School. Now he is a tea seller near the Milan Vidyapith School. He lived in Hatkhola village near Ghoramara local Ferry Ghat before the cyclone Yeas (2021). He was a fisherman and had a small boat. But he lost his small boat and small mud house during the Yass cyclone (2021). Ghoramara Island has only one secondary school, and one cyclone shelter is located on the grounds of Ghoramara Milan Vidyapith Secondary School. However, due to a lack of space within the cyclone shelter, he took shelter at Milan Vidyapith School with his family for two days. Later, with financial assistance of Rs 20,000 from Ghoramara Panchayat, he built a small

mud house near Milan Vidyapith School. He was forcefully displaced from his homeland, Hatkhola village to Mandirtala village (north), near Milan Vidyapith Secondary School (Interview, 18/06/2023).

Sheikh Majahar (48) is a current resident of Hatkhola village, near the Ferry Ghat on Ghoramara Island. He is a fisherman and has a small boat. He lived with his family in Khasimara village before the cyclone Yass (2021). He has maintained his family's needs through his occupation (fishing). But, during the Yass cyclone (wind speed was about 140 km/h) he lost his small boat and small mud house. After the cyclone Yass (2021), he arranged a small boat, which was very difficult to sustain. He was forcefully migrated with his family (7 members) from his homeland, Khasimara village (Khasimara was a local Ferry Ghat before the 1980s), to Hatkhola village (west), near the Ferry Ghat (Interview, 18/06/2023).

Figure: 4.11 Cyclones affected image of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Saddam Hossain Mollah (55) is a current resident of Mandirtala Para (North). He was a fisherman and had a small boat for catching various fish, prawns, crabs, etc. He lived in Khasimara Para on Ghoramara Island. But during the Aila cyclone (2009), their small house was destroyed and his small boat was extremely damaged. Again, he was rebuilding in a mud house on his father's land, which was very difficult. During the Amphan cyclone in 2020 (the wind speed was about 260 km/h) he was forcefully migrated from Khasimara Para to Mandirtala Para (North). He very much loves his occupation (fishing). Finally, he joined another boat as a chief fishing man in Kakdwip coastal area of South 24 Parganas district. He mentioned that, through fishing, he earns sufficient money and supports the 9 members of his family's livelihood (Interview, 18/06/2023).

Figure: 4.12 Climate change affected photo of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Bapi Ali Sheikh (51) is a resident at Mandirtala Para (North) of Ghoramara Island under the South 24 Parganas in West Bengal. Before the Yass cyclone (2021), he lived with the family at Khasimara Para, near the previous coastal Ferry Ghat on Ghoramara Island. He was also a

fisherman. During the Amphan cyclone, his mud house was damaged. After the cyclone of Amphan (2020), he repaired his small house his own ability. But during the Yass cyclone (2021), their small house was totally scratched. He was forced to migrate with his family from Khasimara Para to Mandirtala Para (north) under the Ghoramara Gram Panchayat. Due to climate change, his occupation changed from fisherman to stationery salesman. He bought stationery items from Kakdwip town and sold them to Ghoramara Island to support his family (Interview, 18/06/2023).

4.10 Climate Migration in Mousuni Island, West Bengal

Mousuni Island is a very small island located near Namkhana Block in South 24 Parganas district of West Bengal. According to 2011 census, the total population is 22073 (Baliara – 8672; Bagdanga – 4160; Kusumtala – 5663; and Mousuni Village populations is 3578).

Figure: 4.13 Coastal areas photo of the Mousuni Island

[Source: Photo taken by Anupam Patra, 17/06/2023].

Also, the Island is located towards the southern end of West Bengal and connected to the Bay of Bengal (Karmakar, Dey and Roy 2020: 235). Those people live in the various coastal parts of

Mousuni Island, they have shared their livelihood experiences and how they have migrated from their homeland due to climate change. These are mentioned below –

Arunima Das (76) is a current resident of Mousuni Island. Now, she currently earns a living by selling tea near the tourist spot (west) of Mousuni Island. Until 1990, she lived in Jambudwip (located near the Bay of Bengal). She earned her livelihood by catching various fish, prawns, and mud crabs from the Island. But, due to climate change, the Island was dropped under the water in 1990. She was forcefully migrated from Jambudwip to the Sagar colony of Gangasagar Island, near Gangasagar Kapilmuni Ashram. She was there from 1990 to 2009, during the Aila cyclone. But during the Aila cyclone, she lost her small mud house, and she was disoriented. After the Aila cyclone, for a few days, she was in the Bharat Sevashram Sangha. Finally, she was displaced from Sagar Island to Mousuni Island due to climate change (Interview, 17/06/2023).

Figure 4.14 Climate change affected a woman in Mousuni Island

[Source: Photo taken by A. Patra, 17/06/2023].

Iqbal Hossain (61) is a current resident of the coastal area (West) of Mousuni Island. He is a fisherman and has a small boat. He lived in Mandirtala Para (North) of Ghoramara Island during

the Amphan cyclone in 2020. He catches various fish (such as lote, bhola, amudi, etc.), prawns, mud crabs, etc. from the river for their sustaining life. But during the Amphan cyclone (2020), he lost his small boat and extremely damaged his mud house. He was forcefully migrated from Ghoramara Island to Mousuni Island. After 2020, he again built a small boat. He catches various fish, prawns, crabs, etc. from the local river and earns for his family's livelihood (Interview, 17/06/2023).

Figure: 4.15 A fisherman photo with a child of Mousuni Island

[Source: Photo taken by A. Patra, 17/06/2023].

Saber Khan (61) is a current resident of Western Para, near the tourist spot of Mousuni Island. He is a rickshaw puller from Ferry Ghat to the central tourist spot of Mousuni Island. He was a fisherman before the Amphan Cyclone (2020) in the coastal eastern part of Mousuni Island. He mentioned that he lost his small boat and mud house during the Amphan cyclone (2020). After the cyclone of Amphan, he was forcefully displaced from his homeland near the Ferry Ghat (East) to Western Para (near the central tourist area of Mousuni Island). Presently, he is driving a rickshaw for his family to sustain themselves (Interview, 17/ 06/2023).

Anuradha Hemram (70) is a current resident of the Western Para near the central tourist area of Mousuni Island. She is a tea seller near the western central tourist area of Mousuni Island. She lived from 1995 to 2009 on another very small island in Jambudwip under the South 24 Parganas district. After the cyclone of Aila (2009), the West Bengal government completely banned visiting and staying in Jambudwip Island. Finally, she migrated from Jambudwip to Western Para near the central tourist spot of Mousuni Island due to climate change (Interview, 17/06/2023).

Figure: 4.16 Climate change affected houses in the Coastal areas of Mousuni Island

[Source: Photo taken by A. Patra, 17/06/2023].

Dhiman Bhunia (63) is a current resident of Purba Para (East), near the Patibuniya Ferry Ghat on Mousuni Island. He has a tea shop near the Patibuniya Ferry Ghat. He earns around Rs 500 per day from the tea shop, through which he supports his family (5 members). Until 2021, he lived with his family in the central tourist spot (Paschim Para) of Mousuni Island. He had a small

hotel restaurant in a central tourist spot, through which he earned around Rs 750- 1000 rupees per day. But, during the Yass cyclone (2021), he lost his small hotel restaurant and his small mud house. He has mentioned that after the cyclone of Yass, he forcefully migrated from his homeland, Purba Para (near the Patibuniya Ferry Ghat) to the Ghoramara central tourist spot of Paschim Para due to climate change (Interview, 17/06/2023).

Figure: 4.17 Photo of Mousuni Island after Cyclone Yass

[Source: Photo taken by A. Patra, 17/06/2023].

Anshuman Dingal (54) is a current resident near the Patibuniya Ferry Ghat (Eastern side) of Mousuni Island. Now he is driving a rickshaw from Mousuni Ferry Ghat to Western Para, near the central tourist spot of Mousuni Island. He has mentioned that every day he earns about Rs 500-750 through the rickshaw. He lived with his family in Western Para, near the coastal tourist area of Mousuni Island, before the cyclone of Aila (2009). He was a fisherman, and he had a small boat. He was fishing small fish, small prawns, and mud crabs, near the river for his family's sustainability. But he lost everything during the cyclone Aila (2009). Finally, with his family, he

was displaced from the Western Para near the central coastal tourist area to the eastern part near the local Ferry Ghat (Patibuniya Ferry Ghat) of Mousuni Island (Interview, 17/06/2023).

4.11 Climate Migration in the Coastal Areas of Bangladesh

Simultaneously, due to climate change, various cyclones such as Sidr in 2007 (wind speed was about 260 km/h), Aila in 2009 (about 120 km/h), Fani in 2019 (about 250 km/h), Bulbul in 2019 (about 155 km/h), Amphan in 2020 (about 260 km/h), Yass in 2021 (about 140 km/h), Sitrang in 2022 (about 85 km/h), Mocha in 2023 (about 280 km/h) etc. have extremely affected and damaged the coastal areas of the Sundarbans region of Bangladesh. As such, Barisal (Patuakhali, Kuakata), Noakhali, Khulna, Bhasan Char, and many coastal parts of Bangladesh have been extremely damaged due to climate change. Researchers have taken interviews from the different coastal parts of Patuakhali under the Barisal Division, and Kuakata under the Patuakhali District and Division of Barisal. At the same time, researchers have interviewed the rickshaw pullers of Noakhali and Khulna who are displaced temporarily in Dhaka due to climate change.

Patuakhali is a coastal district of the Barisal division of Bangladesh. The various communities' people have lived together in Patuakhali, such as about 93.2 percent Muslims, about 6.8 percent Hindus, and about 0.11 percent other communities' people. The Patuakhali district is surrounded by the Laukathi River and the Lohalia River, and the two rivers are closely connected with the Bay of Bengal.

Golam Hossain Khan (54) is a resident of Barisal Sadar in Bangladesh. He is a rickshaw puller. He lived in Patuakhali, near the coastal area, before the cyclone of Sidr (2007). He was a fisherman. He had a small boat, and he fished the various fish from the Laukathi River. But he had lost his small boat and small house during the cyclone Sidr (2007) due to climate change. Currently, he drives a rickshaw in Barisal Sadar, and he earns about 600-900 Bangladeshi Taka for the sustenance of his family. He has forcefully migrated from his homeland Patuakhali, near the coastal areas to Barisal Sadar due to the cyclone of Sidr in 2007 (Interview, 18.01.2023).

Kamran Ali (55) is a current resident of Kuakata under the Patuakhali District of Barisal Division. He is now a tea seller in the coastal tourist area of Kuakata. He lived in Patuakhali, near the coastal area, before the cyclone Aila (2009). Also, he was a fisherman, and he had a small boat.

He mentioned that during the cyclone Aila in 2009, he lost his small boat and extremely damaged his small house. After the cyclone Aila, he was forcefully displaced from Patuakhali to the Kuakata coastal area. Currently, he runs a tea shop in the Kuakata coastal area and supports the family with the money earned through the tea shop near the coastal tourist destination of Kuakata (Interview, 18/01/2023).

Saifulla Ali Khan (57) is a current resident of Barisal Sadar, Bangladesh. He is a rickshaw puller. He lived with his family in the coastal area of Patuakhali before the Amphan cyclone (2020). He was a fisherman. But, during the Amphan cyclone in 2020, he lost his small mud house. Finally, he was forcefully displaced with his family from his homeland near the coastal area (East) of Patuakhali to Barisal Sadar under the Barisal Division. He temporarily built a small house near the Barisal Sadar for the family's safety. He has mentioned that by driving a rickshaw, he earns about 500 – 700 Bangladeshi Taka and sustains his family (Interview, 18/01/2023).

Kuakata is a tourist area of Patuakhali district, under the Barisal division of southwestern Bangladesh. About 18 km of beach land is known to tourists as Sagar Kanya. But the area also has been extremely affected and damaged by several super cyclones, such as Sidr (2007), Aila (2009), Fani (2019), Bulbul (2019), Amphan (2020), Yass (2021) cyclone Mocha (2023), etc.

Zinarul Haq (62) is a current resident of the coastal area of Kuakata under the Barisal division. He is a fisherman. He lived in the coastal area (east side) of Patuakhali before the cyclone of Aila (2009). He had a small boat, and he fished the various fish from the Laukathi River. But during the cyclone Aila (2009), he lost his small boat and small mud house. After the cyclone Aila, he forcefully migrated with his family from the coastal area (east) of Patuakhali to the Kuakata coastal area (southwest) due to climate change (Interview, 17/01/2023).

Sirajul Hossain (52) is a resident of the coastal tourist area of Kuakata under the Barisal Division. He is a various small fish chop seller (such as small prawns, amudi fish, boomla fish, etc.) in the coastal tourist area of Kuakata under the Barisal Division of Bangladesh. He lived in the coastal area (east) of Patuakhali with his family before the cyclone of Aila (2009). He was a fisherman, and he had a small boat. But during the cyclone Aila in 2009, he lost his small boat and small mud house. Also, he was forcefully displaced with his family from his homeland to the coastal tourist area of Kuakata due to climate change (Interview, 17/01/2023).

Liyakot Ali Khan (62) is a fisherman in the coastal area of Kuakata. He lived in Patuakhali, near the coastal area. But in the Yass cyclone in 2021, he lost his small boat, and his mud house collapsed. Having lost both his house and occupation, he finally became disoriented. He was forced to move from Patuakhali to Kuakata after the Yass Cyclone in 2021, and here he made a small boat with great difficulty. Through this, he is earning for the sustenance of life with his family (Interview, 17/01/2023).

Tahir Hossain Khan (42) is a current resident of the coastal area (southwest) of Kuakata under the Barisal Division. He is a tour guide. Before the Aila cyclone in 2009, he lived in the coastal areas of Patuakhali as a tea seller. But in 2009, cyclone Aila damaged his tea shop, and he lost his small mud house. After the cyclone Aila, he became disappointed and was displaced forcefully due to climate change from the Patuakhali coastal area (east) to the Kuakata coastal area (southwest). He mentioned that his income is very low as a travel guide, and it has become very difficult to maintain the medical expenses of his sick mother. So, he commented that he would go to some other places (such as Kerala, Hyderabad, and Chennai) as a migrant worker for sufficient earnings and that he would be able to maintain the expenses of his mother's medicines (Interview, 17/01/2023).

Simultaneously, the researcher has interviewed a few rickshaw pullers who lived in the various parts of the Noakhali and Khulna districts of Bangladesh. Due to climate change, they are forced to live with their family in Dhaka as rickshaw pullers. These are mentioned below –

Ziad Hossain (51) was a resident of Khulna, Bangladesh. He was a fisherman, and he had a small boat. During the Sidr cyclone in 2007, he was extremely affected; he lost his small boat, and a small house was destroyed by the cyclone. After Cyclone Sidr, he was rebuilding a small house for their survival. But after two years, during the cyclone of Aila (2009), his family was totally shelterless. Their small mud house collapsed due to Cyclone Aila. Finally, he was displaced with his family due to climate change from Khulna to Dhaka. Now, he is driving a rickshaw near the University of Dhaka, and he earns about Rs 1200 Bangladeshi Taka in a day. Through this, he was able to support the education expenses of two sons and a daughter of his family (Interview, 15/01/2023).

Kohinoor Hossain (53) is a current rickshaw puller in Dhaka. He had lost everything in 2007 during the cyclone of Sidr. He was a farmer in Khulna, Bangladesh. He lost his agricultural lands and mud house due to the cyclone of Sidr in 2007. So, he moved with his family from Khulna to Dhaka for the security of his family. Now, he drives a rickshaw and earns around Rs 1000 (Taka) daily to make a living. He has mentioned that after the cyclone of Sidr, he did not find any shelters to stay in. So he was forced to move from Khulna to Dhaka with his family (Interview, 15/01/2023).

Mahasin Iqbal (54) is an unsettled resident of Dhaka, near the University of Dhaka. He is a rickshaw puller in Dhaka, Bangladesh. He was a permanent resident of Khulna until the cyclone of Sidr in 2007. At the same time, he was a fisherman, and he had a small boat. Through this, he caught small prawns, small fish, mud crabs, etc. from the river and maintained the fundamental needs of the family. But, due to the cyclone of Sidr, he lost his occupation, and he was displaced forcefully from their homeland. His displacement experience from their homeland is very pathetic and painful (Interview, 15/01/2023).

SK Munnya (56) is a temporary resident of Dhaka. He was a fisherman in Noakhali, but now he is a rickshaw puller in Dhaka, Bangladesh. He lived in Noakhali until 2009. His only means of livelihood was a small boat, and his family was totally dependent on his earnings. But he lost his small boat and small house during the Aila cyclone in 2009. He moved from Noakhali to Dhaka after the Aila cyclone in 2009 for the safety of his family. Currently, he is driving a rickshaw in Dhaka to maintain his family's needs (Interview, 15/01/2023).

Firdosh Ali Khan (59) is a current rickshaw puller in Dhaka. He earns around Rs 1500 Bangladeshi Taka a day, through which he is able to meet the needs of his family members. He lived in Noakhali until 2020, during the Amphan cyclone. But in 2020, he lost his small boat due to the Amphan cyclone, and his small house was destroyed by the Amphan cyclone. He was completely worried after the cyclone in Amphan. He was forcefully displaced from Noakhali to Dhaka due to climate change. Now he is staying with very difficult in Dhaka (Interview, 15/01/2023).

Sheikh Moidul Khan (52) is a current resident of Dhaka, near Dhaka University. He is a rickshaw puller. He has mentioned that per day earning is around Rs 800- 1000 Bangladeshi Taka

through the driving of a rickshaw from Dhaka bus stand to Dhaka University. Before the cyclone of Sidr in 2007 (wind speed was 260 km/h) he lived with his family (6 members) in the Noakhali coastal area. He was a fisherman and had a small boat. But during the cyclone of Sidr (2007), he lost his small boat and small mud house. After the cyclone of Sidr, he has forcefully migrated from the Noakhali coastal area to Dhaka due to climate change (Interview, 15/01/2023).

Litton Mollah (58) is a current resident of Dhaka, Bangladesh. He is a rickshaw puller in Dhaka. He lived in Khulna until 2009, during the cyclone of Aila. Due to the cyclone Aila in 2009, he was forcefully displaced from his homeland, the Khulna coastal area to Dhaka near the Dhaka University. Finally, he moved to Dhaka with his family and sustained his life by driving a rickshaw. He said that he earns around Rs 1,200 to Rs 1300 by driving rickshaws near the road to support family members (Interview, 15/01/2023).

4.12 Conclusion

There is no doubt that the climate migration problem due to climate change in the 21st century has become a human security threat. Climate migration is not only migration from one country to another, but due to climate change, climate migration can occur within the country, within the state, or from one place to another on an island. The effects of climate change are most dangerous for people living in the coastal areas of the islands. Through this chapter, an attempt has been made to show that the people of different islands are living in dangerous conditions. The people of different islands in West Bengal, such as Sagar Island, Ghoramara Island, and Mousuni Island are suffering from insecurity of life due to climate change. Due to climate change, the people of these islands are being forced to take shelter in other places that are not desirable to them at all.

Similarly, the people of various coastal areas of Bangladesh, such as Patuakhali, Kuakata (under Barisal), Noakhali, Khulna, etc., are living in dangerous conditions, and they are finally migrating from their homeland to other places that are not desirable to them. This chapter discusses that climate change is actually more threatening and dangerous than terrorism in terms of human security.

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Notes:

Figure: 4.1 Photo of the Gangasagar Coastal area on Sagar Island, near the Kapilmuni Temple, and photo taken by Anupam Patra, 20/06/2023.

Figure: 4.2 Photo of the Beguakhali Coastal areas on Sagar Island and taken by A. Patra, 20/06/2023.

Figure: 4.3 Photo of the Coastal areas of Sagar Island, and taken by A. Patra, 20/06/2023.

Chapter – V

Role of West Bengal and Bangladesh Governments Promote to Environmental Security

5.1 Introduction

In the first half of the 21st century, most of the states are not properly concerned about Environmental Security. Every nation-state wants to fulfil their national interests. So, environmental security problems are continuously increasing around the globe. Not only the states but also people forgot that the existence of human civilization depends on the protection of the environment. Many local, national, and international conferences are being held in the name of environmental protection, but there is no doubt that environmental problems and crises are constantly increasing. The role of the West Bengal and Bangladesh governments in the protection of the environment is analyzed in this chapter.

5.2 International Efforts to Protect the Environment

There have been several international agreements held for the protection of the environment, and some of them are notable. In 1959, The Antarctic was to increase international cooperation for the protection of the environment in the Antarctic region. 1972 The Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris - The main purpose of this convention was the preservation of natural, traditional, and internationally significant places and resources in different regions of the world. Also, the United Nations Environmental Program (UNEP) was established in 1972 through the Stockholm Conference. In 1988, the Intergovernmental Panel on Climate Change was formed to prevent climate change, and in 1992, the Convention on Biological Diversity was signed in Rio de Janeiro for the conservation and sustainable use of biodiversity (Chakrabarti 2010: 125).

The Convention to Combat Desertification was held in 1994 to maintain the balance of ecosystems. In 1997, the Kyoto Protocol was signed to prevent irregular climate change. The World Summit on Sustainable Development was signed in 2002 for the promotion of humanitarian development without any loss of the environment (Chakrabarti and Chakrabarti 2009: 245). Simultaneously, from November 30 to December 12, 2015, the United Nations Framework Convention on Climate Change was signed in Paris, France. The members were representatives of about 195 countries; more than 100 government agencies and more than 1,880 non-governmental organizations joined for the sake of environmental security. The Paris Conference was held to prevent the global temperature from rising to 2°C and to keep it at 1.5°C. It was also declared that by the second half of the 21st century, anthropogenic greenhouse gas emissions would be brought down to zero. At the same time, the developed countries disagreed with the concept of common but differentiated responsibilities of the Kyoto Protocol of 1997 and imposed the concept of common problem and common responsibility. As a result, environmental protection has become increasingly hazardous due to uncompromised behaviour among nation-states (Mishra 2016: 176).

5.3 The Role of Non-governmental Organizations Promote to Environmental Security

Many voluntary organizations are contributing to international environmental security, which continues to play a key role in the sustainability of the environment. Such as Greenpeace International, Friends of the Earth International, Global Footprint Network, Climate Action Network, European Environmental Bureau, World Wildlife Foundation, African Wildlife Foundation, Friends of Nature, Green Cross, etc. (www.raptim.org)

(1) Green Peace International

In 1971, Greenpeace International was established as a volunteer organization with its headquarters in Amsterdam, Netherlands. It was formed to protect the global environment. This organization is engaged in environmental protection in about 150 countries of the world. Some of the goals that Green Peace has set for the protection of the environment are -

(i) To protect the environment from destruction and to do everything possible to restore the environment.

(ii) Stop all biological, chemical, and nuclear missile testing.

(iii) Uncompromising and peaceful struggle to protect the environment.

(iv) Prevention of pollution from rivers and seas; control of whaling; control of air pollution; stopping of smuggling and shipment of radioactive waste.

(v) Creating awareness among people about environmental security, etc. (Ray and Chakrabarti 2010: 65). This organization works mainly on human donations. The UN Economic and Social Committee has recognized this organization as an advisory body.

(2) Friends of the Earth International

Friends of the Earth were established in 1971, and their intention was to protect the international environment. This organization works for the sake of environmental protection, and its branches are in more than 70 countries around the world. This voluntary organization is very active and wants to prevent global warming and deforestation (Jasanoff 1997: 580).

(3) Global Footprint Network

In 2003, this non-profit voluntary organization was established for the sake of environmental protection. The vision of this organization is to ensure that everyone can live comfortably in nature. Also, representatives of this organization are researching how much resource people are using and how much they deserve. At the same time, this environmental humanitarian organization is working to increase awareness among people about how to prevent abnormal climate change (www.footprintnetwork.org).

5.4 Major International Environmental Treaties and South Asian States

There are several international agreements held for the protection of the global environment, and most of the countries in the world have signed them. South Asian states, especially countries like India, Bangladesh, Pakistan, Nepal, Bhutan, Sri Lanka, Maldives, Afghanistan, Myanmar, etc., and China in Asia have ratified many treaties.

Table: 5.I Major international environmental treaties and ratification through South Asian States

Year	Major Environmental Treaties	Ratified Countries
1971	Ramsar Convention on Wetland Protection (Conserving natural resources)	India, Pakistan, Nepal, Bhutan, Bangladesh, Myanmar, including China
1973	CITES (Trade in Endangered Species	India, Pakistan, Nepal, Afghanistan, Bhutan, Bangladesh, Myanmar, including China
1992	Convention on Biological Diversity	India, Pakistan, Nepal, Afghanistan, Bhutan, Bangladesh, Myanmar, including China
1994	UN Convention on Desertification	India, Pakistan, Nepal, Afghanistan, Bhutan, Bangladesh, including China
2005	Asia-Pacific Partnership on Clean Development and Climate	India and China

[Source: Ali (2003), Ecological Cooperation in South Asia: The Way Forward, p-23].

5.5 India's Role in Environmental Protection

Since the birth of human civilization, man has been destroying the balance of nature for his own benefit. No one is aware of the idea that human beings will exist if the balance of nature is protected. Several agreements, and laws have been signed at the international level to make people aware and protect the socio-economic environment, and India is no exception. Several agreement

and laws have been enacted in pre-independent India and post-independence to protect the environment.

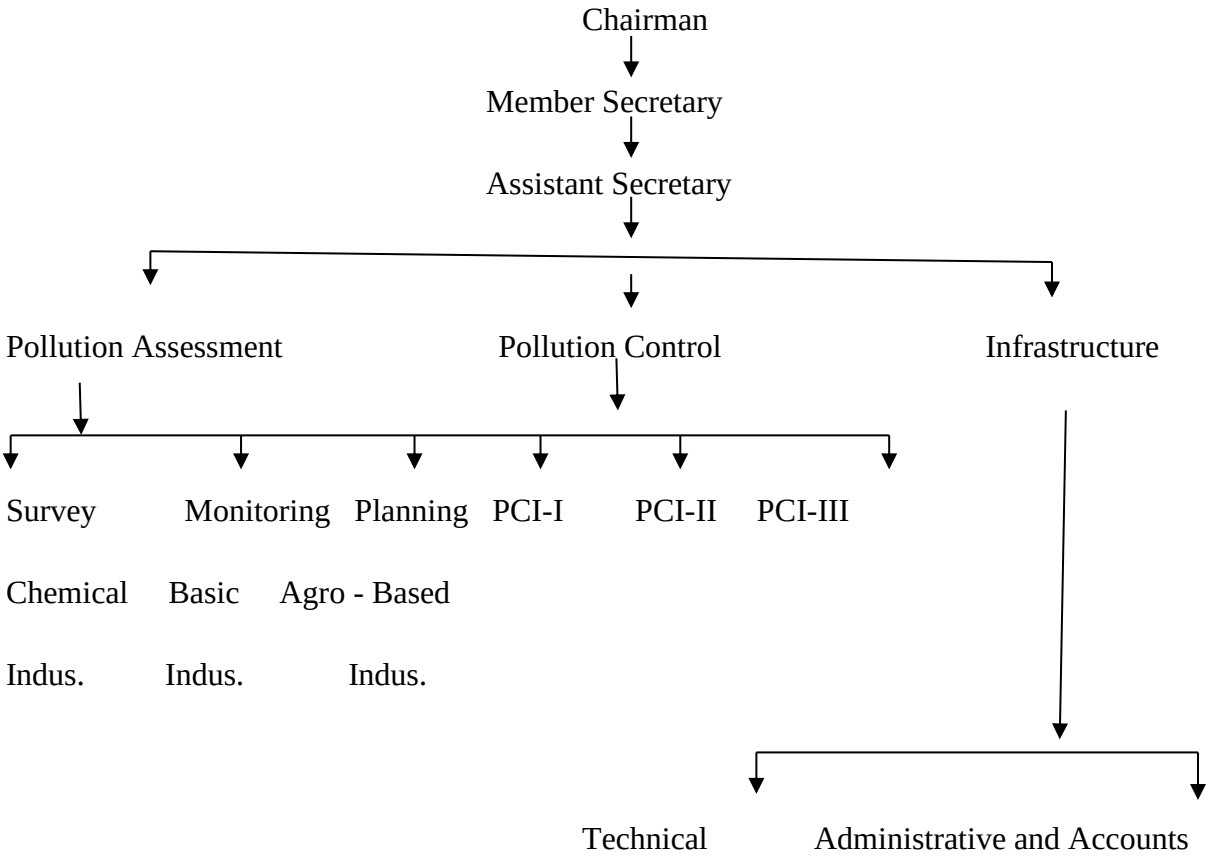
Bengal's Smoke Nuisance Act was formed in 1905 in pre-independent India, and the goal was the preservation of the Victoria Memorial in Kolkata. In 1972, India was one of the signatories' countries to the declaration of the United Nations Conference on the Human Environment. In 1972, several laws were made for the protection of the environment through the Stockholm Conference. Including the Water (Prevention and Control of Pollution) Act of 1974, and this Act was amended in 1988. Simultaneously, the West Bengal Pollution Control Board was formed in September 1974. Also the Water (Prevention and Control of Pollution) Act, 1977, Air (Prevention and Control of Pollution) Act, 1981, Environment (Protection) Act, 1986, Public Liability Act, 1991, National Environment Tribunal Act, 1985, Biodiversity Act, 2002, National Environment Policy in 2004, Forest Rights Act in 2006, West Bengal Trees Protection Act, National Green Tribunal Act in 2010, etc. (Mukhopadhyay 2012: 15).

5.6 Environment (Protection) Act in 1986

In the context of the Bhopal gas incident in 1984, the Environmental (Protection) Act was established in 1986. The Central Government enacted the Environment (Protection) Act in 1986. The Act was enacted to control the various types of pollutants that accumulate in the environment due to human activities, to make people aware that human activities do not harm the environment, and to punish those responsible for environmental pollution (Bhukta 2011: 115).

Section 5 of the Environment Protection Act, 1986 states that the Central Government may order the closure of industrial establishments of the State Governments and, if necessary, disconnect the water and electricity connections of those establishments as per the powers conferred on them. Article 15 of this Act, if the provisions of this Act are not followed properly, the central government can impose appropriate punishment on them. Also, all powers to enforce the Environmental Protection Act are vested in the Central Pollution Control Board under Article 25 (Mukhopadhyay 2022: 21).

Table: 5.II Organizational structure of central pollution control board



[Source: Thakur, Kailash (2013) - Environmental Protection Law and Policy in India, p- 380].

The Environment Protection Act of 1986 has given the central government considerable powers to ensure the protection of the environment. The central government may constitute an authority to supervise the enforcement of environmental laws if necessary. Finally, the National Green Tribunal has been formed under the supervision of the central government. Also, the central government can collect and examine samples from any place to understand if there is any pollution increasing in any industrial areas. According to The Environmental Protection Act, the central government can impose a maximum imprisonment of five years, a fine of one lakh rupees, or both. After being punished, if anyone violates the law, he/she has to pay a fine of five thousand rupees per day. If he/she violates the law even after one year of punishment, he/she can be imprisoned for up to seven years (Bhukta 2011: 115).

India constituted the National Committee on Environmental Planning and Coordination concerning the Stockholm Conference in 1972 for the protection of the environment. In 1980, the central government created the Ministry of Environment and, in 1985, merged it with the Forest Department. As a result, it was renamed the Ministry of Environment and Forests and became the Central Pollution Control Board. The Ministry of Environment and Forests has been enacting new laws from time to time to solve environmental problems and maintain the balance of the environment (Ray and Chakrabarti 2010: 118).

The National Environment Policy was developed in 2004, based on the National Forest Policy in 1988, the Environment and Development Strategy in 1992, the National Water Policy in 2002, etc. The National Environment Policy has been adopted by the central government to ensure environmental security. The National Environment Policy of India wants to create awareness among the people for the preservation of the environment and reduce poverty. The main objectives of this policy are to protect and conserve critical ecological systems, to protect the livelihoods of poor communities who are dependent on the environment for their livelihoods, to improve the quality of life of people at all levels of society, and to ensure that all have equal access to natural resources and the proper use of natural resources.

At the same time, the National Environment Policy wants to increase resources for the balance of the ecosystem, using advanced technology for the prevention of environmental pollution, applying traditional knowledge for the sake of the environment, and especially promoting environmental governance (transparency, responsibility, accountability, efficiency, etc.) for the sake of environmental security and increase cooperation between government and voluntary organizations, civil society, central, state, local, and international cooperation, etc. for the protection of environment (Thakur 2013: 428).

5.7 Role of West Bengal Promote to Environmental Security

In 1972, several declarations were adopted at the Stockholm Conference for the protection of the global environment and India was one of the signatories. Based on the Stockholm Conference, India enacted the Water (Prevention and Control of Pollution) Act in 1974 and the West Bengal Pollution Control Board was formed in September 1974. At that time, the West Bengal Pollution Control Board was under the administrative control of the Health Department.

Since 1982, it has been under the Department of Environment and has been working for environmental security (Mukhopadhyay 2015: 87).

The West Bengal Panchayat Act was enacted in 1973 and some of the articles included in that act concern environmental security. These are mentioned below -

(i) Article 26 of the West Bengal Panchayat Act states that for those private ponds, big ponds, tube wells, etc. where water used for drinking or cooking, the Gram Panchayat will give orders to them for cleaning and reforming based on their financial conditions. Also, Gram Panchayat can inform by written notice to keep it clean. If he disobeys to maintain the order, the Magistrate can fine him 250 rupees.

(ii) Section 19 states that, the Gram Panchayat must provide clean drinking water and to ensure that the drinking reservoirs are not contaminated, the Panchayat shall regularly clean and purify the drinking water of local areas.

(iii) Article 21 of the Panchayat Act states that the Gram Panchayat must dig wells, ponds, and reservoirs and maintain a healthy environment for the local people.

(iv) According to Article 28, the Gram Panchayat could at any time without notice or order temporarily close drinking water for the prevention of water-related epidemics (Mukhopadhyay 2022: 29).

(v) Clause 25 of the Panchayat Act states that the Gram Panchayat shall plant and preserve trees on both sides of the road. If fences or branches of trees fall on public roads, they can be cut, and the Panchayat will take appropriate action to ensure clean drinking water for bathing, washing clothes, and other uses of water (Mukhopadhyay 2013: 94).

The municipal law in 1993 has mentioned several clauses for environmental protection and these are listed below -

(i) Section 202 of the municipal law states that the municipality can prohibit the use of houses for any special purpose in a specific area due to environmental security.

(ii) Article 260 states that, municipalities can control the production, removal, and destruction of solid wastes that harm the environment.

(iii) Article 265 states that the municipality shall provide sufficient vehicles and other arrangements for the removal of solid waste.

(iv) Article 293 states that the municipality can inspect any place where it is suspected of illegally killing wild animals.

(v) Section 328 mentioned that the municipality can take precautions in case of dangerous trees.

(vi) Article 329 states that, precautions should be taken in the case of dangerous ponds, reservoirs, deep wells, etc.

(vii) Article 333 states that, the municipality will take measures to prevent the spread of mosquitoes.

(viii) Article 335 states that, dirty private ponds or tube wells used for drinking water shall be kept clean. (Mukhopadhyay 2022: 25).

West Bengal annually requires about 72 percent of water for irrigation and only 0.82 percent for drinking water. The West Bengal government could not provide sufficient water. In Kolkata, 31 percent of the houses do not have water taps and 51 percent in East Medinipur, 50 percent in South 24 Parganas, 39 percent in Murshidabad, and 44 percent in Howrah do not have water taps. The picture in rural areas is very critical. About 56 percent of the villages in West Bengal have no water taps in their houses. For example, 72 percent of houses in Howrah district do not have water, 64 percent in South 24 Parganas district, 63 percent in Purulia, 66 percent in East Medinipur, etc. Again, 225 liters of water is supplied to a citizen of Calcutta per day, but only 40 liters to a villager, even if the water is not suitable for drinking. Out of 341 blocks in the state, about 130 blocks have drinking water contaminated with arsenic or fluoride. Toxic substances mixed in irrigation water are constantly entering our bodies through the food chain. At the same time, the water in the coastal areas in South 24 Parganas and East Medinipur is highly saline, which is used by about 2 crore people as drinking water.

In 2001, the total water demand in West Bengal was 106.1 lakh hectares meters and in 2011, it was 120.5 lakh hectares. About 8% of India's population lives in West Bengal, and about 11 percent of the country's annual utilizable water resources are available in this state. In 1951, the per capita water supply in West Bengal was 5189 cubic meters; in 2011, it decreased to 1411 cubic meters. Especially, the water crisis is increasing in coastal areas due to natural disasters.

The West Bengal Government has taken up the 'Jal Dharo Jal Bharo' scheme for preserving rainwater, but the scheme was practically not successful. Most of the village ponds dry during summer periods, due to the shallow depth of the pond. Again, during the monsoons, the ponds must be kept open for rainwater to enter and excess water to depart. Water conservation, prevention of water wastage, and proper use of water are still neglected in the state of West Bengal. Water is being wasted everywhere in agriculture, industry, and households. Proper planning can save 10 to 15 percent of the water used for agriculture, 40 to 90 percent of the water used in industry, and about 30 to 35 percent of water used for domestic purposes. Even, the amount of water waste in Kolkata per day, that waste water will meet the needs of around 15 lakh people. South 24 Parganas district of West Bengal has an area of 9960 sq km and a population of 8153176 as per 2011 census. Agricultural land is 3782.6 square kilometers, forest area is 4296.5 square kilometers, non-agricultural land is 12975 square kilometers, and fallow land is 157.1 square kilometers. The water resources (cubic kilometers) of South 24 Parganas are surface water 11.78 and external water 94.00 (Rudra 2019: 100).

Table 5.III Increasing water demand (cubic km) in South 24 Parganas

Category	**Year and Demands of Water**					
	2001	2011	2021	2031	2041	2051
Drinking Water	0.007	0.008	0.010	0.010	0.010	0.011
Household Water	0.132	0.152	0.173	0.190	0.208	0.215

Water used in Agriculture	5.05	5.44	5.82	6.20	6.58	6.97
Industry and Commerce	0.0053	0.0080	0.0104	0.0093	0.0104	0.0114

[Source: Rudra (2019) – Paschimbanger Jalasampad: Samkater Utsasandhane, p -100].

Table: 5.IV Decreasing water per capita (cubic meters) in South 24 Parganas

Year	Total Population	Per Capita Water
2001	6853692	1719
2011	8153176	1445
2021	8522647	1382
2031	9170502	1285
2041	9653906	1220
2051	10005421	1177

[Source: Rudra (2019) - Paschimbanger Jalasampad: Samkater Utsasandhane, p-100].

5.8 West Bengal Biodiversity Council (2002)

The Biodiversity Act was enacted in 2002 for the protection of biodiversity in India. National Biodiversity Authority has been formed at the central level to control the unrestrained use of natural resources to create **e**nvironmental awareness among the people, and implement the Biodiversity Act. Also, at the state level, Biodiversity Boards and Local Biodiversity Management Societies were formed. West Bengal Biodiversity Council was formed in 2002. The major assignment of this council is to give proper advice to the government on various issues related to

the conservation of biodiversity and to provide proper guidance to the people regarding the use of living resources.

West Bengal Biodiversity Council has currently formed Biodiversity Management Associations in various parts of the state to maintain the balance of ecosystems. In 2004, under the West Bengal Biodiversity Council Act (Article 22), each Biodiversity Management Committee shall consist of a Chairperson and not more than six members. The chairman of the local authority will nominate these members, of whom one-third will be women members and 18 percent will be scheduled caste/tribe members. The term of office of each Biodiversity Management Committee shall be 3 years.

The most important duty of the Biodiversity Management Committee is to prepare the 'People's Biodiversity Register' through discussions with the people living in the local area, as well as to protect the endangered species of the Sundarbans area with the authorization of the State Biodiversity Council. The Biodiversity Management Committee will protect the environment by taking special actions against the use of excessive natural resources and the damage to ecosystems in the local area (Mukhopadhyay 2022: 46).

5.9 Disaster Management Act

Due to floods, Cyclones, storms, droughts, etc., and prevention of all types of hazards, the central government of India enacted The Disaster Management Act in 2005. Accordingly, Disaster Management Policy have been adopted at the national, state, and district levels for the prevention of natural calamities. As per the rule of the Disaster Management Act in 2005, the National Disaster Management Authority (headed by the Prime Minister), State Disaster Management Authority (headed by the Chief Minister), and District Management Authority (headed by the District Magistrate) have been formed. The Act states that the Prime Minister, Chief Minister, and District Magistrate shall ensure appropriate measures to deal with disasters according to specific plans (Rudra 2021: 18.2).

The West Bengal Disaster Management Act was adopted in 2005 to deal with disasters. North 24 Parganas and South 24 Parganas districts of Sundarbans area of West Bengal

and the islands of South 24 Parganas district, such as Sagar Island, Ghoramara Island, and Mousuni Island, etc., are the most affected due to climate change and various disasters.

The West Bengal State Disaster Management Policy has mentioned The Government of West Bengal will provide appropriate infrastructure, plans, management strategies, and guidelines for the prevention of disasters at the local level. At the same time, the local administration will ensure the security of people who are living in the coastal areas. Simultaneously, the Disaster Management Policy has declared that the local administration will provide relief and sufficient shelter for the displaced people due to natural disasters. Also, the government will ensure the balance of ecosystems. With that, the local administration will identify the affected areas and warn them for the protection of the environment. Simultaneously, the government will adopt proper plans and strategies for the prevention of disasters and provide security, food, shelter, and resettlement for the displaced people without caste, religion, class, or political division (wbdmd.gov.in).

5.10 Calcutta High Court Judgment in 1996

The Calcutta High Court gave a unique judgment in 1996 to protect the environment from noise pollution and regulate the limits of noise, and it was an unprecedented judgment not only in West Bengal but also in the judicial system of India (Anandabazar Patrika, 28.08.2015). In 1996, Hon'ble Justice Bhagabati Prasad Bandyopadhyay of the Calcutta High Court said during the verdict that no one can make anyone a slave, and no one can make a slave listener. Just as freedom of expression is essential to democracy, not wanting to hear anything is essential to life. Just as sound is necessary in human life, it is not essential to hear too much noise in human life. In 2000, the central government enacted a new law for the prevention of noise pollution based on the judgments of the Calcutta High Court and other judgments in India. Noise Pollution (Regulation and Control) Rules, Noise Pollution (Rules and Control) Rules, etc. are included in that act. However, the noise pollution rules are extremely violated during the multi-festivals in West Bengal. Incidentally, more than 60 people died from 2009 to 2021 during the illegal production of Shabadbaji in Shabadbaji factories, and these scenarios are continuously increasing (Mukhopadhyay 2022: 87).

5.11 Conservation of Traditional Heritage

In 1972, the Stockholm Conference was held for the protection of the environment, and the West Bengal government introduced the Heritage Commission Act in 2001. This law specifically mentions that the preservation of traditional heritage is much more important for the sake of environmental protection. The role of the Calcutta High Court in the protection of West Bengal's Victoria Memorial from pollution is undeniable. However, it is not possible to protect any heritage or the balance of ecosystems under the law. If people are not aware of the environment, it is very difficult to ensure environmental security (Mukhopadhyay 2022: 103).

5.12The Intervention of the National Green Tribunal in West Bengal

Pollution levels are extremely high in urban areas of West Bengal rather than in rural areas. Waste pollution levels are also too high in Kolkata. Multi waste remains trapped in plastic, and that waste is burned at midnight or early in the in the morning. This burning of waste produces a lot of methane gas, which is more responsible for global warming than CO_2. According to the National Green Tribunal, the West Bengal government has failed in waste management. So, West Bengal was fined around Rs 3500 crore by the National Green Tribunal due to a failure of waste management. According to the National Green Tribunal, the West Bengal government is not actively role-playing to control liquid waste. In Kolkata, a huge amount of liquid waste is purified naturally every day through the wetland area of East Kolkata. However, due to administrative mismanagement, these natural refineries are gradually lost to illegal construction (Anandabazar Patrika, 12/02/2023).

The National Green Tribunal mentioned that the West Bengal government is not properly maintaining the drainage system. The financial year 2022-23 has been allocated 12818 crores for development, but the West Bengal state government is not giving importance to the issue of environmental protection. Justice A.K. Goel, the chairperson of the National Green Tribunal, mentioned that constitutionally, the state is responsible for creating a pollution-free environment for the citizens. The National Green Tribunal has made it clear that the state cannot ignore the issues of environmental security under the pretext of financial deficit (ABP Ananda, 09/05/2023).

5.13 Vivekananda Rabindranath and Jagadish Chandra's Environmental Ideas

Swami Vivekananda (1863-1902) wanted to promote sacrifice, tolerance, consciousness, and bringing together East and West to save the environment in the 19th century. He was strongly criticized for the deplorable condition of India's largest river, the Ganga. Vivekananda believed that Indian culture, philosophy, and traditions would enrich the Western countries, and on the other hand, the Western countries would help the East with advanced technology for the protection of the environment. But currently, there is a lack of awareness among the people about the environment, - the state of West Bengal is no exception. At the same time, there is a great lack of cooperation in the international field. Also, it is very difficult for underdeveloped and developing countries to accept the extreme conditions in exchange for financial and technical assistance from developed countries.

Rabindranath Tagore (1861-1941) has discussed environmental issues in his many essays, novels, plays, short stories, etc. He wanted to reconcile man with nature. If people do not love nature and want to use it for their interests, then there is no doubt that the environmental crisis will increase. He has built the Santiniketan-Sriniketan model to reconcile man with nature. However, Tagore's ideas have not been found in the 21st century at the local, state, and international level.

Another world-famous Bengali scientist, Jagadish Chandra Bose (1858 -1937) thought was very significantly related to the environment. He proved to this world that trees also have life and how much contribution trees have in protecting the environment. Extreme levels of unplanned urbanization, industrialization, and massive deforestation by the local people and outsiders are continuously degrading the environment (Mukhopadhyay 2022: 72). It should be noted that in 2018, the World Health Organization mentioned in a report, 14 of the 20 most polluted cities in the world are in India (BBC News Bangla, 02/05/2018).

Several national and international research organizations have mentioned, based on their research, that West Bengal floods, Cyclones, landslides, tidal waves, and multiple natural disasters affect the region. North and South 24 Parganas districts are among the most disaster-prone areas of West Bengal, as listed by the National Disaster Risk Management Program. The West Bengal state government has identified 165 blocks of the state as disaster-prone areas and no actual plan has been developed to deal with the disasters. At present, there is no proper arrangement by the

state government to train the youth in coastal areas to deal with disasters. If the water level rises by 1 meter in the Bay of Bengal, a minimum of 1 lakh hectares of land in West Bengal will be submerged under water.

It is significant that during the Cyclones Aila in 2009, Bulbul, Fani in 2019, Amphan in 2020, Yass in 2021, and Sitrang in 2022, the government could not play a positive role. Even the state government could not provide sufficient shelter to the people of coastal areas of South 24 Parganas during natural and human-induced disasters. Even, the state government has not yet constructed enough Cyclone shelters in coastal areas. During disasters, people have to be forced to risk their lives, and without any help from the local administration, people run to local primary schools for their security of life. Again, there is not enough space in primary schools to provide accommodation to everyone in the coastal areas. To deal with such situations, the state government and the department of the Ministry of Sundarbans Development should be more active and responsible (Sen 2017: 23).

5.14 Interviews in the Coastal Areas of West Bengal

In the coastal areas of Sagar Island, Ghoramara Island, and Mousuni Island few people have mentioned their livelihoods experience during the various disasters and also mentioned on that time the actual role played by West Bengal government, South 24 Parganas district administrations and local administrations. Those are mentioned below -

Nitai Paik (55) is a fisherman from Beguakhali village in the coastal area of Sagar Island in South 24 Parganas district. He lost both his small fishing boat and mud house in Cyclone Aila (2009). He said that the local Panchayat, Panchayat Samiti, and local administration have not constructed sufficient Cyclone shelter in the coastal areas of Beguakhali village till now. As a result, people have suffered insecurity during previous natural disasters. He said the local administration has not played an active role in preventing the disasters (Interview, 20/06/2023).

Nabin Paik (45) is a fisherman at Beguakhali village in the coastal area of Gangasagar Panchayat. He also talked about his pathetic experiences with Cyclone Aila (2009), Bulbul (2019), Fani (2019), and Amphan (2020). According to him, although the West Bengal government enacted various laws and initiatives to deal with natural disasters, the problem is that during the

disasters, government representatives do not come to the coastal areas, and the local administrations are not active and responsible for dealing with disasters (Interview, 20/06/2023).

Figure: 5.1 Cyclone affected Beguakhali coastal areas photo in the Sagar Island.

Source: Photo taken by A. Patra, 20/06/2023].

Ranajit Khatua (48) is a fisherman in the coastal area at Beguakhali village on Sagar Island. He mentioned that the local administration failed to provide sufficient shelter during the Cyclones Aila, Bulbul, Fani, Amphan, Yass, etc. He said that the massive population of the coastal areas at Beguakhali village was displaced during the Aila Cyclone (Interview, 20/06/2023).

Dibyendu Das is a farmer in the coastal area of Gangasagar village on Sagar Island. Cyclones Aila in 2009, Amphan in 2020, and Yass in 2021 were severely destroyed on Sagar Island. Also, he mentioned that most of the mud houses of the coastal areas of Gangasagar

village were flooded by Cyclones. He criticized the irresponsibility of the local administration to prevent the disasters (05/02/2023).

Figure: 5.2 Recent photo of the Ganga Sagar coastal areas, near the Kapilmuni Temple

[Source: Photo taken by A. Patra, 22/01/2024

Ashok Khatua (58) is a fisherman at Gangasagar village on Sagar Island. In 2009, he was completely destitute during Cyclone Aila. He has strongly criticized the local administration due to their lack of responsibility during the Aila Cyclone. According to him, he lost his mud house during the disaster, and he was forcefully displaced from his homeland to a local primary school temporarily. In 2009, at that time, the local administration could not provide any shelter to the people of the coastal areas (Interview, 05/02/2023).

Pratip Das (61) is a fisherman at Gangasagar village on Sagar Island. He mentioned that cyclones like Aila, Amphan, Yass, etc. severely damaged the coastal areas of West Bengal, and people were forced to leave their homes and migrate to other places. At that time, the West Bengal

state government, district, and local administrations could not play a proper and responsible role. (Interview, 05/02/2023).

Figure: 5.3 Photo of the Ganga Sagar coastal areas, near the Kapilmuni Temple

[Source: Photo taken by A. Patra, 22/01/2024].

Safiur Rahaman Sheikh is a fisherman in the coastal area of Khasimara village on Ghoramara Island in South 24 Parganas district. He mentioned that Ghoramara Island was severely destroyed by the natural disaster. According to him, the population of the island before 2009 was about 6,000 and now stands at 2,500-3,000. He said that only one Cyclone shelter and only one high school are located on Ghoramara Island. He also mentioned that the residents of Ghoramara Island are spending their livelihoods in insecurity. Yet, the state government has not been able to arrange any electricity on this island. According to him, the government should be more responsible in dealing with disasters (Interview, 18/06/2023).

Abid Hussain Sheikh (57) is a fisherman in the coastal area of Bagpara village on Ghoramara Island. He mentioned that Ghoramara Island was roughly damaged by the Amphan Cyclone in 2020. He said that during the Amphan Cyclone, most of the Ghoramara coastal areas were submerged by the salt water of the sea, and at that time, the local administration could not

provide shelter to the homeless people in the Ghoramara coastal areas. Even at that time, no representative of the government or any representative of the disaster management department came to Ghoramara Island, and the local administration was not able to cope with the disaster (Interview, 18/06/2023).

Figure: 5.4 Cyclones affected areas of the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

Sahajuddin Sheikh (64) is a resident of the coastal area of Hatkhola Village on Ghoramara Island in South 24 Parganas. He said Cyclones Aila in 2009, Amphan in 2020, and Yass in 2021 have disrupted the normal lives of the coastal areas of Ghoramara Island. According to him, the local Ghoramara Panchayat could not play any positive role during those disasters. However, he said that in 2021, the Ghoramara Gram Panchayat gave Rs 20,000 to the displaced people of the Yass Cyclone (Interview, 18/06/2023).

Marina Bibi (61) is a resident of Mandirtala village on Ghoramara Island. She was displaced from her homeland during the Aila, Amphan, and Yass Cyclones. She has mentioned

Figure: 5.5 Photo of a Cyclone shelter on Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

during the Yass Cyclone, she did not get shelter, and she was forced to go to the local secondary school for the security of her life. Therefore, she said that at that time, the government and the local administration could not play any positive role (Interview, 18/06/2023).

Manuara Bibi (58) is a resident of Khasimara village on Ghoramara Island. She strongly criticized the role of the West Bengal government and local administration. According to him, there has been no electric light until now on Ghoramara Island, and they have to spend the night by the light of the lamp. Some houses have solar lights, but during natural disasters and the rainy season, it is not possible to turn on the solar electricity light due to the lack of solar energy. As a result, they have to spend the night in darkness, and insects and poisonous snakes enter the

Figure: 5.6 Solar energy is the only source of lighting on the Ghoramara Island

[Source: Photo taken by A. Patra, 18/06/2023].

house. She said that the West Bengal state government and local administration failed to provide security to the people of Ghoramara Island (Interview, 18/06/2023).

Bahadur Mandal (68) is a resident of the coastal area of Mousuni Island in the Sundarbans area of South 24 Parganas district. He mentioned that during the Aila Cyclone (2009) and Sitrang (2022), Ghoramara Island was severely affected. He said that the Disaster Management Department and local administration could not play a positive role during the disasters. At that time, in the coastal areas people were forcefully displaced, and the local administration was unable to provide shelter for their security (Interview, 17/06/2023).

Tapan Khara (59) lives in the coastal area of Mousuni Island. He directly said that during the disasters, the local administration could not play a positive role in the prevention of natural and human-induced disasters. He mentioned the West Bengal government and local administration will be more responsible and active in controlling the huge loss of Mousuni Island in the future due to disasters (Interview, 17/06/2023).

Figure: 5.7 Coastal areas image of the Mousuni Island

[Source: Photo taken by A. Patra, 17/06/2023].

Satish Dinda (56) is a fisherman in the coastal area of Mousuni Island. He said that although the state has formed a Disaster Management Department, their representatives never came to the Island during the disasters. Governments tried to provide the message to the local administration as a responsibility, but the local administration does not have the capacity to deal with the disasters (Interview, 17/06/2023).

Meghan Shit (63) is a fisherman in the coastal area of Mousuni Island in South 24 Parganas district of West Bengal. He said that most of the time, the government provides only the message as a responsibility to the local administration and does not properly implement those responsibilities in dealing with disasters. He also mentioned the local administration could not properly deliver relief after the natural disasters (Interview, 17/06/2023).

Sudhir Paik (56) is a farmer in the coastal area of Mousuni Island. He said the island was devastated by Cyclones like Aila in 2009, Amphan in 2020, and Yass in 2021, and the huge agricultural lands were submerged by saltwater. He mentioned that after the Cyclone Amphan and Yass relief (rice,

Figure: 5.8 Cyclone - affected areas image of the Mousuni Island

[Source: Photo taken by A. Patra, 17/06/2023].

flour, oil, sugar, paper to cover the house, etc.) was not distributed impartially, and most of the time the local ruling party provided relief aid to their supporters. He mentioned that the real recipients are often deprived of relief aid, which is not expected during disasters (Interview 17/06/2023).

Bangladesh is a riverine country in South Asia and disaster-prone country around the globe. Bangladesh Nationalist Party was formed by the government from 1991 to 1996 (the Prime Minister was Khaleda Zia), the Bangladesh Awami League from 1996 to 2001 (Sheikh Hasina Prime Minister), and the BNP again from 2001 to 2006. Bangladesh Awami League has formed a government from 2008 to the present, and the Prime Minister is Sheikh Hasina. Sheikh Hasina's government has been making several plans and strategies for dealing with disasters.

Bangladesh has realized that climate change is increasingly disrupting the security of life in Bangladesh and is a major obstacle to the development of Bangladesh. So, the government of Bangladesh adopted the National Coastal Zone Policy (NCZP) in 2005 for the protection and conservation of the ecosystems of coastal areas. According to the goals of the United Nations

Framework Convention on Climate Change (UNFCCC), Bangladesh has formed the Department of the Ministry of Environment and Forest. Also, that department formed the National Adaptation Program of Action (NAPA) and Climate Change Strategy and Action Plan (CCSAP) in 2008. Through this, the government of Bangladesh has reduced the increase in salinity in the drinking water for the people in the coastal areas and raised awareness among the people about climate change and disasters (Rabbani, Rahaman, and Islam 2010: 21).

5.15 Constitution Amendment of Bangladesh (2011)

In 2011, the Bangladeshi government integrated article 18(A) through the 15th constitutional amendment, emphasizing on environmental protection. Article 18 (A) of Part II of the Constitution states that the Government of Bangladesh makes an arrangement of natural resources, biodiversity, wetlands, etc for the present and future citizens and conserves the forests and wildlife. Simultaneously, Bangladesh has adopted several rules, plans, strategies, and methods many times for environmental security.

5.16 Forest Conservation Act

In 2005–2006, the forest area was spread in Bangladesh by 7–8 percent; in 2014–15, the forest area was spread by about 17.08 percent. Several laws and acts have been enacted for the conservation and increase of forest land in Bangladesh, and they are mentioned below:

(i) Bangladesh Social Afforestation Amendment Rules, 2009,

(ii) Bangladesh Rubber Board Act, 2013,

(iii) Formulation of the Second National Communication Forest Act, Policy and Rules,

(iv) Social Forestry (Amended) Rules, 2010,

(v) The Forest Act, 2012,

(vi) Prime Minister's National Award on Tree Plantation,

(vii) Transit Rule for Bangladesh, 2011,

(viii) Saw-mill (License) Rules, 2012, etc (Islam 2015: 7).

5.17 Ministry of Environment, Forestry and Climate Change

The Government of Bangladesh has allocated 3752 crores to the Climate Change Trust Fund since 2009 - 2010 to 2020 - 2021 for the protection of environment. Bangladesh has taken up 728 government projects and 61 private projects through this money. Some of the programs undertaken by the department are given below -

(i) Bangladesh has implemented on regular air quality monitoring in 11 cities.

(ii) Trees planted and distributed 7, 96, 21,000, and more than 11 percent of people are benefiting from pollution-free solar power. Also, 2,00,000 eco-friendly advanced technology-oriented stoves have been provided for cooking in the coastal areas.

(iii) The Bangladesh government has levied compensation of 214 crores against 1745 polluting industries from 2010 to 2019 due to pollution of rivers and river water.

(iv) Air polluters collected a fine of Rs 27, 25, 25,400 from 2015 to 2020 against 1924 illegal brick kilns. About 600 illegal brick kilns have been closed in Bangladesh by the Ministry of Environment, Forestry, and Climate Change.

(v) At the same time, about 10, 54, 54,000 rupees have been deposited in the government treasury of Bangladesh to cover the loss of environment.

(vi) The Bangladesh government has adopted afforestation plans to green the coastal areas and protect new char growing in river estuaries.

From 2009 - 2010 to 2019 - 2020, the Bangladesh government has afforested about 1, 45,342 hectares and planted and distributed about 104 million trees. The total tree-covered land in Bangladesh has become about 22.37 percent of the country's total area (Jahan 2021: 91).

5.18 The Ministry of Disaster Management and Relief

Bangladesh has adopted Disaster Management Act in 2012, National Disaster Management Policy in 2015, National Disaster Management Plan (2016-2020), Cyclone Shelter Construction, Maintenance and Management Policy in 2011, Disaster Standing Orders 2019, etc. Bangladesh Ministry of Disaster Management and Relief has taken a few initiatives and these are below -

(i) The department has introduced Interactive Voice Response (IVR), broadcasting through radio, television, etc. for disaster responses. Also, people can get advance information about hazards by dialing the 1090 (toll-free) number.

Table 5.V Cyclone shelters in coastal Bangladesh

District	Numbers of Shelters	Accommodation of people (%)
Bagerhat	82	11
Barguna	70	17
Barisal	57	5
Bhola	208	24
Chittagong	492	15
Cox’s Bazar	455	52
Feni	106	18
Jhalokathi	26	8
Khulna	34	3
Laxmipur	110	15
Noakhali	202	16

Patuakhali	196	27
Pirojpur	42	8
Satkhira	48	5

[Source: Dutt, B. K. (July, 2010). Hazard Warnings and Responses to Evacuation Orders: The Case of Banglades's Cyclone Sidr. *Geographical Review, Vol. 100, No. 3* , Taylor and Francis, Ltd. 336-355].

(ii) The Bangladesh government has allocated Tk 78,858,251 lakhs from 2011 to 2021 to coastal areas, through which 100 2nd floors, 220 3rd-floor oriented Cyclone shelters, and 220 livestock shelters were constructed.

(iii) The Bangladesh government has trained 74,020 volunteers for those who will face disaster in 3701 units, 355 unions, 41 upazilas, and 13 coastal districts.

(iv) The Bangladesh government has made several plans for the establishment of a disaster management committee within the Division, District, Upazilas, Union, and Ward to deal with disasters. Along with that, the National Management Council has 52 members and is headed by the Prime Minister. It is the highest level of disaster observation and immediate decision-making bodies for disaster responses.

(v) Bangladesh's government has also taken the initiative to build disaster-resistant houses. In 2018–2019, Bangladesh government constructed around 28,227 disaster-resilient houses in the coastal areas of Bangladesh (Jahan 2021: 217).

5.19 Social Forestry Program of Bangladesh

Bangladesh is not only the most densely populated country in South Asia but also one of the most vulnerable countries in the world. The agricultural land is very low per capita, so it is not an easy task to protect forests. Also, the poor and marginalized people have collected excessive natural resources from the forests for their livelihoods. In that condition, the Sheikh Hasina government of Bangladesh launched the social forestry project in the late 1990s.

The Bangladesh government is trying to plant trees and preserve and expand forest land areas. Through this project, the Bangladesh government has undertaken tree plantation programs in uncultivated lands, homestead courtyards, roadsides, office premises, educational institutions, courtyards of all religious institutions, coastal river embankments, etc. Some of the tasks undertaken by the Social Forestry Program have undertaken a few tasks and some of them are -

(i) About 1,05,633 people have received 270 crores as remuneration for their role in forest development through the Social Forestry Program.

(ii) The Social Forestry Department has legally collected valuable timber worth Tk (Taka) 1170 crores.

(iii) More than 12 crores of trees have been planted recently, whereas since 2001 – 2006 it was only 4 crores.

(iv) About 47,363 acres of forest land and 10,626 acres of agroforestry have been created, along with 64,380 plantations along roads and embankments.

(v) More than 200,000 acres of river grazing land in the coastal region and 1,200 km along the Bay of Bengal have been brought under plantation by the Bangladesh government (Kabir 2016: 8).

5.20 Tree Fair Program in Bangladesh

The Forest Department of the government of Bangladesh has organized tree fairs at national, district, and local levels every year in June to raise environmental awareness. They have taken a tree fair program to make people aware of the environment, to sensitize people about the importance of the environment, and to make people aware of environmental degradation due to human activities. Also, the Bangladesh government has launched the Prime Minister's National Award to encourage individuals and organizations for plantations, conservation, and expansion of forests (Islam 2015: 10).

5.21 Coastal Green Belt in Bangladesh

In 1991, a severe Cyclone in Bangladesh killed around 1, 40,000 people and the loss of government property was about 19,000 crores. After this kind of terrible experience, the government of Bangladesh has taken up the greening program in the coastal areas. Around 339 people died in Cyclone Aila in 2009, and over 200 people died in Cyclone Mahasen in 2013. For the prevention of disaster, Bangladesh has undertaken tree plantation programs in the coastal areas, such as (i) Planting of trees on river embankments, roads, and railways, (ii) Planting of trees around houses and institutions, (iii) Planting of trees on the coastal riverbanks, (iv) developing nurseries, (v) providing financial support for environmental research, (vi) Taking Environmental awareness training programs, (vii) Increasing public awareness activities to maintain environmental balance, etc. (Kabir 2016: 11).

5.22 Wildlife Conservation Act in Bangladesh

Sheikh Hasina government of Bangladesh has enacted several initiatives and laws for the conservation of wildlife. The Sundarbans are located in the southern part of Bangladesh and almost 150 species of commercial fish, 270 species of birds, 42 species of mammals, 35 species of reptiles, and about 8 species of amphibians are found in the Sundarbans of Bangladesh.

During the first phase of the Hasina government in 1997, the United Nations Educational Scientific and Cultural Organization (UNESCO) declared the Sundarbans area of Bangladesh as a 'World Heritage Site'. Subsequently, some of the laws and policies enacted by the Sheikh Hasina government in Bangladesh for wildlife conservation are mentioned below -

(i) Bangladesh spotted Deer Rearing policy, 2009,

(ii) Compensation Policy for Causalities Caused by Wildlife,

(iii) Wildlife (Preservation and Security Acts, 2012,

(iv) Tiger Action Plan (2009 - 2017),

(v) Bangabandhu Awards for Wildlife Conservation, 2010,

(vi) Compensation Rules 2011 for Forest Victims/Workers during delivery of duties (Islam 2015: 12).

5.23 Environmental Protection Laws and Programs in Bangladesh

Bangladesh government has adopted several environmental laws and programs to protect people from the multiple disasters due to climate change, increase public awareness and maintain environmental balance. Some of the notable ones are-

(i) Bangladesh Environment Protection Law, 1995 (Amendment 2010),

(ii) Environmental Court Law, 2010,

(iii) Bangladesh Biodiversity Rules, 2013,

(iv) Enactment of National Action Plan on Short lived Climate Pollutants,

(v) Formulation of National Action Plan Roadmap,

(vi) Enactment of Bangladesh Climate Change and Gender Action Plan,

(vii) Brick Burning (Control and Amendment) Act, 2013

Similarly, some of the programs that Bangladesh has taken to protect the environment and these are -

(i) The Bangladesh government has collected an environmental tax at the rate of 1 percent from the polluting industrialized organizations, for the prevention of environmental pollutions (ii) Bangladesh has formed the Mobile Court Act in 2009 for instant pollution control, such as black smoke from vehicles, polythene shopping, stopping the sale of items in polybags, etc.

(iii) According to the Mobile Courts Act, the Bangladesh government has decided to establish a mobile court in each of the 64 districts of Bangladesh. Since 2010, more than 21 Mobile Courts have been actively functioning for the prevention of environmental pollution. Through which the Bangladesh government fined about 184 crores and collected 121 crores.

(iv) The Bangladesh government has announced it is mandatory to set up Effluent Treatment Plants within industrial factories for the control of river water pollution. Effluent Treatment Plant has established about 80% of the industrial factories across the country.

(v) The Bangladesh government has established the Clean Development Mechanism (CDM) for the promotion of environmental sustainability as per the conditions of the Kyoto Protocol. The Ministry of Environment and Forestry has formed a two-tier National Clean Development Mechanism Committee (NCDMC) and National Clean Development Mechanism Board (NCDMB). More than 14 developing countries, including Bangladesh and India, have signed an agreement with Japan for a collective response and to ensure sustainable development. Bangladesh and five countries like Canada, Ghana, Mexico, Sweden, and the United States formed the Climate and Clean Air Coalition (CCAC) in 2012, according to the United Nations Environment Program for the Control of Short-Lived Carbon Pollutants (Kabir 2016: 14). India has joined this organization since 2019 (www.ccacoalition.org).

(vi) The Convention on Biological Diversity was adopted at the Earth Summit in 1992. Bangladesh signed the Convention on Biological Diversity on June 5, 1992, and ratified it on May 3, 1994 (www.cbd.int). As an approving country, Bangladesh has established the Department of Environment under the Ministry of Environment and Forests. That department has regularly advised strategy and techniques to the government for biodiversity conservation (Islam 2015: 18).

(vii) The Montreal Protocol for the Protection of the ozone layer was adopted in 1987 and Bangladesh is a signatory country. Subsequently, the Bangladesh government also approved amendments to the Montreal Protocol for the protection of the ozone layer (Vogler 2017: 321 and Kabir 2016: 18).

(viii) In 2009, the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was adopted by the initiatives of Bangladesh Prime Minister Sheikh Hasina. Through this plan, the Bangladesh government has undertaken multiple programs such as food security, social protection, health security, disaster control management infrastructure, encouraging research related to disaster control, empowering people in dealing with disasters, increasing institutional strength, etc.

(ix) The Bangladesh government has established the Climate Change Trust Fund (CCTF) in the financial year in 2009 - 2010 to deal with disasters. The Bangladesh government has allocated 2900 crores to this fund during the financial years 2009–2010 to 2014 - 2015. Through economic funds, the Bangladesh government has constructed multi-cyclone shelters in the coastal areas, 122 km of river embankment conservation, 15.4 km of coastal embankment construction, 740 deep tube wells, 550 rainwater storage tanks, a 4971-hectare land afforestation program, 12872 solar home systems, etc. (Kabir 2016: 20).

(x) The Bangladesh Government has formed the Bangladesh Climate Change Resilience Fund (BCCRF) to deal with disasters, and Denmark, Sweden, Switzerland, the World Bank, etc. support the Bangladesh Climate Change Resilience Fund. About 1869 million USD has been collected in this fund. The Climate Change Fund was formed at CoP-17 in Cancun, Mexico, in 2010 under the UNFCCC, and Sheikh Hasina was the main entrepreneur (Islam 2018: 21).

5.24 Interviews in the Coastal Areas of Bangladesh

The people of Bangladeshi coastal areas have mentioned their livelihood experiences during the disasters and the roles played by the Bangladesh government and local administration during the natural disasters. A few interviews are described below -

Fajlu Ali (64) is a fisherman in the coastal area of the Kuakata region of Patuakhali district, under the Barisal Division. He said that recently, the Bangladesh government has been actively role play in dealing with disasters, but during the Cyclone Sidr in 1991 and Cyclone Sidr in 2007, it was severely affected, and at that time, the Bangladesh government could not play a positive role (Interview, 17/01/2023).

Azad Rahaman Sheikh (59) is a fisherman at Kuakata Beach in the Patuakhali district of Barisal Division. He said that not enough Cyclone shelters have yet been constructed in Kuakata to provide safe Cyclone shelter to the people in the coastal areas in the future. So, he appealed to the local administration to construct the Cyclone shelters in Kuakata (Interview, 17/01/2023).

Figure: 5.9 Photo of a fisherman of the Kuakata in Patuakhali District

[Source: Photo taken by A. Patra, 17/01/2023].

Anarul Hossain (56) is a fisherman in the Kuakata coastal areas in Patuakhali District. According to him, the Bangladesh government has taken several plans and initiatives to prevent natural disasters, but the local administration level is not active and responsible. As a result, coastal areas are severely damaged during natural disasters. Therefore, he said, local administration should be more active and responsible for ensuring the normal livelihoods of the people in the coastal areas (Interview, 17/01/2023).

Murshid Sheikh (57) is a fisherman at Kuakata in Patuakhali District. According to him, Bangladesh is a riverine country, and during Cyclones, the Ganga, Meghna, and Brahmaputra water levels are very high and severely affect the people in coastal areas. So, he appealed to the Bangladesh government and local administration to be more efficient, active, and responsible for ensuring the safety of people's lives during disasters (Interview, 17/01/2023).

Figure: 5.10 Photo of the Kuakata coastal areas in Patuakhali

[Source: Photo taken by A. Patra, 17/01/2023].

Manjila Khatun (55) is a resident of the coastal area of the Kuakata region of Patuakhali district. She said that the government of Bangladesh is quite active in dealing with disasters, but during disasters, the local administration could not properly respond. She mentioned that during the super Cyclone in 1991 and Sidr in 2007, the local administration was not able to provide sufficient Cyclone shelters for the people in the coastal areas (Interview, 17/01/2023).

Akramul Sheikh (52) is a resident of the southern coastal area of Patuakhali district under Barisal Division. He said that after the devastating Cyclone of 1991, Cyclone Sidr in 2007 had severely affected the southern Jhalokati district, southwestern Pirojpur, southern Barguna district, and Patuakhali District under Barisal division. During disasters, people in coastal areas are forced to be displaced for the safety of their lives. So, he commented that the local administration should be more active, sensitive, and responsible (Interview, 16/01/2023).

Figure: 5.11 Cyclone - affected photo of the Patuakhali District

[Source: Photo taken by A. Patra, 17/01/2023].

Jasimmuddin Khan (56) is a resident of the coastal area of Patuakhali district of Barisal division. He mentioned Bangladesh government and disaster management department have taken a policy of multiple agendas, but the representatives don't come to coastal areas during natural disasters. As a responsibility, they have to provide assignments to the local administration, and during the disaster, the local administration could not properly respond (Interview, 16/01/2023).

Sheikh Amjed Mollah (61) is a fisherman in the southern coastal area of Patuakhali district. He said that the Bangladesh government has sent relief to the Patuakhali area, which was devastated by Cyclone Sidr in 2007 and Cyclone Aila in 2009, but it was not sufficient, and even then, the local administration did not distribute the relief transparently and impartially. According to him, as a result, the livelihood of the people in the coastal areas has been spent in extreme hardship during that disaster period (Interview, 16/01/2023).

Figure: 5.12 Coastal areas photo in Patuakhali District

[Source: Photo taken by A. Patra, 17/01/2023].

Sheikh Rahaman Ali (58) is a resident of the southern coastal area of Patuakhali district. According to him, Bangladesh is devastated by natural disasters. He mentioned that due to the extreme effects of disasters on the coastal areas of Bangladesh, several people have migrated from their homeland to other parts of the country and abroad. So, he mentioned the Bangladesh government and the local administration should be more active and responsible in dealing with disasters and ensuring the safety of people's lives in the future (Interview, 16/01/2023).

Samsul Sheikh (58) is a resident near Barisal University in the Barisal Division of Bangladesh. According to him, Cyclone Sidr (2007) was the most horrible natural disaster that affected Barisal. He also said that at that time there were not enough Cyclone shelters for people to take shelter in, where people could take safe shelter in times of disaster. So, people were forced to go to the local primary school for their safety. He also mentioned the government should ensure more Cyclone shelters for the safety of the people in the local coastal areas in future (Interview, 18/01/2023).

Figure: 5.13 Photo of the Bangladesh Marine Academy in Barisal Division

[Source: Photo taken by A. Patra, 19/01/2023].

Md. Khalil Rahaman (62) is a farmer in the coastal area of Barisal. He emphasized that the Bangladesh government has enacted several laws for the protection of the environment, but it is not possible to maintain the balance of the environment through only the laws. Those who are responsible for the implementation of the law often do not perform their duties properly. At the same time, he mentioned that Bangladeshi people are not aware of the environment. As a result, environmental security problems are increasing due to the lack of responsibility of the local administration and the lack of awareness among the people of Bangladesh (Interview, 18/01/2023).

5.25 Interviews with several Experts

Professor (Dr.) Abul Barkat (Founding Chairman of the Department of Japanese Studies, University of Dhaka and top economist of Bangladesh) mentioned the causes of environmental insecurity in Bangladesh - (i) Corruption at all levels, (ii) Government lacks specific plans for environmental security and its implementation is also problematic, (iii) Crisis of natural resources, (iv) Problems of resource distribution; (v) Exploitation of excess resources by a few people, (vi)

Crisis of clean drinking water, (vii) Lack of responsibility of local administrations in protecting environment, (viii) Lack of awareness among the people of Bangladesh, etc (Interview, 15/01/2023).

Professor (Dr.) Keilchi Ogawa (Graduate School of International Cooperation Studies, Kobe University, Japan) commented that (i) The safety of human life in coastal areas on both sides of India and Bangladesh is increasingly endangered due to global warming, (ii) India and Bangladesh should jointly be more active and responsible for solving environmental problems, (iii) To reduce excessive use of natural resources and to distribute resources fairly (Interview, 15/01/2023).

According to Dr. Lailufar Yasmin (Professor and Chairperson, Department of International Relations, University of Dhaka, Bangladesh) - (i) Currently, the environmental problem is serious in Bangladesh, (ii) There is a lack of high-quality technology in dealing with natural disasters in Bangladesh, (iii) Financial allocation for environmental protection is not enough, (iv) People need to be more aware of the environment, especially the coastal areas of Bangladesh, (v) Non-governmental organizations in Bangladesh are not adequate active in environmental protection, (vi) Too much petrol-diesel driven in Bangladesh and the level of pollution is quite alarming due to old cars and as a result the insecurity of the environment is increasing (Interview, 14/01/2023).

Dr. Mahammad Abdul Mazid (Retired Secretary to the Government of Bangladesh and former Chairman of the National Board of Revenue, Bangladesh) commented - (i) Bangladesh government is currently adopting various policies to protect the balance of the environment and has emphasized its implementation, (ii) At present, the government of Bangladesh has allocated a considerable amount of money to ensure the security of the environment in addition to the military and defense sectors, (iii) According to him, although the government has adopted several environmental policies for the implementation of the environmental security, policies is not being done practically due to the lack of initiative of those who are responsible for the implementations of environmental policies (Interview, 14/01/2023).;

Dr. Him Lal Ghimire (Professor, Tribhuvan University, Nepal) commented - (i) Both India and Bangladesh need to increase technical infrastructure for environmental security; (ii) Both

countries need to increase the amount of financial allocation for the protection of the environment; (iii) The local administrations of India and Bangladesh should make the people of the coastal areas more aware of natural disasters and the environment; (iii) The two countries should increase collective responsibilities and cooperation to ensure the safety of the environment, etc. (Interview, 15/01/2023).

Professor Sanjay Kumar Bhardwaj (Professor, Centre for South Asian Studies, School of International Studies, Jawaharlal Nehru University, New Delhi, India) answered the various research related questions, such as first, what are the impacts of climate change in Bangladesh? Secondly, how will climate change increase climate migration in the coastal areas of Bangladesh? Thirdly, how is the Bangladesh government concerned about environmental security? Fourth, what are the collective responsibilities of the Indian and Bangladesh governments to promote environmental security and global environmental governance?

First, he mentioned that due to climate change, low fall water in Bangladesh, increase in water salinity, and sea level rise were adversely affected on the coastal areas of Bangladesh. In addition, degradation of agricultural system, increase in salinity of water, crisis of drinking water, decreasing Hilsa fish due to increase of water salinity, land erosion and riverbank erosion have led to increased migration problems in the coastal areas to cities in Bangladesh, such as Mongla, Khulna and other coastal parts of Bangladesh.

Secondly, he mentioned that the Maldives, India, and Bangladesh are delta islands and are constantly being severely affected by climate change. There are two types of migration problems in Bangladesh due to climate change, internal and external. Due to climate change, people are moving from coastal areas to cities, and as a result, the problem of conflict is increasing in the cities (such as Khulna and Barisal). Similarly, many people from Bangladesh coastal areas are coming to Assam, causing increased conflicts in Assam, India. He also opined that the Bangladesh government has allocated the islands of Bhasanchar for the Rohingya refugee's people to live on and that the islands are overpopulated (it is also a humanitarian crisis), which would also have an have an adverse impact on the islands and an imbalance in other coastal areas of the environment.

Third, he pointed out that the developmental problem in Bangladesh is one of the barriers to environmental security. Along with that, he said that there is also another problem with the

implications of environmental policy in Bangladesh. Fourth, according to Professor Bhardwaj, environmental problems are a global common problem and not a problem of one country. Therefore, joint action and collective responsibility are required to ensure environmental security. India and Bangladesh should jointly protect the mangrove forests of the Sundarbans region, as these mangrove forests can protect human health by producing oxygen. In 2011, India and Bangladesh signed a Memorandum of Understanding (MoU) to preserve the heritage of the Sundarbans. However, the Rampal Thermal Power Plant project started in Rampal under Bangladesh in a 2010 joint venture (2010 - MoU) between India and Bangladesh will adversely affect the environment. On the other hand, in the Bay of Bengal region, India, Bangladesh, and Myanmar should be more together for the conservation of environment (Telephonic Interview, 25/02/2024).

Dr. Tapan Sarkar (Professor, Finance, and Associate Head of the School of Outreach, Engagement, and International School of Business, University of Southern Queensland, Australia) pointed out that environmental security is a significant component of human security. So, the government of Bangladesh should focus on poverty reduction, providing proper education, increasing renewable resources, sustaining energy security, promoting economic security, and ensuring the implementation of environmental policy. Also, the Bangladesh government should ensure the people in the coastal areas are not isolated and alienated from their families, friends, communities, and societies for the necessities of the balance of the ecosystem and to sustain environmental security (Interview, 01/03/2024).

5.26 Conclusion

The West Bengal and Bangladesh governments and the role played in promoting environmental security from the 1990s to the present have been analyzed through the various information and interviews of the local people in this chapter. The coastal areas of West Bengal and Bangladesh have been extremely affected by the multiple disasters. Bangladesh was severely affected by the supercyclone in 1991 and Cyclone Sidr in 2007. On the other hand, the islands of West Bengal, such as Sagar Island, Ghoramara Island, and Mousuni Island, were severely affected by Cyclone Aila in 2009, Bulbul and Fani in 2019, Amphan in 2020, and Yass in 2021.

Through the analysis of this chapter, new information has also emerged that the Bangladesh Government, the Government of India, and the West Bengal State have formulated several laws, acts, and departments for the protection of the environment, but they have not been properly implemented due to the lack of responsibility of the local administration and lack of environmental awareness among the people. Simultaneously, the governments of Bangladesh and West Bengal have not yet constructed adequate cyclone shelters in the coastal areas of West Bengal and Bangladesh. As a result, the livelihoods of the coastal areas of West Bengal and Bangladesh are gradually at risk during the disasters. So, the Bangladesh government and local administration, the government of India, the West Bengal government, and local administrations will be more responsible, aware, and active for the prevention of disasters in the future and promote environmental security, collective responsibility, and global environmental governance.

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Photos

6.1 Summary and Findings

Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present) has been analyzed on the basis of four research questions and analyzed through the five chapters. The first chapter analyzed that environmental security is an essential part of human security, and it emerged in 1990. Environmental security is a common global problem, and without collective responsibility, it is not possible to ensure environmental security. The first chapter also mentioned that several global environmental conferences were held for the sustainability of the environment, but due to a lack of collective responsibility, environmental problems are increasing. (Vogler 2017: 319).

The second chapter analyses the issue of environmental security from multi-theoretical perspectives. Environmental security is part of human security, and human security was conceptualized by Amartya Sen and Mahbub ul Haq. Also later emphasized was the UNDP's Human Development Report in 1994 (Acharya 2017: 334).

The conventional theory of international relations, such as political realism, has neglected environmental issues. Political realism does not consider environmental security problems, which can threaten the security of the state. Even political realism assumes that ensuring the security of the state can ensure the security of the environment. According to classical realist thinker Morgenthau, national and environmental security can be ensured only by expanding the national power of the state. On the other hand, neo-realist thinker Kenneth Waltz mentioned that international structure can ensure environmental security (Vogler 2017: 331; Dunne, Brian, and Schmidt 2017: 92). But as the insecurity of the environment is increasing at present, it is not possible to ensure environmental security through only the expansion of the national power of the state and the international structure.

In the international context, the liberal theory mentioned that environmental problems can be solved through collective efforts. Similarly, neoliberalism emphasized collective responsibility and cooperation among the state, non-state actors, civil society, etc. to ensure environmental sustainability (Dunne 2017: 99; Hass, Keohane and Levy 1993: 4)

Marxism again blamed the capitalist economic state system as responsible for the degradation of the environment. The Marxist view is that the capitalist system has exhausted and exploited nature for the sake of extreme profits, and as a result, the environment is gradually degrading. At the same time, critical theory has mentioned that modernism, artificial technology, and mechanized capitalism are responsible for the crisis of the environment (Linklater 2013: 113). Critical theory argues that to solve environmental problems, nature must be free from the control of capitalism, artificial technology, and existing socio-political and cultural structures (Luke 2003: 238).

Constructivism also emphasizes identities, norms, ethics, and non-material power for the sake of human security. According to constructivism, identity is more important, and since 2020, China, the USA, India, Russia, Japan, Iran, Germany, South Korea, Saudi Arabia, and Indonesia have become known as the highest-polluting countries in the world. The identity of states is very dangerous for the sustainability of the environment. One of the core social constructivist researchers, Alexander Wendt, emphasizes that values of collective identity can ensure environmental security and human security (Barnett 2017: 126).

Since the 1980s, eco-feminism has emerged as a new form of feminism. Eco-feminism has mentioned that without women's security, it is not possible to ensure environmental security. Women are very much closer to nature than men. Therefore, eco-feminism believes that to save the environment, it is necessary to first protect women. The most important ecofeminist scholars, such as Maria Mies and Vandana Shiva, have extremely criticized extreme modernization and industrialization for a safe life and the environment (Mies and Shiva 1993). On the other hand, traditional patriarchal society wants to divide men, women, nature, and culture, and these divisions have been strongly criticized by feminist scholar Carolyn Merchant. She mentioned that women are more responsible and accountable for promoting environmental sustainability than men (Merchant 1980).

The Green Theory emphasized that a lack of collective action is the main cause of the environmental crisis. At the same time, green theory has mentioned the emergence of the climate migration problem as a new security threat to human society. According to green theory, about 80 million people have been forcefully displaced in the world due to climate change, and about 26

million people have become refugees. Also, about 45.7 million people have been displaced from their homeland, and about 4.2 million people have become refugees from their homeland (Ari and Gokpinar 2021: 41).

The theory of global environmental governance emphasizes that collective responsibility is extremely necessary for the protection of the environment. Neo-liberal thinker Peter Hass has mentioned that epistemic communities, from the representatives of scientists, environmentalists, representatives of the state, representatives of non-governmental organizations, international organizations, representatives of the environmental awareness common people, civil society, etc., can ensure collective responsibility and promote global environmental governance for environmental sustainability (Williams 2017: 51).

In particular, multiple cyclones caused by climate change, such as Super Cyclone in 1991, Sidr in 2007, Aila in 2009, Bulbul and Fani in 2019, Amphan in 2020, Yass in 2021, Sitrang in 2022, etc., have severely damaged the coastal areas of Bangladesh and the various islands of West Bengal in the Sundarbans. This chapter has also emphasized a comparative analysis of the coastal areas of West Bengal and Bangladesh. The coastal areas of Bangladesh were the most affected by the super cyclone in 1991 and Cyclone Sidr in 2007, rather than West Bengal. On the other hand, Sagar Island, Mousuni Island, and Ghoramara Island have been severely damaged by cyclones Aila (2009), Amphan (2020), Yass (2021), etc.

Also, the third chapter has been analyzed About 500000 people died in Bangladesh in the tropical cyclone of 1991, and about 3406 people in Bangladesh died in Cyclone Sidr in 2007. Also, Cyclone Sidr affected 30 districts, the number of affected upazilas was 200, around 1950 unions were affected, the affected households were 20, 64,026, about 7,42,826 hectares are completely damaged, and 9,55,565 hectares of agricultural land are partially damaged. At the same time, livestock deaths in the coastal area of Bangladesh were about 17,78,507; road damage was about 1,714 km, and bridges and culverts were damaged by about 1,687. Comparatively, Cyclone Sidr was much more destructive in Bangladesh than in West Bengal (Khan, Khalily, and Scheyvens 2015: 8).

Also, Cyclone Aila (2009) has been severely affected in Bangladesh rather than in West Bengal. As a result of Aila, about 11 districts of Bangladesh were affected, 64 upazilas were

severely affected, 195 unions were completely and 334 unions were partially affected, about 9, 48,621 families were severely affected, about 2,43,191 houses were completely damaged, and about 77,486 hectares land were completely damaged. Livestock deaths were about 1, 50,131, total road damage was about 2,233 km, partial road damage was about 6,621 km, bridges and culverts were damaged about 157 km, and coastal embankment was damaged about 1,742 km. Also, about 445 educational institutions in Bangladesh have been totally damaged and about 4,588 educational institutions have been partially damaged (Afroz, Cramb and Grunbuhel 2018: 609).

Bangladesh is a riverine country in South Asia. Many times, Bangladesh have been affected by natural and human-induced disasters such as cyclones, wind storms, flooding, droughts, etc. The Padma, Meghna, and Brahmaputra's water levels are uninterruptedly cumulative and as a result, about 80 percent of land areas of Bangladesh have flood plains. Various cyclones and floods, such as those in 1974, 1987, 1988, 1998, 2004, 2007, 2008, 2009, etc., had extremely affected the coastal areas of Noakhali, Khulna, Patuakhali, Kuakata, and Barisal in Bangladesh.

Also, Bangladesh is a vulnerable riverine country. Since the early 2000s, due to climate change, several people have migrated from Bangladesh to other states in the world. In particular, various spaces in India, such as West Bengal, Assam, Tripura, etc., have become important destinations for the people of Bangladesh. Most of the experts of international relations, policymakers, and environmentalists have mentioned that the number of migrations is increasing in Bangladesh due to climate change. This chapter also explained that, due to climate change, people are migrating and coming into different parts of India from the neighbouring states, specifically Bangladesh, Nepal, Sri Lanka, Pakistan, etc.

The third chapter has also mentioned that the number of migrations from Bangladesh to India's North East States and West Bengal is very dangerous. As a result, the problem of resource scarcity in Northeast and West Bengal is increasing. About 15 to 20 million people from Bangladesh migrated to Northeast and West Bengal in India.

The fourth chapter of this study has examined how climate migration emerged as a major threat to human societies. In 2100, around 120 million people in India and Bangladesh will be displaced from their homelands due to climate change. As a result, various cities in India already

faced resource insufficiency. More than 5 million people live in extremely susceptible areas of Bangladesh (McGranahan et al. 2007). About 5,00,000 people are displaced every year due to floods in Bangladesh (Warner et al. 2009). Also, about 20 million people migrate from Bangladesh to India every year (Brown, 2007). The number of migrants from Bangladesh to India has enlarged from 12 to 17 million in the last 40 years due to environmental resource scarcity and conflict due to climate change (Homer - Dixon 1994).

This chapter has explained that climate migration is not only an exodus from one country to another, but due to climate change, it can occur within the country, within the state, or from one place to another. The people of different islands in West Bengal, like Sagar Island, Ghoramara Island, and Mousuni Island's people, are suffering from insecurity of life due to climate change. Due to climate change, the people of these islands are being forced to take shelter in other places. Similarly, the people of the coastal areas of Bangladesh, such as Patuakhali, Kuakata (under Barisal), Noakhali, Khulna, etc., are living in hazardous conditions, and they have migrated from their homeland to other places forcefully due to climate change.

The 5th chapter of the study also investigated the role of the West Bengal and Bangladesh governments in the promotion of environmental security and the livelihood security of the coastal areas of West Bengal and Bangladesh. No doubt, India, West Bengal, and Bangladesh have taken several laws and acts and established the Ministry of Environment and Forest Departments, constitutional amendments, panchayat and municipal laws, etc. for the protection of the environment, but environmental norms and regulations are not implemented due to administrative inactivity, inefficiency and irresponsibility of local administration, and a lack of environmental awareness among the local people.

The fifth chapter also examined that Super Cyclone in 1991 and Cyclone Sidr (2007) were enormously damaged in the coastal areas of Bangladesh, and at that time, the Bangladesh government and the local administration could not play a positive role - that information was also derived from the coastal areas of Bangladesh. Simultaneously, the West Bengal government and the local administration of West Bengal could not play a positive role during the Cyclones Aila (2009), Bulbul (2019), Fani (2019), Amphan (2020), Yass (2021), etc., which also derived from

the coastal areas of Sagar Island, Ghoramara, and Mousuni Island in the South 24 Parganas district of West Bengal.

6.2 Limitations of the Study

The research entitled Environment Security in India and Bangladesh: A Comparative Study (1990s to the present) has some limitations. No sufficient works of literature, books, primary documents, research articles, journals, etc. were found to complete a comparative study of environmental security, especially in the case of West Bengal and Bangladesh.

Sagar Island, Ghoramara Island, and Mousuni Island in the South 24 Parganas District of West Bengal and Patuakhali and Kuakata in the Barisal Division of Bangladesh were selected as field studies for carrying out this study. However, the researcher couldn't interview all the people in the area. The researcher interviewed a small number of people who were living only in the coastal areas and were available at that time. This is a major limitation of this study, and the responsibility rests entirely with the researcher.

In some cases, many government supporters did not want to talk about the responsibilities of the governments during the Cyclones and how the West Bengal government, Bangladesh government, and local administrations were active. This is also another limitation of the study.

6.3 Recommendations of the Study/Some Suggestions

In the Twenty-first century, environmental security has become essential for the existence of human civilization. Environmental problems are becoming more dangerous threats to human society than terrorism. The West Bengal and Bangladesh governments should take multiple strategies for the prevention of environmental problems, including building more infrastructure in the local areas, and more Cyclone shelters in the coastal areas, Government representatives should visit the coastal areas during disasters, and the governments should also properly monitor the relief systems through the local administrations after Cyclones in the coastal areas.

At the same time, in the coastal areas people of West Bengal and Bangladesh, people are responsible for the degradation of the environment. So the people of West Bengal and Bangladesh

need to be more environmentally conscious and responsible to ensure environmental security for their livelihoods.

6.4 Policy Implications

Environmental Security in India and Bangladesh: A Comparative Study (1990s to the present) explored that the coastal areas of West Bengal and Bangladesh, common people are dissatisfied with the local administration, the role of the government, and the 'existing policies' of the government regarding environmental security. However, the 'existing policy' of the Government of India includes the Environmental Protection Act (1986), the National Disaster Management Act (2005), the West Bengal Biodiversity Council (2002), the West Bengal Disaster Management and Civil Defense Department (2006), etc. At the same time, the Government of Bangladesh has adopted Constitution Amendment (2011), Forest Conservation Act, Ministry of Environment, Department of Forest and Climate Change, Cyclone Shelter Construction, Maintenance and Management Policy (2011), Disaster Management Act (2012), National Disaster Management Policy (2015), National Disaster Management Plan (2016-2020), Disaster Standing Orders (2019), etc.

But common people say that the environmental policies are not active, and those who are in charge do not give importance to the implementation of the environmental policies. Therefore, the government of West Bengal and the government of Bangladesh should make the existing environmental policies more active, take appropriate action for the implementation of environmental policies in the local stages and governments should implement multiple environmental security-oriented policies (such as the implementation of tree planting plans, protection of ecosystem, financial and technical assistance to the local governments and its reassessment, set up more environmental awareness programs etc.) to be adopted at national, state and local levels to ensure environmental security and the security of common people those are living in the coastal areas of West Bengal and Bangladesh.

6.5 Further Research of the Study

Environmental security is an integral part of non-traditional security and human security, and it was not discussed until the 1990s in the area of political science discourses and international

relations discourse. But in the twenty-first century, it is more emphasizing environmental security for the existence of human civilizations. Even, a comparative study of the environmental security of West Bengal and Bangladesh this kind of study has never been done before. So the new researchers will take this research area for their innovative and explorative research, and that research will guide them to explore the research. At the same time, if all the educational institutions of the West Bengal and Bangladesh governments have included the area of environmental security in their curricula, students and scholars will be more encouraged to do the research.

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A Coastal area photo of Mousuni Island was taken by A. Patra on 17/06/2023.

Climate change affected a woman on Mousuni Island and the photo taken by Anupam. Patra, 17/06/2023.

Climate change affected areas photo of the Ghoramara Island and taken by A. Patra, 18/06/2023.

Climate change affected houses in the Coastal areas of Mousuni Island and the photo taken by A. Patra, 17/06/2023.

Coastal areas image of the Mousuni Island and taken by A. Patra, 17/06/2023.

Coastal areas photo in Patuakhali District and taken by A. Patra, 17/01/2023.

Cyclones affected area of the Ghoramara Island and photo taken by A. Patra, 18/06/2023.

Cyclones affected areas of Ghoramara Island and photo taken by A. Patra, 18/06/2023.

Cyclone affected Beguakhali coastal areas photo in the Sagar Island and taken by Anupam Patra, 20/06/2023.

Cyclone affected Ferry Ghat of the Ghoramara Island and the photo taken by A. Patra, 18/06/2023.

Cyclones affected the image of Ghoramara Island and were taken by A. Patra, on 18/06/2023.

Cyclone-affected areas image of the Mousuni Island and taken by A. Patra, 17/06/2023.

Cyclone-affected photo of the Patuakhali District and taken by A. Patra, 17/01/2023.

Ferry Ghat photo of the Ghoramara Island and taken by A. Patra, 18/06/2023.

Photo of a Cyclone shelter on Ghoramara Island and taken by A. Patra, 18/06/2023.

Photo of the fisherman with a child of Mousuni Island and taken by A. Patra, 17/06/2023.

Photo of a fisherman of the Kuakata in Patuakhali District and taken by A. Patra, 17/01/2023.

Photo of the Bangladesh Marine Academy in Barisal Division and taken by A. Patra, 19/01/2023.

Photo of the Beguakhali Coastal areas in Sagar Island and taken by A. Patra, 20/06/2023.

Photo of the Coastal areas of Sagar Island and taken by A. Patra, 20/06/2023.

Photo of the Coastal areas of Sagar Island and taken by A. Patra, 20/06/2023.

Photo of the Coastal areas of Sagar Island and taken by A. Patra, 20/06/2023.

Photo of the Ganga Sagar Coastal area on Sagar Island, near the Kapilmuni Temple and taken by A. Patra, 20/06/2023.

Photo of the Ganga Sagar coastal areas, near the Kapilmuni Temple and taken by A. Patra, 22/01/2024.

Photo of the Ghoramara Island and taken by A. Patra, 18/06/2023.

Photo of the Kuakata coastal areas in Patuakhali and taken by A. Patra, 17/01/2023.

Photo of Mousuni Island after Cyclone Yass and taken by A. Patra, 17/06/2023.

Photo of the Secondary School on Ghoramara Island and taken by A. Patra, 18/06/2023.

Recent photo of the Ganga Sagar coastal areas, near the Kapilmuni Temple and taken by A. Patra, on 22/01/2024.

Solar energy is the only source of lighting in Ghoramara Island and the photo taken by A. Patra, 18/06/2023.

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