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Impact of climate change on the life and livelihood of women shrimp farm workers A case study of Assasuni Upazila, Satkhira.

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A Thesis Paper

on

Impact of Climate Change on the Life and Livelihood of Women Shrimp Farm Workers

A Case Study of Assasuni Upazila, Satkhira.

Submitted by

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The Thesis is presented in partial fulfilment of the requirement for the Degree of Masters in Development Studies (MDS) at Independent University, Bangladesh (IUB)

August, 2026
@ Md. Masum Billah

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ABSTRACT

The study explores the impacts of climate change on the lives and income of women shrimp gher labors in Assasuni Upazila, Satkhira district, a significantly climate-sensitive area in Bangladesh. This research examines that how environment changes occurred by climate affect women labor's livelihoods, working conditions, physical health and psychological wellbeing, and gender issues in shrimp farming societies. This study used a qualitative method grounded in an interpretivist frame and also uses a case study design. Necessary information were collected by Ten In-depth interviews and four real life case studies of women from different ages and job kinds like wage labors, wives of shrimp labors and women who are related to shrimp business and Three Key Informants Interviews aligned to the subject. Secondary data collected from different articles, published official reports for making institutional policy papers. The results shows that environmental change has converted traditional livelihood patterns because of acute salinity intrusion, frequent cyclones and reduced the production of agricultural sectors and reliance on shrimp farming as a alternate livelihood. A significant number of women are participating in income-generating works. They face serious occupational health hazards, wage discriminations, limited decision-making power and a double burden of both productive and reproductive worker. The study explores different physical health risks linked to shrimp farming like skin conditions, musculoskeletal problems, reproductive health problems, and heat-related stress. Respondents also said serious mental health issues such as anxiety, economic instability, and stress from natural disasters. Despite these obstacles coastal women showed significant resilience by engaging in livelihood diversification, making savings groups, using social networks, rainwater harvesting and adopting other local adaptation process.

The thesis found climate change adaptation plan in coastal Bangladesh need to accumulate gender-sensitive systems that acknowledge women's roles, bolster workplace health safeguards, increase healthcare accessibility, and promote women's involvement in decision-making.

Keywords: Climate Change, Women Shrimp Farmers, Gender, Livelihood, Health, Coastal Bangladesh, Salinity Intrusion, Adaptation, Resilience, Assasuni, Satkhira.

DEDICATION

This thesis is dedicated to the resilient women shrimp farm workers of coastal Bangladesh whose strength, labor, and perseverance continue to sustain their families and communities despite the growing challenges of climate change.

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LIST OF ABBREVIATIONS

BBS – Bangladesh Bureau of Statistics

BRAC – Bangladesh Rural Advancement Committee

DFID – Department for International Development

FGD – Focus Group Discussion

FPE – Feminist Political Ecology

IDI – In-Depth Interview

IPCC – Intergovernmental Panel on Climate Change

NGO – Non-Governmental Organization

SLF – Sustainable Livelihood Framework

UNDP – United Nations Development Programme

UN Women – United Nations Entity for Gender Equality and the Empowerment of Women

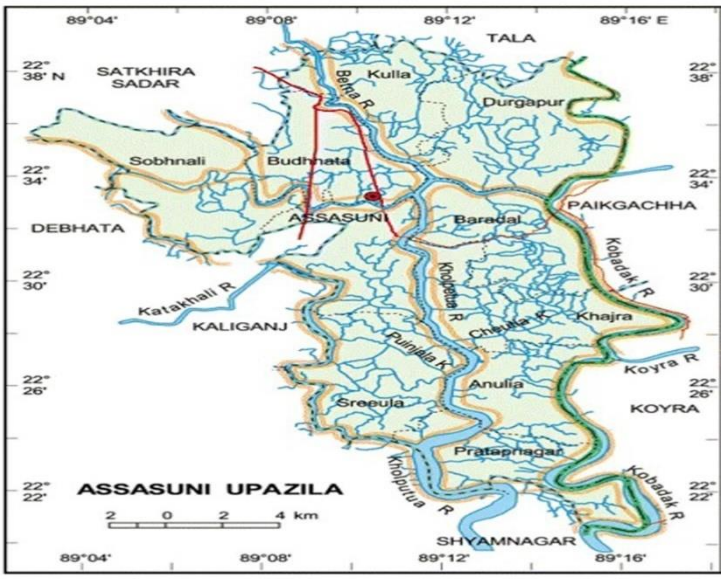
VRF – Vulnerability and Resilience Framework

Chapter 1: Introduction

1.1 Background of the Study

Climate change is a serious issue for the developing nations like Bangladesh. These countries depend on farming and fishing a lot. Bangladesh is one of the countries that is most affected by climate change. This is because of where it's located and how many people live there. The coastal areas of Bangladesh are having a lot of trouble with saltwater coming into the freshwater the sea level rising, big storms and weird weather patterns. All of these things are hurting the economy and the way people make a living. The Satkhira district in southwest Bangladesh is one of the areas that is being hurt the most by climate change. The Assasuni Upazila area has had to deal with a lot of disasters caused by climate change like Cyclone Sidr in 2007 Cyclone Aila in 2009 Cyclone Amphan in 2020 and Cyclone Remal in 2024. These disasters have made it harder for people to farm. Have increased the amount of salt in the water. As a result, many people are now relying on shrimp farming to make a living. Shrimp farming is a deal in coastal Bangladesh and helps the country earn money from exports. The Department of Fisheries reports approximately 315,000 MT of shrimp and prawn farm production in Bangladesh in 2023–24, while shrimp/prawn exports were 19,131.35 MT valued at Tk 2,117.67 crore. It also gives people jobs in areas. Women are very important to the shrimp farming industry. In families women also help make decisions about the farm and take care of the household. Even though women do much work in shrimp farming they often do not get the money or respect they deserve. Climate change has made their jobs harder and more dangerous. They have to work in water for a long time which can cause skin problems, reproductive issues and other health problems. The fact that they do not know how money they will make from one day to another is also causing them a lot of stress and anxiety.

Climate change is really hurting the women who work in shrimp farming in Bangladesh. Shrimp farming is a part of their lives and climate change is making it harder for them to do their jobs. Women, in shrimp farming are facing a lot of challenges and something needs to be done to help them. The impact of climate change on women shrimp workers cannot be understood solely through economic indicators. Socially constructed behaviors, gender relations, right to assets and resources, discriminations of distributing responsibilities make women as highly climate vulnerability. So it is needed for a qualitative study that disclose the real lived experiences of women shrimp farm workers highlighting gender dimensions of environmental change in coastal Bangladesh. This paper focuses on the women shrimp farm workers in Assasuni upazila of Satkhira districts and try to understand that how climate change affected their livelihood pattern, working conditions, physical and mental health and coping strategies.



1.2 Statement of the Problem

Climate change actually altered the path of life of people who are living in the shrimp production area. Shrimp farming gives a lot of women jobs. The changes in the environment because of climate change are making their lives harder in many ways. Women who work in shrimp farming usually do not have jobs and they do not have access to good healthcare, protection and safety at work. The water is getting saltier they have to work in this water for a long time and there are more big storms, which makes their work harder and affects their health. Also women still have to take care of the house the kids and other family members which means they have two jobs to do one at work and one at home. Many people have studied how climate change is affecting the coast of Bangladesh. Not many have looked at how it is affecting women who work on shrimp farms and what their daily lives are like. Most of the research has been about how climate change's affecting the economy and how much food is being produced, but not enough about how it is affecting women and their health. So we need to find out more about how climate change's affecting womens lives their work, their health and how they are adapting to these changes in shrimp farming communities. This study is trying to learn more about this by talking to women, in Assasuni Upazila of Satkhira district and finding out about their experiences.

1.3 Rationale of the Study

This research is very important because it looks at a community that do not thought about during we discuss about climate change and development. They are the people who work in shrimp farm in Bangladesh. Women play an important role in producing shrimp and helping their families survive but we do not often hear about their experiences when we talk about policies or do research. This study is important for a reasons.

First it helps us learn more about how women in Bangladesh are dealing with climate change by telling us what women who work on shrimp farms are going through. Second it shows how changes in the environment are affecting the health of women who work in water. Third it helps us understand how climate change is affecting women differently including how they do not have access to things they need or a say in what happens. Fourth what we learn from this study can help the government organizations that help people and charities make policies that take into account the needs of women in areas. Finally, this research is important because it looks at climate change, gender, health and how people make a living all together which is a way of thinking about these issues in Development Studies and women shrimp farm workers are at the center of this research and the experiences of women shrimp farm workers are very important, to this study.

1.4 Objective of the Study

General Objective

To explore the impact of climate change on the life and livelihood of women shrimp farm workers in Assasuni Upazila of Satkhira district.

Specific Objectives

1. To examine the effects of climate change on the livelihood and working conditions of women shrimp workers with particular emphasizes on health and gender dimension.
2. To identify coping and adaptation strategies adopted by women to sustain their livelihoods and wellbeing.

1.5 Research Questions

The study seeks to answer the following research questions:

1. How has climate change affected the livelihood and working conditions of women shrimp farm workers in Assasuni Upazila?
2. What coping and adaptation strategies are adopted by women to respond to climate-related challenges?

1.6 Scope and Limitations of the Study

Scope of the Study

This research study is about women engaged in shrimp farming in Assasuni Upazila of Satkhira district. The women are those who work as labor for shrimp farming; own shrimp farms; and wives of shrimp farmers engaged in activities in farms along with household duties. The scope of this study is to see the livelihood opportunities and working conditions of women in shrimp farming; impacts of shrimp farming on physical and psychological well-being of women; and impacts of climate change on women and their livelihoods. It is also to identify the challenges posed to women by climate changes and the measures taken by women to adapt themselves to the changes. To know the challenges and adaptation measures in depth, this study uses qualitative approach of research with a focus on in-depth interviews (IDIs), Key Informants Interviews (KII's) and case studies.

Limitations of the Study

There are a number of limitations of this study that must be taken into account while interpreting its results. First, the study is limited to Assasuni Upazila of Satkhira district; thus, the results may not be applicable to other shrimp farming areas and women engaged in shrimp farming in Bangladesh. Second, as there are only a few participants in the study, there cannot be any generalized claims made about the lives of all women shrimp farmers. Third, some of the participants might find it difficult to recall the experience they went through earlier; thus, the reliability of the information about the change in their livelihoods, working condition, health, and climate experience may be in question. Fourth, constraints in terms of time and financial limitations restrict the number of women who can participate in the study and the geographical scope of the research. Fifth, the women may find it awkward to talk about certain health issues that could be considered private or inappropriate to be talked about publicly. Nevertheless, the study will help in gaining an understanding of the lives of women involved in shrimp farming in climate affected areas.

1.7 Operational Definitions

1. Climate Change

The Intergovernmental Panel on Climate Change (IPCC) describes climate change as a long-term change in the state of the climate that can be identified through changes in the mean and or variability of properties and that lasts for a long time. Climate change can happen because of changes and also because of human actions that change the air. Also Goudet et al. (2024) Explain that climate change involves long-term changes in weather that come from both human causes. In the case of Bangladesh, Tanny and Rahman (2017) add that climate change creates problems

through cyclones, floods, salinity intrusion and other environmental changes especially for women and poor coastal communities. For this study climate change means long-term changes in temperature, rain, sea level and weather that affect the lives and jobs of women working in shrimp farming in Assasuni Upazila. The study looks at salinity intrusion cyclones storm surges, floods, waterlogging, irregular rain and changing seasons. In my view climate change is not an environmental problem but also a social and job problem because changes in the environment can directly affect womens jobs, money, health, household tasks and overall happiness.

2. Women Shrimp Farm Workers

Women's involvement in aquaculture and shrimp farming can be in ways, such as working for money helping in the family managing the farm, processing and other unpaid work at home. Nobi and Islam (2021) say that shrimp farming has become a way to earn money and work in coastal Bangladesh although its growth has also caused problems for the environment and society. Also Goudet et al. (2024) In their study of communities that are affected by climate change in Bangladesh found that people who depend on farming and shrimp farming experience changes in their jobs because of climate and environmental problems. The research for this study also shows that women take part in shrimp farming through working on the farm helping at home and important tasks but much of their work is not seen or valued enough. For this study women shrimp farm workers are women who're directly or indirectly involved in shrimp farming. This includes women who work for money women who own or manage shrimp farms and wives of shrimp farmers who help with farm work while also taking care of the home. So the term is used in a way to show that women are workers, business owners and people who help at home. In my opinion it is important to include these roles because womens work in shrimp farming cannot be understood just by looking at paid jobs.

3. Livelihood

Chambers and Conway (1992) define livelihood as the skills, resources and activities people need to live. They say that a good livelihood should be able to handle and recover from problems while keeping or improving resources. Scoones (1998) also explains livelihoods in terms of peoples skills, resources and activities and focuses on how people can use strategies to achieve good results. In the area of coastal Bangladesh, Rayhan et al. (2022) Found that climate change affects the ways people live and work and encourages them to find ways to deal with changes. For this study livelihood means the ways women and their families get money, food, safety and other things they need. It includes shrimp farming working for money owning a farm making things at home ways to earn money and other activities that bring in money. In my view livelihood is not

about making money; it also includes getting resources feeling safe being happy and being able to deal with problems from the climate.

4. Working Conditions

The International Labour Organization (ILO) says that health and safety at work includes everything that keeps workers safe and healthy. The ILO also says that safe and healthy places to work are important for the health of workers. Hossain and Pal (2025) focusing on Bangladesh show that conditions like salty water can create health problems for women showing the importance of thinking about environmental exposure when looking at work and life conditions. For this study working conditions mean the environment and situations where women do shrimp farming. These include the time they work how much they do how much they get paid if they have a job if the place is safe if they have places to protect themselves if they are near water if there are dangers if they get too hot and if they have time to rest. In my view working conditions in shrimp farming should be seen in connection with climate change because women may face both work dangers and environmental problems like hot weather, salty water, floods and storms.

5. Physical Health

The World Health Organization (WHO) defines health as a state of physical, mental and social well-being, not just the absence of sickness. Hossain and Pal (2025) show that salty water is connected to health problems for women in areas. Recently Yasmin et al. (2026) Found that being around salty water is linked to health issues like problems with periods and skin irritation for women in coastal areas of Bangladesh. For this study physical health means the body health and well-being of women working in shrimp farming. It includes skin problems, issues with periods, pain in the body and joints tiredness, headaches, injuries, dehydration and other problems from being around water, hot weather, dirty water and hard work. In my view physical health should be looked at not as having or not having a sickness but also through the everyday experiences of women with pain, weakness, tiredness and discomfort from their jobs.

6. Mental Health

The World Health Organization (WHO) says that mental health is a state of well-being that lets people deal with lifes stresses realize their abilities work well and help their communities. Goudet et al. (2024) In a study of women in areas affected by climate change in Bangladesh found that changes in the climate can affect womens health through more work not having enough to eat not being able to work, moving away and traditional roles. Also Lilier et al. (2024/2026) Found that people in areas affected by climate change in Bangladesh face challenges and have trouble coping, especially women. For this study mental health means the mental health of women working in shrimp farming. It includes stress, worry, sadness, frustration, fear, being too tired not feeling safe

and not knowing what the future will bring. In my view womens mental health cannot be kept separate from their work and family roles. Losing money damage to shrimp farms, weather, higher costs at home health problems and taking care of others can create mental pressure for women.

7. Gender Dimensions

According to Kabeer (1999) the way men and women deal with things affects how resources, tasks and power are shared. Tanny and Rahman (2017) also show that being affected by climate change in Bangladesh is different for men and women and that womens problems are connected to roles owning land working and not having equal access to resources. Moon (2024) also says that women in Bangladesh face problems from climate change because they do not have equal access to resources for dealing with changes and because of existing social inequalities. For this study gender dimensions refer to the differences between women and men in roles, tasks, getting resources making decisions chances to earn money moving around and being at risk. The study looks at who controls the money, who owns or manages the land and shrimp farms, who makes decisions for the home and jobs and who has access to training, money, health services and ways to deal with climate change. In my view looking at gender differences is important because climate change does not affect women just because they are female; instead their problems come from roles, unequal power not having enough resources and not getting help with housework.

8. Coping and Adaptation Strategies

The IPCC sees adaptation as the process of making changes to handle expected changes in the climate and its effects to reduce harm or use benefits. Chambers and Conway (1992) also say that sustainable ways of living should be able to handle and recover from problems. In Bangladesh Islam et al. (2022) Show that women in areas use different ways to deal with problems from the climate like keeping food, managing water saving money making more money and taking care of family. Also women-led research by Islam et al. (2023) Shows that women can use savings and other ways in the home to help during problems from the climate.

For this study coping and adaptation strategies are the actions women and their families take to deal with problems from climate change related to their jobs, health and social life. These may include changing jobs making income finding new jobs spending less borrowing money saving money moving for a while changing how they farm shrimp, collecting or storing rainwater protecting homes and farms and going to health services. In my view coping strategies may be fixes, for sudden problems while adaptation strategies may be longer-term changes to deal with future risks. The study looks at both. Pays special attention to how women know what they experience, how they decide and how they act.

Overall Operational Understanding

In this study the above ideas are closely linked. Climate change is seen as an environmental and social pressure that affects the shrimp-farming way of life. These changes can affect womens work and living conditions which in turn can impact their mental health. At the time gender relations affect how women get resources how much say they have in decisions how free they are to move around what jobs they can get and what options they have to adapt. Finally women use methods to deal with and adjust to climate-related problems to keep their way of life, health and families safe. So this study sees women who work in shrimp farming not just as workers but as workers, farm owners or business people people who help at home caregivers and people who manage their lives.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Climate change has emerged as one of the most urgent development issues confronting at-risk communities globally. Developing nations are impacted more heavily due to their significant reliance on climate-sensitive industries and restricted abilities to adapt. Bangladesh faces significant vulnerability to climate change due to its low-lying delta landscapes, extensive coastline, dense population, and reliance on natural resources. The coastal regions of Bangladesh are becoming more vulnerable to rising sea levels, saltwater intrusion, cyclones, storm surges, erratic rainfall, waterlogging, and various climate-related threats. These ecological shifts have greatly altered livelihood systems, household economies, social connections, and resource utilization patterns in coastal communities. The southwest coastal area of Bangladesh, which encompasses Satkhira, Khulna, and Bagerhat, is especially at risk to these alterations.

Salinity intrusion has affected agricultural production, freshwater availability, food security, health, and livelihood opportunities. At the same time, shrimp farming has expanded as an important economic activity in the coastal region. While shrimp farming creates employment and income opportunities, it has also contributed to changes in land use, agricultural practices, environmental conditions, and social relations. Women experience these changes in gender-specific ways. Their vulnerability is influenced not only by environmental exposure but also by unequal access to land, income, education, productive resources, healthcare, technology, and decision-making opportunities. Women also continue to carry a disproportionate share of unpaid domestic and care work. Therefore, climate change can increase women's economic responsibilities while simultaneously increasing their household and caregiving burdens.

The literature on climate change and coastal livelihoods in Bangladesh has expanded considerably over the past two decades. However, relatively limited research has specifically examined women involved in shrimp farming from the combined perspectives of livelihood, occupational health, mental wellbeing, and gender. This chapter therefore reviews existing literature on climate change and coastal vulnerability, shrimp farming and livelihood transformation, women's participation in shrimp farming, gendered climate vulnerability, women's livelihoods, occupational health, mental health, and adaptation and coping strategies.

2.2 Climate Change and Coastal Vulnerability in Bangladesh

Bangladesh is widely recognized as one of the countries highly vulnerable to climate change because of its low-lying deltaic landscape, extensive coastline, dense population, and dependence on climate-sensitive natural resources. Coastal communities are particularly exposed to sea-level rise, cyclones, storm surges, salinity intrusion, waterlogging, and changing rainfall patterns. These

hazards affect agricultural production, fisheries, access to freshwater, housing, employment, food security, and public health.

Roy, Tandukar, and Bhattarai (2022) identify the southwest coastal region of Bangladesh as one of the most climate-vulnerable areas, where increasing salinity, heatwaves, and sea-level rise have become important threats to people's livelihoods. In a similar vein, Qiu, Ravela, and Emanuel (2023) contend that the combination of rising sea levels and storm tides from tropical cyclones could greatly amplify future coastal dangers in Bangladesh. The coastal districts of Satkhira, Khulna, and Bagerhat in the southwest have undergone considerable environmental changes in recent decades. Salinity intrusion has emerged as a significant issue since it impacts both farming areas and freshwater supplies. Rising salinity diminishes the accessibility of freshwater for drinking, domestic use, agriculture, and livestock farming. Roy et al. (2022) highlight that rising salinity in farmland is a significant long-term effect of climate change in the coastal southwest region of Bangladesh. This environmental change has compelled numerous families to adjust their customary ways of living and pursue different income-producing endeavors. The effects of significant cyclones have heightened the susceptibility of coastal communities. In 2009, Cyclone Aila, Cyclone Amphan in 2020, and Cyclone Remal in 2024 inflicted significant destruction on homes, farmland, water systems, embankments, and livelihood resources in coastal Bangladesh. Such disasters may lead to enduring economic and social impacts since families frequently lose valuable resources and need significant time to recuperate. Sharif et al. (2024) illustrate that natural hazards triggered by climate change in the southwestern coast of Bangladesh considerably affect women, especially as these environmental issues intertwine with pre-existing gender disparities.

Climate change has similarly impacted the evolution of land and livelihood systems. In certain coastal regions, farmland has been progressively transformed into shrimp farming since shrimp cultivation can be financially appealing in saline environments. Nonetheless, this change has created both prospects and obstacles. Though shrimp farming can create jobs and generate income, it may also heighten environmental strain and limit chances for conventional agricultural practices. Consequently, climate change in coastal Bangladesh must be viewed not merely as an environmental concern but also as a matter of livelihood, health, gender, and development.

2.3 Shrimp Farming and Livelihood Transformation

Shrimp farming has emerged as a crucial economic endeavor in coastal Bangladesh and is vital to the nation's export-driven aquaculture industry. The growth of shrimp farming has created jobs and income prospects for numerous families in the coastal area. For communities impacted by

salinity and reduced agricultural productivity, shrimp farming has frequently emerged as a vital source of income.

Hoque, Quinn, and Sallu (2018) demonstrate that shrimp farming has played a role in various livelihood paths in coastal Bangladesh and is closely linked to individuals' approaches to adapting to social and environmental changes. Nonetheless, shrimp farming has not equally benefited all individuals in coastal communities. The growth of shrimp farming has changed land-use trends and impacted conventional farming practices. Nobi and Islam (2021) claim that the environmental expenses linked to shrimp farming may involve ecological harm, issues related to salinity, and adverse impacts on farming output. These expenses are frequently not entirely captured in the shrimp market price and may be passed on to local communities instead. The growth of shrimp farming has similarly changed social and economic dynamics. Land formerly utilized for rice farming and other crops can be transformed into shrimp farming ponds. This procedure can alter local job frameworks and family income strategies. In certain households, shrimp farming offers a source of cash income, whereas for others it may result in reliance on wage labor and informal jobs. Hoque et al. (2018) suggest that households react differently to coastal social-ecological changes based on their access to land, financial resources, social connections, and various livelihood assets. Many households in Assasuni and nearby regions of Satkhira have turned to shrimp farming as a vital livelihood strategy due to growing challenges in traditional agriculture from salinity, waterlogging, cyclones, and shifting climatic conditions. As a result, shrimp farming can be perceived as both a financial prospect and a way to adapt to changes in the environment. Simultaneously, the industry has developed new types of work, providing job prospects for women. Consequently, shrimp farming plays an important role in the changes to livelihoods occurring in coastal Bangladesh.

2.4 Women in Shrimp Farming

Women play a crucial role in shrimp production and associated activities in coastal Bangladesh. Their participation might encompass pond setup, fry gathering, feeding, sorting, grading, processing, cleaning, drying, packaging, and support with marketing. Alongside paid jobs, women also provide unpaid labor in family shrimp farming by managing farms, supporting the household, preparing meals, and performing caregiving tasks. Hamid and Alauddin (1998) recorded the participation of rural women in shrimp aquaculture in coastal Bangladesh, showing that jobs in shrimp-related fields provided income prospects for women. Nevertheless, women's engagement in shrimp farming does not automatically indicate that they have attained economic empowerment. Islam (2008) discovered that women involved in the shrimp commodity chain frequently held lower-paying and less stable jobs. Their work conditions were influenced by

gender disparities, low salaries, weak negotiating power, and limited access to improved job opportunities. Therefore, the heightened involvement of women in the shrimp industry can be viewed as a type of economic engagement without necessarily indicating equal authority over resources or decision-making processes. The labor of women is often overlooked since a significant portion takes place in family-run businesses or informal setups. When women engage in unpaid family work, their economic input often goes unrecognized as official employment. This lack of visibility can affect their ability to obtain income, social protection, training, and institutional assistance.

The participation of women in shrimp farming may also increase when male household members migrate temporarily or permanently for alternative employment. In such circumstances, women may become increasingly responsible for both household survival and economic activities. However, increased labour participation does not automatically result in increased control over land, productive assets, financial resources, or household decision-making. Therefore, women's role in shrimp farming needs to be examined not simply in terms of employment but also through the broader dimensions of gender relations, labour rights, economic empowerment, and household responsibilities.

2.5 Gender and Climate Change Vulnerability

The relationship between climate change and gender has become an important area of research within development studies. Climate change does not affect all individuals equally; rather, its effects are shaped by gender, class, age, income, education, access to resources, and social position. Women in developing nations frequently face heightened vulnerability due to limited economic resources, restricted access to land and financial assets, reduced mobility, and increased obligations for unpaid domestic and caregiving tasks. Moon (2024), in a comprehensive review of gender and climate change in Bangladesh, signifies that women face unequal challenges connected to food insecurity, loss of income, livelihood instability, and health hazards. The impacts related to gender are particularly important in coastal communities, where women typically take on responsibilities such as collecting water, preparing food, caring for children, looking after the elderly, and managing the household. During and after climate-related disasters, these responsibilities can increase considerably. The southwest coastal region provides a particularly important example of gendered climate vulnerability. Sharif et al. (2024) found that climate-induced natural hazards have significant consequences for women in the southwest coast of Bangladesh and that these impacts are connected with broader human rights and gender inequalities. Similarly, Roy et al. (2022) show that women in southwest coastal Bangladesh often have weaker adaptive capacity than men because of unequal access to resources and gendered

social structures. The concept of the "double burden" is therefore important for understanding women's experiences in climate-vulnerable communities. Women may be expected to contribute economically through paid or unpaid work while simultaneously continuing to perform household and care responsibilities. Climate-related shocks can therefore increase women's total workload rather than reducing it. Tanjeela and Rutherford (2018) also emphasize that gender relations influence women's participation and experiences in climate change adaptation programmes in Bangladesh.

Therefore, gendered vulnerability should not be seen merely as women's increased risk to climate threats. Instead, it illustrates the relationship between environmental exposure and the disparities in social, economic, and institutional circumstances. Grasping these connections is crucial for examining the experiences of female shrimp workers in Assasuni.

2.6 Climate Change and Women's Livelihood

The livelihood systems in coastal Bangladesh are increasingly impacted by climate change. Crop failures, salinity encroachment, decreasing agricultural yields, shifting precipitation patterns, water saturation, hurricanes, and various environmental pressures can diminish family income and job prospects. These demands frequently compel families to broaden their means of earning a living. Women are progressively engaging in wage labor, fisheries, aquaculture, small enterprises, livestock farming, and other income-generating endeavors to aid in household sustenance. In coastal regions, women might turn to shrimp farming and other fisheries-related pursuits due to diminishing prospects in conventional agriculture. Nevertheless, these job openings frequently feature low pay, unstable employment, strenuous tasks, and inadequate worker protections. Zarin (2015) discovered that female shrimp workers in southwestern Bangladesh faced low wages, unsafe working conditions, work-related health issues, and challenges in accessing proper medical care. These circumstances suggest that diversifying livelihoods does not automatically result in enhanced livelihood security.

Women's ability to cope with climate change is further limited by inadequate access to financial means, education, land, training, technology, and institutional assistance. Asaduzzaman (2025), concentrating on women in coastal Bangladesh, emphasizes the connection between climate change, livelihood vulnerability, and women's resilience. Roy, Chowdhury, and Akther (2021) also highlight the significance of climate-resilient livelihood options centered around women in coastal regions such as Khulna and Satkhira. Women might consequently implement various livelihood strategies, including pursuing wage labor, participating in shrimp-related tasks, raising animals, operating small enterprises, seeking loans, lowering household expenses, and depending

on social networks. Nevertheless, these approaches are frequently influenced by imbalanced gender dynamics and scarce resources.

For women shrimp workers in Assasuni, climate change could thus result in a complicated livelihood scenario. On one side, shrimp farming can offer a source of income when traditional crop agriculture faces challenges. Conversely, reliance on shrimp farming might subject women to unstable jobs, saltwater exposure, physical dangers, health issues, and restricted negotiating strength. This inconsistency is key to grasping the connection between climate change and the livelihoods of women in coastal Bangladesh.

2.7 Occupational Health Risks among Women Shrimp Workers

The occupational health of women involved in shrimp farming is a significant yet relatively under-explored aspect of coastal livelihood research. Women employed in shrimp farms often endure extended hours standing or wading in water, lifting heavy objects, laboring under direct sunlight, and engaging in repetitive physical tasks. These circumstances can lead to physical fatigue, muscle soreness, skin issues, headaches, tiredness, injuries, and various workplace health hazards. Zarin (2015), in research on women laborers in the shrimp farming industry of southwestern Bangladesh, discovered that women faced health issues related to various shrimp sector jobs, unsatisfactory working conditions, low wages, insufficient nutrition, and challenges in accessing medical care. The research also recognized income bias and inconsistent salary payments as significant elements influencing women's access to healthcare services. Salinity poses a significant health risk for women residing and working in coastal regions. Hossain and Pal (2025) carried out research in Gabura Union of Shyamnagar, Satkhira, and found that water salinity poses a significant public health issue for women of reproductive age. Their study specifically investigated the link between salinity exposure and reproductive health issues in women residing in a highly saline coastal area. This information is particularly important for the current research as Shyamnagar and Assasuni possess comparable environmental and livelihood traits in Satkhira's southwestern coastal area. Women employed in saline water might encounter challenges concerning menstrual health and hygiene. Sinha et al. (2024) investigated the effects of saline water on women's health in coastal Bangladesh and emphasized the significance of having access to safe freshwater for menstrual hygiene and women's health.

Consequently, health risks in the workplace for women shrimp workers should be evaluated in terms of both exposure at work and wider environmental factors. Prolonged exposure to saline water, elevated temperatures, strenuous labor, insufficient protective gear, poor hygiene, low earnings, and restricted access to medical care may impact their health. Consequently, the link among climate change, salinity, work exposure, and women's health demands more focus.

2.8 Mental Health and Psychological Wellbeing

The effects of climate change on health go beyond physical ailments and encompass mental and psychological health. Disasters related to climate, loss of livelihoods, income instability, displacement, environmental deterioration, and future uncertainty can lead to psychological stress. These effects might be especially profound for women as they frequently bear the main responsibility for ensuring food security at home, caring for children and the elderly, and maintaining family welfare. Goudet et al. (2024), in an ethnographic study of at-risk communities in Bangladesh, show that climate change can lead to psychological distress in women due to the interplay of environmental stress, economic instability, and gender-specific social roles. Their results highlight that mental health issues linked to climate change are interwoven with the wider social and economic circumstances surrounding women. Women living in climate-vulnerable coastal areas may experience repeated stress from cyclones, salinity, loss of livelihood assets, food insecurity, water shortages, and difficulties in ensuring household wellbeing. When these problems occur repeatedly, they may contribute to anxiety, emotional exhaustion, frustration, fear, and feelings of insecurity. Women who experience income insecurity may also face additional pressure because they are expected to contribute to household income while continuing to perform unpaid domestic work.The psychological consequences of climate change may be further intensified by limited access to healthcare and social support. In many rural communities, mental health problems receive less attention than physical illnesses. Women may also hesitate to discuss psychological difficulties because of social norms and fear of stigma. Goudet et al. (2024) therefore argue for gender-sensitive approaches to addressing the mental health impacts of climate change in Bangladesh.

The relationship between environmental change and mental health is particularly relevant to women shrimp workers. Their psychological wellbeing may be influenced by insecure employment, low wages, occupational health problems, household financial pressure, environmental uncertainty, and responsibilities for family care. Therefore, the mental health experiences of women shrimp workers should be considered as an important part of the broader impact of climate change on life and livelihood.

2.9 Adaptation and Coping Strategies

People living in climate-vulnerable coastal communities have developed a variety of adaptation and coping strategies to manage environmental and livelihood challenges. These strategies may include livelihood diversification, migration, small businesses, livestock rearing, saline-tolerant agriculture, rainwater harvesting, savings, borrowing, food storage, and community cooperation. Women often play an important role in household-level adaptation by managing food, water, household savings, children's needs, and other essential resources.

Roy, Tandukar, and Bhattarai (2022) examined gender and climate change adaptation in the southwest coast of Bangladesh and found that both men and women actively developed strategies to deal with climate-related impacts. Their research also highlighted the role of government and NGOs in providing climate-related knowledge and adaptation techniques. However, the adaptive capacity of women was comparatively weaker than that of men because of gendered inequalities and differences in access to resources. Households may also diversify their livelihood activities when traditional occupations become less reliable. Hoque, Quinn, and Sallu (2018) found that households in coastal Bangladesh follow different livelihood adaptation trajectories in response to social-ecological change. These strategies depend on access to land, financial resources, employment opportunities, social networks, and other livelihood assets. Women may adopt specific strategies such as engaging in wage labour, shrimp farming, small-scale businesses, livestock rearing, vegetable production, and savings groups. Community networks can also provide important support during disasters by facilitating information sharing, mutual assistance, and access to resources. However, the ability to adopt these strategies is not equally distributed among women. Women with greater access to education, income, land, credit, social networks, and institutional support are generally better positioned to adapt. Climate adaptation therefore requires more than simply providing technical solutions. It also requires addressing the social and economic inequalities that constrain women's adaptive capacity. Tanjeela and Rutherford (2018) emphasize that gender relations influence women's involvement and experiences in climate adaptation programmes. Therefore, adaptation programmes should be gender-sensitive and should ensure women's meaningful participation in planning and decision-making.For women shrimp workers in Assasuni, adaptation may involve changing occupations, diversifying household income, increasing participation in shrimp farming, borrowing money, reducing consumption, migrating temporarily, relying on social networks, or seeking support from government and NGOs. These strategies may help households survive climate-related shocks, but they may also create additional workloads and risks for women. Understanding these coping and adaptation

practices is therefore essential for assessing the long-term sustainability of women's livelihoods in coastal Satkhira.

Overall, the research shows that climate change, shrimp farming, gender, livelihood, and health are deeply interconnected in coastal Bangladesh. Women are not just passive victims of climate change; they are proactive economic participants who play a vital role in household survival and adaptation. However, their capacity to adjust is limited by unequal resource access, unstable jobs, workplace risks, societal expectations, and insufficient institutional assistance. This research establishes a crucial base for exploring the experiences of female shrimp farmers and laborers in Assasuni, Satkhira, focusing specifically on their work conditions, livelihoods, health status, mental health, and coping mechanisms.

2.10 Research Gap

There is extensive information regarding climate change, its impact on people's lives in certain regions, and shrimp farming in Bangladesh. There are still several significant things that remain unknown to us. First, most studies have looked at how climate change affects families but there have not sufficient emphasize on how it affects the women who work. Second, researchers often treat all women as the same. They are not. They are different because they have jobs, own farms or are married to shrimp farmers. Third, not many studies have looked at how climate change affects the health and wellbeing of women who work with shrimp. Fourth, there are not studies that look at how climate change affects peoples lives, health and gender roles all at the same time. This study wants to fill these gaps by talking to women who work with shrimp in Assasuni Upazila of Satkhira district and finding out what they think.

2.11 Conclusion

The information we have shown that climate change has changed the way people live in areas and has made it harder for women. Women who work with shrimp face problems because of their jobs, money, health and the way they are treated. Even though we know a lot about the problems in areas we do not know enough, about what women who work with shrimp think and feel. This study wants to help us understand better how climate change affects women in Bangladesh.

2.12 Theoretical Framework

To understand what is happening some theories have been used. Since this study looks at climate change people’s lives, health and gender roles we need to use than one theory. We are using the Sustainable Livelihood Framework, Feminist Political Ecology and the Vulnerability and Resilience Framework. These theories help us understand how climate change affects womens lives and how women deal with problems.

2.12.1 Sustainable Livelihood Framework (SLF)

The Sustainable Livelihood Framework, developed by the United Kingdom's Department for International Development (DFID) in the late 1990s, is one of the most widely used frameworks in Development Studies for understanding poverty, vulnerability, and livelihood strategies. The framework defines livelihood as the capabilities, assets, and activities required for a means of living. A livelihood is considered sustainable when it can cope with and recover from shocks and stresses while maintaining or enhancing its capabilities and assets without undermining the natural resource base.

The framework identifies five categories of livelihood assets or capitals: Those are Human Capital, Natural Capital, Financial Capital, Physical Capital and Social Capital. For female shrimp farm workers in Assasuni, climate change directly affects these resources. Human capital is influenced by deteriorating health, work-related illnesses, and diminished productivity. Salinity intrusion, waterlogging, and environmental degradation pose threats to natural capital. Financial capital is diminished by inconsistent job prospects and variable shrimp production. Physical assets, such as homes and infrastructure, are often harmed by cyclones and floods. Social capital, such as family connections and community support frameworks, becomes more vital during times of crisis. Climate change serves as a significant external shock within the vulnerability framework of the Sustainable Livelihood model. Women react to these shocks by implementing different livelihood strategies, including diversifying income sources, migrating family members, informal borrowing, raising livestock, and engaging in small-scale business ventures. The Sustainable Livelihood Framework is essential to this study as it clarifies the impact of environmental changes on livelihood assets and how women create strategies to ensure household survival. The framework emphasizes the significance of institutions, policies, and social systems in influencing adaptation possibilities and livelihood results.

The theoretical connection in this research can be illustrated as follows:

Climate Change Stressors

⇩

Changes in Livelihood Assets

⇩

Livelihood Outcomes

⇩

Adaptation Strategies

This framework aids in assessing both the adverse effects of climate change and the tactics women use to maintain their livelihoods amid increasingly unpredictable environmental circumstances. Despite the common application of the Sustainable Livelihood Framework in climate adaptation

studies, critics contend that it occasionally overlooks power dynamics and gender disparities within families and communities. Thus, this research enhances SLF through the lens of Feminist Political Ecology.

2.12.2 Feminist Political Ecology (FPE)

Feminist Political Ecology, introduced by Dianne Rocheleau, Barbara Thomas-Slayter, and Esther Wangari in their 1996 work "Feminist Political Ecology: Global Issues and Local Experiences," serves as an expansion of political ecology and feminist development studies. It aims to comprehend how gender dynamics affect access to, management of, and utilization of natural resources. The framework posits that environmental issues are intertwined with social power dynamics and that men and women perceive environmental shifts differently due to socially defined gender roles and disparities. In contrast to conventional environmental studies that frequently view communities as uniform entities, Feminist Political Ecology prioritizes variations within households and communities, emphasizing how power dynamics influence vulnerability and adaptation abilities. The framework emphasizes three interconnected dimensions:

1. Gendered knowledge of the environment.
2. Gendered rights and access to resources.
3. Gendered responsibilities and environmental decision-making.

Women in coastal Bangladesh possess extensive local knowledge regarding water management, food preservation, household adaptation, and livelihood diversification. Nonetheless, in spite of their expertise and contributions, women frequently exercise limited authority over land ownership, financial assets, technology, and institutional assistance. For women shrimp workers in Assasuni, the effects of climate change are not just environmental but also political and social. The exposure of women to saline water, along with occupational health hazards and livelihood instability, is intricately connected to unequal labor structures and restricted decision-making authority within households and communities. Feminist Political Ecology clarifies why women frequently face the effects of climate change differently than men, even when residing in the same surroundings. It also emphasizes the necessity of exploring the overlaps among gender, class, age, and occupation while investigating environmental vulnerability. The framework also questions the belief that households behave as cohesive decision-making entities. In numerous shrimp farming households, decisions about production, investment, adaptation strategies, and resource distribution are predominantly made by men, despite the substantial contributions of women in labor and household management. This viewpoint is particularly significant for the current research as it enables the investigator to examine not only environmental shifts but also the societal frameworks and gender disparities that influence women's experiences and adaptability in coastal

Bangladesh. Feminist Political Ecology highlights that climate vulnerability is created by social factors and influenced by political processes rather than being solely a result of environmental conditions.

2.12.3 Vulnerability and Resilience Framework

The Vulnerability and Resilience Framework is frequently utilized in climate change studies to investigate the ways individuals and communities encounter environmental threats, their sensitivity to these threats, and their ability to adjust to them.
This framework identifies three key elements of vulnerability: Exposure, Sensitivity, and Adaptive Capacity. Exposure denotes the level at which people or communities encounter climate-related threats, including cyclones, salinity intrusion, flooding, and waterlogging. Women in Assasuni face significant risks due to their geographic position and the nature of their work. Sensitivity denotes the extent to which individuals are influenced by these risks. Women shrimp laborers may be especially vulnerable due to extended exposure to saline water, insufficient access to healthcare, low earnings, and significant caregiving duties. Adaptive capacity is the capability of individuals or households to react to environmental changes and mitigate potential harm. Elements that affect adaptive capacity encompass education, income, social connections, institutional backing, and resource availability. The resilience aspect of the framework emphasizes the capacity of individuals and communities to withstand shocks, adapt, and maintain operations despite disruptions. Resilience does not mean being free from vulnerability; it instead signifies the ability to bounce back and adjust after experiencing environmental stress. Women in coastal Bangladesh have shown significant resilience by diversifying livelihoods, collaborating within their communities, utilizing informal savings methods, adopting migration strategies, and implementing local adaptation techniques. Nonetheless, resilience varies greatly and relies significantly on availability of resources and institutional assistance. The Vulnerability and Resilience Framework allows this research to examine both threats and reactions. It refocuses from seeing women solely as climate change victims to acknowledging their knowledge, agency, and adaptability. This viewpoint is crucial for Development Studies as it combines structural vulnerability with human agency and processes of adaptation. Recent studies on climate vulnerability highlight that interventions aimed at building resilience should tackle social inequalities and institutional obstacles instead of concentrating solely on technical solutions.

2.12.4 Integration of the Three Frameworks

While each framework independently delivers useful insights, utilizing them together yields a more thorough understanding of climate change effects on women working in shrimp farming. The Sustainable Livelihood Framework illustrates the impact of climate change on livelihood

resources and survival tactics. Feminist Political Ecology illustrates how power dynamics and gender relationships influence resource access, decision-making processes, and susceptibility. The Vulnerability and Resilience Framework outlines how exposure, sensitivity, and adaptive capacity affect women's reactions to climate-related shocks.Collectively, these frameworks offer a cohesive analytical model for comprehending the experiences of women shrimp workers in Assasuni.

The connection can be outlined in the following way:

Climate Change Hazards

↓

Changes in Livelihood Assets and Working Conditions

↓

Gendered Vulnerability and Health Outcomes

↓

Coping Strategies and Adaptation Mechanisms

↓

Livelihood Resilience and Wellbeing

This cohesive framework establishes the theoretical basis for the research and directs the creation of interview questions, analysis of data, and interpretation of results.
The integration of the Sustainable Livelihood Framework, Feminist Political Ecology, and Vulnerability and Resilience Framework offers a strong analytical basis for analyzing the gender-specific effects of climate change on women shrimp farm laborers in coastal Bangladesh. These frameworks collectively recognize the significance of environmental shifts, social disparities, livelihood resources, and human agency in influencing vulnerability and adaptation. By incorporating these viewpoints, the research aims to offer a richer insight into how women encounter, manage, and react to climate-related issues in the shrimp farming areas of Assasuni, Satkhira.

2.13 Conclusion of Chapter Two

This chapter looked at what other people have written about climate change, coastal livelihoods, shrimp farming, gender vulnerability, health and adaptation strategies in Bangladesh. It found that there is not research on the experiences of women shrimp farm workers especially about how livelihood, health and gender are connected in communities that are vulnerable to climate change. The chapter also established the foundation of the study using the Sustainable Livelihood Framework, Feminist Political Ecology and the Vulnerability and Resilience Framework. Finally

the conceptual framework showed how climate change affects womens lives and livelihoods and highlighted the role of gender and adaptation in shaping resilience outcomes.

The next chapter will talk about the research methodology used to investigate these issues, in Assasuni Upazila of Satkhira district.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodological approach adopted to investigate the impacts of climate change on the life and livelihood of women shrimp farm workers in Assasuni Upazila of Satkhira district. Since the study seeks to understand participants' lived experiences, perceptions, health conditions, gender relations, and coping strategies, a qualitative research methodology was considered the most appropriate approach. The chapter discusses the research philosophy, research design, study area, study population, sampling procedure, data collection methods, data analysis techniques, ethical considerations, and limitations of the methodology.

3.2 Research Philosophy

Research philosophy refers to the assumptions about the nature of reality and how knowledge is generated. This study is guided by the interpretivist research paradigm, which assumes that social reality is socially constructed and that individuals interpret experiences differently based on their social, economic, and cultural contexts. The interpretivist approach is especially appropriate for this study since the effects of climate change are perceived differently by various women based on factors like age, job, household responsibilities, and resource availability. The aim of this study is not to quantify relationships but to comprehend how women view and encounter climate-related alterations in their well-being and livelihoods. By employing this philosophical viewpoint, the research aims to investigate the meanings women ascribe to their experiences instead of considering them as objective or universal events.

3.3 Research Approach

The research utilizes an inductive methodology. Inductive research transitions from particular observations to more general interpretations and theoretical comprehension. Instead of assessing established hypotheses, the research seeks to derive insights from participants' stories concerning: Shifts in livelihood patterns, Encounters with occupational health issues, Gender-specific susceptibilities, Adaptation and coping strategies.
The inductive method facilitates the natural emergence of themes and patterns from data gathered via interviews and case studies.

3.4 Study Design

This research utilizes a qualitative case study approach. A qualitative case study method allows the researcher to investigate intricate social realities in their authentic environments and is especially valuable for examining modern challenges like climate change and gender-related vulnerability. The case study approach facilitates a thorough exploration of women's job experiences in shrimp farming, the impacts of climate change on their livelihoods and health,

strategies that households use to adapt, and gender dynamics within coastal communities. The associated Key Informant Interviews provide the necessary insights. The qualitative case study approach offers detailed contextual insights that quantitative surveys alone cannot provide.

3.5 Research Area

The research took place in Assasuni Upazila of the Satkhira District, situated in the southwestern coastal area of Bangladesh. Assasuni is among the most climate-sensitive regions in Bangladesh, facing challenges from salinity intrusion, cyclones and storm surges, waterlogging, river erosion, and rising temperatures alongside erratic rainfall patterns. The region has faced devastating effects from significant cyclones such as Cyclone Sidr (2007), Cyclone Aila (2009), Cyclone Amphan (2020), and Cyclone Remal (2024). These ecological shifts have greatly altered farming methods and heightened reliance on shrimp aquaculture as a primary means of livelihood. The choice of Assasuni was intentional as it symbolizes a significant context for examining climate change and the livelihoods of women.

3.6 Study Population

The research population includes women actively participating in shrimp farming activities in Assasuni Upazila. In this study, women involved in shrimp farming are defined as:

1. Women employed as wage laborers in shrimp farms;
2. Women who own or manage shrimp farms;
3. Wives of shrimp farmers who actively participate in shrimp production activities and household livelihood management.

This expansive definition acknowledges women's contributions that frequently go unrecognized in formal statistics and policy debates.

3.7 Sampling Technique

The research utilized purposive sampling. Purposive sampling is commonly utilized in qualitative studies as it allows the researcher to choose individuals who have firsthand experience and pertinent expertise related to the research subject. Participants were chosen according to these criteria:

Participants were selected based on the following criteria:

1. Active involvement in shrimp farming activities
2. Residence in Assasuni Upazila
3. Experience with climate-related events and environmental changes
4. Willingness to participate in the study.

The sampling strategy ensured variation in Age, Occupational role, Economic condition, Experience in shrimp farming.

3.8 Sample Size

The study uses a small but information-rich sample consistent with qualitative research principles.

In-Depth Interviews (IDIs)

Ten in-depth interviews were conducted with women from different age groups to capture intergenerational experiences. I took help from my friend Khaleda Parvin to take information about sensitive issues like womens reproductive health.

S/N	IDI Number	Participant Category	Age Group
1	IDI-1 to 3	Shrimp laborer	20-30 years
2	IDI-4 to 6	Shrimp laborer	31-40 years
3	IDI-7 to 8	Wife of shrimp farmer	41-50 years
4	IDI-9 to 10	Woman shrimp entrepreneur	51 years and above

Table: 1 IDI Participant Profile

The age diversity allowed the researcher to examine changes across generations and identify differences in experiences and adaptation strategies.

Key Informants Interview (KII's)

Three KIIs were conducted to know the actual condition from the expert's eye.

S/N	KII Number	Participant Category
1.	KII-1	A Local Doctor
2.	KII-2	NGO Officials
3.	KII-3	UP Chairman

Table: 2 KII Participant Profile

The three KIIs provide complementary perspectives on women's health and climate vulnerability.

Case Studies

Four detailed case studies were conducted to document livelihood and health trajectories before and after major climate events.

S/N	Case Study	Participant Type
1	Case Study 1	Young shrimp laborer
2	Case Study 2	Middle-aged shrimp laborer
3	Case Study 3	Wife of shrimp farmer
4	Case Study 4	Woman shrimp farm owner

Table: 3 Case Study Participant Profile

The case studies looked at the participants lives before. After climate change happened. They wanted to see how climate change affected the participant's income and jobs. The case studies also looked at how climate change impacted the participant's health. This included health problems from being in water for too long working in very hot weather and doing jobs that are

very hard on the body. The study also looked at how climate change affected the participants' mental health. This included feeling stressed, anxious and insecure because of the changes, in their lives. The case studies also tried to find out how women and their families dealt with the problems caused by climate change. The women and their families used different ways to cope with the problems. They tried to find ways to make money get new jobs move to new places save money borrow money from others and get help from their friends and family. They also changed the way they spent their money and used strategies to deal with the problems caused by climate change. The case studies looked at all these things to understand how climate change affected the participants lives and how they dealt with it.

3.9 Data Collection Methods

The study relied primarily on primary qualitative data supplemented by secondary sources.

3.9.1 In-Depth Interviews (IDIs)

The main method of data collection was the use of semi-structured in-depth interviews.Semi-structured interviews allowed flexibility while ensuring that key topics were covered. Major themes including Changes in shrimp farming practices, Working conditions, Income and employment patterns, Physical health experiences, Mental health challenges, Gender roles, Adaptation strategies. Interviews were conducted in Bangla and later transcribed and translated into English where necessary. Each interview lasted approximately 45 to 90 minutes.

3.9.2 Case Studies

Case studies were done to learn more about the lives of women and how they experienced climate change and changes in how they made a living. These studies looked at what life was like for women before climate events especially what their work was, how they made money what they did at home and how they got the things they needed. The studies also looked at how things changed after the environment was affected by climate issues. This included changes in how money they made the kind of jobs they had how they worked and whether their families were safe financially. The studies paid attention to the health problems women had from working with shrimp like getting tired being, around salty water having skin issues feeling pain and other health problems. The studies also looked at how families dealt with these problems like trying jobs saving money borrowing money moving to new places changing what they spent money on and finding other ways to make money. The study also looked at the help people got from their families, neighbors, local groups, charities and other people in the community. A lot of focus was placed on what happened and after a big storm called Cyclone Aila in 2009. Many people said that Cyclone Aila changed how people made a living how the environment was what jobs were available and how families dealt with problems.

3.9.3 Key Informants Interview (KII's)

Key Informant Interviews play a crucial role in this study as they reinforce and validate the insights gained from the ten In Depth Interviews and four case studies. Key Informant Interviews provide insights from professionals and organizations that the women we interviewed may not be able to share. For instance, the community physician is highly informed about the reproductive and mental health issues that women encounter. The leader of the non-profit organization informs us about the initiatives that assist women in earning a livelihood, addressing climate change, and gaining greater independence. The Union Parishad Chairman updates us on the services offered by the government, their disaster management efforts, and the assistance they provide to organizations. Key Informant Interviews enable us to view the findings from diverse perspectives, enhancing the credibility of the research and illustrating how women's personal experiences relate to broader issues such as health, livelihood, gender, and institutions in Assasuni.

3.9.4 Observation

Non-participant observation complemented the findings from interviews. The investigator examined working environments in shrimp farms, contact with saline water, living conditions, health and sanitation amenities, and environmental factors. Field notes were kept consistently during the research process.

3.9.5 Secondary Data

Secondary information was gathered from government documents, scholarly articles, NGO publications, climate change studies, census data, agricultural statistics, and prior research on shrimp farming and coastal communities. Secondary sources were utilized to contextualize and validate primary results.

3.10 Data Analysis Procedure

The study employed thematic analysis. Thematic analysis is a widely used qualitative analytical technique that identifies patterns and themes within textual data.

The analytical process involved:

Step 1: Familiarization with Data

Interview transcripts and field notes were read repeatedly.

Step 2: Theme Development

Codes were grouped into broader themes. Major themes included:

1. Livelihood and working conditions;
2. Physical health impacts;
3. Mental health impacts;
4. Gender dimensions;

5. Adaptation strategies.

Step 3: Interpretation

Themes were interpreted using the theoretical frameworks of the study.

3.11 Ensuring Trustworthiness of the Study

To enhance the quality and credibility of the findings, the study followed the criteria proposed by Lincoln and Guba (1985).

Credibility

Credibility was ensured through prolonged engagement with participants and triangulation of information obtained from interviews, observations, and case studies.

Transferability

Detailed contextual descriptions were provided to allow readers to determine the applicability of findings to similar settings.

Dependability

The research process and analytical decisions were documented systematically.

Confirmability

Interpretations were grounded in participants' narratives rather than researcher assumptions.

3.12 Ethical Considerations

The study rigorously tackled ethical concerns. The principles upheld included obtaining informed consent from all participants, ensuring participation was voluntary, allowing participants the right to withdraw at any time, guaranteeing confidentiality and anonymity, utilizing pseudonyms in reporting results, and treating sensitive health information with privacy and respect

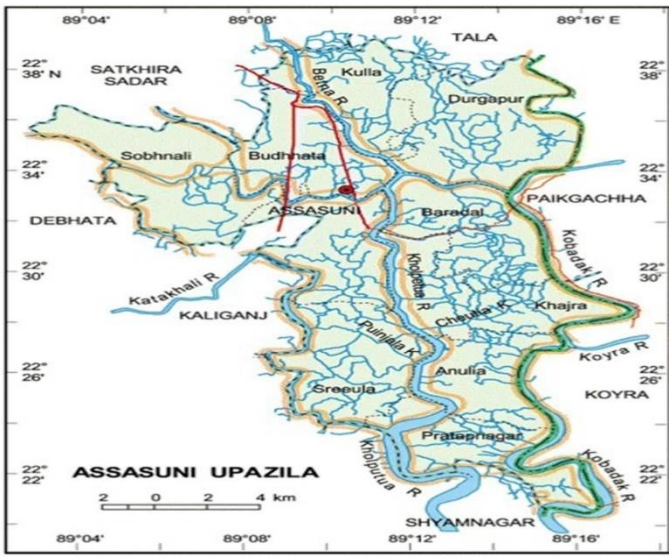
3.13 Limitations of the Methodology

The research presents multiple limitations. Initially, the limited sample size constrains statistical generalization. Secondly, the results pertain specifically to Assasuni Upazila and might not reflect all coastal communities in Bangladesh. Third, when recounting past events and living conditions, participants might encounter recall bias. Fourth, participants' readiness to share personal experiences may be affected by cultural sensitivity related to reproductive and mental health. Even with these constraints, the qualitative method offers deep understanding of the experiences of women working in shrimp farms.

3.14 Chapter Summary

This chapter described the qualitative approach used in the research. The study utilized an interpretivist philosophy, an inductive methodology, and a qualitative case study framework. Data were gathered via in-depth interviews, Key Informant Interviews (KII's), case studies, observations, and secondary sources, and examined through thematic analysis. Ethical principles and trustworthiness measures were maintained throughout the research process. The next chapter presents the socio-economic and environmental context of Assasuni Upazila and discusses the transformation of livelihoods and shrimp farming under climate change conditions.

Chapter 4: The Study Area and Its Context



4.1: Introduction

To understand how climate change affects womens livelihoods and health we need to know about the socio-economic and environmental context of the study area. Climate vulnerability is not about the environment it is also about the local way of life, social relationships and access to resources. This chapter is about Assasuni Upazila of Satkhira district the history of shrimp farming in the area the effects of climate change and natural disasters and the socio-economic conditions of women who work in shrimp farming.

4.2 Where the Study Area Is Located

Assasuni Upazila's in Satkhira district in the south-western coastal region of Bangladesh. It is between 22°24′ and 22°43′ north latitude and 89°08′ and 89°24′ east longitude. The upazila is next to Shyamnagar Upazila to the south Tala Upazila to the north Debhata Upazila to the east and Koyra Upazila of Khulna district to the west. The area has rivers and canals including the Kholpetua, Betna and Kobadak rivers, which are important for irrigation, fishing, transportation and shrimp farming. Being close to the Bay of Bengal makes the region very exposed to cyclones tidal surges, salinity and rising sea levels. Assasuni has become one of the areas sensitive to climate change in Bangladesh due to its natural characteristics and dependence on natural resources.

4.3 Socio-Economic Characteristics

The economy of Assasuni is mainly based on farming, fishing, small businesses and wage labor. Over the thirty years' shrimp farming has replaced traditional rice cultivation because of salinity and changing market trends. Most households in the study area have sources of income including Shrimp farming, Agricultural labor, Fishing, Small businesses, Seasonal migration and Livestock rearing. Many coastal communities experience widespread poverty because of scarce job options and recurring environmental disasters. Women frequently play a crucial role in household income by engaging in informal economic activities while simultaneously handling unpaid domestic responsibilities. Education among women in rural communities is relatively low which limits their access to other job opportunities and reduces their ability to adapt during environmental crises.

4.4 Climate Vulnerability of Assasuni

The coastal region of Satkhira is widely recognized as one of the climate-vulnerable areas in Bangladesh. Assasuni faces climate-related threats that immediately impact local livelihoods and quality of life. Significant environmental issues include salinity, cyclones and storm surges, waterlogging, riverbank erosion, precipitation, increasing temperatures, and a lack of freshwater. Salinity has emerged as an ecological issue in the area. Decreased freshwater flow from rivers, along with rising sea levels, has led to higher salinity levels in surface water and farmland. This alteration in the environment has decreased agricultural output. Speeded up the growth of shrimp farming as a different livelihood approach.

4.5 Major Climate Disasters Affecting Assasuni

4.5.1 Cyclone Sidr

Cyclone Sidr inflicted harm in coastal Bangladesh and highlighted the susceptibility of coastal communities to severe weather occurrences. While the effects in Satkhira were not as devastating as in certain other districts, the cyclone affected local means of living and harmed infrastructure.

4.5.2 Cyclone Aila

Cyclone Aila is widely regarded as a turning point in the livelihood history of Satkhira. The cyclone destroyed embankments. Allowed saline water to enter agricultural lands for extended periods.Many people described Aila as the event that permanently changed agriculture in the region. Rice cultivation declined sharply while shrimp farming expanded rapidly after the disaster.Women experienced increased workloads during the post-disaster recovery period as they were responsible for household management, water collection, caregiving and income generation.

4.5.3 Cyclone Amphan

Cyclone Amphan caused damage to shrimp ponds, embankments, roads and housing infrastructure across Satkhira. Many shrimp farmers lost production and income due to flooding and saline water intrusion. Women shrimp workers reported unemployment and increased financial pressure during the recovery period.

4.5.4 Cyclone Remal

Cyclone Remal further highlighted the continuing vulnerability of communities to climate-related disasters. Damage to embankments and aquaculture infrastructure increased livelihood uncertainty and reinforced concerns regarding climate risks.

4.6 Development of Shrimp Farming in Satkhira

Shrimp farming started expanding in coastal Bangladesh during the 1980s due to increasing international demand for shrimp exports. The southwestern coastal districts of Satkhira, Khulna and Bagerhat became production zones. Several factors contributed to the expansion of shrimp farming such as export market opportunities, increasing salinity levels, declining rice productivity, government support for export-oriented aquaculture and availability of coastal land. Shrimp farming slowly supplanted traditional agricultural methods and emerged as a key source of income and jobs in Assasuni. While shrimp farming created opportunities, it also led to environmental and social shifts, such as higher soil salinity, decreased crop diversity, alterations in land ownership patterns, and changes in labor relationships.

4.7 Womens Participation in Shrimp Farming

Women often have an unseen role in shrimp farming systems. Their tasks include fry collection, preparing and distributing feed, maintaining ponds/ghers, sorting and grading, supporting harvesting, processing and drying, aiding in marketing, keeping records, and managing the farm. Numerous women also support indirectly by managing households, preparing meals for laborers, and overseeing the financial aspects of family farms.

The current research identifies three groups of women shrimp farmers: women working as wage laborers on shrimp farms, women who own or oversee shrimp farms, and wives of shrimp farmers who engage in shrimp production tasks. This wider perspective acknowledges the actual impact of women's roles in aquaculture livelihoods within Bangladesh.

4.8 Gender Roles in Coastal Households

Gender roles significantly affect labor distribution, resource access, and decision-making in coastal communities. Males typically handle land ownership, marketing tasks, negotiations, and key production choices.

Women are often responsible for household work, childcare, elderly care, food preparation, water collection, supplemental income generation. As climate change increases livelihood pressure women frequently experience an expansion of responsibilities without an increase in authority or access to resources. This phenomenon is commonly referred to as the " burden" of productive and reproductive labor.

4.9 Livelihood Transformation under Climate Change

Climate change has fundamentally transformed livelihood systems in Assasuni. Traditional livelihoods such as rice cultivation and freshwater fishing have become increasingly difficult because of salinity and waterlogging. As a result households have adopted adaptation strategies of shrimp farming, crab cultivation, poultry rearing, businesses, seasonal migration and wage labor. Women have become increasingly involved in income-generating activities to compensate for declining household earnings. However, this increased participation often occurs under conditions characterized by low wages, insecure employment and occupational health risks.

4.10 Health Risks in Shrimp Farming Communities

Women working in shrimp farms are exposed to occupational hazards. Common physical health problems including skin diseases, allergic reactions, joint pain, back pain, reproductive health complications, fatigue and weakness. Mental health challenges are also increasingly reported due to income uncertainty, fear of disasters,debt burdens,family responsibilities,stress associated with livelihood insecurity. The interaction between climate change, livelihood instability and health vulnerability creates a cycle of risk that disproportionately affects women.

4.11 Existing Adaptation Practices

Despite challenges women in Assasuni have developed a variety of adaptation strategies. These include livelihood diversification, savings groups, credit systems,rainwater harvesting,gardening, livestock rearing andcommunity support networks. Womens local knowledge and social networks play an important role in strengthening community resilience.However adaptation opportunities remain constrained by poverty, limited institutional support and gender inequalities.

4.12 Why Assasuni Is Relevant to the Study

Assasuni provides a setting for this study for several reasons.First it is among the areas severely affected by climate change in Bangladesh.Second shrimp farming is one of the livelihood activities in the region.Third women play a role in shrimp production while simultaneously experiencing significant livelihood and health vulnerabilities.Finally the area provides an opportunity to examine how change, gender relations and livelihood adaptation interact within a highly climate-sensitive context.

4.13 Chapter Summary

This chapter described the socio-economic and environmental context of Assasuni Upazila. It highlighted the increasing climate vulnerability of the region and the transformation of livelihoods from agriculture to shrimp farming. The chapter also discussed womens participation in shrimp farming gender roles, within households and the health and livelihood challenges associated with climate change.

The next chapter presents the findings of the study focusing on the experiences of women shrimp farm workers regarding livelihood changes, health impacts, gender relations and adaptation strategies.

Chapter 5: FINDINGS AND DISCUSSIONS

5.1 Introduction

This chapter is about the results of a study on how climate change affects the life and work of women who work on shrimp farms in Assasuni Upazila of Satkhira district. The study is based on ten in-depth interviews with women who work on shrimp farms and four detailed stories of their lives. These women are from groups: some work for money on shrimp farms some are wives of shrimp farmers and help with the farm work and some women own or manage their own shrimp farms.The interviews were done with women of ages. The first three interviews were with women who work on shrimp farms and are between 20 and 30 years old. The next three interviews were with women who work on shrimp farms and are between 31 and 40 years old. Two interviews were with wives of shrimp farmers who're between 41 and 50 years old.. The last two interviews featured women who are over 51 and own shrimp farms. In this manner, the research could examine how women's lives and careers vary based on their age and occupations. The study also explored the experiences of four women in depth to understand how their lives shifted following significant climate-related incidents such as floods or storms. The study looked at how their work and lives changed how their health was affected and how they took care of their families and coped with the changes. The results of the study are grouped into five sub-sections:

How climate change affects womens work. Lives on shrimp farms

How climate change affects womens health

How climate change affects womens health and wellbeing

How climate change affects women differently because of their gender

How women cope with. Adapt to the changes caused by climate change.

The results are then discussed using three frameworks: the Sustainable Livelihood Framework, Feminist Political Ecology and the Vulnerability and Resilience Framework to understand the climate change impacts, on women shrimp farm workers in a way.

5.2 Profile and Distribution of the Participants

Distribution of IDI Participants

IDI Number	Participant Category	Age Group
IDI-1 to IDI-3	Shrimp laborer	20–30 years
IDI-4 to IDI-6	Shrimp laborer	31–40 years
IDI-7 to IDI-8	Wife of shrimp farmer	41–50 years
IDI-9 to IDI-10	Woman shrimp entrepreneur	51 years and above
Total	10 participants	Four age groups

Table: 4 Distribution of IDI Participants

Distribution of Case Studies

Case Study	Participant Type
Case Study 1	Young shrimp laborer
Case Study 2	Middle-aged shrimp laborer
Case Study 3	Wife of shrimp farmer
Case Study 4	Woman shrimp farm owner

Table: 5 Distribution of Case Studies

Women shrimp farm workers are a part of this study. Women do lots of jobs. They work for money. They also help their families. Some women are in charge of the farms. Some are the wives of men who farm shrimp. Some women even own the farms. Women shrimp farm workers do things like get the ponds ready collect the baby shrimp feed them pick them when they are ready sort them process them help sell them keep track of things and take care of the house. Women working on shrimp farms engage in various tasks. Female workers at shrimp farms engage in the preparation of ponds. They also engage in activities, such as gathering and feeding. Women who work on shrimp farms also assist with harvesting and sorting. They help with promotion. They maintain records. Women shrimp farm workers excel in household management.

Theme 1: Climate Change, Livelihood Transformation and Working Conditions

5.3 Climate Change and the Transformation of Traditional Livelihoods

The results show that climate change has greatly Modified conventional livelihood systems in Assasuni. Most of the participants said that, ‘We consider extreme heat during summer, extreme cold during winter, unseasonal rainfall, increased water salinity, and the frequent occurrence of cyclones and storm surges as manifestations of climate change.’ Participants reported a slow decrease in agriculture and freshwater-related livelihoods due to the impact of salinity intrusion, waterlogging, cyclones, and shifting environmental conditions on crop yields. The accounts from respondents indicate that numerous households formerly relied on rice farming, vegetable growing, freshwater fishing, and agricultural wage work. Nonetheless, rising salinity and frequent climate shocks rendered these sources of income progressively harder. Multiple participants recognized Cyclone Aila in 2009 as a significant milestone in their livelihood narratives. Due to damage to embankments and the infiltration of saline water, agricultural land was affected for extended durations, complicating rice cultivation

This finding is consistent with the Sustainable Livelihood Framework. Climate-related shocks have affected natural capital, particularly agricultural land and freshwater resources, which in turn have influenced household livelihood strategies. The shift toward shrimp farming represents an



attempt by households to reorganize their livelihood portfolios in response to environmental pressure.

However, shrimp farming should not automatically be considered a secure adaptation strategy. The findings indicate that women may gain employment opportunities while simultaneously becoming exposed to insecure work, saline water, heat, low wages, and occupational health risks.

5.4 Increasing Contribution of Women's Income

The IDIs show that women are now contributing a lot more to the money their families make at home. Women are doing things related to shrimp like getting the ponds ready collecting the baby shrimp feeding them helping with the harvest, sorting and processing. Some women are also taking care of chickens, running businesses and doing other things to help their families make more money.The fact that more women are working to make money is closely related to the fact that their families are not making money to get by. When the money from farming is not certain families have to rely on the money women make.

One of the women Salma Akter talked about how things have changed.

She said:

> ***"Before women mostly stayed at home. Now every family has women working on the shrimp farms because one persons income is not enough to take care of the family."***

This shows that women working and making money does not always mean they are in a financial situation. Sometimes women have to work because their families need the money.So what we found out is interesting. Because of climate change women need to contribute more to their familys money.. Just because women are making more money does not mean they have more control, over the money or can make big decisions.

5.5 Changes in Working Conditions

The people who work in shrimp farming said that their work life has changed a lot. They have to work for hours they have to be in salty water for a long time it is really hot the work is very hard they do not have a regular job they do not get paid well and women get paid less than men for doing the same job.The information we have shows that women get paid less than men for doing the work in shrimp farming. For example women get paid around BDT 500 per day to take care of the ponds. Men get paid BDT 700 per day to do the same job. Women get paid BDT 600 per day to collect the shrimp. Men get paid BDT 800 per day to do the same thing. Women also get paid BDT 500 per day to sort and clean the shrimp. Men get paid BDT 700 per day to do the same work.This shows that even though women are working more they are still not treated equally. Women do a lot of work in shrimp farming. They are not paid well and they do not have a lot of power.From the point of view of Feminist Political Ecology this is a deal because the way people live is affected by how society works. Climate change is making it harder for people to make a living but it is affecting women more because they do not have control, over things they get paid less. They do not have a strong voice.

Theme 2: Physical Health Impacts

5.6 Salinity Exposure and Skin Problems

Exposure to salinity emerged as a significant physical health concern. Those affected reported experiencing skin irritation, itching, allergies, foot infections, fungal problems, and burning sensations after prolonged water exposure. The existing research results indicate that skin issues were frequently mentioned by participants in the study. Rina Begum recounted her experience: "After being in water for several hours, my hands and feet feel like they are burning." At times, the skin sheds layers. "This narrative illustrates how an environmental factor becomes a health hazard. Salinity is not an environmental problem; for women engaged directly in shrimp ghers, it is an aspect of their everyday work surroundings

5.7 Musculoskeletal Problems and Physical Exhaustion

Musculoskeletal issues are a concern for women's health. Women report experiencing pain such as knee pain, neck pain, joint issues, weakness, and significant fatigue. These issues arise due to long hours of work, carrying heavy loads, bending frequently during harvesting, and then doing household chores after returning from the shrimp farms.

Ayesha Khatun mentioned

"After returning home from work, I still need to prepare meals and complete household tasks."

At times, my body aches so much that I struggle to get a good night's sleep. This indicates that

health issues for women are not solely due to their employment at the shrimp farm. Issues related to women's health arise from all the tasks they handle at home. Women perform two types of work: paid employment such as at the shrimp farm and unpaid labor like caring for the family. The Feminist Political Ecology viewpoint is relevant in this context as both women and men engage in various types of work. This implies that women are more prone to illness due to their job demands. Women can experience the same situation in various ways based on the amount of effort they exert at home and on the shrimp farm.

5.8 Reproductive and Menstrual Health

Certain women believe that prolonged exposure to water may lead to issues with conception and menstruation. They reported experiencing problems such as their period being late, getting infections when using the restroom, and feeling discomfort in their regions. Some women found it difficult to discuss these issues as they feared offending others. The reality that individuals become upset when discussing women's health is significant. It indicates that women are influenced not only by the water and air surrounding them but also by societal expectations regarding what they should or shouldn't discuss. So people who make plans to help women stay healthy should think about their health including having babies and getting their period. They should not just focus on injuries that you can see or sickness that you can feel. Womens health is more than that. Climate change and work health programs should consider womens health, like problems, with their period as part of keeping them safe and healthy.

5.9 Heat Stress, Dehydration and Fatigue

The temperature is going up. That is a big problem for people at work. When people work outside in the sun they get dehydrated feel weak, dizzy get headaches and feel tired. This is especially hard for people who have to do physically demanding work when it is very hot.This shows that climate change is making things worse for people at work. Women who work in water and do hard physical work are also feeling the heat. They are already working in an environment and the heat is making it worse.This is like what the Vulnerability and Resilience Framework says. It says that when people are exposed to something like heat and they are also sensitive to it that is a big problem. Women who work outside are exposed to the heat because of their job and they are also sensitive to it because they do not make a lot of money they have to do work they do not get enough rest and they do not have the right equipment to protect themselves from the heat. Climate change and the heat are problems for women, at work.

Theme 3: Mental Health and Psychological Wellbeing

5.10 Economic Anxiety and Livelihood Insecurity

The results show that climate change has an effect on womens health because of financial worries and direct dangers from the environment.The people involved shared worries about diseases in shrimp, storms, changes in prices paying off debts. What will happen to shrimp farming. For women who run businesses and for women whose families rely a lot on shrimp farming one weather-related event can put all the things the family has saved at risk.

Rokeya Parvin said that

"A storm can destroy everything we have worked years to build."

This shows the effects that come from facing climate problems over and over. The worry is not about things getting broken but also about losing money, things, jobs and the safety of the home. Because of this mental health needs to be looked at in the picture of not having a stable way to make a living. The results back up the idea in the thesis that stress, from climate issues is strongly linked to not knowing if you will have money, bad weather, debts and the things you have to take care of at home.

5.11 Fear of Future Disasters

Repeated experiences with cyclones have created a feeling of uncertainty among the people involved. Weather warnings can bring back memories of disasters and worries about losing their way of life in the future.

Kakoli Das explained,

"When the radio says there is a storm, in the Bay of Bengal I cannot sleep at night."

This shows that the mental effects of climate change can keep happening when no disaster is taking place. Past events affect how people think about dangers.The Vulnerability and Resilience Framework explains this situation because resilience does not mean that people are free of fear or feeling unsafe. Instead people can keep going and adjusting while dealing with a lot of stress.

5.12 The Double Burden of Productive and Reproductive Labor

The study also shows that there is a connection, between how much climate affects people and the heavy load that women have to deal with. Women have to do a lot of things at the time. They have to help earn money for their family. They still have to do all the work at home. This includes working on shrimp farms cooking meals taking care of kids taking care of family members getting water and managing the household.When women have to do both paid and unpaid work it makes them very tired. Stressed out.This is a deal when we think about how men and women are treated differently. Climate change might make it so that women have to do more work to take care of their family but it will not change the fact that women are still expected to do most of the

household work. Climate change and womens double burden are closely. Womens double burden is a big problem that we need to think about when we talk about climate change and how it affects women.

Theme 4: Gender Dimensions of Climate Vulnerability

5.13 Women's Participation Without Equal Decision-Making Power

One big thing we learned is that when women are more involved in the economy it does not mean they have a say in the decisions that are made. Women do a lot of work. Bring in money from shrimp farming but the men in the household usually make the big decisions about things like leasing land investing money, borrowing and selling shrimp.

Salma Akter said it simply:

"Women work in the farms but men make the decisions."

This is what Feminist Political Ecology is talking about. The idea that who gets to make decisions about the environment and who gets to use its resources is not fair to women.Women may know a lot about farming and how to take care of their households. They still do not have much control, over the things they need to make their plans work like shrimp farming resources.

5.14 Unequal Access to Resources

The people who answered the questions said they do not have access to money, training, help from the government and advice on farming. Women who own their businesses were doing a little better than women who work for a salary but they still had problems because they are women.This shows that women are able to deal with problems in ways depending on what they do for a living. A woman who owns a shrimp farm has control over her business than a woman who works for a salary. A woman who has money saved friends she can ask for help or access to money from a bank may be able to handle problems like bad weather.The Sustainable Livelihood Framework helps us understand these differences because it looks at how things, like money, equipment, knowledge, natural resources and social connections are shared among people.

5.15 Invisible and Undervalued Labor

Another significant observation is that women frequently describe their role as "assisting" or "laboring." This illustrates standards that undervalue women's contributions, particularly in family-oriented shrimp farming. The lack of recognition for women's labor has consequences. If women's contributions go unrecognized, their efforts may fail to secure control over financial resources, possessions, or decisions they make

Theme 5: Coping and Adaptation Strategies

5.16 Livelihood Diversification

People showed they could deal with situations even when things were not going well for them. They found ways to adapt and make things better. One big way they did this was, by trying things to make a living.The people they live with started doing things like raising chickens raising ducks growing vegetables working for wages and moving to a different place for a few months at a time.These new things they did helped them not have to rely much on just shrimp farming to make a living.When people try ways to make a living it helps them have a better life because they are trying to make their situation better when one way of making a living is not working out.Just because women are trying different things does not mean they have a safe and secure life. Sometimes trying things means they have to work even more and this can make their life even harder.

5.17 Savings, Credit and Informal Financial Support

Women also used savings groups, non-profits informal lenders, family members and other local financial methods. Savings groups were especially helpful after disasters.These methods show how important social connections and money are. When banks or financial institutions are hard to access, women seek assistance from informal networks to address unexpected issues that impact their livelihoods. Such groups are crucial for women lacking their own financial resources.

5.18 Community Support Networks

Support from the community was another key adaptation strategy. Participants recounted help from neighbors, family, and community members in times of crisis through sharing food, fixing damaged homes, providing childcare, lending money, and offering information and support. These actions illustrate that resilience is not just a personal journey. It is also generated through social connections and community collaboration.

5.19 Case Studies

Case Study 1: Young Shrimp Worker - Ajmira Khanom (Pseudonym)

Ajmira Khanom is a 26-year-old woman. Her life has been profoundly influenced by change, poverty, and restricted job opportunities. She came from a family that has a long-standing tradition of cultivating rice. As a child, farming provided food and income for her family. Her parents labored diligently to maintain their rice paddies. They believed that agriculture would consistently provide for their family. However, her familys situation changed a lot after Cyclone Aila. The cyclone damaged their land and made the soil and water salty. Because of this growing rice became very difficult. Eventually could not provide a reliable income for her family. Losing their land meant more than just losing crops. It also reduced their economic security and changed the

kinds of work they could do. Her family started to depend on shrimp farming and other activities related to shrimp. Ajmira Khanom wanted to study when she was a kid and a teenager. She hoped that education would help her get an more secure job.. Her familys economic problems made it hard for her to continue studying. As her familys income decreased she felt pressure to contribute financially. When she was 18 years old she started working in shrimp related labor. She did not choose to be a laborer just because she wanted to. It was because of the economic problems caused by environmental change that affected her family. As a woman working in shrimp production Ajmira Khanoms daily life became very physically demanding. She had to stand for periods carry things work in wet and muddy environments and do repetitive tasks. Over time she got skin problems and back pain. These health problems affected her comfort and ability to work. She could not stop working because there were not many other job opportunities available to her. Her health problems were connected to her vulnerability. She had to keep working even though she had physical difficulties. Ajmira Khanom's situation is also affected by her gender. As a woman from a low income household she does not have many opportunities to get a different job. Not being able to continue her education also reduces her access to better paid jobs. Even though shrimp farming has provided an income it has not necessarily provided long term security. Her experience shows how climate related livelihood changes can affect womens educational opportunities and future employment prospects. Apart from her job Ajmira Khanom has tried to improve her family's livelihood through activities. She raises chickens, which can provide eggs, meat or occasional income. She additionally sets aside money by means of a savings group. These tasks might appear minor when compared to shrimp farming. They serve as essential methods for her family to adjust. Saving funds can assist her family in managing costs, while keeping chickens offers an extra income stream that isn't solely reliant on shrimping. Looking to the future Ajmira Khanoms life shows both difficulties and aspirations. She started working in shrimp labor because her family needed income. Her earlier desire for education suggests that she may still value learning and greater economic independence. Her experience shows that young women living in areas affected by climate change may enter physically demanding work because environmental change has limited their familys choices. Her story shows the connection between climate change, poverty, gender, education, insecure employment and occupational health. Ajmira Khanoms life is not a story, about a woman working in shrimp farming. It is a story of how a changing environment can affect a young womans education, employment, health and aspirations.

Case Study 2: Middle-Aged Shrimp Laborer- Anjuara

Anjuara is a 37-year- woman. She has been working with shrimp for than fifteen years. Her life is an example of how people adapt to changes in the environment and the economy.Anjuara grew up in a family that depended on farming. Farming gave them food and money. Her family did farming during times of the year. Her husband also worked in farming. They thought farming would always be a part of their lives.Over time the environment started to affect farming. Crops did not grow well the soil became salty and saltwater got into the fields. This made it hard for Anjuaras family to keep farming. What was once a familiar way of life became uncertain.As farming got harder shrimp farming became one of the ways to make money in the salty conditions. So Anjuara started working with shrimp. She became a person in her household because she brought in money.Anjuara's decision to work with shrimp was not a temporary job. It was a long-term change in her life. For than fifteen years she has been working with shrimp. She has seen the bad sides of shrimp farming. Shrimp farming gives her a chance to earn money when farming is hard. The money she makes can change depending on many things like the weather, disease and market prices.This means that even though Anjuaras family has a way to make money they are not always secure.As Anjuara got older she took on responsibilities. She uses her money to help with household expenses. She also has to take care of her family. One of her worries is paying for her childrens education. Education is important to her because she wants her children to have opportunities that she did not have. School expenses add pressure to the household budget. When there is not money families may have to borrow money or cut back on spending.Debt is a part of Anjuaras life. Loans can help families deal with problems but paying back the loans can be stressful when the income is not regular. The pressure to pay back loans pay for education and take care of the household can be very hard on a person.Anjuaras story shows that not having a livelihood is not just an economic problem. It can also affect a person's well-being, relationships and hopes for the future.Anjuara said that her family used to depend on farming. Now they depend on shrimp and uncertainty. This shows how her life has changed. Shrimp farming has given her an alternative to farming. It has not made her life secure. Instead the risks have changed. Before her family was affected by farming risks. Now they are affected by the uncertainties of shrimp farming, environmental change, debt and market conditions. As a middle- woman Anjuaras body has been affected by many years of hard work. She does not have a lot of time to rest because she has to take care of her household.. She keeps working because her income is important to her family. Anjuaras life shows that a womans income can be crucial to her households survival. It does not always make the household secure. Her money helps pay for food, education, debt and other expenses. The unpredictable income can still create insecurity. Her story shows the connection between climate change changes, in livelihood, womens economic contribution, debt,

family responsibilities, childrens education and psychological pressure. It also shows that adapting to climate change can give people ways to make a living in the term but it can also create new uncertainties.

Case Study 3: Wife of a Shrimp Farmer- Kini Begum

Kini Begum is forty six years old. She is a different kind of woman in the shrimp farming economy. She is not like the women who work for money in the shrimp farms. Kini Begum helps her family with the shrimp production. Also takes care of the household and the farm. She does a lot of work at home like cooking and cleaning and taking care of her family.Kini Begum grew up in a village where people had to work to survive. They had to grow their food and take care of their families. From an age she learned how to do all the household work like cooking and cleaning and taking care of her family. When she got married and had her family she had to do even more work. Her work in the shrimp farm started when she got married and had children. Even though she does not get paid for all the work she does she is very important to the familys economy. She helps with the shrimp production. Also does all the household work. She has to cook and clean and take care of her family. Now because of the changes in the weather her work has become even harder. The weather is. It is affecting the food production and the water. This means Kini Begum has to work harder to take care of her family. She has to balance her work in the shrimp farm and her work at home. Her day does not end when she finishes her work in the shrimp farm. She has to go and cook and clean and take care of her family.This is what we call a burden. Kini Begum has to do two kinds of work. One is the work that helps her family earn money, like the shrimp production. The other is the work that she does at home like cooking and cleaning and taking care of her family. Both kinds of work are important for the familys survival.. The work she does at home is not paid and it is not valued. All this work is affecting Kini Begums health. She is in pain. She is tired all the time. She does not have time to rest. This shows that the changes in the weather are not just affecting the familys economy but their health. Kini Begum is a strong woman. She has found ways to make her familys life better. She has started raising ducks, which give her family eggs and meat and also some extra money. She has also started growing vegetables in her backyard. This helps her family have food. It also helps her reduce the money she spends on vegetables. Kini Begum also collects rainwater, which helps her family during the times when there is not water. This shows that people do not need a lot of money or help from outside to adapt to the changes in the weather. Women like Kini Begum use their knowledge and experience to find ways to survive.

Kini Begums story shows us that we need to recognize the work that women like her do. We need to see that their work is important not the work they do to earn money but also the work they do

at home. Their work helps their families survive. It also helps them adapt to the changes in the weather. Kini Begums story also shows us that women are not just victims of the changes in the weather. They are women who can find ways to adapt and survive. They use their knowledge and experience to find solutions to their problems.. We also need to see that women, like Kini Begum are tired and they need help. They need to be recognized and valued for the work they do.

Case Study 4: Woman Shrimp Farm Owner - Nadu

Nadu is a 49-year- woman. She represents women who have moved beyond working for a wage and have gained some control over the things that help them make a living. Nadu. Manages a small shrimp farm on government land. Her situation is different from women who work as laborers or do work on their husbands shrimp farms. As the owner Nadu has control over the decisions she makes about her farm the money she invests and how she makes a living.. Owning the farm does not completely protect her from the bad effects of climate change. Nadu's life has been affected by environmental disasters. She has lived through cyclones like Cyclone Sidr, Cyclone Aila and Cyclone Amphan. These events have hurt her farm, the area around her farm her income and the security of her household. For Nadu climate change is not something she hears about. It is something she experiences every time her livelihood and daily life are disrupted. Before Nadu owned her shrimp farm she did not have as many opportunities to make a living. Like women in rural areas the work she did was closely tied to her household and the resources available in her area. Over time Nadu gained experience managing her activities and eventually took control of a small shrimp farm. Owning the farm gave her a position because she could make her own decisions about how the farm was run, instead of relying on someone else. However Nadus farm is still vulnerable to hazards. Cyclones can damage the walls around her ponds the equipment and the systems she uses to produce shrimp. Flooding and salty water can also affect her shrimp production. A big environmental event can result in Nadu losing the income she expected. The money she already invested. For someone who owns a farm it can be very hard to recover from such a loss because she does not have a lot of money. Nadu has worked to address these risks by broadening and enhancing her means of support. One thing she has accomplished is beginning to cultivate crabs. Raising crabs provides her with an additional income source and decreases her reliance on shrimp farming. She has also attempted to reinforce the barriers surrounding her ponds. This method helps adjust to climate change as more robust walls can lessen the effects of flooding and storms. Nadu states that climate change has altered her lifestyle. This shows the transformations that her family and neighborhood have experienced. Environmental change has influenced not just production but also the choices she makes regarding risk-taking, financial investments, expenditures, and future planning. Nadu must consider if investing in her

farm will yield returns and if a future cyclone could ruin her investments. Currently, owning her farm grants Nadu a degree of power that many other women lack. She has the authority to manage her farm, determine priorities, and adjust to alterations.

A woman can own assets and still be exposed to climate hazards, financial losses and insecure markets. The difference is that owning something can give her power to make decisions and develop strategies to adapt. Nadu's life shows both her vulnerability and her ability to take action. She has experienced climate-related shocks but she has also developed practical ways to protect her livelihood. Her story shows how womens control over resources can influence their ability to respond to climate change. It also highlights the importance of seeing women not as vulnerable people but also as entrepreneurs, farm managers, decision-makers and people who can adapt to change. The stories of four women, including Nadu show positions of women in the shrimp farming industry. There is Ajmira, a female laborer who had to stop her education because of financial pressure at home. There is Anjuara, a middle- laborer who has made a livelihood transition that has brought her both income and uncertainty. There is Kini, a wife who contributes labor and has a double burden of productive and reproductive responsibilities. There is Nadu, a woman farm owner who has more decision-making power but is still vulnerable to environmental and economic shocks.

These stories suggest that climate change does not affect all women in the way. Factors like age, marital status, household position, education, access to assets, employment status, health and control over resources shape how women experience climate-related changes in their livelihoods. At the time all four stories show that womens lives are closely connected to the shift from agriculture to shrimp farming. This shift may provide a response to increasing salt levels in the water but it also introduces new forms of insecurity including unstable income, physical demands, debt, environmental risk and dependence on production systems that are sensitive, to climate change.

Vulnerability scale of the four case study

Cases	Participant	Exposure	Sensitivity	Adaptive Capacity	Overall
Case 1	Ajmira Khanom – Young shrimp laborer	Very High	Very High	Low	Very High
Case 2	Anjuara – Middle-aged shrimp laborer	High	Very High	Low–Moderate	High
Case 3	Kini Begum – Wife of shrimp farmer	High	High	Moderate	High
Case 4	Nadu – Woman shrimp farm owner	High	Moderate	High	Moderate

5.20 Cross-Case Analysis

The four case studies reveal several common patterns. All four cases illustrate that environmental changes related to climate have impacted livelihood pathways. Conventional farming has become more unpredictable, whereas shrimp cultivation has gained more significance. Secondly, the examples show variations based on job status. Wage workers like Ajmira and Anjuara face heightened job instability and possess restricted authority over their work environments. Kini, as the spouse of a shrimp farmer, plays a larger role in managing the home and farm but faces a notably heavy double burden. As a farm owner, Nadu has more authority over productive resources but also risks significant asset losses in the event of disasters. Third, health hazards take different shapes but are tightly linked to living conditions. Exposure to saline water, engaging in physical work, high temperatures, and extended hours of work pose risks to physical health. Economic instability, indebtedness, experiences of disasters, and unpredictability generate mental strain. Fourth, adaptation strategies vary based on resource availability. Wage laborers depend more on savings groups, poultry, and additional income. Women in households engage in gardening, raising ducks, and collecting rainwater. The farm proprietor can expand into crab farming and allocate resources for physical security. These disparities illustrate that women ought not to be regarded as a uniform group. Factors such as age, job, ownership situation, household role, and resource accessibility influence their susceptibility and ability to adapt.

5.21 Discussion of Findings in Relation to the Research Objectives

Objective 1: Effects on Livelihood and Working Conditions

The study found that climate change has really changed the way women in Assasuni make a living. Things like salt water getting into the land big storms, water covering the land and crops not growing well have made women more likely to work in shrimp farming.Women are now working more in shrimp farming. The jobs are not very secure and are very hard on their bodies. The study shows that women have to work for a long time are in salt water for too long deal with extremely hot temperatures do not have regular jobs and get paid differently because of their gender.So climate change has given women in Assasuni some ways to make a living but it has also created new problems that make their lives harder and this is all because of climate change and its effects, on womens livelihood systems and shrimp farming. Women who work with shrimp have a lot of health issues. These health issues are because of the work they do and the environment they are in. Women shrimp workers get skin irritation and allergies. They also get infections and pain in their backs and joints. Some women shrimp workers feel tired all the time. Get dehydrated. They get headaches. Experience difficulties with their menstrual health. The research indicates that climate change and the labor of women shrimp workers can negatively impact their health. As

temperatures rise and the water becomes saltier, the health risks increase. Female shrimp laborers are already required to perform manual tasks on shrimp farms. Thus, incorporating climate change into the equation worsens their health. Women shrimp workers and the effects of climate change are interconnected. Climate change exacerbates health risks for women involved in shrimp farming.

Mental Health Consequences

The results show that mental health is a significant yet frequently neglected aspect of climate vulnerability. Economic unpredictability, debt, concerns about cyclones, potential loss of income, expenses for children's education, and the duty of ensuring household welfare add to stress and anxiety. Anjuara and Nadu's experiences clearly demonstrate how uncertainty in livelihoods and frequent disasters can create psychological insecurity.

The research validates that climate vulnerability varies by gender. Women play a vital role in shrimp production and supporting household survival but often have limited control over land, income, credit, training, and key household decisions. The research additionally reveals the dual burden of both productive and reproductive work. Women are taking on more income-generating jobs while still managing responsibilities for cooking, caring for children, gathering water, and maintaining the household. Hence, the susceptibility of women cannot be attributed solely to environmental factors. It arises from the interplay between environmental change and gender dynamics, societal norms, unequal access to resources, and power hierarchies.

Objective 2: Coping and Adaptation Strategies

The research revealed that women engage with climate-related issues instead of staying as passive victims. Key approaches such as diversifying livelihoods, raising poultry and ducks, cultivating crabs, growing vegetables, operating small businesses, forming savings groups, informal lending, harvesting rainwater, providing community support, and securing shrimp farms physically. These approaches show considerable local adaptability. However, the capacity to adjust is not the same for all. Women who have increased access to land, income, savings, social connections, and productive resources are better positioned to implement effective adaptation strategies.

5.22 Discussion on linking theoretical framework

5.22.1 Sustainable Livelihood Framework

The results provide strong evidence for the Sustainable Livelihood Framework. Climate change serves as an external disturbance that impacts multiple livelihood resources at once. Natural capital is influenced by salinity, water saturation, and decreasing agricultural yield. Human capital is influenced by physical ailments, exhaustion, and diminished work ability. Financial capital is influenced by fluctuating income, debt, and losses in livelihood. Physical capital is susceptible to

damage from cyclones and water-related issues. Social capital gains significance through support from savings groups, family, neighbors, and the community. Women adapt to these changes by broadening their sources of income

5.22.2 Feminist Political Ecology

The results also strongly back Feminist Political Ecology. Climate change impacts women and men differently. Women's susceptibility is influenced by unequal resource access, gendered labor divisions, wage disparities, and limited decision-making authority. The phrase "Women labor on the farms while men hold the power" illustrates this contradiction vividly. Women participate in shrimp farming but often lack control over land, investment choices, marketing, or household finances. Consequently, climate vulnerability is more than just an environmental state

5.22.3 Vulnerability and Resilience Framework

The Vulnerability and Resilience Framework clarifies the coexistence of vulnerability and agency. The women participating in this study face significant exposure to salinity, heat, cyclones, waterlogging, and various other risks. Low income, job-related exposure, restricted access to healthcare, and significant household duties amplify their sensitivity. Simultaneously, they show adaptive capacity by diversifying their livelihoods, saving, utilizing social networks, harvesting rainwater, raising poultry and livestock, cultivating crabs, and employing various localstrategies. The situation in Nadu specifically illustrates that resilience does not imply a lack of vulnerability. Despite being a farm owner, she is still vulnerable to losses from cyclones. Nonetheless, her expansion into crab farming and investment in pond preservation illustrate adaptive agency.

5.23 Triangulation with Recent Secondary Evidence

The qualitative findings are supported by broader evidence from government and recent research.

Triangulation of Major Findings

Qualitative finding	Supporting secondary evidence	Interpretation
Shrimp farming is increasingly important	DoF reports 19,131.35 MT shrimp/prawn exports worth Tk 2,117.67 crore in 2023–24	Demonstrates national economic importance of shrimp
Cyclones threaten livelihoods	Government data reported through UNICEF recorded 221,176 people affected in Satkhira during Remal, with 1,192 partially and 276 fully damaged houses	Provides district-level evidence of disaster vulnerability
Salinity affects women's health	2026 coastal study reported menstrual and skin-health problems associated with salinity	Supports participants' health narratives
Salinity and reproductive health are connected	2025 study in Gabura, Shyamnagar examined reproductive-health impacts of salinity	Provides geographically relevant comparison
Women's health is gendered	Recent coastal studies emphasize environmental and social dimensions of women's health	Supports Feminist Political Ecology interpretation
Women adapt through multiple strategies	Existing coastal research identifies diversification, savings and social networks	Supports resilience findings

Table 6: Triangulation of Major Findings

The Government of Bangladesh's cyclone information reproduced in UNICEF's situation report recorded 221,176 affected people in Satkhira, 1,192 partially damaged houses and 276 fully damaged houses following Cyclone Remal.

These data do not demonstrate the impact on the study's individual participants, but they provide an important broader context for their accounts of repeated disaster exposure.

Key Informants Interview

KII -1: Dr. Tarun Kumar Bishwas, Local Doctor

Doctor informed me that women involved in shrimp farming in Assasuni face several health problems associated with prolonged exposure to saline water, extreme heat and physically demanding work. Common problems include skin irritation, allergies, back and joint pain, fatigue and weakness. Women may also experience reproductive-health difficulties because of inadequate access to safe water and sanitation. It is mentioned that most of the woman do not disclose the

Uterus related diseases. In addition, livelihood insecurity, household responsibilities, disaster experiences and financial pressure can contribute to stress and anxiety.

The doctor recommends improving occupational safety for women shrimp workers through protective equipment, safe drinking water, sanitation and adequate rest facilities. Affordable and accessible healthcare should be strengthened, particularly services related to women's reproductive and mental health. At least one or two mobile healthcare center should have established in every union. Regular health-awareness programmes should also be organized by government or NGO to educate women about the risks of prolonged saline-water exposure, extreme heat and physically demanding work.

KII-2: Mr. Rabiul Islam, NGO Official

A local NGO officer of 25 years of working experience, reported climate change has increased livelihood insecurity in Assasuni by affecting agriculture, freshwater resources and other traditional occupations like husk paddy, jute related work. As a result, women are increasingly participating in shrimp farming and other income-generating activities. However, many women continue to face low wages, insecure employment, difficult working conditions and health risks. Their increased economic participation also adds to their existing household responsibilities, creating a double burden of productive and reproductive work.

He recommends livelihood diversification, skills development, savings groups and alternative income-generating activities to reduce women's dependence on insecure shrimp-farm employment. NGOs should also provide health-awareness programmes, occupational-safety training and support for women during climate-related disasters. Greater coordination between NGOs, local government and health institutions is needed to improve women's health, livelihoods and climate resilience.

KII 3: S. M. Hossain, Union Parishad Chairman

Mr. Hossain says women in Assasuni are particularly vulnerable to cyclones, salinity, waterlogging and other climate-related hazards. Climate-related livelihood losses increase women's household responsibilities because they often manage food, childcare, water collection and other domestic activities while also contributing to household income. Women shrimp workers are additionally exposed to saline water, heat and difficult working conditions. These combined pressures can negatively affect their physical and mental well-being. The paper identifies Assasuni as highly exposed to salinity, cyclones, storm surges and waterlogging.

The Chairman recommends strengthening local healthcare, safe-water and sanitation facilities and ensuring that women's needs are considered in disaster-management programmes. Government

and NGOs should provide livelihood support, skills training and alternative employment opportunities for women. Women's participation in local adaptation and decision-making should also be increased so that climate-resilience programmes reflect their specific health, livelihood and household needs.

Triangulation of the Three KIIs

The three KIIs provide complementary perspectives on women's health and climate vulnerability.

Major Findings	Doctor	NGO Official	UP Chairman
Salinity affects health	✓	✓	✓
Skin problems	✓✓	✓	✓
Back/joint pain	✓✓	✓	-
Fatigue/weakness	✓✓	✓	✓
Reproductive-health concerns	✓✓	✓	✓
Mental stress/anxiety	✓✓	✓✓	✓
Livelihood insecurity	✓	✓✓	✓✓
Women's double burden	✓✓	✓✓	✓✓
Healthcare barriers	✓✓	✓	✓✓
Need for adaptation	✓	✓✓	✓✓
Need for institutional support	✓	✓✓	✓✓

Table: 7 Triangulation of the Three KIIs

The three people we talked to who are very knowledgeable about this topic say that the health of women in Assasuni is really affected by climate change the conditions they work in at the shrimp farms not having an income and the jobs they have to do at home because of their gender. The doctor we talked to says that this is having effects on their health. The person from the - government organization says that it is affecting how they make a living and how they are able to adapt. The Chairman of the Union Parishad says that they need services and support from the local institutions. This is similar to what we found out from the in-depth interviews with women. The women told us about their experiences and the knowledgeable people we talked to gave us a professional view of what is happening. The women said they have to deal with water, hot weather, hard work and long hours. The health professional said these things are bad for their health. The women also said they feel anxious and stressed about money, which's something the non-government organization and the local government people also talked about. They said it is because they do not have an income and they have to deal with natural disasters and a lot of work, at home.

5.24 Overall Discussion

The findings demonstrate that climate change has transformed the lives and livelihoods of women involved in shrimp farming in Assasuni. The shift from agriculture to shrimp farming is not just an economic change; it also represents a social, gendered, and health-related change. The research highlights a fundamental contradiction. Shrimp farming offers a significant source of income as traditional agriculture faces growing challenges from salinity and climate-related issues. At the household level, women are increasingly contributing to income. Nevertheless, their greater economic contribution does not automatically produce greater empowerment. Women continue to have limited access to resources and decision-making authority while carrying a disproportionate share of domestic responsibilities.

The findings also demonstrate that women are not merely victims of climate change. They actively develop coping and adaptation strategies. Their resilience is visible through livelihood diversification, savings, social networks, rainwater harvesting, poultry and livestock rearing, gardening, crab cultivation, and farm protection.Therefore, the study suggests that climate vulnerability in Assasuni is best understood as the interaction of environmental exposure, livelihood insecurity, occupational health risks, gender inequality, and limited access to resources.The findings are consistent with the three theoretical perspectives adopted in this study. The Sustainable Livelihood Framework explains changes in livelihood assets and strategies; Feminist Political Ecology explains gendered access to resources and decision-making; and the Vulnerability and Resilience Framework explains the relationship between exposure, sensitivity, adaptive capacity, and resilience.

5.25 Chapter Summary

This chapter presented the findings from 10 IDIs and three key informants interview and four case studies concerning women involved in shrimp farming in Assasuni, Satkhira. The findings demonstrate that climate change has significantly transformed livelihood systems, working conditions, health, gender relations, and adaptation practices.The study found that salinity intrusion, cyclones, waterlogging, and increasing heat have reduced the reliability of traditional agricultural livelihoods and increased dependence on shrimp farming. Women have become increasingly important contributors to household income, but they continue to experience low wages, insecure employment, occupational hazards, and unequal decision-making power.Physical health problems include skin irritation, allergies, fungal infections, musculoskeletal pain, fatigue, heat-related problems, and reproductive health concerns. Mental health issues encompass financial worries, fears connected to disasters, stress from debt, and emotional fatigue. The results also reveal a notable gender aspect. Women face a dual challenge as they juggle work that generates income along with household and caregiving duties. Their heightened economic

involvement has not automatically led to equal authority over resources or decision-making processes. Ultimately, the research demonstrates that women have considerable adaptive ability. They broaden their income sources, engage in savings groups, raise poultry and ducks, grow crabs and vegetables, collect rainwater, depend on community networks, and safeguard shrimp farms from climate impacts.

The results indicate that climate change in Assasuni is an issue that affects the environment, livelihoods, health, economy, and gender aspects simultaneously. Tackling these issues necessitates adaptation strategies that acknowledge women's economic roles, enhance workplace safety and health services, bolster the diversification of livelihoods, and guarantee substantial involvement of women in decision-making at both household and community levels.

CHAPTER 6: POLICY RECOMMENDATIONS AND ADAPTATION STRATEGIES

6.1 Introduction

The study found that climate change has had an impact on the lives of women who work on shrimp farms in Assasuni Upazila of Satkhira district. Climate change has affected their work, health and social status. Women have to deal with water, big storms, flooding and very hot temperatures. These things have changed the way people live and work in the area. They have also made it harder for women to be equal. With all these problems women have shown that they can adapt. They have found ways to make a living and they help each other out. They cannot do it alone. The government, local organizations and private companies need to work to help women adapt to climate change. This chapter has some ideas for policies and strategies that can help.

6.2 Making Climate Policies Better for Women

For a time, climate policies in Bangladesh have focused on building things farming and dealing with disasters. They have not paid much attention to the special needs of women. This needs to change. The government should make sure that women are included in all parts of planning and decision-making.

Some things that can be done including making climate plans that take into account the needs of women, recognizing women as contributors to the economy, making sure women are part of committees that make decisions about climate change, collecting data that shows how climate change affects women, giving money to programs that help women adapt to climate change.

The government should also make sure that women are represented in groups that deal with disasters and water management.

6.3 Keeping Women Safe at Work

The study found that women who work on shrimp farms often get sick or hurt. This is because they have to work in water, very hot temperatures and do hard physical labor. To make things better some things can be done:

Occupational Safety Measures

Give women the equipment they need to stay safe like Boots that are waterproof, Gloves, Special clothes, Hats to protect them from the sun, Make sure women get breaks when it is very hot and Create rules to keep women safe at work.

Health Screening Programs

Local health workers should check on women who work on shrimp farms to see if they are healthy. They should check for Skin problems, reproductive health issues, musculoskeletal problems, if they are getting nutrients mobile health clinics can be very helpful in areas that're far away.

6.4 Making Healthcare More Available

In coastal areas of Satkhira it is hard for people to get to hospitals or clinics. This is because they are away or it is hard to get transportation. Some things can be done to make healthcare more available such as establishing health centers in villages, make sure women have access to healthcare especially when they are having babies, hire female healthcare workers, teach people about the health risks of working on shrimp farms, provide counseling for health issues especially after disasters.

Special attention should be given to women who have health problems because of water.

6.5 Helping Women with Mental Health

The study found that women who work on shrimp farms often have health issues. They are stressed and anxious because of money problems, disasters and taking care of their families. Some things can be done to help:

1. Create programs to support womens health.
2. Provide counseling after disasters.
3. Teach people that mental health is important and should not be stigmatized.
4. Create support groups for women.
5. Make sure mental health services are part of healthcare.

Community programs should include health as an important part of adapting to climate change.

6.6 Empowering Women

Economic empowerment is crucial for women to adapt to climate change. Some things can be done to help- Access to Microfinance

1. Give women low-interest loans to start their businesses. 2. Help women get money to adapt to climate change. 3. Create groups where women can save and borrow money.

Skills Development such as teach women skills like, better ways to farm shrimp, how to adapt to climate change, how to run a business, how to manage money, how to use marketing.

Income Diversification like help women find new ways to make money by raising crabs, farming poultry, farming ducks, gardening at home, starting businesses

This can help women not rely on just one way to make a living.

6.7 Including Women in Decision-Making

The study found that women who work on shrimp farms are often not included in decisions. They should be part of groups that make decisions about how to farm shrimp, how to manage water, how to adapt to climate change. Programs should help women become leaders and challenge ideas that keep women from being part of decision-making.

6.8 Making Shrimp Farming More Resilient

Climate change is making it harder to farm shrimp. Some things can be done to make shrimp farming more resilient:

a. Introduce types of shrimp that can adapt to climate change.

b. Improve the way ponds are managed.

c. Monitor water quality.

d. Make sure the ponds are protected from storms.

e. Create systems where shrimp and fish are farmed together.

Research institutions and agricultural extension services should help farmers.

6.9 Improving Water Management

Salty water and lack of water are big problems in coastal Bangladesh. Some things can be done to improve water management like fix. Polders, improve drainage systems, collect rainwater, create community reservoirs for water, manage rivers in a way.This can help both peoples livelihoods and their health.

6.10 Preparing for Disasters

Cyclones and tidal surges are still threats to coastal areas. Some things can be done to prepare for disasters to improve warning systems, create places for women during cyclones, provide help for peoples livelihoods after disasters, teach people how to prepare for disasters, create plans for evacuating people. Women should be part of groups that prepare for disasters.

6.11 Expanding Social Protection Programs

Social protection programs can help people during disasters. Some things can be done:

a. Create insurance programs for climate risks.

b. Give people money after disasters.

c. Provide food during recovery periods.

d. Guarantee employment in areas.

e. Give subsidies for climate adaptation investments.

Women who are heads of households should get priority consideration.

6.12 Role of Non-Governmental Organizations

Non-governmental organizations have played a big role in helping people in coastal Bangladesh. They can provide training, support womens cooperatives, and help people access markets, teach people about health issues, support climate adaptation initiatives.

Non-governmental organizations should work with government institutions.

6.13 Community-Based Adaptation Strategies

Community-based adaptation approaches recognize that local knowledge and community participation are essential, for building resilience. Some examples including womens savings groups, community seed banks. Local water management committees are really important for the community. These committees help people work together to manage water. Mutual aid networks during disasters are also very helpful. They provide support to people who are affected by disasters. Collective embankment maintenance is another way that people can work together. They can maintain the embanks to prevent flooding and other problems. The study found that social capital and community solidarity play a role in helping people recover from disasters.

6.14 Proposed Adaptation Framework for Women Shrimp Workers

Based on what the study found a new framework is being proposed for women who work with shrimp. This framework is called an adaptation framework. It looks at the risks that these women face because of climate change.

Climate Risks: Salinity intrusion is a problem. Cyclones are also an issue. Waterlogging is another problem that these women face.

Heat stress is also a concern. It Impacts on these women can lose their income. They can also face health risks. Their jobs may not be secure.

Adaptation Measures

These women can do things to make a living.

They can protect their health.

They can learn skills.

They can get money from banks or other places.

They can also get help from their community.

Outcomes

These women can be more resilient. They can have lives. They can be healthier. They can have equality. This framework says that we need to look at all the aspects of climate change at the same time.

6.15 Implications for Development Studies

The study found some things that can help us understand development better. First we need to think about climate change as an political issue not just a technical problem. Second we need to think about how gender affects how vulnerable people are to climate change. Third we need to pay attention to the health of people who work, especially in jobs that are affected by climate change. Finally, we need to recognize that women have knowledge and skills that can help their communities be more resilient.

6.16 Chapter Summary

This chapter talked about some policies and strategies that can help women who work on shrimp farms in Bangladesh. The main ideas are to make sure that these women are treated fairly that they have health care that they can make a good living and that they have a say, in what happens in their communities. We need to work to help these women. The government, -governmental organizations and local communities all need to be involved. We need to use technology to help these women. We also need to make sure that everyone is treated equally and that women have the power to make decisions. The next and final chapter will summarize the study and talk about what it means for the future.

CHAPTER 7: CONCLUSION

7.1 This chapter presents the conclusion of the study by summarizing the major findings, discussing the contributions of the research to Development Studies, highlighting policy implications, acknowledging the limitations of the study, and suggesting directions for future research. The chapter concludes with a list of references used throughout the thesis.

7.2 Summary of the Study

Climate change has emerged as one of the most significant threats to sustainable development, particularly in vulnerable coastal regions of developing countries. Bangladesh, due to its geographical location and dependence on climate-sensitive livelihoods, remains highly exposed to environmental hazards such as cyclones, salinity intrusion, tidal surges, flooding, and sea-level rise. The southwestern coastal region, particularly Satkhira district, has experienced substantial environmental and socio-economic transformations over recent decadesAssasuni Upazila has turned into one of the nation's most climate-vulnerable regions due to frequent cyclones and rising salinity levels. The alterations in the environment have led to a decrease in conventional farming practices and spurred the swift growth of shrimp aquaculture. Women have an important role in shrimp production as paid workers, business owners, and family contributors. Nonetheless, their input remains mostly overlooked in official economic data and policy conversations. This research aimed to investigate the impact of climate change on the livelihood, health, and wellbeing of women engaged in shrimp farming in Assasuni Upazila. Employing a qualitative case study methodology, the study gathered data via ten extensive interviews, four case studies, field observations, and relevant secondary literature. The research explored the experiences of women across various age brackets and professional fields to comprehend the intersection of climate change, gender, health, and livelihoods.

7.3 Major Findings of the Study

7.3.1 Climate Change Has Transformed Livelihood Systems

A key discovery of this research is that climate change has drastically changed the livelihood patterns in coastal communities. The majority of participants indicated that their households relied on rice farming, freshwater fishing, and agricultural work in the past. Nonetheless, frequent cyclones, salinity intrusion, and waterlogging considerably diminished agricultural output and promoted the shift to shrimp farming. Participants often recognized Cyclone Aila as the incident that permanently altered local livelihoods and sped up the growth of shrimp farming.

7.3.2 Women's Economic Participation Has Increased

The research indicated that women's involvement in income-producing activities has risen significantly in the past twenty years. Women currently participate in household income generation via shrimp farming work, pond management, feed preparation, processing tasks, poultry raising, and small enterprises. Nevertheless, enhanced economic involvement has not automatically led to increased empowerment or authority in decision-making.

7.3.3 Occupational Health Risks Have Increased

The results suggest that female shrimp workers encounter considerable workplace health issues. Widespread physical health issues encompass skin disorders, allergies, joint discomfort, backaches, reproductive health problems, and heat-related ailments. Extended exposure to saline water was recognized as one of the primary contributors to health issues among participants.

7.3.4 Mental Health Is an Emerging Concern

The research indicated that mental health effects are becoming more significant in communities susceptible to climate change. Participants indicated feelings of anxiety related to potential disasters, financial pressures, worries about crop failures, concerns about debt, and emotional fatigue. Women frequently bear the responsibility of ensuring household wellbeing in times of crisis, leading to heightened psychological pressure and stress.

7.3.5 Gender Inequality Intensifies Climate Vulnerability

The results indicate that the effects of climate change are not the same for all genders. Women face increased vulnerability due to restricted access to resources, lower salaries, limited mobility, unequal decision-making authority, and higher caregiving duties. The research supports the claim of Feminist Political Ecology that social power dynamics and gender disparities influence environmental risks.

7.3.6 Women Demonstrate Significant Adaptive Capacity

The outcomes show that the impacts of climate change vary by gender. Women experience heightened vulnerability due to limited access to resources, reduced wages, restricted mobility, disproportionate decision-making power, and elevated caregiving responsibilities. The study substantiates the assertion of Feminist Political Ecology that social power relations and gender inequalities affect environmental hazards.

7.4 Contribution to Development Studies

This study contributes to Development Studies in several ways.First, it expands understanding of the relationship between climate change and gender in coastal Bangladesh.Second, it highlights the importance of occupational health within climate adaptation research.Third, it integrates livelihood analysis with gender relations and health outcomes, offering a more comprehensive understanding of climate vulnerability.Fourth, the study contributes to qualitative scholarship by

documenting the lived experiences of women shrimp workers, a group that remains underrepresented in existing literature. Finally, the research demonstrates the usefulness of combining the Sustainable Livelihood Framework, Feminist Political Ecology, and Vulnerability and Resilience Framework for analyzing climate change impacts in coastal communities.

7.5 Policy Implications

The findings suggest several important policy implications. Gender-sensitive climate adaptation policies are needed. Occupational health services should be expanded in coastal regions. Women's participation in decision-making processes should be strengthened. Livelihood diversification programs should receive greater support. Mental health services should be integrated into climate adaptation initiatives. Social protection systems should prioritize climate-vulnerable women workers.

7.6 Limitations of the Study

Several limitations should be acknowledged. First, the study involved a relatively small number of participants due to its qualitative nature. Second, the research focused exclusively on Assasuni Upazila, which limits geographical generalization. Third, participants' recollections of past events may have been influenced by memory bias. Fourth, cultural sensitivity surrounding reproductive health and mental health may have affected the depth of some responses. Despite these limitations, the study provides rich and context-specific insights into the experiences of women shrimp workers.

7.7 Recommendations for Future Research

Future research may consider the following areas:

1. Comparative studies between different coastal districts of Bangladesh.
2. Longitudinal studies examining changes in adaptation strategies over time.
3. Mixed-method research combining qualitative and quantitative approaches.
4. Studies focusing specifically on reproductive health and occupational exposure among women shrimp workers.
5. Research examining the experiences of adolescent girls and elderly women in climate-vulnerable communities.
6. Comparative research between women involved in shrimp farming and women engaged in agriculture or fisheries.

7.8 Concluding Remarks

Climate change is reshaping the economic, environmental, and social landscape of coastal Bangladesh. For women involved in shrimp farming, climate change represents not only an environmental challenge but also a livelihood, health, and gender issue.

The experiences of women shrimp workers in Assasuni demonstrate that vulnerability is produced through the interaction of environmental hazards and social inequalities. At the same time, these women continue to demonstrate remarkable resilience, creativity, and adaptive capacity in the face of uncertainty.

Sustainable climate adaptation in coastal Bangladesh will therefore require more than technological interventions. It will require policies that recognize women's contributions, reduce gender inequalities, strengthen occupational health protections, and enhance livelihood opportunities.

By placing women's voices and experiences at the center of climate adaptation discussions, this study contributes to a more inclusive and equitable understanding of sustainable development in coastal Bangladesh.

IDI (In-Depth Interview) Form

Date:

1. Name, Age, education, family size: ……..
2. What is your role in shrimp farming: ……...
3. How long have you been involved in shrimp farming: ……
4. What are your family's main sources of income: ……
5. What livelihood did your family depend on before shrimp farming: ……
6. How has climate change affected your livelihood: ……
7. Which climate events (e.g., Cyclone Aila, Amphan, Remal) affected your family the most: ……
8. How has shrimp farming changed because of climate change: ……..
9. Has your income changed over time? In what ways: ……..
10. How have your working conditions changed: ……
11. What health problems do you experience while working on shrimp farms: ……..
12. Does working in saline water affect your health: ……...
13. Have you experienced skin diseases, joint pain, or fatigue: ……...
14. Have you experienced any reproductive or menstrual health problems: ……..
15. Do you think increasing temperature affects your work: ……..
16. How do cyclones and climate disasters affect your mental wellbeing: ……
17. Do you feel stressed balancing household work and shrimp farming: ……..
18. How do financial uncertainty and debt affect you: ……...
19. Who makes important decisions in your household: ……
20. Do women receive equal wages as men: ……..
21. Do women have equal access to loans, training and government support: ……..
22. How are women's contributions viewed in your community: ……..
23. What challenges do women face compared to men: ……
25. How has your family adapted to climate change: ……
26. Have you started any additional income-generating activities : ……...
27. Do you participate in savings groups or NGOs: ……..
28. What community support do you receive during disasters: ……..





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