Master's Thesis

on

Survival at Stake: Unraveling the Challenges of Climate Change to the Right to Life in Bangladesh

Acknowledgments

I would like to extend my heartfelt gratitude to my supervisor, Mr. Sven Arntzen, for his essential mentorship, assistance, and motivation during my thesis. His expertise and discernment were important in shaping this argument.

Furthermore, I express profound appreciation to all the participants for their valuable efforts in the research. The research would not have been accomplished without their invaluable time and willingness to generously share their experiences and perspectives.

I would like to express my gratitude to my student adviser, Anne-Kari Ruud, for her consistent guidance and assistance, which served as a constant source of encouragement.

Furthermore, I would like to convey my deep gratitude to my esteemed parents, wife, and sole Daughter Marium Bushra, who have consistently provided unwavering support, affection, and motivation in relation to my academic pursuits. The confidence you have in me has bestowed in me immense fortitude.

Finally, I express my gratitude to my friends and colleagues for their companionship, assistance, and the numerous conversations that improved my ideas and gave me the determination to continue.

I appreciate the valuable contributions made by each of you to our project.

Abstract

Climate change is causing enormous changes to Bangladesh's environment and ways of living, which is deepening the complex connection between environmental problems and the fundamental human rights to life. This thesis performs a comprehensive investigation of the profound consequences of climate change on the core foundation of the right to life.

Increasingly frequent storms, floods, and droughts, along with rising sea levels encroaching upon low-lying coastal regions, are eroding the fundamental aspects of existence. This study investigates human rights to life by assessing the consequences of severe weather events on crop devastation, the exacerbation of water scarcity caused by the entrance of saltwater, and the destruction of property and loss of human lives arising from continuous climate-related disruptions.

This study employs in-depth interviews and other qualitative methodologies to gather insights from individuals in Bangladesh directly impacted by the effects of climate change. Women and underserved communities are highlighted as examples of those most in need of resilience strategies and equitable disaster management.

The thesis condenses the results into thorough analysis, suggestions, and policy implications. It emphasizes the pressing need for immediate action to mitigate the impacts of climate change, safeguard human rights, and secure a sustainable future for the resilient people of Bangladesh.

Keywords: right to life, climate change, Environment, insecurity

Contents

List of Figures and Tables

Chapter One

Prologue

1.1 Introduction

Climate change is no longer a hazard in the distant future; rather, it is now here with us, and we must act on it as soon as we can. Increases in average global temperature, changes in weather patterns, and rising sea levels are just a few examples of how climate change is having far-reaching, negative consequences. People in many places are at increased risk of immediate and devastating consequences due to their disproportionate exposure to the threats presented by this worldwide catastrophe. Bangladesh is an interesting case study since it is now working to address the many challenges that climate change brings. This thesis examines the potential effects of climate change on the fundamental human right to life, specifically within the context of Bangladesh.

1.2 Background

A remarkable worldwide occurrence, climate change is defined as "A change in the condition of the climate that is noticeable. Human activities, particularly the burning of fossil fuels, cutting down forests, and industrial operations, are the main sources of greenhouse gas emissions into the atmosphere of the Earth.

Climate change is an issue that affects everyone on Earth and has no borders. It has caused global temperatures to rise, mostly because of what people do, especially the release of greenhouse gases (Brack, 2019). Consequently, there has been an increase in the occurrence of extreme weather events like heat waves, floods, cyclonic storms, and wildfires worldwide. These occurrences cause extensive harm to human welfare and global economies in addition to endangering natural habitats.

Bangladesh, situated in South Asia, boasts diverse topography that significantly influences the daily lives of its population. The country is characterized by a vast river delta formed by the confluence of several major rivers, including the Ganges and Brahmaputra. The deltaic landscape features numerous water bodies, including rivers, estuaries, and wetlands, making it prone to both flooding and cyclones. The coastal regions situated at lower altitudes, especially susceptible to the increasing sea levels, contribute to the challenges faced by communities residing in these regions.

Figure 2: Map of Bangladesh (https://www.infoplease.com/atlas/asia/bangladesh-map)

The human populace of Bangladesh engages in a variety of activities throughout various regions of the country, reflecting the geographic diversity. Agriculture is a primary occupation, with the fertile plains of the delta supporting the cultivation of rice and other crops. Notably, shrimp culture has gained prominence in the coastal areas. Shrimp farming, often practiced in brackish water regions, has become a significant economic activity, contributing to both local livelihoods and the national economy. However, the environmental impact of shrimp farming, including mangrove deforestation and changes in water quality, poses challenges to sustainable development.

Bangladesh experiences distinct seasons, profoundly influencing the socio-economic fabric. Monsoon, spanning from June to October, brings heavy rainfall, triggering floods in low-lying areas. Conversely, the dry season, from November to April, is marked by reduced precipitation, leading to drought conditions in some regions. These climatic extremes significantly impact agriculture and water resources, underscoring the complex interplay between weather patterns and human activities.

1.3 Local Implications for Bangladesh

Bangladesh, which is located by the Bay of Bengal, is particularly vulnerable to coastal flooding and tropical storms. The occurrence and strength of these climate phenomena have heightened, causing ever-greater destruction to the coastal areas. Hossain and Mullick (2020) claim the deadly potential of these natural disasters is poignantly brought home by the memory of the 1970 Bhola cyclone, which claimed the lives of over 300,000 people.

Sea levels are rising because of rising global temperatures. This, along with the yearly monsoons and the faster melting of the Himalayan glaciers and causes flooding. Every year,

these floods force millions of Bangladeshis to leave their homes. Khan et al. (2021) say that whole villages are submerged, which means people lose their homes and land.

Bangladesh's farming is being greatly affected by climate change. Patterns of unpredictable rainfall, long droughts, and saltier water entering the soil have all made it much harder to grow crops. Al-Maruf (2020) notes that as a result, food is hard to come by, prices go up, and in the worst cases, famine happens.

Climate change has led to reduced precipitation and prolonged dry seasons which have caused water scarcity. Moreover, increased sea levels lead to salinity intrusion damaging the water used for drinking. Many people in the region of Bangladesh confront grave health risks because they do not have easy access to clean and sound water, according to Buchmann et al. (2019).

Erosion by water in rivers has caused many individuals to lose their houses, means of livelihood, and farmland as the water swells and rises. In the process, there is always a threat in rural areas located along the Coastal strip where the main livelihoods comprise fishing and farming. This according to Barua et al. (2019) results in internal displacement as individuals relocate from rural areas to urban centers for improved prospects.

Ahmed and Eklund (2021) noted that Bangladesh is affected by climate change, primarily affecting women and vulnerable groups more than men. Women and children may be in danger than men, women usually must look after their families during disasters. It should be noted that women are also more vulnerable to violence and discrimination.

Climate change leads to more disasters that cause waterborne diseases, poor nutrition, and filthy living conditions. Anas, et al. (2021) argue that, as a result, it increases the overall health risks for everyone. Limited access to health care worsens the problem even further. For instance,

Faisal et al. (2021) state that the infrastructure of Bangladesh such as roads, schools, and hospitals may be damaged due to adverse weather conditions. This further worsens the circumstances by complicating access to essential services and resources.

The effects of climate change on unique ecosystems and biodiversity in Bangladesh have affected a lot of people. For instance, the warming of the earth leads to habitat destruction and pollution which have resulted in a reduction for some species leading to the disturbance of fragile ecosystems and threatening income-generative activities depending on them (Pandit, 2023). In such areas, they are often prevented by floods or cyclones from getting to schools. The use of schools as shelters in cases of an emergency makes students fail to learn. Rising temperatures resulting in unpredictable changes in rain patterns undermine hydropower output, making the power supply shortages even more severe (Ahmed & Eklund 2021). The electricity shortage has affected even the economy as well as the daily lives of people in Bangladeshis who rely on it for several functions.

Many people in cities such as Dhaka are going to be hit harder than others due to the rapid urbanization taking place. The city's infrastructures including housing may not be able to stand against flooding, heat waves, and other consequences of climate hazards.

1.4 Rationale and Relevance of the Study

In the context of the global climate effect, it is significant to stress the importance and rationale of this research on climate change impacts on Bangladesh's right to life. Life being a basic human right is accorded in many international law instruments including the Universal Declaration of Human Rights (Heri, 2020). Effects of Climate Change – Humanitarian Crisis Hits Big in Bangladesh. Das et al. (2021) note that such severe and frequent climate-induced calamities cause significant loss of lives, livelihoods, and overall well-being. This thesis

examines how climate change heightens the susceptibility of people in different parts of Bangladesh, focusing more on the right to life.

The findings of this study have a direct impact on policies. Since Bangladesh is a highly climate change-vulnerable country, it needs some strategies and policies that would protect the right to life of its people. Such understanding should be brought to international organizations that work in the region and policymakers on the importance of human rights-based adaptation and mitigation measures of climate change since this study highlights the pressing issues. This research becomes important not only in Bangladesh but also internationally when investigated against the backdrop of changing environment and human rights to life because of the hazardous consequences of climate change.

1. 5 Research Questions

A. Primary Research Question:

Considering the heightened frequency, intensity, and unpredictable nature of climate-related events, what are the particular and complex effects of climate change on Bangladesh's right to life?

B. Secondary Research Questions:

- How do natural disasters like cyclones, floods, and droughts impact food accessibility and availability in Bangladesh, especially in coastal areas?
- What effect does climate change have on crop productivity and food security in the nation? How does it change patterns of pests and diseases?
- How is Bangladesh's supply of clean drinking water being impacted by climate change, and what are the population's health implications as a result?

- What effects do coastal flooding, land degradation, and riverbank erosion bring to Bangladeshi people's lives and livelihoods?
- What effects does climate change have on population displacement, and what difficulties do displaced people then face—especially in urban slums and informal settlements?

1.6 Research Objectives

- Objective 1: To explore the complex effects of climate change on Bangladesh's food security.
- Objective 2: To explore how access to clean drinking water and water scarcity are affected by climate change.
- Objective 3: To investigate how property loss, disruption of livelihood, and population displacement are affected by climate change.
- Objective 4: To investigate coping techniques, adaptation tactics, and mediating factors.
- Objective 5: To provide evidence-based recommendations for policy and practice.

Chapter Two

Climate Change and the Human Rights to Life: A General Discussion

2.1 Introduction

Of all global challenges, few intertwine as profoundly as the issues of climate change and human rights. Chapter 2 discusses climate change, with a view to both natural variability and human intervention as causes of our planet's weather patterns. Defined through the scale of the United Nations Framework Convention on Climate Change (UNFCCC), climate change emerges not merely as a shift in temperature but as a nexus of interconnected systems, where human activities such as fossil fuel emissions weave a blanket of greenhouse gases, trapping heat and unsettling the delicate equilibrium of our biosphere (UNFCCC, n.d). Through the view of history and science, the chapter presents the story of a world teetering on the brink of environmental disruption n where rising temperatures are not just statistics but harbingers of a range of environmental impacts, from drought-induced famines to coastal communities facing the encroaching tides of sea-level rise.

2.2 Climate Change and the Human Right to Life

Climate change refers to alterations in the usual weather patterns of a region due to shifts in the Earth's climate system. These changes impact various elements of the environment and can affect specific areas differently, despite being a global phenomenon. Concerning the United Nations Framework Convention on Climate Change (UNFCCC), climate change denotes alterations in the Earth's climate over an extended duration, stemming from various factors, both direct and indirect, that surpass natural fluctuations throughout time (UNFCCC, n.d). According

to Trenberth (2011), climate change is a natural process where wind, rainfall, temperature, and other elements of the atmosphere vary over a certain period, usually a decade or more.

Several decades ago, climate predictions indicated potential shifts towards either cooler or warmer conditions compared to the present. Nevertheless, contemporary climate change is rapidly unfolding due to human actions, notably the combustion of fossil fuels resulting in the release of greenhouse gases (Shindell & Smith, 2019). The escalation in emissions of these gases forms a blanket-like layer, trapping solar radiation and elevating temperatures. Perera (2018) identifies carbon dioxide and methane as principal examples of such gases stemming from human activities, exerting a significant impact on climate dynamics. These activities encompass fossil fuel combustion for transportation and heating, deforestation, and waste disposal. Major emission sources encompass industrial processes, agriculture, and waste handling. Over the past two million years, greenhouse gas concentrations have been on the rise, driving a temperature increase of 1.1°C since the 1800s, with the last decade registering as the warmest period on record (Letcher, 2019).

Many believe climate change primarily involves warmer temperatures, but this is just the beginning of the story (Rich, 2018). Recognizing Earth as a system of interconnected elements, where changes in one element affect all others, is crucial. As per Rich (2018), climate change could affect various aspects of our lives, including employment, shelter, safety, and food production. People that are currently living in small island states and other developing nations, are already more susceptible to the effects of the climate. Prolonged periods of drought pose a threat of famine to individuals. Simultaneously, rising sea levels and issues such as the infiltration of saltwater have advanced to the extent that entire communities have had to relocate. The number of individuals classified as "climate refugees" is expected to rise.

There is a wealth of evidence indicating that the world's climate is undergoing significant changes. These include an uptick in landslides and floods, as well as a rise in heat waves, droughts, and wildfires. While the majority of scientists agree that human activities are primarily responsible for driving these changes, there are some who hold differing views. However, it's important to note that those who disagree with the human-caused climate change theory are either misinformed or influenced by conflicting motives (Bellard et al., 2012). This perspective acknowledges the overwhelming scientific consensus attributing climate change to human actions while recognizing the existence of dissenting opinions that may be based on misinformation or other interests.

The irony of the unfounded debate over climate change is that even without all the supporting evidence, the interconnectedness of the environment makes it clear that the climate cannot remain unaffected by the widespread destruction of ecosystems. As the ecosystem deteriorates in a myriad of ways, including deforestation, pollution, and habitat loss, it's inevitable that the climate will be impacted. This underscores the importance of addressing environmental degradation and its effects on the climate, regardless of differing opinions on the specifics of climate change. Even Theophrastus, an Ancient Greek who lived nearly 2,400 years ago, saw that deforestation resulted in warmer and drier weather.

He undoubtedly exhibited more practical wisdom than all present-day climate skeptics combined. Their reluctance to address the looming dangers of climate change due to ignorance and imprudence has unfortunately led to a situation where it's now too late to prevent the unfolding crisis (Hughes & Hughes, 2014). The most unsettling aspect is our uncertainty about the extent of its severity.

The statement that we have a very limited understanding of the environment raises concerns about the reliability of scientific findings regarding climate change and environmental impact. Moreover, with approximately 200,000 people contributing to water, soil, and air pollution daily (Appannagari, 2017), the situation appears to be worsening. The degradation of soil, depletion of groundwater, destruction of ecosystems, and extinction of animal species, as evidenced by widespread flooding and rising ocean levels, further emphasize the urgency of addressing environmental issues. Ocean life is already declining because of warmer seawater (Tang, 2020). It is also feasible that the vast and condensed areas of agriculture that provide most of the world's food would disappear. All of this indicates that millions of human lives are directly in danger. Additionally, the decline of habitats would inevitably cause unprecedented-scale mass migrations and ensuing social and political turmoil.

2.3 Human Right to Life

The human right to life is fundamental to ensuring the well-being and dignity of every individual. It encompasses not only the right to physical existence but also the conditions necessary for a decent quality of life. This includes access to clean air and water, adequate shelter, and sufficient food to sustain oneself. Moreover, the right to life extends beyond mere survival to encompass the right to live in a safe and healthy environment, free from threats to one's health and safety. This includes protection from environmental hazards such as pollution, natural disasters, and climate change.

In the context of climate change, the right to life is increasingly being challenged, extreme weather events, and environmental degradation pose significant risks to human health and well-being. Heatwaves, droughts, floods, and wildfires are becoming more frequent and severe, resulting in loss of life, displacement, and destruction of homes and communities.

Additionally, the consequences of climate change have a more significant impact on disadvantaged sectors such as impoverished neighborhoods, indigenous communities, and marginalized factions, worsening pre-existing disparities and unfairness. Urgent measures are imperative to uphold the basic human right to life amidst climate change, necessitating actions to reduce its consequences, adjust to evolving circumstances and safeguard the most susceptible individuals within society.

Legal, ethical, and environmental issues are carefully examined in the theoretical study of the right to life in the context of climate change. The International Covenant on Civil and Political Rights (ICCPR) and the Universal Declaration of Human Rights (UDHR) may have been established long before climate change became a recognized global concern. However, these documents do lay the foundation for understanding the broader implications of the right to life in the context of environmental degradation and climate change. While they may not explicitly mention climate change, they do recognize the importance of protecting individuals from threats to their lives, including those arising from environmental hazards.

In recent years, there has been growing recognition within the international community of the need to address climate change as a human rights issue. Legal frameworks and ethical considerations have evolved to encompass the intersecting challenges of environmental degradation and human rights violations (Bell, 2013). Today, the right to life is understood not only as protection against arbitrary deprivation but also as an obligation for states to take proactive measures to prevent harm to individuals from environmental threats. This includes addressing the root causes of climate change, mitigating its impacts, and ensuring that vulnerable populations are safeguarded against its effects.

Climate change is mainly triggered by global warming, which results from greenhouse gas emissions. These emissions, predominantly generated by human activities like burning fossil fuels and deforestation, retain heat in the Earth's atmosphere, altering climate patterns. This leads to various consequences, including more frequent and intense extreme weather events, rising sea levels, loss of biodiversity, and ecosystem disruptions.

Consequently, it is climate change that directly threatens human lives and livelihoods through its impacts on the environment and natural systems. People adopt living in such challenging environments, which include a shortage of food and water, displacement, and a rise in the prevalence of disease. According to scholars, nations should be required to prevent climate change and safeguard their citizens from its effects if the right to life is to be understood broadly to encompass environmental components (Knox, 2015). The notion that states bear a human rights obligation to tackle climate change is gaining traction. Climate change is being more widely acknowledged as a basic human rights concern by the Human Rights Council and other international organizations. Due to its disproportionate impact on the world's poorest and future generations who have contributed the least to global emissions, legal academics such as Caney (2010) contend that climate change violates the principles of intergenerational justice, equity, and nondiscrimination.

Furthermore, a notion known as "climate justice" has surfaced, which advocates for fair responses to climate change that uphold and defend human rights, particularly the right to life, and establishes a connection between environmental sustainability and human rights. To shield vulnerable communities from the effects of climate change, this entails both adaptation strategies and mitigation initiatives to lower emissions. Unprecedented degrees of worldwide collaboration are imperative to address climate change as a menace to the fundamental right to life. The Paris

Accord, forged within the United Nations Framework Convention on Climate Change (UNFCCC), symbolizes a universal dedication to combat climate change through the reduction of greenhouse gas emissions (UNFCCC, n.d.). But as academics like Bodansky (2016) point out, the success of these kinds of agreements hinges on their capacity to materialize into national action and be upheld by moral and legal commitments. Governments, businesses, and individuals all bear a moral responsibility to respond to climate change and safeguard human rights. Shue (1993) argues that there is a moral obligation for those who have historically benefited from emissions to bear the financial burden of reducing climate change and preparing for its consequences. This ensures that measures to mitigate climate change do not further marginalize vulnerable populations and is consistent with the values of accountability and justice.

The necessity of an integrated strategy that incorporates legal, ethical, and environmental measures is highlighted by the theoretical discussion of the right to life in the context of climate change. The global nature of climate change underscores how environmental sustainability is intricately linked to human rights, revealing the interconnectedness of nations and the need for collective action. This challenge traditional notions of sovereignty, as addressing climate change necessitates cooperation and coordination among countries beyond their individual borders. It is becoming more and more important to defend the right to life by taking significant action as the effects of climate change become more apparent.

The intersection of climate change and human rights presents a big and urgent problem talked about a lot these days. Climate change exacerbates existing vulnerabilities and inequalities, threatening the enjoyment of fundamental human rights worldwide (Levy & Patz, 2015). From food security to access to clean water and shelter, climate change has an impact on various facets of human existence, amplifying social, economic, and environmental challenges.

Amidst this backdrop, the right to life emerges as a paramount concern in the context of climate change. For instance, in regions experiencing more frequent heatwaves, vulnerable populations, such as the elderly and children, are at increased risk of heat-related illnesses and death. Similarly, communities living in coastal areas confront the threat of intensified hurricanes and storm surges, leading to loss of life and displacement. Moreover, degradation of natural habitats, like deforestation and loss of biodiversity, can disrupt ecosystems vital for human survival, impacting food security and health outcomes. The right to life, enshrined in international conventions and declarations, underscores the imperative to address climate change as a human rights issue, demanding urgent action to mitigate its adverse effects and protect the inherent dignity of all individuals.

In constructing a theoretical framework for understanding the right to climate stability, Bell (2013) posits that a right to climate stability can be conceptualized as a derivative of the right to life. This means that ensuring stable climatic conditions is fundamental for safeguarding human life and well-being. By subsuming the stability of the climate under already existing frameworks of human rights, for instance, the ICCPR and the UDHR, it becomes clearer that climate stability is not really an issue about the environment but is, however, an issue about basic human rights. In his argument, Bell (2013) further posits that a stable climate is important to warrant basic human rights, such as life and health. This perspective emphasizes the interconnectedness between climate change and fundamental human interests, highlighting the need to address climate instability as a threat to human rights. Moreover, Lanyi (2012) delves into the analysis of how the right to life is understood in global agreements such as the International Covenant on Civil and Political Rights (ICCPR). The ICCPR acknowledges that the right to life involves more than just a prohibition on states from causing death; it also entails an

obligation for states to actively safeguard life, as highlighted by the Office of the United Nations High Commissioner for Human Rights (n.d). Lanyi's analysis underscores the broad scope of the right to life and its relevance in the context of climate change, where indirect impacts such as increased mortality from climate-related disasters pose significant challenges to human security.

Additionally, Shelton et al. (2011) contributes to the discussion by examining the convergence and conflicts between human rights and environmental protection. They argue that while there are common interests and objectives shared between human rights and environmental protection, tensions may arise between the two fields. This perspective acknowledges the complexities of addressing environmental issues within a human rights framework. It calls for nuanced approaches to ensure that efforts in both domains mutually support each other. For example, while protecting the environment is essential for safeguarding human rights such as the right to a clean and healthy environment, the implementation of environmental policies should also consider potential impacts on other human rights, such as the right to livelihood and access to resources. Balancing these considerations requires careful navigation and interdisciplinary collaboration to address both environmental challenges and human rights concerns effectively.

Climate change affects human rights in various ways, particularly in terms of food insecurity. According to Humphreys (2009), there is a projected concerning rise in food insecurity globally due to climate change. This includes millions of additional people being at risk of hunger by 2020 and beyond. The impact of climate change on food insecurity exacerbates existing challenges related to access to nutritious food and threatens the fundamental human right to food. As temperatures rise and weather patterns become more unpredictable, agricultural productivity is affected, leading to crop failures, reduced yields, and increased food prices. These consequences disproportionately impact vulnerable populations, including smallholder farmers

and communities reliant on subsistence agriculture. Therefore, addressing climate change is crucial not only for environmental sustainability but also for ensuring food security and upholding human rights. This projection underscores the urgent need to address climate-related disruptions to food production and distribution systems to safeguard this fundamental human right. Moreover, as highlighted by various studies (Intergovernmental Panel on Climate Change, n.d), climate change disproportionately affects vulnerable populations, including smallholder farmers and artisanal fisherfolk, who rely heavily on local ecosystems for their livelihoods. These communities face heightened risks due to localized impacts of climate change, such as shifts in weather patterns, increased frequency of extreme events, and alterations in marine ecosystems. These changes exacerbate existing challenges related to food insecurity and poverty among vulnerable communities. For instance, changes in precipitation patterns and rising sea levels can lead to reduced agricultural productivity and loss of marine biodiversity, directly impacting the food sources and income opportunities of these populations. Therefore, addressing the impacts of climate change on vulnerable groups is essential for promoting social justice, reducing inequality, and safeguarding human rights.

In addition, forestry and forest ecosystems play a major part in mitigation against the impacts of variation and change in climate by the uptake of carbon dioxide from the atmosphere, hence helping to regulate global climate. Further, the forests offer important ecosystem services of soil conservation, water filtration, and biodiversity conservation, without which human well-being and livelihood are just unsustainable. Changes in world food and forestry trade patterns by global climate change are hence far-reaching in their implications for the environmental sustainability and socioeconomic development of the world. As climate-related disruptions affect agricultural yields and forest ecosystems, there is a growing need for adaptive strategies and

resilient supply chains to ensure food security and sustainable resource management (Sarkar & Sensarma, 2019).

Addressing the changing circumstances demands united action at local, national, and global levels to alleviate the negative effects of climate change on food security and livelihoods. The right to survival is under serious threat due to climate change, as shown by forecasts of increased deaths resulting from climate-related catastrophes. IPCC reports extensively detail the rising occurrence and severity of extreme weather events linked to climate change, such as hurricanes, heatwaves, floods, and wildfires. Notable instances include the devastation wrought by Hurricane Katrina in 2005, claiming over 1,800 lives and causing widespread damage along the US Gulf Coast, and the 2003 European heatwave, which led to approximately 70,000 additional deaths (World Vision, n.d.). Moreover, Lanyi's (2012) research has emphasized the indirect effects of climate change on health and well-being, such as heightened rates of malnutrition, respiratory ailments, and infectious diseases. These projections underscore the pressing need for effective adaptation and disaster readiness measures to reduce loss of life and shield vulnerable communities. Governments, societies, and international bodies must prioritize investments in infrastructure, early warning systems, and public health programs to bolster resilience against climate-related disasters and safeguard the welfare of all individuals, particularly those most susceptible.

Furthermore, climate change indirectly impacts health and well-being by exacerbating factors like malnutrition and cardio-respiratory illnesses, which can result from disruptions in food production and increased air pollution. These adverse outcomes pose significant challenges to public health systems and individual well-being. The interconnected nature of climate-related factors, including food insecurity and environmental degradation, exacerbates existing health

challenges, particularly in developing countries (Stavi et al., 2021). Addressing these indirect impacts requires comprehensive strategies that integrate climate resilience into public health systems and social safety nets. Moreover, there are significant legal implications associated with states' failure to mitigate environmental damage, leading to climate change. This negligence may result in breaches of human rights obligations and could expose governments to legal challenges and liabilities. Lanyi (2012) argues that when states neglect their duty to prevent environmental harm, resulting in climate change-induced threats to life, affected individuals may seek legal remedies against violations of their right to life. This underscores the necessity for improved systems of responsibility and collaboration among nations to enforce the environmental obligations of states and safeguard human rights in the context of climate change.

Integrating climate considerations into human rights conversation requires strategies that address climate-related threats while upholding fundamental rights and dignity. It is important to reiterate the significance of proactive climate mitigation measures, as emphasized by Davies et al. (2021). These measures can have an important role in protecting vulnerable populations from the detrimental effects of climate change, including threats to their lives and livelihoods. By incorporating climate resilience into policy frameworks and development agendas, governments can promote social justice and equity to resources and opportunities for all. Central to this integration is the recognition of climate change not just as an environmental issue but also a human rights issue. Collaborative efforts between policymakers, researchers, and communities are crucial for advancing this understanding and developing effective solution. By engaging diverse stakeholders in dialogue and decision-making processes, inclusive climate action can be fostered, ensuring that the voices and needs of marginalized groups are heard and addressed.

In addition to promoting awareness and education about the intersection between climate change and human rights, it's crucial to frame climate change as a human rights issue, as noted by Cameron (2016). This approach enables individuals and organizations to advocate for policy reforms and resource allocations that prioritize the protection of human rights in climate-related decision-making. Ultimately, through collaboration across sectors and disciplines, we can work together to build a more just and sustainable future, where human rights are upheld, and communities are resilient in the climate change perspective.

2.4 Causes of Climate Change and Their Consequences on the Right to Life

The issue of climate change is one of the most undeniably challenges of our time. In places like Bangladesh, where its impacts are deeply felt, understanding its causes is crucial. This section explores the grounded causes of climate change and illuminates how they directly impact the right to life in this context. Recognizing these underlying factors is paramount to grasping the gravity of their consequences on human well-being.

Climate change has various reasons behind it. Some happen naturally, like the Earth's cycles, while others are because of what people do. The big ones caused by humans are the gases we release into the air and cutting down forests. The primary factors contributing to climate change are human actions, specifically the combustion of fossil fuels like coal, petroleum, and gas, which emit significant quantities of greenhouse gases (GHGs), including carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), into the air. These gases accumulate and trap heat from the sun in a phenomenon known as the greenhouse effect (Gray et al. 2020). This enhanced greenhouse effect intensifies global temperatures, resulting in climate change.

The massive clearing of forests known as deforestation greatly aggravates climate change. As carbon sinks, forests absorb CO2 and are essential for controlling the planet's

temperature. The atmospheric release of stored carbon occurs when forests are cleared or burnt, leading to an increase in CO2 levels (Hoover & Riddle, 2020).

Rising temperatures have led to more heat-related illnesses and deaths. According to recent statistics like that one by Faurie et al. (2022), the number of these cases has increased significantly in regions experiencing higher temperatures due to climate change. According to Vu et al. (2019), vulnerable groups are disproportionately impacted, including the elderly, children, and people with pre-existing medical conditions. Heatstroke, dehydration, and other heat-related illnesses are directly linked to prolonged exposure to intense heat, posing serious threats to individuals' right to health. This emphasizes the intersection between climate change and human rights, highlighting how extreme weather conditions can directly impact people's well-being.

There is frequently a correlation between high temperatures and a higher chance of natural disasters like storms and cyclones. Homes may be destroyed or severely damaged by these extreme weather events, leaving people and communities in desperate need of shelter. It is in such circumstances that the right to adequate housing becomes precarious.

High temperatures accelerate surface water body evaporation rates and decrease freshwater availability, exacerbating the problem of water scarcity. The right to have safe drinking water is impotant for human existence with good health and well-being. When this right is compromised due to scarcity, the risk of waterborne illnesses and other health issues significantly increases, directly affecting individuals' right to life.

Deforestation accelerates climate change by reducing the capacity of the earth to absorb CO2. Deforestation due to the clearance of forest lands for urbanization and agricultural purposes, among others, in regions such as Bangladesh, raises the greenhouse effect and, in turn,

exacerbates climate change across the world. The reasons why the climate is changing are very much interlinked with how climate change affects the people of Bangladesh. In our country, the right to life is at stake due to anthropogenic climate change arising from greenhouse gas emissions and deforestation, posing serious fears about access to housing, health, food, and water. To effectively mitigate and adapt to the impending climate challenges, it is imperative to acknowledge these causes.

Chapter Three

Bangladesh: A Brief Introduction

3.1 Introduction

Bangladesh stands as a vibrant nation, characterized by its resilience and variety, showcasing a deep cultural heritage and a complex past (Mannan, 2015). Officially known as the People's Republic of Bangladesh, it resides in South Asia, bordered by Myanmar to the southeast, India to the west, north, and east, and the Bay of Bengal to the south (Van Schendel, 2002). Its adjacency to Bhutan and Nepal is through the Siliguri Corridor, while Sikkim, an Indian hill state, separates it from China to the north. Positioned between 20°34' and 26°38' north latitude and 88°01' and 92°41' longitude, Bangladesh extends approximately 440 km east-west and 760 km north-northwest to south-southeast at its widest points (Banglapedia, 2024). With a population of 165.16 million crammed into 147,570 square kilometers, Bangladesh ranks among the most densely populated nations (Bangladesh Bureau of Statistics, 2022), its demographics primarily consisting of Muslims, who make up 91.04% of the populace (census, 2023).

Figure2: Political and administrative map of Bangladesh (snl.no/Bangladesh)

3.2 History of Bangladesh

Ikhityar Uddin Muhammad bin Bakhtiar Khalji came in 1204 in the 13th century and conquered West Bengal and parts of North Bengal and Nadia. However, he died in 1206 during the Bihar campaign. Bangladesh's civilization has roots dating back nearly 4,000 years to the Chalcolithic period, characterized by the transition from the Neolithic to the Bronze Age. However, the emergence of Hinduism and Buddhism in the region dates to around 500 BCE, marking significant cultural and religious developments. Later, in the early 13th century AD, Islam began to gain prominence in the region with the establishment of Muslim rule, shaping Bangladesh's cultural and religious landscape. Islam came to the area around 1200 and became popular in the early 13th century through the military campaigns of Bakhtiar Khilji and the efforts of Sunni preachers such as Shah Jalal. From the 14th century onwards, Sultan Shamsuddin Ilyas Shah ruled as Shahi Bang, promoting economic growth and military superiority. The Europeans regarded the Kingdom of Bengal as the most commercially successful state. The region later came under the Mughal Empire and became its wealthiest region. The Bengal Subah produced about half of the GDP of the Mughal Empire and 12% of the world GDP, more than the GDP of Western Europe combined (Hamid et al., 2011) This economic prosperity brought the first industrialization, with the people of Dhaka numbers over one million. After the collapse of the Mughal Empire in the early 18th century, Bengal became a semi-autonomous state under the Nawabs, under the control of Nawab Sirajuddaula. The British East India Company rose to power in Bengal after emerging victorious in the Battle of Plassey in 1757. Subsequently, the Bengal Presidency was formally established in 1765, following the signing of the Treaty of Allahabad between the British East India Company and the Mughal Emperor Shah Alam II. This treaty granted the British significant administrative control over

Bengal, Bihar, and Orissa, solidifying the Bengal Presidency as a key administrative division within British India.

The partition of Bengal and India in August 1947 defined the borders of present-day Bangladesh, named East Pakistan as a province of the newly formed state of Pakistan. The most significant chapter in the modern history of Bangladesh was the Liberation War of 1971, which gave birth to an independent Bangladesh (Raghavan, 2013). In the post-partition period, East Pakistan experienced political marginalization and economic exploitation, leading to demands for independence. In 1966, Bangabandhu Sheikh Mujibur Rahman, father of the Nation, made a six-point proposal for Bengali freedom. In the 1970 elections, landslide victory of the East Pakistan Awami League, raising hopes of change. Despite their victory, the rulers of Pakistan conspired to prevent the transfer of power to the Bengalis. This policy motivated the freedom struggle of East Pakistan.

3.3 Political and Administrative Structure

Bangladesh demonstrates a multifaceted political and administrative environment influenced by its location, history, and culture. The cornerstone of Bangladesh's political framework is its constitution, ratified on November 4, 1972, which designates the nation as a secular, democratic, and parliamentary republic (Bari & Dey, 2020). The government's organizational framework, the division of authority among its several parts, and the citizens' fundamental liberties and rights are all covered in Bangladesh's constitution (Khan, 2003). As the fundamental pillars of the state, it embodies the values of democracy, nationalism, socialism, and secularism. The concept of the separation of powers among the executive, legislative, and judicial branches guide the organization of Bangladesh's government (Hoque, 2018).

The Prime Minister holds executive authority as the head of government, while the President fulfills a symbolic role as the head of state (Ullah, 2009). The Prime Minister, as the leader of the majority party in the Jatiya Sangsad (National Parliament), wields substantial power in shaping government policies and overseeing administration. The Cabinet, headed by the Prime Minister and consisting of ministers from the governing party or coalition, supervises multiple government departments and agencies.

The Legislative Branch the Jatiya Sangsad (JS), a unicameral body, with legislative authority. The legislative body is composed of 300 members who are elected directly through public vote from single-member constituencies. Additionally, there are 50 seats specifically designated for women, which are selected by political parties according to their representation in Parliament (Akhter, 2019). The National Assembly legislates, ratifies the budget, and supervises the operations of the executive branch.

The Judiciary operates autonomously and is tasked with maintaining the supremacy of legal principles and guaranteeing fairness (Bari & Bari, 2022). It's split into two parts: the lower courts and the Supreme Court, which includes the Appellate Division (AD) and High Court Division (HCD). The judiciary is crucial to the interpretation of the Constitution, the settlement of conflicts, and the defense of citizens' rights.

Bangladesh adheres to a parliamentary democracy system, in which the Prime Minister serves as the chief executive. General elections occur at regular intervals of five years to select representatives for the National Assembly (Ahmed, 2001). The nation has a first-past-the-post electoral system for its general elections, wherein the candidate who receives the highest number of votes in each constituency qualifies as the Member of the Parliament (MP). The Election

Commission of Bangladesh, an autonomous entity, is entrusted with the responsibility of supervising the electoral process to guarantee the conduct of free and fair elections.

Bangladesh's administrative structure follows a decentralized approach, where the country is divided into divisions, districts, upazilas, and unions. At the county level, governance systems consist of City Corporations, Municipalities, Upazila Parishads, and Union Parishads (Musleh, 2017). These organizations have the responsibility of overseeing local governance, implementing development initiatives, and delivering essential services to the community. Local government elections are conducted to select members who will govern and facilitate growth at the local level.

Bangladesh's political and administrative framework embodies a blend of democratic principles and practical government. Although facing obstacles like as political instability, governance problems, and administrative inefficiencies (Zafarullah & Huque, 2001), the constitutional and institutional framework establishes a foundation for political engagement, policy development, and administration (Islam & Mahmud, 2015). Comprehending these systems is essential for examining the governance, political dynamics, and growth trajectory of Bangladesh.

3.4 Geography of Bangladesh

Bangladesh occupies a unique location in South Asia, surrounded by the Bay of Bengal's embrace to the south and the Himalayas to the north. The country is known for its vast biological and ecological diversity.

The landscape of Bangladesh is characterized by an intricate system of over 700 rivers that traverse the country like a network of blood vessels. In Bangladesh, the powerful Ganges, Brahmaputra, and Meghna rivers come together to create the biggest delta on Earth. The delta,

known for its productive floodplains, sustains the nation's agricultural foundation. The continuous sedimentation of silt from these rivers guarantees the fertility of the soil, but it also poses the risk of periodic floods that can both sustain and devastate life. 90 percent of the country consists of lowlands with extensive delta areas that never reach higher than ten meters above sea level (snl.no, 2024).

In addition to its rivers, Bangladesh boasts a varied topography, spanning from the steep-sided mangrove forests of the Sundarbans, which are inhabited by the Royal Bengal Tiger, to the verdant highlands of Sylhet in the northeast. The nation's coastal region, serving as a protective barrier against the Bay of Bengal, is encompassed by sandy shorelines and tidal forests, which enhance ecological diversity. Nevertheless, the region is susceptible to cyclones and floods, which present substantial obstacles to the resilience of both communities and ecosystems.

Bangladesh, by its distinctive geographical positioning near the Tropic of Cancer, experiences a climate pattern that is unique in that it partitions the year into six conventional seasons, each exhibiting distinct attributes and allure. The following seasons—Grishma (Summer), Barsha (Monsoon), Sharat (Autumn), Hemanta (Late Autumn), Shita (Winter), and Vasant (Spring)—illustrate the profound relationship between the nation and the natural world, which has an impact on its festivals, culture, agriculture, daily life, and practices.

The onset of Grisma, which precedes the monsoons, occurs between mid-April and mid-June. Periods of extreme heat and humidity, known as nor'westers (Kalbaisakhi), are indicative of the high temperatures, which frequently surpass 30°C. Grisma is renowned for its copious succulent fruits, including mango, jackfruit, and litchi, which offer a delightful respite from the sweltering heat, notwithstanding any discomfort.

The monsoon season, occurring from mid-June to mid-August, is characterized by the onset of the southwest monsoon, which brings copious rainfall that revitalizes arid regions and rivers. The onset of precipitation coincides with the planting season, which makes this a critical time for agriculture. A verdant canvas emerges from the landscape, and the atmosphere is permeated with the fragrance of moist soil.

The autumn season, which lasts from mid-August to mid-October, is characterized by clear skies and temperate weather due to the withdrawal of the monsoons. The rural landscape is embellished with white clouds set against a vibrant azure sky, commonly referred to as "Kash Phul", representing the quintessential allure of this time of year. An important Hindu festival that falls in the fall, Durga Puja, honors the triumph of good over evil.

Hemant serves as a transitional period to lower temperatures, lasting from mid-October until mid-December. The commencement of the harvest season is marked by the presence of vast expanses of golden rice fields, fully prepared for harvesting, which now dominate the landscape. Seasonal rituals and cultural celebrations abound, with songs lauding the beauty of Nobel laureate Rabindranath Tagore among them. The mild breeze provides a welcoming respite from the earlier humidity.

Winter, which spans from mid-December to mid-February, is characterized by frigid temperatures that can plummet to as low as 10°C in certain regions. The current season is distinguished by misty mornings and pleasantly hot afternoons. In rural Bangladesh, the cultural essence of winter is captured through the celebration of Poush Mela and Pitha Utsav. These festivities involve the enjoyment of traditional sweets and cakes made from date syrup and rice flour.

Spring, which typically spans from mid-February to mid-April, marks the onset of the season characterized by rejuvenation and renewal. The air is fragrant with the scent of flowers like marigolds and jasmine, and the countryside bursts into a riot of color. Spring is celebrated with gusto with Pahela Phalgun (second last month of Bengali Calender) and International Mother Language Day on 21st February, reflecting the nation's spirit of cultural pride and linguistic heritage.

3.5 Economy of Bangladesh

During last few decades, economy of Bangladesh demonstrated significant resilience and expansion, transitioning from an agricultural-focused foundation to a more diversified one with substantial contributions from the industrial and service sectors. The economic revolution has been propelled by a confluence of government policy reforms, international commerce, and investments in education and health. The subsequent parts analyze many facets of Bangladesh's economy, encompassing pivotal industries, obstacles, and prospects.

Traditionally, agriculture has served as the fundamental pillar of Bangladesh's economy, offering a means of sustenance for the bulk of its inhabitants (Titumir, 2021). Bangladesh is a prominent global producer of jute, which is one of its principal crops, along with rice (Islam & Ali, 2017). Although its proportion of GDP is decreasing, agriculture remains crucial for ensuring food security and generating job opportunities (Rahman, 2017; Ghose et al., 2014). Government initiatives have focused on increasing agricultural productivity through modernization and technology adoption (GoB, 2023). The Government of Bangladesh (GoB) has undertaken a subsidy initiative targeted at promoting the adoption of machinery in the agricultural sector. Under this program, subsidy ranging from 50% (increasing to 70% in coastal

areas) is provided for acquisition of various equipment. These include power tillers, rippers, rice transplanters and combine harvesters.

The textile and garment industry, particularly in the manufacturing sector, has emerged as the fundamental pillar of Bangladesh's economic prosperity. The nation is the second largest exporter of clothing globally, profiting from inexpensive labor expenses and advantageous trade arrangements. Therefore, the RMG industry holds significant importance in the economy of Bangladesh, contributing substantially to the country's GDP and comprising a considerable portion of its gross export earnings (Uddin, 2023)

Service-sector industries, such as finance, information technology, and telecommunications, have all experienced substantial growth and contributed substantially to the GDP. The expansion of digital services and the IT outsourcing industry are notable developments, positioning Bangladesh as a potential player in the global IT and service market.

Notwithstanding its remarkable expansion, Bangladesh has several economic obstacles. Among them are the advancement of industry labor rights and working conditions (Hossain et al., 2013; Kabeer, 2004), the battle against corruption, the development of infrastructure, and environmental sustainability (Chowdhury, 2007). The country also needs to diversify its export base beyond textiles and address the vulnerabilities associated with climate change (Rahman et al., 2007; Mallick & Rahman, 2020), which brings a significant danger to its agricultural sector and overall economic stability.

In Bangladesh, the susceptibility of the agriculture sector is significant in determining the influence of climate change on the right to life. Traditionally, agriculture has formed the backbone of Bangladesh’s economy, providing livelihoods for most its population. Climate change poses multi-faceted challenges to the region, including natural risks such as floods,

cyclones, frequent droughts, which disrupt crop cycles and threaten food security (Rozario,n.d). Rising temperatures and changing rainfall intensify these challenges, affecting crop production and livelihoods. Government policies to increase agricultural productivity using modern inputs and technologies are needed to mitigate these impacts. However, concerted efforts are needed to address the weaknesses in agriculture and build resilience to ensure that Bangladeshi citizens have a chance to survive.

3.6 Shrimp Culture

Culturally, the shrimp industry forms an integral part of the coastal regions' heritage. It has strong roots in traditional practices, serving as a primary source of sustenance and a way of life for generations. Shrimp farming fosters community bonds, with knowledge and techniques passed down through families. Festivals and community gatherings often revolve around the industry, embedding it deeply in the local culture and identity. The major communities in shrimp farming are primarily situated within the coastal parts of Bangladesh, among others being Khulna, Bagerhat, and Satkhira (Alam & Phillips, 2004). The high number of small-scale farmers in these regions contributes to the livelihood based on shrimp culture. The industry also supports workers in processing plants, traders, and logistics providers, thereby extending its impact across various sectors. Women has a crucial role in the industry, especially in processing and other value-added tasks, contributing to the overall success and sustainability of shrimp farming.

According to Alam & Phillips (2004) research, Shrimp culture, or shrimp farming is a vital industry in Bangladesh, offering substantial economic benefits and holding significant cultural importance for local communities. Despite its contributions, the industry faces numerous challenges from climate change, threatening the sustainability of shrimp farming and the well-

being of the communities reliant on it. Economically, shrimp farming is one of the very critical industries for export in Bangladesh (Rahman & Hossain, 2013). The country has been one of the biggest countries in exporting shrimp, thus earning much foreign exchange and aiding in economic expansion. The industry sustains livelihoods for many individuals, especially in coastal areas where alternative job opportunities are scarce. From farmers and hatchery workers to processors and exporters, shrimp farming supports a diverse range of employment, enabling these communities to maintain their economic stability.

Climate change presents significant obstacles to shrimp farming in Bangladesh. Rising sea levels, increased salinity, and more frequent and severe cyclones disrupt farming operations and damage shrimp stocks (Islam et al., 2016). These environmental changes can lead to lower yields, decreased income, and heightened vulnerability for coastal communities. This is further aggravated by the fact that the industry relies on sustainability by mangroves, which are increasingly at risk from changing climatic conditions. The combination of climate change-related challenges such as rising sea levels, increased salinity, and severe weather events poses a substantial threat to the industry and the communities that depend on it. These challenges disrupt shrimp farming operations, causing harm to shrimp stocks and reducing yields. As a result, the livelihoods and income of those reliant on shrimp culture are at risk, increasing their vulnerability to economic insecurity. The industry’s dependence on mangroves for sustainability further complicates the situation, as these vital ecosystems are under threat.

3.7 Demography of Bangladesh

Bangladesh's demographic landscape is marked by a significant and tightly packed populace, posing distinctive challenges amidst climate change. With a population exceeding 160 million, Bangladesh stands as one of the most densely inhabited nations (Khan et al., 2021). This

dense population exacerbates the nation's susceptibility to climate change adversities like inundation, cyclonic storms, and land erosion, notably in its low-lying coastal regions.

Rapid urbanization, particularly in the capital city of Dhaka, exacerbates challenges related to climate change. High population density in urban areas places significant strain on infrastructure, housing, and essential services (Siddiqy, 2017). This strain is intensified by climate change impacts such as increased rainfall and inundation, which can damage roads, buildings, and drainage systems, leading to disruptions in transportation and public services. Additionally, extreme weather events can exacerbate housing shortages, while the influx of people displaced by environmental factors may overwhelm available resources and services. Bengali is the official language and the common language of communication in Bangladesh, facilitating cohesive disaster response and awareness campaigns. However, efforts to address climate change must consider the country's diverse ethnic and linguistic groups to ensure all communities are reached (Abdul,2023).

Islam is the predominant religion, followed by Hinduism, and plays an important role in shaping community responses and cultural practices. Religious leaders can significantly influence awareness and adoption of sustainable practices. Bangladesh's young demographic composition offers opportunities for innovation and development of the country.

3.8 Climate Change and Bangladesh

Climate change affects all the regions across the world. While the sea is rising due to polar ice melting, extreme climate events and rainfall are becoming more common in some regions, and others are experiencing drought and extreme heat waves. Therefore, climate action is needed to prevent these impacts from intensifying. According to Grubb (2014), climate change is a serious threat to right to life and sustainable development, and its consequences affect

different facets of life. Some scenarios of climate change are as below. In this section, we delve into the specific climate change scenarios in Bangladesh and their implications for the human right to life. Bangladesh, with its densely populated coastal regions and vulnerability to climate-related disasters, serves as a poignant case study for examining the intersection of climate change and human rights. We will explore the unique environmental challenges faced by Bangladesh, including the phenomena of rising sea levels, heightened occurrence of catastrophic weather events, and the socio-economic consequences on susceptible people.

a. High Temperature

The right to life in Bangladesh is being severely impacted by the high temperatures brought on by climate change (Levy & Patz, 2015). The population's health is directly threatened by several negative effects that result from these record-breaking temperatures.

The frequency and intensity of heatwaves correlate with the increasing global temperatures. Although exact figures may differ, research such as the one conducted by Islam et al. (2021) has observed a troubling pattern in Bangladesh: a rise in both the frequency and severity of heatwaves. This results in an increase in the number of days marked by excessive heat, which presents substantial hazards to human health and overall welfare. These circumstances pose a direct threat to the right to health. Incidents of heat-related ailments, including heatstroke, dehydration, and heat fatigue, are increasing throughout the nation. Vulnerable populations, such as the elderly, children, and individuals with pre-existing medical issues, are disproportionately affected (Diaz et al., 2021). The high incidence of these heat-related health problems poses a serious threat to their fundamental right to life.

Agriculture, which is the foundation of the nation's economy and provides a living for a significant section of the people, is inextricably related to the right to enough food (Wirzba,

2003). Prolonged heatwaves and rising temperatures upset the agricultural cycle. Crop yields are negatively impacted by such circumstances, as crops wither and fail to flourish in the intense heat (Stone, 2023). This directly impacts food security since it lowers agricultural productivity and reduces the supply of wholesome food, endangering the right to a sufficient diet.

High temperatures are directly correlated with an increased risk of natural disasters like storms and cyclones. Homes and other infrastructure are vulnerable to serious damage from these intense weather occurrences. When communities lack a place to live because of hurricanes and cyclones, the right to sufficient housing is seriously jeopardized. The nation has a low-lying coastal region that is particularly susceptible to sea level rise, which might lead to more frequent and strong storm surges, exacerbating the problem. People's right to life is endangered when they are abandoned and left outside in the elements.

The lack of water is further made worse by high temperatures. Elevated temperatures cause surface water bodies to evaporate more quickly, reducing the amount of freshwater available (Mishra, 2023). The right to consume water that is safe and clean is directly impacted by this shortage. Waterborne illnesses brought on by a lack of access to clean drinking water may further threaten the right to life and health.

Bangladeshis right to life is being severely impacted by the high temperatures brought on by climate change. The population's health is directly threatened by several negative effects that result from these record-breaking temperatures.

b. Drought

As a result of shifting climatic patterns, Bangladesh, along with many other areas, is suffering from the negative consequences of drought and wildfires (Hasnat et al., 2018). The right to life is severely impacted by these occurrences.

There is acute water shortage in several areas of this country due to drought. Long-lasting dry periods lower the water levels in ponds, rivers, and other water sources, making it more difficult to get clean water for agriculture and drinking (Ashrafuzzaman et al., 2023). Since the absence of water hinders agricultural activity, this scarcity directly affects people's right to life, particularly their right to food and clean drinking water.

Crop failures are a result of drought conditions, and this has an impact on food security (Faisal & Parveen, 2004). Agriculture serves as the principal source of income for a large number of Bangladeshis (Rahman & Salim, 2013). The right to food and the right to a living standard sufficient for one's health and well-being are both threatened by crop failures.

3.9 Climate Change Effects on Flood Patterns Across Regions

The consequence of climate change on precipitation patterns has caused in increased instances of flooding across various regions. In Bangladesh, heavy rainfall has inundated low land, exacerbated by storms, that has resulted in casualties and significant economic damage to thousands of households (Islam et al., 2021). It is projected that with the frequently occurring climate change, along with human activities that leads to greenhouse gasses emission and aerosols, the frequency of flooding across Bangladesh in the future is expected to increase. More so, according to Shahid et al. (2016), climate change viability and change because of human activities in major cities of Bangladesh is expected to increase temperature and result in frequent heavy storms across the country. The geographical location of Bangladesh has increased its vulnerability to early spring floods and flash flooding in the hilly areas, overloading the river systems.

High rainfall during the monsoon periods has frequently increased the flow of the rivers in Bangladesh, which has led to increased drainage congestion and flooding (Sivakumar &

Stenfanski, 2010). The increased runoff also increases the existing drainage problems and creates new ones. According to Mahmud (2013), the primary river in Bangladesh has experienced a decrease in gradient over time, significantly reducing its capacity to carry water. This reduction in conveyance capacity is compounded by the challenge of drainage during periods of heavy monsoon rainfall, exacerbating waterlogging issues. Additionally, projections indicate that climate change may lead to a further increase in monsoon rainfall, with estimates suggesting a potential rise of 10%-15% by 2030 and an average increase of approximately 27% by 2075 (Mohsenipour et al., 2020). In the coastal region in Bangladesh, the backwater effect has increased its strength over time due to sea level rise induced high oceanic stage. This climate change event has resulted in waterlogging, especially at the confluence points of major water bodies. Besides, high-intensity floods with prolonged duration as a result of rainfall and riverine floods have been frequently experienced in Bangladesh. CEGIS (2006) posits that in addition to low-lying flooding areas along the shore, a rise in sea level in the coastal strip would increase the likelihood for saline water to overtop flood-protecting coastal embankments, particularly in the event of strong winds. Davis et al. (2018) found that frequent flooding affected the proportions of the different land types based on flood depths, where the proportion of highlands decreased, while the proportion of other land types increased through a cascading impact of different flood depths' land types of categorizations. Besides, climate change has led to increased flooding in low-lying areas, while new areas are also now at risk of being flooded.

3.10 Sea level-rise and Coastal Shrimp Culture

Throughout the 20th century, frequent climate change has resulted in rising sea levels and accelerated this tendency over the last few decades. The rise due to warming has resulted in thermal growth and the melting of Atlantic ice sheet and glaciers. Alongside other climate

change events, rising sea levels increase erosion and flooding around the coastal regions, significantly and negatively affecting the livelihoods, businesses, infrastructure, and nature in these areas (Griggs & Reguero, 2021). Climate change affects biodiversity in coastal habitats and related natural goods and services. According to Clarkson et al. (2013), “climate change will lead to the loss of various wetlands, remove natural protection from these areas against storm surges, and threaten the unique plants and bird species”.

The amount of available freshwater has also been reduced as sea level risen, which is believed to push further into underground water tables. More saltwater intrusion into freshwater bodies is experienced, affecting the supply of drinking water and agriculture (Singh, 2020). However, the limited availability of fresh water is exacerbated by rising water temperatures and more frequent, severe drought conditions, which promote the growth of bacteria and toxic algae, worsening the water scarcity issue. This problem is further compounded by human activities. Additionally, Kais and Islam (2018) argue that strong surges and tidal bores lead to saline water overtopping coastal embankments. In coastal districts like Khulna, Satkhira, Cox's Bazaar, and Bagerhat, there's a significant industry centered around building earthen mini polders, known as ghers, for shrimp farming. However, these ghers face threats from both high tides outside and salinity ingress inside the embankments. According to Akhter (2017), the intrusion of saltwater into areas north of shrimp farming zones has facilitated the shrimp business.

Shrimp farming is of great importance in the coastal regions of Bangladesh, as it supports the livelihoods of several groups and individuals. The industry bolsters local economies and enhances the country's export profits (Ray et al.,2021). However, Climate change-related variables such rising sea levels, saline water intrusion, and heat-related illnesses that impair shrimp health pose a danger to the sustainability of shrimp farming (Kais, 2018). This

demonstrates how climate change may have an erratic effect on such profitable enterprises, endangering their long-term viability.

3.11 Cyclone and Storm Surge

The current information regarding the negative effects of cyclones and the ensuing storm surge due to climate change is hazy. In prior literature, speculations (qualitative claims) have been made about how the country's coastal regions may become more vulnerable to cyclonic storm surges brought on by climate change (Mallick & Rahman, 2013). Regarding Rakib et al. (2018), cyclones can be defined as strong weather systems that can damage the built and natural environment. Cyclones result from low-pressure systems that develop over warm large water bodies in the tropics, which intensify over several days. Heavy rain, severe winds, and flooding characterize them. On the other hand, a storm surge is an elevation above the normal level along a shore which is a result of reduced atmospheric pressure and string onshore winds and occurs together with the tropical cyclones as it approaches ashore (Mallick & Rahman, 2013). However, storm surges may occur due to the tropical areas' intense low-pressure systems.

Haigh et al. (2014) provided a rationale that “rising surface temperature is likely to increase the frequency of cyclone and storm surge occurrence”. The cyclonic intensity increase along with the height of the surge of newly inundated shorelines is expected to rise. However, surge height and the continental shelf will reduce the occurrence of sea level rise (Guo et al., 2020). In Bangladesh, there has been an increased concern related to the increased precipitation, especially in the coastal regions, where heavy rainfall has resulted in flooding in the agricultural lands (Ahmad, 2005). Under climate change, cyclones and storm surge surges, and sea-level rise have increased waterlogging, which is also accentuated by intense rainfall.

3.12 The Interconnection Between Climate Change and the Right to Life in Bangladesh

Despite advancements, our understanding of climate change's health impacts remains limited. Events like floods and prolonged waterlogging heighten cholera cases, posing a direct threat to the right to life (McMichael, 2013). Climate change is increasing people's vulnerability to pathogen-induced diseases. Dengue fever and malaria are common cases in Bangladesh. The statistics indicate that approximately 34% of the South-East Asian population is at risk of malaria. According to Hague et al. (2014), "malaria is prevalent in 13 out of 64 Bangladeshi districts subjecting over 17 million people at risk. The Chittagong Hill Tract districts, Khagrachhari, Rangamati, Bandarban, and Cox's Bazar, report the highest number of cases of pathogen-induced diseases". Climate change events, particularly high humidity and rainfall from May to October result contribute to more cases of pathogen-induced diseases (Ahmed et al., 2013).

Increased surface temperature provides a favourable climate for the bleeding of parasites which are a threat to human health. Therefore, climate change increases the number of deadly diseases such as cholera, tick-borne diseases, dengue, malaria, and diarrhoea-related diseases (Costetello et al., 2009). More so, climate change and variability have been the main threat to human health and contribute to infectious and non-communicable diseases, inequality, and poverty. Poor countries are at high risk of being affected by climate change even though they contribute less to climate change causes (WHO, 2003).

IPCC (2007) asserts that the distribution of the infectious disease has been altered together with allergic pollen species. The study conducted to investigate the rate of premature mortality and morbidity due to risk factors related to climate change WHO (2003), found that

climate change significantly causes loss of lives. Green (2006) indicated that climate change results in health outcomes such as cases of Plasmodium falciparum malaria, episodes of diarrheal disease, and fatal accidental injuries due to landslides and floods. Deschenes and Moretti (2009) assert that an increase in extreme climate change events results in high rates of accidental death and injuries.

Climate change increases the spread of pollution and is a major threat to the right to life. Environmental and air pollutions, especially in urban areas from battery production and processing industries, ceramic factories, cement factories, metal workshops, car repair, chemical and pharmaceutical industries, fertilizer companies, and welding workshops, have a negative impact on human health. According to Mitra et al. (2009), flooding increase exposure to environmental pollution from ceramics, paints, used batteries, and gasoline. During extreme climate challenges like wind, many people suffer from respiratory infections and diseases caused by the poor quality of air from different air pollutants (De Sario et al., 2013).

Climate change is an ongoing phenomenon, and both animal and plant species are facing challenges in adapting to it. It is evident that biodiversity is currently responding to the effects of climate change, a trend that is projected to persist in the future (Pawson et al., 2013). The behavior and the life cycle of plants and animal species (Phenology), community makeup, ecosystem processes, species distribution and abundance, and habitant structure are a few examples of direct effects. Biodiversity is also affected indirectly by climate change through changes in the use of land and other resources, which may be more hazardous compared to direct effects due to their speed, scope, and scale. Indirect impacts of climate change on biodiversity include the spread of invasive species like the prevalence of sucker-mouth catfish has increased, over-exploitation, water, soil, and air pollution, and habitat fragmentation and loss, which reduce

ecosystems' capacity to provide essential services like food, clean water, and air, and control of erosion and flood and their resilience to climate change.

Climate change has diminished the overall suitable land for cultivating crops, notably impacting rice, which holds paramount importance in Bangladesh. Brammer (2014) suggests that climate change-induced events like wider flood occurrences and prolonged inundation have curtailed rice irrigation in Aman regions, while irrigation constraints have affected the Boro rice cultivation areas. The land conducive to rice farming may potentially stagnate or diminish due to climate change effects. Moreover, the rise in sea levels in the southwest regions of Bangladesh has notably shrunk the suitable rice cultivation areas. Karim et al. (1996) previously found that the 1988 floods in Bangladesh led to over a 45% reduction in agricultural output. During this period, agricultural productivity plummeted due to crop damage and farmers' inability to transplant seedlings timely amid extended flood periods. Consistent with this finding, Akter et al. (2020) posit that with the possibility of a frequent increase in high-intensity floods lead to demolition of the crops. The increase in land salinity has a significant effect on the production of crops, with most areas becoming extremely vulnerable to climate change. Just as Habibullah et al. (1998) predicted, the effect of land salinity on Aus (a sepsis of paddy grown in monsoon) production has been detrimental, and Aman has suffered over two-fold yield reduction because of severe climate change scenarios.

Recently, the presence of embankments in areas that are virtually flood free has resulted in great prospects in agriculture (Adnan et al., 2019). The water tanks/pond inside the embankment is used for pisciculture/ fish culture, which is a year-round activity in most areas. High-intensity flood, which is characterized by overtops embankments by water from outside, wash off the culture ponds, and the fish are released in free water. This causes losses to the fish

producer, especially those who solely depend on fishing as their main souse of livelihood (Kurukulasuriya & Rosenthal, 2013). Climate change increases the extent of monsoon flooding, which significantly negatively affects culture fisheries (GOD, 2005).

D'Alpoim and Bocinsky (2018) assert "that climate change and variability have substantially affected agricultural productivity both in the locations where different crops are grown and in crop yield". Due to a lengthy growing season in the autumn and earlier commencement of development in the spring, the crop seasons have grown longer and are expected to do so in the future. The expansion of warm season crops northward into previously unsuitable regions could occur due to of climate change. However, despite the possiblity for a longer growing season in some areas, the majority of Bangladesh is projected to experience significant agricultural losses due to heat and drought. These losses are unlikely to be offset by any gains from the extended growing season. Although irrigation is a useful adaptation strategy for agriculture, its use will be more constrained by water supply, especially in hilly regions. Climate change negatively impacts agriculture. According to Gaudin et al. (2015), high temperatures, extreme weather events, and water shortage may lead to higher yield or lower yield variability, which in the long run, reduce the suitable area for cultivation. This increases the food shortage in the population, which is a life-threatening phenomenon.

Climate change's impacts on cattle directly affects the livelihood of humans. Livestock is not only a source of quality food for people but also a source of resources such as on-farm power, manure for fertilizer, and other by-products and the basis for economic diversification, sustainable development, and risk distribution (Stoddard & Hovorka, 2019). According to Protopopova et al. (2021), livestock improves the life and welfare of people ranging from improving mental health by providing companionship and rescue facilitation, especially during

climate change disasters. Climate change also causes significant suffering for the livestock population, which also affects the right to life and sustainable development. During the cyclonic storm surge in Bangladesh, a large number of animals dies. Flooding and prolonged water logging cause death to a variety of animals.

The statement from Javeline (2014) suggests that drought, because of climate change, may not directly cause death in livestock but does increase their vulnerability to diseases due to water scarcity. However, Cramer et al. (2018) argue that climate change indeed subjects' animals to diseases and death, impacting their economic efficiency and posing challenges to sustainable development. This suggests that while drought may not always lead to direct mortality in livestock, it does heighten their susceptibility to health issues, particularly in regions prone to natural disasters exacerbated by climate change. We often see images from Africa with animals' having died for lack of water. The expansion of shrimp farming areas and the scarcity of grazing land due to climate change are causing a decline in the livestock population across many regions of Bangladesh. This trend is expected to continue worsening as climate change persists. Consequently, it can be inferred that climate change heightens the susceptibility of livestock to negative consequences.

According to WHO (2018), "extreme climate events that are a threat to crop production, agriculture, and livestock negatively influence human food security and nutrition and the ability of people to access social services like health care, education, and income sources. With the rising frequency of climate change occurrence, food prices, quality, quantity, and dietary diversity have declined, leading to an increased risk of malnutrition". Vargas-Lopez et al. (2022) assert that "an increase in the cost of food products results in a proportionate increase in food expenditure while less money is spent on other life-sustaining activities". This unsustainable

adapting strategy results in an increase in micronutrient malnutrition by reducing the quality of dietary intake. Similarly, Bleom et al. (2009) found that food insecurity, in the long run, results in reduced physical and intellectual capabilities, poorer health, and lower income. Besides, food and nutrition insecurity may result in chronic crises among the more vulnerable population, like pregnant women, infants and children, and chronically ill individuals. In Bangladesh, severe malnutrition remains a life-threatening problem in most places, where the number of underweight and malnutrition cases are so common in rural areas, areas at a high risk of climate challenges than in urban areas (Sarker et al., 2019).

Ahmed et al. (2019) argues that "the rise in sea levels, global temperature, ocean acidification, flooding, cyclone storm surges, and other effects of climate change have significant impacts on low-lying coastal countries and coastal regions". Small Island Developing States and LDCs experience a disproportionately higher degree of impact from these extreme climate events compared to developed nations. Furthermore, Luis et al. (2015) highlight that "the increasing frequency of climate change affects the viability of biological support systems and societal structures". Climate change has led to degradation of global ecosystems, water resource scarcity, reduction in cryosphere extent, biodiversity loss, and exacerbation of soil erosion, all of which have implications for sustainable development and human economic well-being.

Industries like farming, forestry, and fishing are anticipated to undergo diverse impacts due to climate change. As per Figueiredo et al. (2021), although certain regions might benefit from increased carbon dioxide levels and warmer temperatures, the overall outcome is unlikely to meet expectations. Regrettably, those unable to swiftly adjust to climate shifts will bear the brunt, as stated by Kanianska (2016). The expansion of agriculture, both for livestock and crops,

leads to the deterioration of peatlands and forests, culminating in substantial depletion of carbon reserves and genetic assets.

Severe scenarios of climate change have led to considerable harm to buildings and infrastructure, especially in economically disadvantaged or emerging countries such as Bangladesh, where most people live in poverty. As per Rahman and Rahman (2015), when climate-related disasters occur, sanitation becomes a pressing concern for poor communities who cannot afford suitable shelter. Bangladesh's position on the map makes its human settlements vulnerable to extreme environmental events like floods, cyclones, land erosion, and storm surges. Rahman and Rahman (2015) note that these events have led to the destruction of various infrastructures, including educational institutions, administrative buildings, roads, and markets. For instance, the cyclone in 1991 wreaked havoc on Bangladesh, damaging the runways of Chittagong airport, the coastal embankment in the Patenga area, and causing the sinking of numerous ships, disrupting port activities (Haider, 1992)

Many individuals frequently find themselves displaced from their residences due to climate change, with some tragically losing their lives (Bronen et al., 2018). Such displacement exacerbates food scarcity among the affected population and exposes them to health hazards from waterborne and pathogen-driven diseases. Consequently, their overall quality of life deteriorates, and the condition of their settlements worsens. Climate challenges have a detrimental impact and will continue to affect sustainable development objectives and overall quality of life. Castells-Quintana (2018) suggests that while efforts to address climate change through mitigation and adaptation will shape global development agendas, the warming climate system, high temperatures, and drought are anticipated to diminish the availability of essentials like energy, fresh water, and food security. The nexus between sustainable development and

climate change is robust. Hellegatte (2016) argues that developing and impoverished nations are disproportionately affected by adverse climate change scenarios and are least equipped to manage the anticipated disruptions to their economic, social, and environmental systems.

Chapter Four

Methodology

4.1 Introduction

This section explains the methods used to accomplish the goals and respond to the research questions. It is organized into the following sections: research philosophy, research approach, research methods, target population, sampling techniques, sample acquisition, sample size determination, data collection procedures, research materials, analysis methods, presentation of findings, discussion, considerations for generalization and validity, and adherence to research ethics.

4.2 Research Approach

According to Teherani et al. (2015), conducting research necessitates various steps, including gathering, assessing, and interpreting data in line with the study's objective. The two common types of research: inductive and deductive research methodologies. The researcher can move from specific observations to more general theories using the inductive technique to build theories from the facts acquired. The inductive method's cornerstone is data gathering, which is then used to develop new ideas and a conceptual framework. This method is widely used by case researchers to investigate specific situations.

Deductive research methodology relies on testing and proving hypotheses created by the researcher after evaluating existing theories, in contrast to inductive research methodology (Woiceshyn & Daellenbach, 2018). In the deductive method, outcomes from earlier research are validated using premises or hypotheses. Big quantitative data that support the creation of generalizations are best suited for this method. The inductive research approach, on the other hand, enables the researcher to create a theory based on the information acquired to examine a

specific incident (Woiceshyn & Daellenbach, 2018). With data gathered from tiny samples, the researcher, particularly in qualitative analysis, can shift from a specific to a general scale and create a conceptual framework. Considering the main objective of the inquiry, the inductive research approach was the most suitable for this study.

4.3 Method of Research

In my study, I used a qualitative research method based on my philosophical beliefs about the nature of reality and knowledge. I feel it's important to explain why I chose the qualitative approach over other research methods. From previous studies, the significance of both qualitative and quantitative research in comprehending social issues has been widely discussed. As Al-Saadi (2014) points out, different research methods reflect varying philosophical beliefs about reality and knowledge. I found that combining qualitative and quantitative methods provides a useful way to categorize diverse social research approaches, addressing the limitations of each method. I believe that qualitative research is associated with the view that reality is constructed, and that knowledge is subjective and interpretive, while quantitative research is associated with the view that reality is objective, and knowledge can be measured objectively.

Antwi and Hamza (2015) propose that multi-method qualitative research prioritizes a naturalistic and interpretive stance towards its subjects. This suggests that qualitative researchers delve into phenomena within their natural settings, aiming to elucidate the interpretations individuals attribute to these phenomena. A diverse range of empirical sources, such as personal narratives, historical accounts, observational data, visual materials, interactive engagements, and case studies, are utilized to capture and understand the common and significant occurrences and interpretations in people's lives within qualitative inquiries. More consistently, Fletcher (2017) posits that qualitative study concerns the interpretation, understanding, experience, and

production of the social world. It aims to give rounded understandings based on contextual, detailed, and comprehensive information.

In my research, I have learned that multi-method qualitative research emphasizes a naturalistic and interpretive approach to its subjects. This means that as a qualitative researcher, I am investigating phenomena in their natural environment while attempting to explain the meanings assigned to those phenomena by individuals. As Austin and Sutton (2014) suggest, the aim of qualitative research is to interpret, understand, experience, and produce a more comprehensive understanding of the social world based on contextual, detailed, and thick description of information.

According to my understanding of Rees et al.'s (2021) perspective, the primary objective of qualitative research is to amplify the voices of marginalized communities, such as the Hijras in Bangladesh. This amplification of voices is achieved through methods like in-depth interviews, participant observation, and thematic analysis, allowing their narratives to be heard, understood, and incorporated into social discourse and policymaking. Thee Hijras are traditional third-gender identity in South Asia, encompassing transgender women, eunuchs, and intersex individuals (Al-Mamun et al., 2022). They historically held respected roles in society but face modern challenges including discrimination and lack of legal recognition. Qualitative researchers aim to understand a specific topic from the perspective of the group they are studying. MacDonald (2012) also suggests that qualitative research can bring attention to the issues that marginalized groups face and increase their visibility in society. Through one-on-one interviews, researchers can obtain a deep understanding of people's experiences and reflections. This approach allows for the collection of detailed information on how individuals in the population of interest comprehend various aspects of life (Seitz, 2016).

4.4 Population of Target

The population of interest for this study is individuals who reside in the coastal regions of Bangladesh, where they are vulnerable to the impacts of climate change and associated disasters. These individuals may face a range of challenges, including rising sea levels, flooding, cyclones, and other extreme weather events, as seen in previous chapters. It is relevant to note that the coastal regions of Bangladesh are densely populated, and many residents rely on the surrounding ecosystems for their livelihoods, including agriculture and fishing. Due to their disproportionately low access to resources and social safety nets, these populations are frequently disproportionately affected by climate change.

4.5 Sampling Techniques

Sampling methods are crucial in answering research questions. Two main methods include probability and non-probability sampling. According to Acharya et al. (2013), probability sampling guarantees all members of the population an equal chance to participate. As a result, this method minimizes the likelihood of bias, but is more time-consuming and can have sampling errors. On the other hand, Vehovar et al. (2016) define non-probability sampling as a sampling method that does not rely on mathematical randomness and helps in achieving time effectiveness and cost-effectiveness. To reach hard-to-identify or hard-to-reach populations, snowball sampling could have been used. This method is suitable for populations without a sampling frame or where members know each other or are interconnected. However, it may result in interviews with a limited group of people with similar characteristics. Nevertheless, compared to other statistical sampling methods, snowball sampling is more appropriate for qualitative studies.

To ensure the study's relevance, the participants targeted for this research should be knowledgeable about the effect of climate change on the right to life in Bangladesh's coastal regions. Therefore, two non-probability sampling techniques are appropriate. Convenience sampling, which involves selecting participants based on their availability and willingness, is used to reach a significant number of participants. In addition, snowball sampling is utilized to identify interested participants who may be difficult to access due to their closed nature. This involves targeting a small sample of participants and asking them to refer other individuals who have experience or interest in the research topic. This approach is considered suitable for this study as it enables the researchers to approach residents in Bangladesh's coastal regions.

In my study, I carefully selected interviewees who were well-informed about the topic, willing to express their thoughts, and could provide a diverse range of perspectives. To achieve this, I utilized purposive sampling, also known as subjective sampling. This sampling technique allowed me to rely on my judgment when choosing participants from the sampling frame. I specifically targeted individuals with knowledge of the study's topic, given that the population of interest is so diverse. Therefore, using this method ensured that I gathered valuable insights from knowledgeable participants in the coastal regions of Bangladesh.

4.6 Sample Size

The size of a study's sample is often chosen after considering a number of variables, including the research question, the study population's characteristics, the level of precision required, and the resources available (Taherdoost, 2016). All participants in this study were adults from Bangladesh's coastal districts. The participants' ages are not given. However, it is said that the study only enrolled people who were both willing and informed about the subject matter.

The sample of this study consisted of 15 participants where all of whom were working in Bangladesh's meteorological department, academics and student of related field and general people affected by climate change. The participants were well knowledgeable about climate change and its effect on the people of Bangladesh. Besides, some came from coastal regions, while other participants indicated that they have family and friends living in coastal districts, such as Chandpur, Khulna, Jessore, Gopalgani, Narail, Bagerhat, Barguna, Feni, Shariatpur, Bhola, Barisal, Satkhira, Pirozpur, Jhalakati, Noakhali, Patuakhali, Cox's Baza, Chittagong, and Lakshmipur which are the most vulnerable districts to weather changes.

The interview took place from June 20 to September 20, 2023, and the timing depended on the availability of the participants. The age of the participants ranged from 32 to 50 years, and the researcher asked about their gender registration. Out of the 15 informants, nine were registered as male, and six were registered as female, with no participants identifying as third gender (Hijra).

4.7 Data Collection

4.7.1 Primary Data

For this study, I chose to use key informant interviews as the primary method of data collection. Interviews are a qualitative data collection method that involves posing questions to participants to obtain relevant data (Manzano, 2016). The interview process entails two individuals, with one acting as the interviewer, who poses the questions, while the others act as interviewees, who provide answers to the questions posed. To conduct the interviews, I utilized Zoom, WhatsApp, cellular calling, and one-to-one direct meetings to interact with the participants. Before commencing the interviews, it was crucial to provide the participants with

comprehensive information about the study's objectives and the use of writing equipment in native language of Bangladesh which is Bengali. Later I inscribed the data into information.

Following these guidelines ensured that ethical considerations were prioritized, and the participants' rights and privacy were respected. Furthermore, the use of Zoom meetings enabled the interviews to be conducted remotely, thereby reducing the risk of exposure to COVID-19. After the interviews were completed, I analyzed and categorized the data based on emerging themes and provided an in-depth analysis of the primary data collected through the interviews. In this study, I used an interview schedule, paper, pen, and a field notebook for data recording.

4.7.2 Research Material

To gather data for my study, I utilized personal semi-structured interviews. According to Roulston (2010), interviews are an effective way of collecting data as they provide the researcher with a deep and detailed understanding of the participants' perspectives, experiences, and comprehension of the topic being studied. The questions asked during the interviews were constructed based on the study objectives, and I was prepared to adapt to the respondent's direction throughout the interview, thanks to the use of a semi-structured approach.

By employing the open questions interview technique, I was able to pose questions that were not included in the interview guide or that arose because of the interviewee's response, as highlighted by Graue (2015). This technique allowed for unrestricted participation during the interview, enabling me to pinpoint the most relevant topics for the interviewees. Furthermore, the unstructured approach allowed me to establish rapport with the participants, ensuring that they were comfortable enough to share their experiences and insights freely.

Before conducting the primary data collection for the study, I created an interview guide and shared it with my supervisor (Oddvar Hollup), who assisted in locating potential participants

for feedback. My main objective was to confirm the wording and order of the questions in the guide and to ensure that the participants would feel safe during the interview. To ensure the accuracy of the data collected, the interviews were conducted individually rather than in a group or focus group setting. This approach provided me with a better understanding of the participant's perceptions and experiences regarding the sensitive topic under study. To guarantee the participants' privacy and anonymity during and after the study, I made it clear to them that the data collected would only be used for research purposes. Moreover, I emphasized that they had the right to keep any personal or private issues shared during the interview confidential. Overall, my goal was to create a safe and private environment for the participants to feel comfortable sharing their experiences and insights with me.

Although most interviewees were more amenable to the conversation, some provided lengthy, in-depth answers. This might be a limitation of this research because I served as a conduit for the transmission of knowledge. I focused on the knowledge developed through collaboration with the participants during the interview session. Respecting the interviewees was essential to developing a positive relationship with them. After the first interview, I discovered that it was essential to start a general chat with the subject to establish a rapport that made it easier and more comfortable to perform the research.

4.7.3 Secondary Data

There is a lot of data gathering, analysis, and recording going on nowadays, and it is common and unavoidable that the information will be used for study, particularly social research. According to Clark (2013), secondary data is information gathered by others for primary goals but used in a different study to conserve time and resources. In gaining a greater comprehension

of the subject matter, the researcher can employ secondary data, which could then lead to the acquisition of primary data.

Secondary data formed the basis of this study's methodology and literature analysis, shedding insight into the comprehension and construction of the study's foundation. The researcher gained a general understanding and important information for developing this study by reading and screening several research articles and information relevant to the goal of the current study from Google Scholar, Scopus, and Primo.

To understand the collected information in this study, it was suitable to relate it with different findings to have an in-depth understanding and make valid conclusions and recommendations. A general discussion related to the topic under investigation is important in any social research. While there is a lot of discussion about climate change issues in Bangladesh, earlier research has looked at the contexts of different regions across the world to better understand the environmental challenges to the right to life.

4.8 Method of Analysis, Findings, and Discussion

By combining the results of the interviews and inscription, I was able to examine the responses to the research questions and understand the environmental obstacles to the right to life and sustainable development.

To ensure a comprehension of the environmental consequences from climate change to the right to life in Bangladesh, I analyzed the data collected during the interview along with secondary data from previous studies, concepts, and theories. Additionally, I carried out a detailed discussion of the findings, which reflected the analysis and the results of the study.

4.9 Generalization and Validity

The notion of validity is vital in any research, as it encompasses everything from data collection to the final recommendations made in scientific reports (Yin, 2013). Throughout the process, I took great care to ensure validity. Specifically, I made sure to collect information from the participants belong to mainstream society. The research questions were carefully designed to extract sufficient data from the sample participants.

The questions used in the study were straightforward and unambiguous, and the participants were given the freedom to communicate their experiences in the language they were most comfortable with, Bengali. I made sure that certain statements made during the interviews did not indicate any bias or favoritism toward promoting any individual's interests or position. Additionally, the participants of the study were quite diverse. To account for these factors, I utilized cross-comparison techniques to analyze the responses provided by respondents who participated in the research.

The interviewees of the study were allowed to participate freely, which allowed them to discuss various social problems they experienced through exclusion and discrimination in mainstream society. Therefore, at some point, the participants could divert from the research aim, and I had to drive them back.

During the study, the participants were given the freedom to express their knowledge of environmental changes, their effects on the right to life in Bangladesh. This meant that, at times, participants may have veered off-topic, and I had to guide them back to the research aim. At every stage of the interview, I made sure to clarify what was needed and what type of responses were expected.

Generalization can be used in the analysis of differences and similarities in situations (Yin, 2013). The participants had similar perspectives when it came to climate change scenarios and their consequence on the right to life. They perceive the viewpoint of the respondents; the collected data was explored through concepts and theories during descriptive analysis. Various prior studies used to support the study were from the environmental, and social context related to the research topic. Therefore, the information gleaned from the research could be used to provide knowledge regarding the impact of climate change on the right to life and sustainable development in Bangladesh as a whole.

4.10 Ethical Considerations

Every research project must incorporate ethical issues, and the researcher is responsible for making sure that these factors are adhered to. These factors consist of managing the information gathered, preventing malicious intent to harm others, protecting informants' right to anonymity, and the beneficence of the study. These elements make sure that the study participants are appropriately informed about how their contributions are assessed, categorized, and handled to avoid fraud, inappropriate use, and the disclosure of personal information. To accomplish all of this, the chosen participants received a brief description of the purpose and goals of the research. The individual gave informed consent to the interview sessions being conducted. To remind the subject and prevent fraud, the interviewer offered specific bullet points before the interview began, such as the background, nature, and purpose of the study. Also, they received guarantees of anonymity and were forbidden from using any personal information that could reveal their identities. The respondents were instructed to maintain their anonymity, and the identities of the organizations they were affiliated with were also kept a secret.

CHAPTER 5

The Environmental Consequences and Impacts on Humans of Climate Change in Bangladesh

5.1 Introduction

In exploring the Environmental Consequences and Impacts on Humans of Climate Change in Bangladesh, the chapter explores into the multifaceted effects of climate change on both the environment and human populations. This chapter provides an analysis of the data collected through interviews, focusing on the experiences and perspectives of individuals directly affected by climate change in Bangladesh. The demographic data were presented in analysis tables, offering insights into the various demographic factors shaping vulnerability and resilience to environmental changes in the region.

5.2 Demographic Information of the Participants

Table 5 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	9	60.0	60.0	60.0
	Female	6	40.0	40.0	100.0
	Total	15	100.0	100.0	

Table1, indicates that there out of 15 participants who participated in the interviews, 60% participants were male, while 40% participants were females.

Table 6 Friend or Family

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Family	4	26.7	26.7	26.7
	Friends	7	46.7	46.7	73.3
	Family and Friends	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Table 2 shows that 26.7% of the participant indicated that they have family members residing in coastal areas, vulnerable to environmental changes disasters. 46.7% indicated that they have only friends in the vulnerable places to environmental changes disasters, while 26.7% indicated that they have family and friends in the vulnerable places to environmental changes disasters.

Table 7 Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	2	13.3	13.3	13.3
	Bachelor's degree	6	40.0	40.0	53.3
	Master's Degree	5	33.3	33.3	86.7
	PhD	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

Table 3 indicates that 13.3% of the participants were Diploma holders, 40.0% were bachelor's degree holders, 33.3% were master degree holders while 13.3% had PhD.

Table 8 Age Statistics

N	Valid	15
	Missing	0
Mean		40.8667
Mode		46.00
Minimum		32.00
Maximum		50.00

Table 4 indicates that the minimum age of the participants who participated in the study was 32 years, while the oldest respondent had 50 years. The mean age of the respondents was 40.8667 while the most respondents had 46 years.

5.3 The Interconnection Between Climate Change and Right to Life

The findings of the study found that climate change have a negative influence on right to life. Right in this context can be described as the freedom from wants and other components of human right to life such as health, water supply, food supply and livelihood. Besides, right was used also to mean freedom from fear of aspects like losing assets and properties, personal security, tenure security, and political security. Like in any other country, the participant of the study indicated that climate change in Bangladesh have been threat to right of life in terms of water, properties, food, life, settlement, livelihood, and livelihood assets.

5.3.1 Food Security

Because of different types of climate change-related natural disasters, i.e., floods, storm surges, cyclones, and droughts, Bangladesh has been losing more crops every year. The loss of farms and decreased agricultural yields brought on by these extreme weather event has a significant negative influence on nation's ability to feed its people. In addition, coastal areas are experiencing saltwater intrusion due to increasing sea levels, which hinders crop growth and causes farmland to permanently flood. The ensuing salinity is also reducing crop productivity, worsening Bangladesh's challenge of food insecurity.

According to different respondents, extreme natural calamities i.e., frequent and severe floods, droughts, cyclones, and tidal surges are lowering yields, destroying infrastructure, and seriously harming fisheries, animals, and crops. As a result, farmers are suffering huge financial losses, food prices are going up, and it's getting harder for lots of people to get food. In addition, because of climate change, freshwater supplies are becoming scarcer and becoming contaminated with salt, which has an adverse effect on agricultural output and worsens food poverty (Brammer, 2016).

Coastal regions in Bangladesh's experiences coastal floods and the rising sea levels, which leads to the loss of arable land, the collapse of crops, and the relocation of entire people (Brammer, 2014). The saline intrusion has affected the availability and price of food by making it impossible to grow traditional crops like rice, wheat, and vegetables. The regular flooding and cyclones have also harmed transportation and storage systems, which has an impact on food distribution and raised food costs.

Respondent 3 said that,

"*I have witnessed firsthand the harsh impact of climate change in our country. Living in one of the most vulnerable regions, our low-lying deltaic geography, dense population, and dependence on agriculture amplify the challenges. The reality is daunting—facing more frequent and severe floods, droughts, cyclones, and tidal surges. As a victim of these environmental consequences, I have seen our communities struggle against these relentless forces, and the urgency for effective solutions is undeniable*."

Additionally, Climate change has caused alterations in pest and disease patterns, resulting in significant impacts on crop yields. Crop growth has been stunted by the heat stress brought by rising temperatures, and crop irrigation water availability has been impacted by shifting rainfall patterns and timing.

Respondent 1 said that,

> "*I have seen how shifts in temperature and rainfall are creating new environments for pests like locusts. It's hitting our crops hard, causing significant damage*."

Pests frequently have cold blood, which indicates that their ability to regulate body temperature depends on the outside environment. When temperatures warm, pests can survive in locations that were previously too cold for them. As a result, their range might grow, and their population might rise. The availability of water and food supplies can be altered by variations in rain patterns, that can have an impact on pest populations. According to Skendzic et al. (2021), change may alter the timing of plant development and growth, which may have an impact on pest populations. For instance, faster flowering of plants may increase the amount of food available to pests, which may result in higher populations.

Respondent 7 said that,

> "*I've witnessed the harsh reality of climate change. Storms, floods, and droughts have become more frequent and intense, wreaking havoc on our communities. The very fabric of our ecosystems, habitats, and the balance of pests has been profoundly disrupted. We're not just facing environmental shifts; we're living through the consequences, grappling with the immediate impacts on our lives and surroundings*."

According to Afjal et al. (2012), Bangladesh's coastal regions are especially susceptible to the effects of climate change, including modifications in the patterns of pests and diseases. The timing of plant growth and development has changed because of climate change, which has an impact on pest and disease outbreaks in this area. Rising temperatures are being felt in coastal districts including Chandpur, Khulna, Jessore, Gopalgani, Narail, and Bagerhat, while alterations in rain patterns have accelerated the flowering of crops like rice. Because crops are not fully grown and may not have robust resistance mechanisms, earlier flowering can leave crops more vulnerable to pests and diseases (Corwin, 2021).

Respondent 6 said that,

> "*I have experienced climate change altering the timing of plant growth. This shift, in turn, has triggered disruptions, like changes in the timing of pest and disease outbreaks. In some cases, it led to the spread of diseases, directly impacting our community*."

Respondent 15 said that,

> "*We've seen a rise in pests like the brown plant hopper (BPH) and the rice hispa beetle in my farm. These pests have been hitting my rice fields hard, causing significant drops in yields. It's affecting us directly*."

Respondent 10 said that,

"*I have seen how climate change messes with the timing of rice flowering. When the rice flowers early, these bugs, the brown plant hoppers, go crazy. They have more time to eat and multiply. It's like an epidemic that hits our rice crops hard*."

Additionally, the interviewees of the study revealed that extreme heat and rainfall has increased incidence of fungal infection which has adversely affect food security among the Bangladeshis. According to Brammer (2016), in Bangladesh, fungal infections pose a serious danger to agricultural productivity because they can result in considerable crop yield losses and crop quality degradation. The optimum conditions for the growth and spread of fungi have been established because of climate change's rising temperatures and higher rainfall, that has boosted the occurrence of fungal diseases in crops.

Respondent 4 said that,

"*I have witnessed firsthand how the rise in temperatures and humidity provides the perfect environment for fungi to thrive, leading to infections in our crops and substantial losses in yields. It's affecting us directly, and the impact is undeniable*."

Fungal infections have reportedly had a considerable influence on food security in Bangladesh. respondents indicated that in some coastal districts, crop losses owing to fungal diseases have been as high as 50%, leading to a drop in the availability and cost of food for residents. Therefore, respondent 2said that,

"*We urgently need to take corrective measures to lessen the impact of climate change on Bangladesh agriculture. Researching and creating novel varieties of crops with enhanced resistance to fungal pathogens, promoting integrated pest management, and providing farmers with information and training on climate-smart practices are essential steps to address these challenges*."

5.3.2 Water Scarcity that Affects Life

Bangladesh is progressively feeling the effects of climate change, with decreased precipitation, extended dry seasons, and droughts leading to a shortage of drinking water in many regions of the nation. The situation is notably problematic along the coast, where saline water pollution of fresh water sources is also a major worry. According to Dey et al. (2011), there has been a fall in the water levels of rivers, lakes, and groundwater resources in many areas of Bangladesh because of the decreased precipitation and prolonged dry seasons. Due to this, it has become more challenging for individuals to acquire safe drinking water, which has increased the prevalence of water-borne illnesses 8(Mustafa et al., 2017). The situation is especially dire in rural areas, where access to drinkable water is already limited.

Respondent 5 said that,

> "*In our regions, climate change has brought about droughts, prolonged dry seasons, and reduced rainfall. This has left many communities, particularly in rural areas, grappling with severe water scarcity. Obtaining clean water has become increasingly challenging, leading to a rise in water-borne infections among our people*."

Respondent 9 also said that,

> "*In many parts of our country, we are facing a severe shortage of drinking water. In my area particular, the rainfall has decreased, dry seasons are lasting longer, and droughts are hitting hard. It's hitting us the hardest in rural areas where clean water is already a rare commodity*."

In Bangladesh's coastal districts, freshwater resources are being more contaminated by saline water, in addition to being in short supply as drinking water. Environmental change-related rises in sea level and increases salinity intrusion have caused saline water to enter coastal

aquifers, a crucial supply of fresh water for many populations (Rawlani and Sovacool, 2011). As a result, fresh water supplies have become less valuable, making it harder for people to get access to clean drinking water.

Respondent 8 said that,

"*I live in Bagerhat, and the water here has changed. It's not the same as before. You can taste the salt now. In places like Satkhira and Khulna too, it's happening. The water isn't good anymore, too salty. We can't use it for drinking or anything in our homes. It's affecting our daily life, and we're struggling to find clean water*."

Besides respondent 11 said that,

"*Here in the coastal areas, sea level rising, and the salinity turns our freshwater unusable. It's becoming increasingly difficult for us to secure clean drinking water. The struggle is real, and it's affecting our daily lives*."

As Bangladesh continue to face enormous challenges, including the unavailability of clean water to drink and the salty water pollution of freshwater resources due to environmental change. These issues must be resolved immediately. Most respondents (respondent 1, 3, 6,7, and 13) indicated that new water desalination technology, the promotion of rainwater collection, and the construction of new water storage facilities are a few potential remedies. Moreover, initiatives should be taken to encourage water efficiency and conservation, as well as to inform communities of the need to safeguard aquatic resources in the phase of climate change.

Respondent 14 said that,

"*We urgently need new water desalination tech, widespread rainwater harvesting, and more storage. We must promote water efficiency, educate communities on preserving*

water amidst climate change, and enforce policies for sustainable water management. Availability of clean drinking water is a critical need to the most vulnerable among us."

According to Gain et al. (2017), water body contamination by increasing sea levels and flooding is a complicated problem that can be solved using a variety of strategies such as infrastructure improvements for drainage and flood protection are a key strategy. To help redirect floodwaters away from susceptible regions, this may entail building flood embankments, canals and dredging rivers, and installing drainage systems. Besides, Rahman et al. (2022) asserts that community's involvement in the creation and implementation of any solutions to this problem. This can entail disseminating information and instruction on climate-smart water management strategies as well as encouraging neighborhood-based water management and conservation programs.

Respondent 12 said that,

"*I can assure you, from the firsthand struggle we face in our communities, that the solutions become real, enduring, and fair when we're equipped with the tools to tackle this issue head-on*."

The respondents indicated that restoration and promoting preservation of natural ecosystems such as mangrove forest and wetlands can assist absorb floodwaters and lessen the impact of floods on individuals and aquatic ecosystems. Furthermore, efforts must be taken in improving land use plan and zoning, to prevent growth in flood-prone regions and guarantee that new infrastructure is built to control flooding.

According to respondent 6, it is critical to upgrade water management and sanitation system to prevent contamination of water sources. This include promoting sanitary and safe

methods of disposing of human wastes, building new wastewater treatment facilities, and creating new technologies for the treatment and recycling of wastewater.

Additionally, respondent 9 said that,

> "*It is imperative to promptly increase awareness among our community regarding the perils presented by flooding and water contamination. Living through the consequences, I can't emphasize enough how crucial it is to promote climate-smart water management techniques. We need to understand the dangers we face and take immediate action to safeguard our lives and surroundings*."

Respondent 10 said that,

> "*As someone directly impacted by the environmental consequences, I can attest that fostering sustainable practices for water conservation and management, along with building resilience to climate change, requires active collaboration with local authorities, educational institutions, and community organizations*."

Therefore, involving communities to the implementation and perfection of solution to water security could involve promoting community-based initiative for water management and conservation, and the provision of education and training on climate-smart water management techniques. Rahman and Rahman (2015) support this by indicating that community involvement and empowering them to act on environmental change related issue can ensure that solutions are effective, equitable and sustainable.

5.3.3 Loss of Properties and Life

Catastrophic meteorological phenomena such as cyclones, floods, storm surge and riverbank erosion in Bangladesh have increased due to environmental change (Brammer, 2016). These have resulted to a severe effect on people's property and way of life. the study found that

the occurrences these events have significantly disrupted people's lives and caused damage to the loss of homes, livestock, land and other valuable things. Besides, the damage and loss of assets for property and livelihood have increased exponentially as a result of the regular occurrence of catastrophic calamities.

Respondent 1 said that,

"*Severe weather occurrences due to climate change, have had a terrible effect on people's lives and property, causing loss and destruction to homes, farms, cattle, and other crucial possessions*."

The respondent indicated that the occurrence of severe weather scenarios in Bangladesh such as cyclones and tropical storms is because of its proximity to the Bay of Bengal at a low elevation.

Respondent 4 said that,

"*As a survivor of the environmental crises in recent years, I witnessed the harrowing impact of devastating cyclones in our country. In 1991, I saw more than 130,000 lives lost to a merciless cyclone. In 2007, Cyclone Sidr wreaked havoc, causing over 3,000 deaths and displacing over a million people, including myself. The toll on lives and communities was overwhelming, leaving an indelible mark on those of us who directly faced the catastrophic consequences*."

Additionally, respondent 8 said that,

"*In the aftermath of the devastating events, I, as a witness and victim, recount the profound impact of Cyclone Amphan in 2020. Having experienced the tragedy of 1970 where thousands lost their lives, the recent cyclone brought back haunting memories. The rising storm, reaching up to 5 meters, claimed about 100 lives. As someone directly*

affected by these environmental consequences, the echoes of past and present disasters underscore the urgent need for proactive measures to safeguard lives in the face of such relentless natural forces."

Through the interview, it was clear that flooding and prolonged water logging in Bangladesh is a major problem especially during the monsoon season. Widespread flooding can result from rivers overflowing their banks due to heavy rainfall and Himalayan snowmelt. This can cause substantial loss of life, damage of infrastructure and displacement.

Respondent 13 said that,

"*My uncle suffered because of the harrowing impact of severe flooding in Bangladesh back in 2017. Nearly 8 million of us were directly affected, and the resulting damage amounted to an estimated $1 billion. The scale of destruction was beyond imagination, and the personal toll it took on our lives was immeasurable*."

The researcher through the interviews understood that riverbank erosion has led to deaths in Bangladesh. Homes and other buildings have been carried away by rivers as their banks erode, trapping people or causing them to drown.

Respondent 10 said that,

"*In 2019, I witnessed the devastating impact of riverbank erosion in Bangladesh, over 200 lives were lost, and thousands of us were forced from our homes, becoming displaced residents. The environmental consequences were stark and personal, leaving an indelible mark on our community*."

Addressing environmental related issue that affect human life require a thorough and well-coordinated approach to catastrophe risk management and reduction. This could entail

making early warning systems stronger, enhancing building codes and infrastructure to better resist harsh weather conditions, and encouraging disaster-resilient land use and livelihoods.

Respondent 3 said that,

> "*I find it crucial to actively engage in disaster management efforts, fostering community involvement. It is crucial to guarantee that the distinct requirements and perspectives of susceptible groups are taken into account during all stages of disaster preparedness and response. Having experienced the environmental consequences with my family before, I emphasize the importance of direct participation in these initiatives to mitigate the impact on our community*."

Through the interview, the it was clear that investments in post-disaster rehabilitation and reconstruction initiatives are required, with an emphasis on reestablishing healthier and more resilient communities. To restore homes and infrastructure, financial aid and technical support may be provided. Moreover, sustainable livelihoods and climate-resilient economic activity may be encouraged.

5.3.4 Loss of livelihood and displacement

According to Dutta (2015) Riverbank erosion and coastline erosion are both increasing alarmingly because of environmental degradation. The Intergovernmental Panel on Climate (IPCC) estimates that a 45 cm rise of sea level would submerge nearly 10.9% of our country and force 5.5 million coastal residents to leave their homes. The economy and social structure of the impacted areas would be significantly impacted by this. Through the interview, the study found that the degradation of land resources is already occurring 100 km into the countryside due to salinity intrusion. This has negative impacts on local populations who depend on the land for their livelihoods as well as on agriculture because many crops cannot thrive in salty soil.

Conflicts are developing between many stakeholders who are vying for the same diminishing resources as land resources continue to deteriorate.

Respondent 7 said that,

> "*The struggles intensify due to shrimp farming and the diminishing space for farming. Shrimp aquaculture, despite its profitability, exacerbates the environmental damage. Our coastal protection, the mangrove trees, gets linked to the destruction caused by shrimp farms. The consequences include soil erosion, water quality decline, and the loss of these vital forests, amplifying our challenges*."

Through the interview, it was evidence that conflicts caused by declining land usage and depleting land resources are made worse by the consequences of environmental change. The problem is likely to get worse as sea levels rise and weather patterns become more erratic. To ensure the sustainable management of land resources and mitigate the impacts of environmental change on riverbank and coastal erosion, Bangladesh must adopt proactive measures. According to respondent 11 said that,

> "*We need to act by reducing carbon emissions, promoting sustainable use of land, and building infrastructure that can withstand the impacts of climate change. It's crucial for those of us directly affected by environmental consequences*."

The researcher through the interview found that the opportunities for people to make a living can be severely impacted by land loss and deterioration. The income and food security of the local population may be impacted by lower agricultural output and restricted access to natural resources like grazing areas and forests. Besides, environmental change in Bangladesh have resulted to water scarcity, which reduce access to safe water for drinking, limits crops' irrigation,

increase crop failure and poverty among the residents. Affect people's livelihoods and also result to displacement as people shift to seek for better livelihood.

Respondent 4 said that,

> *"I have witnessed firsthand how floods and prolonged waterlogging wreak havoc on our infrastructure, crops, and homes. The recovery often takes years, significantly worsening our livelihood opportunities."*

Besides, a significant percent of coastal regions residents practice fishing as their primary source of income. The rough sea limits this activity which impacts the livelihood of coastal community by loss of cultural traditions, increasing food insecurity and poverty, and loss of knowledge related to fishing activities.

Respondent 14 said that,

> *"In my own experience, the struggles we face go beyond the immediate impact of disasters. Malnutrition and health risks become exacerbated, hindering our ability to work and earn a living. The absence of crucial services before, during, and after disasters severely limits our recovery, reducing working days and opportunities for a better life. It's a firsthand account of how environmental consequences directly affect our daily lives and livelihoods."*

During the interview, it was found that environmental changes often lead to frequent conflicts over resources, particularly when individuals are compelled to abandon their residences and move to different areas due to land degradation, environmental hazards, and other contributing factors. The respondent indicated that people move from their residential areas to look for resources like water, land, and other essentials, which cause conflict with nearby groups and competition for resources.

Respondent 8 said that,

> "*I, as a resident directly impacted by the harsh consequences of climate change, affirm that a significant number of migrants from coastal areas find themselves compelled to relocate to urban slums, notably in Dhaka, the capital of Bangladesh. In these overcrowded slums, our living conditions are substandard, marked by limited access to vital services such as clean water, sanitation facilities, and medical care—a distressing reality resulting from the severe environmental challenges we face*."

Besides, respondent 13 said that,

> "*I have seen it myself—people constantly moving from places hit hard by severe events. The problem is, when they arrive, there's a surge in crime, and security becomes a major issue. There just isn't enough law enforcement and infrastructure to handle the growing population. It's like a cycle of vulnerability that puts us all at risk*."

Disasters brought on by environmental change such as floods and cyclones in Bangladesh, have a considerable negative impact on vulnerable populations, such as women and underprivileged groups (Dutta, 2015). During the interview, it was confirmed that women often assume the responsibility of caring for their elderly relatives, children, and disabled siblings in times of disasters. This obligation limits their ability to escape or seek safety. More so, gender-based violence and discrimination have found to provide unique obstacles for women, which increase their susceptibility in disasters.

Respondent 9 said that,

> "*As a witness directly impacted by environmental change, I attest that disasters triggered by these changes disproportionately harm vulnerable groups like low-income*

households and residents of slums. The absence of early warning systems, secure housing, and emergency services leaves us perilously exposed during such crises."

These populations may lack the means necessary to deal with the disaster's aftermath, such as restoring their homes and replacing the lost possessions. They run the danger of suffering further harm in the future because of this, which can prolong cycles of vulnerability and poverty. Individuals may also have difficulty in getting basic needs i.e., food, water, and healthcare, which can have a long-lasting repercussion on their health and well-being.

The respondents indicated that in the recent years, Bangladesh has improved early warning systems and evacuation protocols, making considerable strides in disaster management and response. In the effort of ensuring that vulnerable groups are involved in these initiatives and that their unique concerns and needs are addressed, further work must be done. The country has also enhanced access to emergency services and secure shelters, supported women and underprivileged groups with resources, addressed the involved grounds of vulnerability such poverty and inequality, and expanding access to emergency services. Nevertheless, Bangladesh must establish more robust and inclusive communities that possess enhanced capacity to cope with the impacts of climate change through the implementation of a comprehensive strategy for disaster risk reduction and management.

Chapter 6

The Right to Life in the Context of Climate Change

6. Introduction

The right to life, a fundamental and universally recognized human right, has historically focused on protecting individuals from arbitrary actions of political powers and the unjust use of force. However, in the current situation of climate change, this right needs to be expanded to include wider aspects, such as the communal well-being and their existence in the economic and cultural domains, in addition to the traditional understanding. We probe the intricacies of the right to life, analyzing its development, applicability, and necessity of combining it with the problems presented by climate change. We aim to lay the groundwork for comprehending the profound effects of climate change on the fundamental right to life by exploring the intersections between environmental crises and human rights.

6.1 Historical Perspective and Evolution

Throughout history, the primary focus of the human right to life has been protecting people from arbitrary state actions and excessive violence. This traditional viewpoint placed a strong emphasis on defense against offenders, such as repressive regimes or the illegal use of force. But a profound change in the world has brought climate change to the forefront as a systemic threat, necessitating a reevaluation of our conception of the right to life. According to Bell (2013), "In contemporary philosophical discussions, two kinds of moral argument have been identified to justify human rights, namely, ‘instrumental’ and ‘intrinsic’ arguments (Nagel, 1995). An instrumental argument for human rights suggests that the ‘recognition and protection of rights ... serves human happiness and human interests’ (Nagel, 1995). So, for example, the

protection of human rights might serve human interests, such as autonomy, health, security, or well-being" (Bell, 2013).

In this evolving context, the concept of the right to life necessitates a broader comprehension that extends beyond mere protection against direct injury inflicted by individuals. As noted by Johnson et al. (2021), the effects of climate change, which range from extreme weather events to resource scarcity, highlight the connection between human well-being and the health of the planet. As a result, a broader understanding of the right to life develops, one that considers communal aspects and recognizes the existential risks that communities face because of environmental changes.

6.2. Extending the Right to Life in Climate Change

The extension of right to life in the viewpoint of climate change requires a change in perspective, recognizing threats that do not have specific perpetrators typically linked to violations of human rights. In contrast to traditional transgressions, climate change poses problems for which accountability is elusive, calling for a review of legal and moral frameworks. This change is essential in realizing that the protection of individuals and communities from non-traditional, systemic threats that endanger their existence is part of the right to life.

In addition, a broad interpretation of right to life needs to consider the community's welfare. Given that climate change disturbs ecosystems, puts resources in peril, and causes displacement, protecting individual lives is inextricably linked to maintaining the health of communities. According to Piguet (2022), it is critical to expand the meaning of the right to life considering detrimental effects which environmental degradation has on populations that are already at risk. This puts human rights at the center of the larger conversation about sustainable development, where the preservation of life is understood to include not just immediate physical

threats but also the socioeconomic and cultural fabric of communities dealing with environmental difficulties.

6.3 Legal Framework and Human Rights Documents

The legal basis for expanding the right to life in the era of climate change is found in important human rights treaties and jurisprudential decisions that take changing environmental concerns into account. According to Shandle and Canetti (2019), the Universal Declaration of Human Rights is a foundational document that inherently recognizes the right to life and is adaptable enough to address modern issues. The right to an adequate standard of living is recognized clearly by the International Covenant on Economic, Social, and Cultural Rights. This right naturally encompasses the environmental conditions that are necessary for life.

Furthermore, a growing understanding of environmental issues within the umbrella of human rights is reflected in jurisprudence at various international and regional levels. As demonstrated by Nwozor (2020), cases involving environmental degradation and its effects on communities reveal the connection between environmental protection and the right to life. This body of law offers a rationale for contending that the right to life encompasses more than just protection from immediate dangers; it also includes preserving the environmental conditions essential to a life of dignity. These legal tools provide a framework to address the complex and diffuse challenges posed by the evolving climate crisis, as climate change blurs the lines between traditional human rights violations and environmental concerns.

Furthermore, it is crucial to recognize the constraints of current legal systems in specific jurisdictions. As suggested by Lanyi (2012), "The existing legal framework in Australia and internationally does not protect many of the human rights — both civil and political rights, as well as economic, social and cultural rights — that are important to the environment and climate

change" (p. 271). This observation stresses the need for a critical examination of legal structures to ensure the comprehensive protection of human rights in the face of climate change challenges.

6.4 Linking Economic and Cultural Existence to the Right to Life

The right to life incorporates aspects of the economy and culture that are significantly affected by climate change, in addition to the immediate physical threats. Food insecurity and economic vulnerability are made worse by disruptions in agriculture, as stated by Savary et al. (2020). The impacts of climate change on agricultural productivity are highlighted by Humphreys (2009), who notes, "Diversity in the patterns of rainfall events, and the cycles of the monsoon – combined with a higher risk of critical temperatures being exceeded more frequently – could automatically change crop yields and production. For example, mean yields for some crops in northern India could be reduced by up to 70 percent by 2100" (p. 323). This emphasizes the profound implications of environmental changes on food security and economic stability, reinforcing the need for a broader interpretation of the right to life to encompass protection against climate-induced economic hardships.

Additionally, an evident risk to the right to life is the deterioration of cultural customs and identity. Changes in climate influence ecosystems that are essential to cultural practices and lead to a decrease in biodiversity. Communities' established ways of life are disrupted because of forced relocation due to sea levels rise and extreme weather. As communities struggle with the existential threat posed by climate-induced changes, research by Burkard et al. (2020) reveals that protecting cultural identity becomes entwined with protecting the right to life. An appreciation of the right to life, therefore, must consider the complex relationships that exist between cultural preservation, economic stability, and climate change affect the general well-being of communities.

6.5 Human Rights and Climate-Induced Displacements

Human rights are greatly threatened by climate-related displacement, which makes it imperative to pay close attention to the rights of climate refugees. Ensuring people's rights becomes critical when environmental changes force individuals and communities to migrate. According to Johnson (2020), preserving the dignity, safety, and access to basic services for individuals who have been displaced due to climate-related factors is component of the right to life. Human rights frameworks should change to consider the unique vulnerabilities that climate refugees face, highlighting the necessity of taking precautions against historically unheard-of difficulties. According to Anton et al. (2011), human rights transcend legal frameworks that are at odds with them, much like fundamental or natural rights do. This viewpoint, which emphasizes the fundamental connection between environmental issues and human rights, is in line with the developing debate on the right to life in the face of climate change.

As vulnerable populations face increased risks due to climate-related displacement, dignity becomes increasingly important. Migration makes it more difficult to access basic services like clean water, sanitary conditions, and healthcare. As a result, policies pertaining to climate change must take an intersectional approach that incorporates human rights concerns. International human rights instruments need to change to reflect the changing nature of displacement brought by climate change, considering the rights and vulnerabilities of individuals impacted. The conversation about human rights needs to broaden as climate change continues to alter forms of living around the glove to protect and promote the welfare of those who are being forced to relocate because of environmental pressures.

6.6 The Urgency of a Comprehensive Approach

A broad plan is needed to address the problems caused by climate change, and cooperation between communities, organizations, and governments is encouraged. The pressing nature of this issue demands a well-coordinated approach that incorporates legal, ethical, and policy considerations to develop efficient solutions. International collaboration is important for governments to implement measures that mitigate the adverse impacts of climate change on the fundamental right to life. Legal structures should be adjusted to accommodate the complexities of climate-related matters, emphasizing the ethical duty to protect disadvantaged groups. It is crucial to prioritize adaptive measures and include community opinions in policies to guarantee that they are effective and relevant. An all-encompassing approach that incorporates legal, ethical, and policy dimensions is crucial in addressing the intricate implications of climate change on human rights.

In addition, given that climate change as a global phenomenon, transnational cooperation is essential to promoting a coordinated response to it. It is urgent to take both immediate action and to promote long-term collaboration to increase adaptability and resilience. To safeguard the fundamental right to life in the face of climate change, governments, organizations, and communities can work together to navigate the complex intersection of legal, ethical, and policy dimensions by adopting a comprehensive approach.

Adopting guiding principles for an all-encompassing approach is necessary to reimagine human rights in the era of climate change. In this evolving world, protecting one's existence and dignity necessitates an integrated approach that goes beyond conventional ideas of personal safety. A paradigm change is needed to address the intersections between the right to life and the worldwide issue of climate change. This shift must acknowledge the importance of community-

oriented thinking and collective well-being in addressing threats without identifying individual perpetrators. Respecting these values is not only morally and legally essential, but also a fundamental commitment to creating a sustainable and dignified future for all people, as it acknowledges the complex relationship between human rights and the evolving nature of climate change. This comprehensive approach, which is based on inclusive principles and respect for human dignity, provides a way forward for addressing the complex issues of protecting human rights in the face of climate change.

Chapter Seven

Discussion and Conclusion

7.1 Interpretation of Results

The study's findings provide a convincing and comprehensive analysis of how Bangladesh's right to life is affected by climate change. This section explores the main conclusions and what they indicate about the intricate and terrible repercussions that the people of Bangladesh must deal with.

Our research showed that food insecurity in Bangladesh is becoming worse because of climate change. Decreased rainfall and the progress of insect habitats brought forth by altered precipitation patterns have resulted in large crop losses. Respondent 1 underlined the growing danger to food security posed by the spread of locust habitats and their destruction of crops. These results are consistent with those of Ceglar et al. (2019), who observed that changes in weather patterns foster an atmosphere that is favorable to the spread of pests that cause damage to crops.

After analyzing the data, it is clear that quick and flexible actions are needed. Climate-smart agricultural techniques, the creation of pest-resistant crop types, and farmer training are crucial, as indicated by respondent 2. This highlights the need for a multifaceted strategy to protect food security. Additionally, as suggested by respondent 3, including community participation is essential to comprehending and meeting the needs of marginalized populations in times of tragedy.

The study also revealed Bangladesh's water resources are severely impacted by climate change. Respondents 5 and 11 emphasized the unavailability of potable water because of increased salinity posed by rising sea level. Given that having availability to clean drinking water

is a fundamental human right, this has an immediate impact on the right to life. This finding supports previous research by Rakib et al. (2020) and emphasizes the growing concern regarding coastal areas' salinization and water scarcity.

The effect of climate change on pests that affect rice crops, as highlighted by respondents 6 and 10, highlights the complex connections that exist between changes in climate and pest outbreaks. Climate change has resulted in early rice flowering, which gives pests more favorable conditions. Consequently, when evaluating food security and livelihoods, it is crucial to consider the timing of plant growth and its effect on pests.

According to respondent 8, the survey highlights the grave effects that people who relocate from coastal areas experience as a result of climate change. Urban slums' overcrowding, poor living circumstances, and restricted access to necessities support the ongoing violation of people's right to life. These results are in line with the study by Sams (2019), which highlights the difficult living circumstances that urban migrants brought on by climate change face.

Respondent 9 claimed that disadvantaged populations are disproportionately affected by disasters due to environmental change. These people are more vulnerable to losing their lives during catastrophes when there are no early warning systems, secure shelter, or emergency assistance available. This highlights how critical it is that vulnerable populations' interests and rights be considered in attempts to adapt to climate change.

The analysis of the data highlights how complex the effects of climate change are on Bangladesh's right to life. These results emphasize how crucial it is to handle food security, water shortages, insect outbreaks, migration, and disaster management in a comprehensive way in order to guarantee the defense of this essential human right.

7.1.1 Comparison with the Literature

The research's conclusions support and add to the body of knowledge already available on the subject of how Bangladesh's human rights are affected by climate change. The findings of the study will be compared and contrasted with pertinent academic literature in this section.

Our research supported Al-Rawi's (2021) results, which highlighted the detrimental impacts of shifting weather patterns on pests that cause damage to crops. Our data interpretation is consistent with their claim that a greater danger to food security may arise from modified precipitation patterns. Additionally, the study supported the worries expressed by Shammi et al. (2019) about how saline intrusion and increasing sea levels might restrict coastal communities' access to safe drinking water. These results highlight the ongoing nature of this important problem and how it affects Bangladeshi citizens' right to life.

Our findings, which demonstrate the results of migration brought on by climate change on urban slums, are consistent with Rana and Ilina's (2021) research. The study highlights the necessity for proactive policies and actions considering the dire living circumstances in urban slums. Our results reinforce the significance of attending to the rights of marginalized groups in the event of environmental catastrophes, as recommended by other studies. The results of several researchers are in line with the lack of early warning systems and the restricted access to critical services for these populations (Perera et al., 2019).

In essence, the findings of this research are consistent with the prevailing literature, further validating the critical nature of climate change's impact on the right to life in Bangladesh.

7.1.2 Implications of the Findings

The implications of the findings extend beyond the academic realm and carry significant policy, practical, and humanitarian implications.

First, these findings emphasize the critical need to take measures to adapt to Bangladesh's shifting climate. Data analysis reveals that swift action is required to defend the right to life of the people of Bangladesh, including the adoption of climate-friendly agricultural techniques, water management strategies, and integrated disaster management. Bangladesh's national strategies and programs should include these measures heavily.

Furthermore, the study highlights the need to enhance emergency preparation for vulnerable groups. The absence of early warning systems and safe housing may be remedied by policy reforms and localized initiatives. Not only is this a morally acceptable course of action, but it is also legally mandated by international human rights standards.

The importance of sustainable land-use practices was raised by Respondent No. 7, highlighting a key finding of the research. Striking a balance between economically viable endeavors such as shrimp farming and the preservation of mangrove forests is crucial for mitigating the adverse impacts of climate change. The environmental and economic policies now being adopted in Bangladesh will be profoundly affected by this.

This study highlights the significant social and economic ramifications. Not every member of society is equally impacted by climate change; rather, it exacerbates already-existing socioeconomic disparities. Those living in urban slums, disadvantaged communities, and low-income families are among the vulnerable groups most affected by these developments. The results underscore the moral responsibility to rectify these disparities and protect the basic entitlement to life. The socioeconomic inequities that adapting to and mitigating climate change policies influence must be clearly considered in their design.

The findings stress the need to implement inclusive tactics that account for the needs of marginalized groups. Low-income families, those living in slums, and those Compelled to move

because of adverse climatic conditions. are among the vulnerable populations that need to be considered when crafting adaptation policies.

This research is important not only on a national level but on an intercontinental one as well, since it highlights the importance of human rights in the setting of climate change. The implications of the findings stress the need to uphold the right to life in the face of environmental changes as a worldwide ethical obligation, not simply a local one. The research can be applied in areas such as:

7.1.3 Capacity Building Programs

NGOs and community groups may use the study to inform the development and execution of capacity-building initiatives that strengthen the climate change resilience of their local communities. Notably, climate-smart agriculture practices may be highlighted in these initiatives. Organizations might provide training sessions and seminars to teach farmers about sustainable and adaptable agricultural methods in response to the study results. This upholds the right to life in addition to promoting food security. Another important factor is being ready for disasters. In order to protect human rights in the context of climate change, training modules encompassing catastrophe preparation, response, and recovery might be created based on the study findings.

7.1.4 Advocacy and Awareness Campaigns

The study’s findings serve as a potent resource for community organizations and non-governmental organizations' lobbying and awareness initiatives. Changes in policy that are popular at the local, regional, and national levels may be the focus of advocacy. By sharing the study's findings, organizations may promote disaster management procedures that are better, climate-resilient infrastructure, and sustainable water resource management. Vital policy changes

that promote human rights in the circumstance of climate change are sparked by these efforts. In order to make sure that the local populace is aware of the effects of climate change for human rights, programs for community education and awareness might be started simultaneously. Residents are educated about the perils of climate change and instructed on how to protect their rights through workshops, seminars, and community debates.

7.1.5 Projects and Initiatives

The findings may be used by international organizations and funders to provide funding for particular initiatives designed to tackle the issues highlighted in the analysis. International organizations may support initiatives linked to water purification technology and infrastructure development, given the research's focus on water shortage and pollution. This guarantees the accessibility of safe drinking water, which is essential to maintaining the right to life. Initiatives promoting sustainable agriculture may aid in the fight against climate-related food insecurity. The effect on food production is lessened by encouraging the creation of pest-resistant crop types and sustainable farming methods. Initiatives aimed at increasing community resilience to catastrophes may also benefit from the research's findings. These initiatives may improve capacities for recovery and readiness, which are essential for defending human rights in the face of environmental change.

7.1.6 Global Relevance

The study findings have far-reaching ramifications that beyond Bangladesh's borders. Even if the report clearly highlights the urgent problems of climate change and human rights in one country, its significance is worldwide. Protecting human rights in the face of environmental changes is universally significant, and this research emphasizes how universally relevant climate change is. The issues raised by this research are not exclusive to Bangladesh; rather, they affect

the whole world community. Your results may provide essential insights for policymakers, organizations, and governments throughout the globe to address similar situations in their own locations. Stakeholders worldwide may create more resilient and knowledgeable policies and initiatives, creating a future where the right to life is upheld even in the constantly shifting climatic landscape, by acknowledging the complex interplay between climate change and human rights. This study serves as a light, pointing the international community in the direction of the morally and practically required resolution of climate-related human rights issues.

7.1.7 Recommendations for Future Research

Many new lines of inquiry are suggested by this study's findings, any one of which might improve our understanding of the effects of climate change on human rights in Bangladesh.

1) Longitudinal Studies: Future studies could benefit from using longitudinal research methodologies, which track the development of climate change's consequences across time. This would allow for more nuanced policy responses and provide light on how these effects are evolving over time.
2) Comparative Studies: Potentially useful insights about adapting to climate change may be gleaned from comparative studies with other countries experiencing similar challenges. Comparing Bangladesh to other coastal nations, for instance, might provide some instructive insights.
3) Climate Policy Evaluation: Studies assessing the effectiveness of climate policy in safeguarding human rights in Bangladesh are needed. This would be useful for assessing the present policies' impact and suggesting improvements.

4) Resilience and Capacity-Building: Research that focuses on the adaptability and capacity-building of helpless populations in the context of climate change may provide concrete answers for advancing the human right to life.
5) Legal and Ethical Frameworks: Research that explores the legal and ethical frameworks for climate change adaptation in Bangladesh, and the enforcement of international human rights obligations, is a promising avenue for future inquiry.
6) Innovative Solutions: Research into innovative solutions, such as sustainable urban planning for climate-induced migrants, climate-resilient crop varieties, and clean drinking water technologies, could provide practical options for policymakers.
7) Policy Recommendations: To tackle the adverse consequences of climate change on Bangladeshi's right to life, the policy suggestions resulting from this research are essential. The findings underscore the critical need for a comprehensive plan of safeguard human right. Policies need to concentrate specifically on:

   a. Climate-Smart Agriculture: Policymakers in Bangladesh need to give the implementation of climate-smart agriculture practices top priority considering the obvious obstacles to food security. By using these tactics, crop tolerance to pests and unpredictable weather patterns may be increased, guaranteeing a steadier supply of food.

   b. Water Management Strategies: Bangladesh must create and put into practice efficient water management plans, especially in coastal regions that are susceptible to salt intrusion. Availability of safe drinking water is a crucial problem that may be resolved by making investments in infrastructure and water purification technology.

   c. Disaster Preparedness and Response: Improving disaster management systems is crucial, with a focus on the wants of disadvantaged and vulnerable clusters. To save lives

during climate-related catastrophes, this entails putting early warning systems, secure shelter alternatives, and effective emergency services into place.

d. Sustainable Land Use Policies: It is crucial to implement policies that create a balance between commercially rewarding endeavors like prawn farming and the preservation of important ecosystems like mangrove forests. In addition to preserving the rights of coastal people, sustainable land use practices may lessen the adverse impacts of climate change on the environment.

e. Inclusive Policies: Legislators must develop inclusive policies that take into consideration the requirements of excluded populations, such as low-income families and migrants displaced by climate change. This entails making certain that their access to necessary services and rights are safeguarded.

7.1.8 Limitations and Future Work

While this study significantly contributes insightful information on connection of human rights in Bangladesh with climate change, it is vital to recognize its broader implications on a global scale. Notably, the geographical focus of the study presents an apparent constraint, as the findings primarily pertain to the Bangladeshi context. Generalizing these results to areas with diverse socioeconomic, environmental, and cultural characteristics requires caution. Additionally, the dynamic nature of climate change and the temporal scope of the study necessitate future research initiatives to encompass a broader range of geographical locations and an extended timeframe. To comprehensively depict the spectrum of climate change-related challenges faced by vulnerable communities globally, future projects should aspire to enhance geographical diversity. Additionally, the ever-changing impact of climate change, coupled with the study's finite timeframe, underscores the need for future research to encompass greater

geographical diversity. Emphasizing a more extensive temporal scope would capture the evolving nature of these challenges.

More research ought to be done to examine the specifics of adapting and mitigating plans and see how well they work in different situations. Studies that draw comparisons with other countries or areas can help us grasp the different ways that climate change affects human rights. The adaptive methods used by vulnerable populations to address the issues of long-term effects of climate change may be clarified by longitudinal studies. To establish comprehensive measures, it is imperative that the legal and ethical frameworks underlying climate-related human rights challenges be addressed. With this study, the first steps towards protecting human rights in the ground of climate change have been taken; significant advancements will require a cooperative strategy involving academia, policy, and practice.

Moreover, the discussion explores the various ways that Bangladesh's right to life is impacted by climate change. The data analysis emphasizes the urgency of adjusting measures, enhancing disaster readiness, promoting sustainable land use, and implementing inclusive policies. These considerations are pivotal in resolving the challenges posed by climate change. The study's implications extend beyond local borders, influencing international concerns. Future research recommendations provide a roadmap for addressing the severe risks caused by climate change in Bangladesh, emphasizing the global relevance of the findings. Ultimately, this study serves as a beacon, guiding the international community toward the ethical and practical resolution of climate-related human rights issues.

7.2 Conclusion

Climate change is a real and growing threat that threatens the right to life in Bangladesh right now. This is not some hypothetical threat that may happen in the future. The impact of climate change on this fundamental human right was explored in depth in this dissertation thesis. Millions of people in Bangladesh would be affected by the tangled web of difficulties and implications that it exposed. Interviews with individuals whose lives have been directly influenced by climate change are among the qualitative research approaches used in this study. It's based on a lot of research, too, including interviews with people whose lives have been altered by climate change. Consequently, the crisis in Bangladesh is seen from all angles.

7.2.1 The Looming Risks

This research demonstrates that Bangladesh is at the very face of the destruction caused by climate change. The nation's geographical location makes it vulnerable to a broad range of climate-related threats. Due to coastal erosion brought on by increasing sea levels, villagers are losing their homes and livelihoods, and many have been forced to relocate to overcrowded urban slums. The worrying decline in freshwater supplies is mostly attributable to the increased pace at which saline water is seeping into freshwater sources. Meanwhile, migration due to climate change continues to put pressure on cities like Dhaka, exacerbating existing issues in urban regions. Food security is threatened by the effects of climate change on agriculture, which in turn affects results in areas such as nutrition and health.

7.2.2 Understanding the Consequences

Individual accounts from climate-affected areas of Bangladesh provide a vivid picture of the vulnerability of the nation. Extremely disruptive changes in agricultural techniques have resulted from climate change. Variations in temperature and rainfall have expanded the spectrum

of pests that may cause damage to crops. In response, several responders emphasized the critical need to develop climate-smart agriculture practices and create pest-resistant crop varieties. Food security is an integral aspect of the right to life, and these measures are essential to securing it.

7.2.3 Community Engagement and Disaster Management

Natural catastrophe management becomes crucial under these conditions. Given the constant destruction inflicted by natural catastrophes, many of which are initiated by floods, community engagement in emergency preparation and response is crucial. The requirements of management. To preserve lives and lessen the extent of harm caused by climate-related disasters, it is crucial to improve early cautionary systems and offer better access to emergency services.

7.2.4 Impact on Water Resources

The accessibility of clean drinking water is another area of daily living that is being profoundly disturbed by climate change. When there is less access to clean water, especially in more rural areas, the prevalence of waterborne diseases increases. Respondents emphasized the urgency of acting in this scenario. We need to find solutions quickly since this problem is only going to become worse as sea levels rise and saltier water makes its way onshore.

7.2.5 Biodiversity and Environmental Degradation

These effects are compounded by the fact that human activities, such as shrimp farming, lead to environmental changes that further devastate the ecosystem. Degradation in soil quality and a drop in water quality are only two of the many far-reaching effects of cutting down mangrove trees, which are crucial to the survival of coastal communities.

7.2.6 Crop Changes and Pest Outbreaks

Climate change alters the timing of pest and disease outbreaks because it alters the timing of plant growth. Pests like the brown plant hopper (BPH) and the rice his beetle have become

more common, which has a devastating effect on harvests. Understanding the connection between climate-induced changes and insect outbreaks is crucial for protecting rice fields and people's livelihoods.

7.2.7 Practical Solutions for a Viable Future

Despite the seemingly insurmountable challenges, the thesis also covers a variety of adaptation strategies and coping mechanisms. Communities must be given the tools they need to address this complex issue. To safeguard the right to life, it is crucial to identify solutions that can be implemented, are long-term, and are equitable. New crop varieties, pest management techniques, and farming practices that accommodate climate change are all positive developments. Sustainable shrimp farming practices and reforestation projects may lessen the environmental impact, protect people's livelihoods, and strengthen communities' ability to withstand the effects of natural catastrophes.

7.2.8 Policy Recommendations for the Future

The end goal of this thesis is to offer suggestions based on solid evidence for enhancing policy and practice. These recommendations should serve as a road map for the government of Bangladesh, along with international organizations and local people, to tackle the challenges that climate change is posing in Bangladesh. Adaptation and resilience-building measures, better disaster management, access to clean water, and safeguarding the rights and well-being of vulnerable populations should all be at the forefront of these suggestions.

7.2.9 Conclusion: The Path Forward

Ultimately, the consequences of climate change on the right to life in Bangladesh is more than just an environmental concern; it is a complicated and interrelated succession of crises. This is due to the terrible state of infrastructure in the nation. Confronting the adversity related to climate change, this thesis emphasizes the need to address these challenges and preserve people's right to life. Its primary goal is to improve the quality of life in underprivileged regions by increasing access to clean water and hygienic amenities.

The challenges caused by multifaceted climate change, yet they are not intractable. Humans' ingenuity, toughness, and empathy may pave the way to a future that can be sustained. If the international community and Bangladesh take a holistic approach to the problem, include the communities where people live, and adopt policies based on evidence, then they will be able to mitigate the effects of climate change and ensure that everyone in Bangladesh is guaranteed the basic right to life.

There are tremendous challenges and problems, but there are also tremendous opportunities for development and improvement. As a global community, we must act quickly and decisively to improve conditions in Bangladesh and the world at large. The claim to human dignity and life must continue to take precedence over all other considerations in this effort.

References

Abedin, M. A., & Shaw, R. (2018). Constraints and coping measures of coastal community toward safe drinking water scarcity in Southwestern Bangladesh. In Science and technology in disaster risk reduction in Asia (pp. 431-452). Academic Press.

Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: Why and how of it. Indian Journal of Medical Specialties, 4(2), 330-333.

Adnan, M. S. G., Haque, A., & Hall, J. W. (2019). Have coastal embankments reduced flooding in Bangladesh? Science of the total environment, 682, 405-416.

Adopted, I. P. C. C. (2014). Climate change 2014 synthesis report. IPCC: Geneva, Switzerland.

Afjal Hossain, M., Imran Reza, M., Rahman, S., & Kayes, I. (2012). Climate change and its impacts on the livelihoods of the vulnerable people in the southwestern coastal zone in Bangladesh. Climate change and the sustainable use of water resources, 237-259.

Bangladesh Map., 2024 https://www.infoplease.com/atlas/asia/bangladesh-map accessed on 01.04.2024

Ahmed, M. N. Q., Haq, A., & Md, S. (2019). Indigenous people's perceptions about climate change, forest resource management, and coping strategies: a comparative study in Bangladesh. Environment, Development and Sustainability, 21(2), 679-708.

Ahmed, N. (2001). Parliamentary committees and parliamentary government in Bangladesh. *Contemporary South Asia*, *10*(1), 11-36.

Ahmed, S., Galagan, S., Scobie, H., Khyang, J., Prue, C. S., Khan, W. A., ... & Sack, D. A. (2013). Malaria hotspots drive hypoendemic transmission in the Chittagong Hill Districts of Bangladesh. PloS one, 8(8), e69713.

Akhter, M. N. (2017). Impact of climate change on environment and socio-economic status in the coastal region of Bangladesh. Business, Social and Scientific Research, 170.

Akter, M. (2019). *Women's Political Participation in Bangladesh Parliament: a Case Study Analysis of Women's Substantive Representation* (Doctoral dissertation, Universität Bremen).

Akter, S., Ahmed, K. R., Marandi, A., & Schüth, C. (2020). Possible factors for increasing water salinity in an embanked coastal island in the southwest Bengal Delta of Bangladesh. Science of The Total Environment, 713, 136668.

ALAM, S. M. N., & PHILLIPS, M. J. (2004). Coastal Shrimp Aquaculture Systems in Southwestern Bangladesh. *Asian Fisheries Science*, *17*(3). https://doi.org/10.33997/j.afs.2004.17.3.001

Allen, M., Antwi-Agyei, P., Aragon-Durand, F., Babiker, M., Bertoldi, P., Bind, M., ... & Zickfeld, K. (2019). Technical Summary: Global warming of 1.5 C. An IPCC Special Report on the impacts of global warming of 1.5 C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

Al-Rawi, A. A. (2021). Potential impacts of future climate changes on agriculture.

Al-Saadi, H. (2014). Demystifying Ontology and Epistemology in research methods. Research gate, 1(1), 1-10.

Alston, M. (2015). Women and climate change in Bangladesh. Routledge.

American Civil Liberties Union. (n.d.). FAQ on the Covenant on Civil and Political Rights (ICCPR). Retrieved from https://www.aclu.org/documents/faq-covenant-civil-political-rights-iccpr

Anton, D. K., & Shelton, D. L. (2011). Environmental Protection and Human Rights. Cambridge University Press.

Antwi, S. K., & Hamza, K. (2015). Qualitative and quantitative research paradigms in business research: A philosophical reflection. European journal of business and management, 7(3), 217-225.

Appannagari, R. R. (2017). Environmental pollution causes and consequences: a study. North Asian International Research Journal of Social Science and Humanities, 3(8), 151-161.

Ashrafuzzaman, M., Gomes, C., & Guerra, J. (2023). The Changing Climate Is Changing Safe Drinking Water, Impacting Health: A Case in the Southwestern Coastal Region of Bangladesh (SWCRB). *Climate*, *11*(7), 146.

Austin, Z., & Sutton, J. (2014). Qualitative research: Getting started. The Canadian journal of hospital pharmacy, 67(6), 436.

Awal, Abdul. (2023). Language Contact in Bangladesh. International Journal of English Linguistics. 13. 69-90. 10.5539/ijel.v13n4p69.

Bangladesh Economic Review 2023 (2023) Finance Division, Ministry of Finance Government of the People's Republic of Bangladesh www.mof.gov.bd, 93-107, Dhaka, Bangladesh.

Banglapedia, 2024, retrieved from https://bn.banglapedia.org/index.php?title=%E0%A6%AC%E0%A6%BE%E0%A6%82%E0%A6%B2%E0%A6%BE%E0%A6%A6%E0%A7%87%E0%A6%B6

Bari, M. E., & Bari, M. E. (2022). The Principle of Judicial Independence and Its Recognition in the Constitution of Bangladesh, 1972. *The Independence of the Judiciary in Bangladesh: Exploring the Gap Between Theory and Practice*, 19-56.

Bari, M. E., & Dey, P. (2020). The anti-defection provision contained in the constitution of Bangladesh, 1972, and its adverse impact on parliamentary democracy: A case for reform. *Wisconsin International Law Journal*, *37*(3), 487.

Bell, D. (2013). Climate change and human rights. *Wiley Interdisciplinary Reviews: Climate Change*, *4*(3), 159-170.

Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. Ecology letters, 15(4), 365-377.

Bhaga, T. D., Dube, T., Shekede, M. D., & Shoko, C. (2020). Impacts of climate variability and drought on surface water resources in Sub-Saharan Africa using remote sensing: A review. Remote Sensing, 12(24), 4184.

Brammer, H. (2014). Bangladesh's dynamic coastal regions and sea-level rise. Climate risk management, 1, 51-62.

Brammer, H. (2016). Floods, cyclones, drought and climate change in Bangladesh: a reality check. International Journal of Environmental Studies, 73(6), 865-886.

Cameron, E. (2016). Building Climate Justice: An analysis of how the nexus between climate change and human rights shapes public policy agendas and alternatives.

Cameron, E. (2016). Building Climate Justice: An analysis of how the nexus between climate change and human rights shapes public policy agendas and alternatives.

Ceglar, A., Zampieri, M., Toreti, A., & Dentener, F. (2019). Observed northward migration of agro-climate zones in Europe will further accelerate under climate change. Earth's Future, 7(9), 1088-1101.

Cerf, M. E. (2019). Sustainable development goal integration, interdependence, and implementation: The environment–economic–health nexus and universal health coverage. Global Challenges, 3(9), 1900021.

Clark, G. (2007). Evolution of the global sustainable consumption and production policy and the United Nations Environment Programme's (UNEP) supporting activities. Journal of cleaner production, 15(6), 492-498.

Clark, G. (2013). Secondary data. Methods in Human Geography, 57-73.

Clarkson, B. R., Ausseil, A. G. E., & Gerbeaux, P. (2013). Wetland ecosystem services. Ecosystem services in New Zealand: conditions and trends. Manaaki Whenua Press, Lincoln, 1, 192-202.

Corwin, D. L. (2021). Climate change impacts on soil salinity in agricultural areas. European Journal of Soil Science, 72(2), 842-862.

Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., ... & Patterson, C. (2009). Managing the health effects of climate change: lancet and University College London Institute for Global Health Commission. The lancet, 373(9676), 1693-1733.

Cramer, W., Guiot, J., Fader, M., Garrabou, J., Gattuso, J. P., Iglesias, A., ... & Xoplaki, E. (2018). Climate change and interconnected risks to sustainable development in the Mediterranean. Nature Climate Change, 8(11), 972-980.

Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. Nature Climate Change, 8(4), 275-281.

d'Alpoim Guedes, J., & Bocinsky, R. K. (2018). Climate change stimulated agricultural innovation and exchange across Asia. Science advances, 4(10), eaar4491.

Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T. (2009). Climate change adaptation, disaster risk reduction and social protection: complementary roles in agriculture and rural growth?. IDS Working Papers, 2009(320), 01-37.

Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T. (2009). Climate change adaptation, disaster risk reduction and social protection: complementary roles in agriculture and rural growth?. *IDS Working Papers*, *2009*(320), 01-37.

Davis, K. F., Bhattachan, A., D'Odorico, P., & Suweis, S. (2018). A universal model for predicting human migration under climate change: examining future sea level rise in Bangladesh. Environmental Research Letters, 13(6), 064030.

Deschenes, O., & Moretti, E. (2009). Extreme weather events, mortality, and migration. The Review of Economics and Statistics, 91(4), 659-681.

Dey, N. C., Saha, R., Parvez, M., Bala, S. K., Islam, A. S., Paul, J. K., & Hossain, M. (2017). Sustainability of groundwater use for irrigation of dry-season crops in northwest Bangladesh. Groundwater for Sustainable Development, 4, 66-77.

Diaz, A., Baweja, R., Bonatakis, J. K., & Baweja, R. (2021). Global health disparities in vulnerable populations of psychiatric patients during the COVID-19 pandemic. *World Journal of Psychiatry*, *11*(4), 94.

Dutta, B. (2015). Views of Bangladesh on Climate Change and its Possible Security Implications.

Faisal, I. M., & Parveen, S. (2004). Food security in the face of climate change, population growth, and resource constraints: implications for Bangladesh. *Environmental Management*, *34*, 487-498.

Faurie, C., Varghese, B. M., Liu, J., & Bi, P. (2022). Association between high temperature and heatwaves with heat-related illnesses: A systematic review and meta-analysis. Science of The Total Environment, 852, 158332. UNFCCC. (n.d.). What is the United Nations Framework Convention on Climate Change? UNFCCC. Retrieved from https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change

Mannan, M. (2015). BRAC, global policy language, and women in Bangladesh: Transformation and manipulation. Suny Press.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: methodology meets method. International journal of social research methodology, 20(2), 181-194.

Fritze, J. G., Blashki, G. A., Burke, S., & Wiseman, J. (2008). Hope, despair and transformation: Climate change and the promotion of mental health and wellbeing. International journal of mental health systems, 2(1), 1-10.

Political map of Bangladesh, 2024, Store Norske Leksikon, https://snl.no/Bangladesh Accessed on 28.04.2024

Gain, A. K., Mondal, M. S., & Rahman, R. (2017). From flood control to water management: A journey of Bangladesh towards integrated water resources management. Water, 9(1), 55.

Gaudin, A. C., Tolhurst, T. N., Ker, A. P., Janovicek, K., Tortora, C., Martin, R. C., & Deen, W. (2015). Increasing crop diversity mitigates weather variations and improves yield stability. PloS one, 10(2), e0113261.

Government of Bangladesh, Ministry of Agriculture. "Agricultural Policy", (2023).

Graue, C. (2015). Qualitative data analysis. International Journal of Sales, Retailing & Marketing, 4(9), 5-14.

Gray, A., Thind, J., Guedes, S., Singh, S. P., Belot, T., & Syu, W. (2020). Greenhouse Gases.

Griggs, G., & Reguero, B. G. (2021). Coastal adaptation to climate change and sea-level rise. Water, 13(16), 2151.

Grubb, M. (2014). Planetary economics: energy, climate change and the three domains of sustainable development. Routledge.

Guo, B., Subrahmanyam, M. V., & Li, C. (2020). Waves on Louisiana continental shelf influenced by atmospheric fronts. Scientific reports, 10(1), 1-9.

Guo, X., Marinova, D., & Hong, J. (2013). China's shifting policies towards sustainability: a low-carbon economy and environmental protection. Journal of Contemporary China, 22(81), 428-445.

Haigh, I. D., MacPherson, L. R., Mason, M. S., Wijeratne, E. M. S., Pattiaratchi, C. B., Crompton, R. P., & George, S. (2014). Estimating present day extreme water level exceedance probabilities around the coastline of Australia: tropical cyclone-induced storm surges. Climate Dynamics, 42(1), 139-157.

Hallegatte, S. (2016). Shock waves: managing the impacts of climate change on poverty. World Bank Publications.

Hallegatte, S. (2016). Shock waves: managing the impacts of climate change on poverty. World Bank Publications.

Haque, U., Overgaard, H. J., Clements, A. C., Norris, D. E., Islam, N., Karim, J., ... & Glass, G. E. (2014). Malaria burden and control in Bangladesh and prospects for elimination: an epidemiological and economic assessment. The Lancet Global Health, 2(2), e98-e105.

Hasegawa, T., Fujimori, S., Shin, Y., Tanaka, A., Takahashi, K., & Masui, T. (2015). Consequence of climate mitigation on the risk of hunger. Environmental science & technology, 49(12), 7245-7253.

Hasnat, G. T., Kabir, M. A., & Hossain, M. A. (2018). Major environmental issues and problems of South Asia, particularly Bangladesh. *Handbook of environmental materials management*, 1-40.

Hoover, K., & Riddle, A. A. (2020). Forest carbon primer. Congressional Research Service: Washington, DC, USA.

Hoque, R. (2018). Eternal provisions in the constitution of Bangladesh: A constitution once and for all?. *An Unamendable Constitution? Unamendability in Constitutional Democracies*, 195-229.

Hossain, M. S., & Majumder, A. K. (2018). Impact of climate change on agricultural production and food security: a review on coastal regions of Bangladesh. International Journal of Agricultural Research, Innovation and Technology (IJARIT), 8(2355-2020-1646), 62-69.

Hossain, M. S., Roy, K., & Datta, D. K. (2014). Spatial and temporal variability of rainfall over the south-west coast of Bangladesh. Climate, 2(2), 28-46.

Hossen. , M A., Chowdhury, M. A., Hans, A., Tagoe, C. A., Allan, A., Nelson, W., ... & Das, S. (2019). Governance challenges in addressing climatic concerns in coastal Asia and Africa. Sustainability, 11(7), 2148.

Hughes, J. D., & Hughes, J. D. (2014). Environmental problems of the Greeks and Romans: Ecology in the ancient Mediterranean. JHU Press.

Hughes, J., Cowper-Heays, K., Olesson, E., Bell, R., & Stroombergen, A. (2021). Impacts and implications of climate change on wastewater systems: A New Zealand perspective. Climate Risk Management, 31, 100262.

Humphreys, S. (Ed.). (2009). Human Rights and Climate Change. Cambridge University Press.

Huq, S. (2008). Climate change impacts and responses in Bangladesh.

Iacobuţă, G. I., Höhne, N., van Soest, H. L., & Leemans, R. (2021). Transitioning to low-carbon economies under the 2030 agenda: Minimizing trade-offs and enhancing co-benefits of climate-change action for the sdgs. Sustainability, 13(19), 10774.

Islam, A. R. M. T., Islam, H. T., Shahid, S., Khatun, M. K., Ali, M. M., Rahman, M. S., ... & Almoajel, A. M. (2021). Spatiotemporal nexus between vegetation change and extreme climatic indices and their possible causes of change. Journal of Environmental Management, 289, 112505.

Islam, M. A., Islam, M. S., & Wahab, M. A. (2016). Impacts of climate change on shrimp farming in the South-West coastal region of Bangladesh. *Research in Agriculture Livestock and Fisheries*, *3*(1), 227–239. https://doi.org/10.3329/ralf.v3i1.27881

Islam, M. A., Islam, S. L., & Hassan, A. (2017). Impact of Climate Change on Water with Reference to the Ganges–Brahmaputra–Meghna River Basin. In Chemistry and Water (pp. 121-160). Elsevier.

Islam, M. S., & Mahmud, R. (2015). Trust in governance in Bangladesh: Ideas, issues and solutions. *Millennial Asia*, *6*(2), 128-146.

Islam, M. T., & Nursey-Bray, M. (2017). Adaptation to climate change in agriculture in Bangladesh: The role of formal institutions. Journal of environmental management, 200, 347-358.

Islam, M., Tamanna, S., van Amstel, A., Noman, M., Ali, M., Saadat, S., ... & Ghosh, A. (2021). Climate change impact and comprehensive disaster management approach in Bangladesh: a review. Bangladesh II: Climate Change Impacts, Mitigation and Adaptation in Developing Countries, 1-39.

Javeline, D. (2014). The most important topic political scientists are not studying: adapting to climate change. Perspectives on Politics, 12(2), 420-434.

Johnson Petri, R. (2020). Climate Change, Displacement and Human Rights: The Principle of Non-Refoulement and the Right to Life in the Context of Climate Change.

Johnson, S. S., Constible, J., Knowlton, K., Gifford, B., Roberts, J. D., Ada, M. S., & Jette, S. L. (2021). Knowing Well, Being Well: well-being born of understanding: Climate Change & Well-Being: The Role for Health Promotion Professionals. American Journal of Health Promotion, 35(1), 140-152.

Jones, P. (2017). Formalizing the informal: Understanding the position of informal settlements and slums in sustainable urbanization policies and strategies in Bandung, Indonesia. Sustainability, 9(8), 1436.

Kais, S. M. (2018). *Climate change and resilience in industrial aquaculture: a study of community capitals in the shrimp-farming zone in Bangladesh* (Doctoral thesis).

Kais, S. M., & Islam, M. S. (2018). Impacts of and resilience to climate change at the bottom of the shrimp commodity chain in Bangladesh: A preliminary investigation. Aquaculture, 493, 406-415.

Kelman, I. (2017). Linking disaster risk reduction, climate change, and the sustainable development goals. Disaster Prevention and Management: An International Journal, 26(3), 254-258.

Khan, M. M. (2003). State of governance in Bangladesh. *The Round Table, 92*(370), 391-405.

Khan, M. R. (2017). Climate change governance: Bangladesh perspective. Int J Hort Agric, 2(1), 1-8.

Koop, S. H., & van Leeuwen, C. J. (2017). The challenges of water, waste and climate change in cities. Environment, development and sustainability, 19(2), 385-418.

Kurukulasuriya, P., & Rosenthal, S. (2013). Climate change and agriculture: A review of impacts and adaptations.

Lanyi, G. (2012). Climate Change and Human Rights: An Unlikely Relationship?

Letcher, T. M. (2019). Why do we have global warming? In Managing global warming (pp. 3-15). Academic Press.

Leveque, B., Burnet, J. B., Dorner, S., & Bichai, F. (2021). Impact of climate change on the vulnerability of drinking water intakes in a northern region. Sustainable Cities and Society, 66, 102656.

Levy, B. S., & Patz, J. A. (2015). Climate change, human rights, and social justice. Annals of global health, 81(3), 310-322.

Li, W., Shao, L., Zhang, D., Ro, C. U., Hu, M., Bi, X., ... & Chen, J. (2016). A review of single aerosol particle studies in the atmosphere of East Asia: morphology, mixing state, source, and heterogeneous reactions. Journal of Cleaner Production, 112, 1330-1349.

Li, Z., Guo, J., Ding, A., Liao, H., Liu, J., Sun, Y., ... & Zhu, B. (2017). Aerosol and boundary-layer interactions and impact on air quality. National Science Review, 4(6), 810-833.

Limon, M. (2009). Human rights and climate change: Constructing a case for political action. Harv. Envtl. L. Rev., 33, 439.

Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., ... & Torquebiau, E. F. (2014). Climate-smart agriculture for food security. Nature climate change, 4(12), 1068-1072.

Loboguerrero, A. M., Campbell, B. M., Cooper, P. J., Hansen, J. W., Rosenstock, T., & Wollenberg, E. (2019). Food and earth systems: priorities for climate change adaptation and mitigation for agriculture and food systems. Sustainability, 11(5), 1372.

MacDonald, C. (2012). Understanding participatory action research: A qualitative research methodology option. The Canadian Journal of Action Research, 13(2), 34-50.

Mahmud, M. A. (2013). Hydraulic effects of urban development to floodplains in Dhaka, Bangladesh. Dhaka Metropolitan Development Area and its Planning Problems, Issues and Policies. Dhaka: Bangladesh Institute of Planners (BIP), 1-13.

Mallick, F., & Rahman, A. (2013). Cyclone and tornado risk and reduction approaches in Bangladesh. In Disaster risk reduction approaches in Bangladesh (pp. 91-102). Springer, Tokyo.

Manzano, A. (2016). The craft of interviewing in realist evaluation. Evaluation, 22(3), 342-360.

Mashwani, Z. U. R. (2020). Environment, climate change and biodiversity. In Environment, climate, plant and vegetation growth (pp. 473-501). Springer, Cham.

McMichael, A. J. (2013). Globalization, climate change, and human health. New England Journal of Medicine, 368(14), 1335-1343.

Mishra, R. K. (2023). Fresh water availability and its global challenge. British Journal of Multidisciplinary and Advanced Studies, 4(3), 1-78.

Mohsenipour, M., Shahid, S., Ziarh, G. F., & Yaseen, Z. M. (2020). Changes in monsoon rainfall distribution of Bangladesh using quantile regression model. Theoretical and Applied Climatology, 142(3), 1329-1342.

Mondejar, M. E., Avtar, R., Diaz, H. L. B., Dubey, R. K., Esteban, J., Gómez-Morales, A., ... & Garcia-Segura, S. (2021). Digitalization to achieve sustainable development goals: Steps towards a Smart Green Planet. Science of The Total Environment, 794, 148539.

Musleh, U. A. (2017). Local Government Decentralization Efforts for Revenue/Resource Mobilization in Developing Countries: Rhetoric or Realities in Bangladesh. *Journal of East Asian Studies*, *15*, 215-257.

Mustafa, S., Abdollahi, K., Verbeiren, B., & Huysmans, M. (2017). Identification of the influencing factors on groundwater drought and depletion in north-western Bangladesh. Hydrogeology journal, 25(5).

Nassar, D. M., & Elsayed, H. G. (2018). From informal settlements to sustainable communities. Alexandria engineering journal, 57(4), 2367-2376.

Nazari, B., Liaghat, A., Akbari, M. R., & Keshavarz, M. (2018). Irrigation water management in Iran: Implications for water use efficiency improvement. Agricultural water management, 208, 7-18.

Nelson, G. C., Valin, H., Sands, R. D., Havlík, P., Ahammad, H., Deryng, D., ... & Willenbockel, D. (2014). Climate change effects on agriculture: Economic responses to biophysical shocks. Proceedings of the National Academy of Sciences, 111(9), 3274-3279.

Niles, M. T., Lubell, M., & Brown, M. (2015). How limiting factors drive agricultural adaptation to climate change. Agriculture, Ecosystems & Environment, 200, 178-185.

Nilsson, M. (2017). Important interactions among the sustainable development goals under review at the high-level political forum 2017 (Vol. 6). Stockholm Environment Institute.

Nwozor, A. (2020). Depoliticizing environmental degradation: revisiting the UNEP environmental assessment of Ogoniland in Nigeria's Niger Delta region. GeoJournal, 85(3), 883-900.

Pawson, S. M., Brin, A., Brockerhoff, E. G., Lamb, D., Payn, T. W., Paquette, A., & Parrotta, J. A. (2013). Plantation forests, climate change and biodiversity. Biodiversity and Conservation, 22(5), 1203-1227.

Perera, D., Agnihotri, J., Seidou, O., & Djalante, R. (2020). Identifying societal challenges in flood early warning systems. International Journal of Disaster Risk Reduction, 51, 101794.

Perera, F. (2018). Pollution from fossil-fuel combustion is the leading environmental threat to global pediatric health and equity: Solutions exist. International journal of environmental research and public health, 15(1), 16.

Piguet, E. (2022). Linking climate change, environmental degradation, and migration: An update after 10 years. Wiley Interdisciplinary Reviews: Climate Change, 13(1), e746.

Nagel T., Personal rights in public Space. *Philos Public Affairs.* 1995, pp83-107

Population and Housing Census 2022 Preliminary Report (2022), Bangladesh Bureau of Statistic, Statistics and Informatics Division, Ministry of `planning, Government of The People's Republic of Bangladesh, vii-10, Dhaka, Bangladesh.

Pour, S. H., Abd Wahab, A. K., Shahid, S., Asaduzzaman, M., & Dewan, A. (2020). Low impact development techniques to mitigate the impacts of climate-change-induced urban floods: Current trends, issues and challenges. Sustainable Cities and Society, 62, 102373.

Protopopova, A., Ly, L. H., Eagan, B. H., & Brown, K. M. (2021). Climate change and companion animals: identifying links and opportunities for mitigation and adaptation strategies. Integrative and Comparative Biology, 61(1), 166-181.

Rahman, A., Jahan, S., Yildirim, G., Alim, M. A., Haque, M. M., Rahman, M. M., & Kausher, A. H. M. (2022). A review and analysis of water research, development, and management in Bangladesh. Water, 14(12), 1834.

Rahman, M. M. (2020). Organizational gap analysis in achieving SDGs in Bangladesh.

Rahman, M., & Hossain, M. (2013). Production and Export of Shrimp of Bangladesh : Problems and Prospects. *Progressive Agriculture*, *20*(1-2), 163–171. https://doi.org/10.3329/pa.v20i1-2.16868

Rahman, S., & Rahman, M. A. (2015). Climate extremes and challenges to infrastructure development in coastal cities in Bangladesh. Weather and Climate Extremes, 7, 96-108..

Rahman, S., & Salim, R. (2013). Six decades of total factor productivity change and sources of growth in Bangladesh agriculture (1948–2008). *Journal of Agricultural Economics*, *64*(2), 275-294.

Rakib, M. A., Sasaki, J., Matsuda, H., Quraishi, S. B., Mahmud, M. J., Bodrud-Doza, M., ... & Bhuiyan, M. A. (2020). Groundwater salinization and associated co-contamination risk increase severe drinking water vulnerabilities in the southwestern coast of Bangladesh. Chemosphere, 246, 125646.

Rakib, M. R., Islam, M., Parvin, H., & Amstel, A. V. (2018). Climate change impacts from the global scale to the regional scale: Bangladesh. In Bangladesh I: Climate change impacts, mitigation and adaptation in developing countries (pp. 1-25). Springer, Cham.

Rana, M. M. P., & Ilina, I. N. (2021). Climate change and migration impacts on cities: Lessons from Bangladesh. Environmental Challenges, 5, 100242.

Rawlani, A. K., & Sovacool, B. K. (2011). Building responsiveness to climate change through community based adaptation in Bangladesh. Mitigation and Adaptation Strategies for Global Change, 16, 845-863.

Ray, S., Mondal, P., Paul, A. K., Iqbal, S., Atique, U., Islam, M. S., ... & Begum, S. (2021). Role of shrimp farming in socio-economic elevation and professional satisfaction in coastal communities. *Aquaculture Reports*, *20*, 100708.

Rees, S. N., Crowe, M., & Harris, S. (2021). The lesbian, gay, bisexual and transgender communities' mental health care needs and experiences of mental health services: an integrative review of qualitative studies. Journal of Psychiatric and Mental Health Nursing, 28(4), 578-589.

Rich, N. (2018). Losing earth: The decade we almost stopped climate change. New York Times Magazine, 1.

Rights (Doctoral thesis, thesis, University of Leiden).

Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., Hughes, N., Jamart, L., ... & Hamilton, I. (2021). The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. The Lancet, 398(10311), 1619-1662.

Roulston, K. (2010). Reflective interviewing: A guide to theory and practice. Sage.

Rozario, S.R., Rezaie, A.M. and Khan, M.R., Insights on land use, agriculture and food security in Bangladesh: way forward with climate change and development. *Guidelines for Authors Agriculture for Development*, p.32.

Sams, I. (2019). Climate induced migration and social mobility among migrants: evidence from the southwest coastal region of Bangladesh. Social Sciences, 8(4), 147-159.

Sarkar, A., & Sensarma, S. R. (Eds.). (2019). Sustainable solutions for food security: Combating climate change by adaptation. Springer.

Sarkar, A., & Sensarma, S. R. (Eds.). (2019). *Sustainable solutions for food security: Combating climate change by adaptation*. Springer.

Savary, S., Akter, S., Almekinders, C., Harris, J., Korsten, L., Rötter, R., ... & Watson, D. (2020). Mapping disruption and resilience mechanisms in food systems. Food Security, 12, 695-717.

Scoones, I. (2007). Sustainability. Development in practice, 17(4-5), 589-596.

Scotland, J. (2012). Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. English language teaching, 5(9), 9-16.

Seitz, S. (2016). Pixilated partnerships, overcoming obstacles in qualitative interviews via Skype: A research note. Qualitative research, 16(2), 229-235.

Shahid, S., Wang, X. J., Harun, S. B., Shamsudin, S. B., Ismail, T., & Minhans, A. (2016). Climate variability and changes in the major cities of Bangladesh: observations, possible impacts and adaptation. Regional Environmental Change, 16(2), 459-471.

Shammi, M., Rahman, M. M., Bondad, S. E., & Bodrud-Doza, M. (2019, March). Impacts of salinity intrusion in community health: a review of experiences on drinking water sodium from coastal areas of Bangladesh. In Healthcare (Vol. 7, No. 1, p. 50). MDPI.

Shan, V., Singh, S. K., & Haritash, A. K. (2020). Water Crisis in the Asian countries: status and future trends. Resilience, Response, and Risk in Water Systems: Shifting Management and Natural Forcings Paradigms, 173-194.

Sharpley, R. (2020). Tourism, sustainable development and the theoretical divide: 20 years on. Journal of sustainable tourism, 28(11), 1932-1946.

Shindell, D., & Smith, C. J. (2019). Climate and air-quality benefits of a realistic phase-out of fossil fuels. Nature, 573(7774), 408-411.

Shrivastava, P., Smith, M. S., O'Brien, K., & Zsolnai, L. (2020). Transforming sustainability science to generate positive social and environmental change globally. One Earth, 2(4), 329-340.

Siddiqy, M.R., 2017. Urban environment and major challenges in sustainable development: experience from Dhaka City in Bangladesh. *South East Asia Journal of Public Health*, *7*(1), pp.12-16.

Singh, A. K. (2020). Coastal agriculture and future challenges. In Development in Coastal Zones and disaster management (pp. 61-86). Palgrave Macmillan, Singapore.

Sivakumar, M. V., & Stefanski, R. (2010). Climate change in South Asia. In Climate change and food security in South Asia (pp. 13-30). Springer, Dordrecht.

Skendžić, S., Zovko, M., Živković, I. P., Lešić, V., & Lemić, D. (2021). The impact of climate change on agricultural insect pests. Insects, 12(5), 440.

Stavi, I., Paschalidou, A., Kyriazopoulos, A. P., Halbac-Cotoara-Zamfir, R., Siad, S. M., Suska-Malawska, M., ... & Ficko, A. (2021). Multidimensional food security nexus in drylands under the slow onset effects of climate change. Land, 10(12), 1350.

Stavi, I., Paschalidou, A., Kyriazopoulos, A. P., Halbac-Cotoara-Zamfir, R., Siad, S. M., Suska-Malawska, M., ... & Ficko, A. (2021). Multidimensional food security nexus in drylands under the slow onset effects of climate change. *Land*, *10*(12), 1350.

Stoddard, E. A., & Hovorka, A. (2019). Animals, vulnerability and global environmental change: The case of farmed pigs in concentrated animal feeding operations in North Carolina. Geoforum, 100, 153-165.

Sun, J., Fu, B., Zhao, W., Liu, S., Liu, G., Zhou, H., ... & Deng, Y. (2021). Optimizing grazing exclusion practices to achieve Goal 15 of the sustainable development goals in the Tibetan Plateau. Sci. Bull, 66(15), 1493-1496.

Taherdoost, H. (2016). Sampling methods in research methodology; how to choose a sampling technique for research. How to choose a sampling technique for research (April 10, 2016).

Tang, K. H. D. (2020). Implications of climate change on marine biodiversity. *Global Journal of Agriculture and Soil Science*, *1*(1), 1-6.

TBS report (2022). 1cr people in Bangladesh at risk of climate change hunger in 2030.

Teherani, A., Martimianakis, T., Stenfors-Hayes, T., Wadhwa, A., & Varpio, L. (2015). Choosing a qualitative research approach. Journal of graduate medical education, 7(4), 669-670.

Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. Perioperative Nursing-Quarterly scientific, online official journal of GORNA, 7(3 September-December 2018), 155-163.

Trenberth, K. E. (2011). Changes in precipitation with climate change. Climate research, 47(1-2), 123-138.

Uddin, Md. JulHash., Islam, Sirjul. (2023). Quarterly Review on Readymade Garments (RMG): April-June of FY23, External Economics Wing, Research Department Bangladesh Bank, p-4

Ullah, S. M. (2009). *Democracy in Bangladesh: Role of Student Politics (1972-2002)* (Doctoral dissertation, University of Rajshahi).

UN Intergovernmental Panel on Climate Change (IPCC), Climate Change 2007: Synthesis Report 72 (2007) (hereinafter IPCC Synthesis Report), <http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf>. The Synthesis Report is the fourth element of the IPCC Fourth Assessment Report; Nicholas Stern, The Economics of Climate Change: The Stern Review (2007) vi–ix.

UNFCCC. (n.d.). The Paris Agreement. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement

Vehovar, V., Toepoel, V., & Steinmetz, S. (2016). Non-probability sampling (Vol. 1, pp. 329-45). The Sage handbook of survey methods.

Vu, A., Rutherford, S., & Phung, D. (2019). Heat health prevention measures and adaptation in older populations—a systematic review. International journal of environmental research and public health, 16(22), 4370.

Wirzba, N. (Ed.). (2003). *The essential agrarian reader: The future of culture, community, and the land*. University Press of Kentucky.

Woiceshyn, J., & Daellenbach, U. (2018). Evaluating inductive vs deductive research in management studies: Implications for authors, editors, and reviewers. Qualitative Research in Organizations and Management: An International Journal, 13(2), 183-195.

Yin, R. K. (2013). Validity and generalization in future case study evaluations. Evaluation, 19(3), 321-332.

Zafarullah, H., & Huque, A. S. (2001). Public management for good governance: Reforms, regimes, and reality in Bangladesh. *International Journal of Public Administration*, *24*(12), 1379-1403.

Zakar, M. Z., Zakar, D. R., & Fischer, F. (2020). Climate change-induced water scarcity: a threat to human health. South Asian Studies, 27(2).

বাংলাদেশ কিছু মৌলিক পরিসংখ্যান (Bangladesh Some Basic Statistics), 2022, Bangladesh Bureau of Statistics, Retrieved from https://bbs.portal.gov.bd/site/page/b9a5a464-baa9-4fae-84a2-33922e7f397c/-