AN INTERNSHIP REPORT ON SAVING MOTHERS, PROTECTING THE WOMB PROJECT

BY

Susmita Saha

Id : 193-34-1004

Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

Supervised By
Juwel Rana
Assistant Professor
Department of NFE

Co-Supervised By
Nawal Sarwer
Lecturer
Department of NFE

FACULTY OF ALLIED HEALTH SCIENCE (FAHS)

DAFFODIL INTERNATIONAL UNIVERSITY

OCTOBER 2023

APPROVAL

This internship, "**An internship report on saving mothers, protecting the womb project**," has been turned in by **Susmita Saha** to the Department of Nutrition and Food Engineering at Daffodil International University. It has been accepted as a partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved for its style and content. The date of the presentation was October 2023.

EXAMINING COMMITTEE

_____

Member
Department of NFE
Faculty of Allied Health Science
Daffodil International University

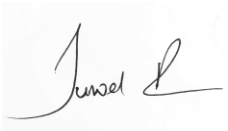
_____

Dr. Nizam Uddin
Associate Professor and Head
Department of NFE
Faculty of Allied Health Science
Daffodil International University

DECLARATION

The internship was completed under the supervision of **Md. Juwel Rana, Assistant Professor**, Department of NFE at Daffodil International University. I also affirm that neither this project nor any portion of this project has been submitted elsewhere to earn a degree or certificate.

Supervised by:



Juwel Rana
Assistant Professor
Department of NFE
Faculty of Allied Health Science
Daffodil International University

Co-Supervised by:

Nawal Sarwer
Lecturer
Department of NFE
Faculty of Allied Health Science
Daffodil International University

Submitted by:

Susmita Saha
Id : 193-34-1004
Department of NFE
Daffodil International University

ACKNOWLEDGMENT

First, I want to sincerely thank Allah for giving me the willpower to complete my internship report.

I had an excellent opportunity to study and develop practical skills during my internship with the Research Division at DIU. I met several knowledgeable and skilled individuals who were helpful to me during this process.

Juwel Rana, Assistant Professor, dept of NFE at Daffodil International University, supervised me throughout my project work. I owe much gratitude to him for always having my back.

Nawal Sarwer, Lecturer, dept of NFE at Daffodil International University, also supervised me throughout my project work. I also owe much gratitude to him for always having my back.

I appreciate my project leader **Prof. Dr. Md Kabirul Islam**, co-project leader **Khalid Md. Bahauddin,** technical expertise **Maruf Ahmed, and** data collector trainer & and leader **Maharunnasha Antora.**

EXECUTIVE SUMMARY

The “Saving Mothers, Protecting the Womb” project, funded by The Adaptation Research Alliance Micro-Grants and supported by UKAID, has been a vital initiative in enhancing maternal health and reducing maternal mortality in coastal areas of Bangladesh. The dedication and efforts of the Faculty of Graduate Studies (FGS) at Daffodil International University have played a pivotal role in making this project a success. The project's impact underscores the importance of ongoing efforts to support the health and well-being of mothers and their unborn children.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background

Bangladesh has significant impacts from climate change-induced catastrophes, including cyclones and floods (Nishat and Mukherjee, 2013; Ahmed, 2006). In addition to sudden-onset disasters, there is a significant prevalence of slow-onset disasters in this region. These include the gradual loss of biodiversity, the rise in sea levels resulting in the intrusion of saline water into aquifers, estuaries, and wetlands, sedimentation, drainage congestion, as well as the occurrence of landslides and erosion during storm surges and rainstorms. These phenomena have been extensively documented in scientific literature (IPCC, 2007; Titus et al., 1991). One of the significant issues in Bangladesh that has gained attention in recent times is the increase in salt intrusion, which may be attributed to the decrease in the volume of freshwater flowing from upstream sources (Abedin, 2010). According to Gbetibouo and Hassan (2005), the anticipated influx of saline water is likely to worsen existing issues, including agricultural damage, food instability, and limited availability of potable water. Saline water intrusion has been shown to have a significant negative impact on coastal agriculture, as highlighted by Mahmood et al. (2010). This issue is particularly concerning due to the fact that coastal agriculture plays a crucial role in supporting rural lives, as emphasized by the Asian Development Bank (ADB, 2011). According to Alam et al. (2013), a significant majority of people, ranging from 80% to 90%, rely on agriculture and fisheries as their primary sources of livelihood. These sectors are particularly vulnerable to the impacts of climate change, as highlighted by the Intergovernmental Panel on Climate Change (IPCC, 2007) and the Climate Change Commission (CCC, 2006). Uddin (2012) reported that around 56.6% of those living in coastal regions experience food insecurity as a result of salt. According to a report by the World Bank in 2012, it is estimated that around 40% of arable land in the southern part of Bangladesh would be destroyed due to a predicted sea level rise of 65 cm by the 2080s. The potential consequences of this might exacerbate the issue of food poverty among coastal communities. The ability to adapt is a critical determinant in influencing the potential magnitude of climate change effects on food production (Easterling, 2007; Sovacool et al., 2012). A number of governmental initiatives are now being undertaken with the aim of enhancing the agricultural sector's ability to adapt to climate-related hazards (FAO, 2008). The potential for adaptation is intricately linked to several types of capital, such as financial, social, human, natural, and physical. The aforementioned types of capital suggest the inherent ability of the coastal population, allowing them to effectively adjust to the dynamic nature of climatic circumstances (Alam et al., 2013; FAO, 2008).

Historically, women have encountered limited access to various forms of capital, particularly financial capital, on a global scale (Nasreen, 2012; Goh, 2012; Mitchell et al., 2007; Ariyabandu and Foenseka, 2006). This disparity may be attributed to the presence of patriarchal social systems and structures, whereby males wield authority and control over women. The exercise of male power in relation to women serves to perpetuate the marginalization of women from many social and economic prospects, so limiting their ability to avail themselves of

resources. While there is a widespread acknowledgment of the significant role that women play in both mitigation and adaptation efforts (Rodenberg, 2009; UNDP, 2008), their capacity to adapt is hindered by a dual impact of predetermined physical shocks and their constrained access to resources (Alam et al., 2013; Nandy and Ahammad, 2012; Moser, 2007; Sherraden, 1991).

The cost associated with the adaptation of coastal agriculture is significant due to various factors, such as the procurement of saline-tolerant seeds, crop diversification, the removal of saline water from the land through pumping mechanisms, the establishment of channels to facilitate the inflow of saline-free water, the utilization of floating mats for crop cultivation, and the preparation of artificial seedbeds. According to Tanellari et al. (2011), there is often a lower adoption rate of these tactics among women in comparison to males, primarily due to the financial burden they are unable to sustain. In addition, women have the load sometimes referred to as the 'triple burden', including ensuring family nourishment via activities such as cultivating and preparing food, engaging in child raising, and frequently engaging in the commercial sale of their produce. Investing in women has dual advantages enhancing their well-being and positively impacting the welfare of their family members. The enhancement of women's ability to adapt necessitates the integration of personal talents and household capabilities with institutional assistance (Alam et al., 2013; Osbahr et al., 2008; Park et al., 2012). The present research anticipates that women residing in coastal areas have the ability to use diverse adaptation techniques in relation to agricultural output, leading to an improvement in their capacity to adapt, provided they have access to different kinds of capital.

1.2 Division of Research

Daffodil International University strives to make tremendous progress in quality education and research. To become a full-fledged research university, DIU is committed to conducting research as a central part of its mission. Consequently, DIU reached the milestone of publishing about 2000 research articles in Scopus, the largest abstract and citation database of peer-reviewed literature (e.g., scientific journals, books, and conference proceedings), within a very short period. It may be noted that since the establishment of the research division in 2017, the number of publications has started to increase rapidly (see the figure below). Consequently, DIU obtained the 1st position among Private Universities for its ISi / Scopus-indexed publications in 2019 and 2020 and 3rd and 5th positions in 2019 and 2020, respectively, among private and public universities in Bangladesh.

1.2.1 Vision

The vision of Daffodil International University research is to help improve the quality of life of people and develop society through the discovery of knowledge and innovation.

1.2.2 Mission

- Establish a sustainable research culture academically in a collaborative manner

- Enhance research networking with foreign university faculty to improve the quality of research and publications
- Identify current issues and problems of different disciplines and resolve them through fundamental, experimental, and applied research jointly with the local and foreign stakeholders
- Undertake research projects in practical contexts to solve national and international problems and fulfill the demands of society.

1.3 Objectives

This internship aims:

- To provide solutions to disadvantaged pregnant women of coastal regions.
- To provide a comprehensive overview of the "Saving Mothers, Protecting the Womb Project," including its mission, goals, and the organization or institution responsible for its implementation.
- To clearly define my role and responsibilities as an intern within the project.
- Evaluate the methods and strategies employed in the project to protect maternal health and ensure the well-being of women's reproductive health.
- To describe the educational and awareness initiatives carried out as part of the project. Evaluate the success of these efforts in promoting maternal health and reproductive rights.

CHAPTER 2

OVERVIEW

2.1 UKAID

The United Kingdom's Foreign, Commonwealth & Development Office (FCDO) allocates funding to UK Aid, a challenge fund that aims to assist in the UK's efforts to alleviate poverty and accomplish the Global Goals. The collaboration between UNICEF and FCDO aims to tackle the issue of malnutrition in the Sahel region. Supported by the Foreign, Commonwealth & Development Office (FCDO), UK Aid Direct provided financial backing to small and medium-sized civil society organizations (CSOs) located both in the United Kingdom and abroad. The primary objective of this initiative was to facilitate long-term poverty alleviation and contribute to the attainment of the United Nations Global Goals. UKAID, formerly known as the Department for International Development (DFID), was the governmental entity entrusted with the administration of foreign assistance by the United Kingdom. The aforementioned entity served as a ministerial department under the government of Her Majesty, with the primary mandate of advancing the United Kingdom's interests via the provision of foreign aid. Its core objectives included the reduction of poverty and the facilitation of economic growth within developing nations. The main objective of UKAID was to address poverty alleviation and contribute to the attainment of the United Nations Sustainable Development Goals (SDGs). In June 2020, the United Kingdom government made an announcement on the merger of the Department for International Development (DFID) with the Foreign and Commonwealth Office (FCO). This merger resulted in the establishment of a novel government department known as the Foreign, Commonwealth, and Development Office (FCDO). The primary objective of this merger was to enhance the convergence between the United Kingdom's foreign policy and development endeavors. The merger led to the dissolution of DFID as an independent department, resulting in the integration of UKAID into the FCDO. The fund demonstrated flexibility, adaptability, and responsiveness to the goals set by the UK government. The project included several issues, including conflict prevention, disability inclusion, education, the eradication of modern-day slavery, health, livelihoods, nutrition, water, sanitation, and hygiene (WASH), as well as women's empowerment. Since its inception in 2014, the UK Aid program has successfully provided assistance to a substantial number of disadvantaged and marginalized individuals, namely women, children, and men. This achievement has been made possible by the allocation of 196 grants and the implementation of various projects in 39 different countries.

Figure 2.1: UKAID logo(wikipedia.org)

2.2 The Adaptation Research Alliance Micro-Grants

The Grassroots Action Research Micro-grants, initiated by the Adaption Research Alliance (ARA), aims to support collaborative efforts between action and research organizations in order to provide insights, concepts, and prospects for climate change adaption in the Global South. According to ARA Co-Chair Anand Patwardhan, the latest series of awards was initiated at the global climate conference COP27, with the objective of providing assistance to concerns highlighted by local stakeholders in the Global South. These grants include the active participation of academics in order to delve further into these challenges collaboratively. The objective is to establish a connection between various groups of individuals involved in both practical and scholarly endeavors, with the aim of collaboratively generating ideas and facilitating the joint development of pertinent information. This method seeks to identify suitable approaches and locations for communities to adapt to changing circumstances.

Figure 2.2: Adaptation Research Alliance logo (southsouthnorth.org)

2.3 Project moderation

The project was funded by the Adaptation Research Alliance Micro-Grants, supported by UKAID, and conducted by the Faculty of Graduate Studies at DIU. This combination of funding, support, and a capable conducting organization is typically a positive indication of the project's prospects. It suggests that it has the financial resources, governmental support, and the right team to carry out the work effectively.

Table 2.1: Project moderation outline

Funded by	The Adaptation Research Alliance Micro-Grants.
Supported by	UKAID.
Conducted by	Faculty of Graduate Studies (FGS), DIU.

2.4 Project coordinators and Data collectors

The project has a well-defined team of coordinators and data collectors with various roles and responsibilities. The Project Leader, Co-Project Leader, Technical expert, and Data Collector Trainer and leader provide leadership and expertise to ensure the project's success, while the Data Collectors play a crucial role in collecting the necessary data for the project's objectives.

Table 2.2: List of project coordinators and data collectors

Positions	Names
Project Leader	Prof. Dr. Md Kabirul Islam
Co-Project Leader	Khalid Md. Bahauddin
Technical Expertise	Maruf Ahmed
Data Collector Trainer & Leader	Maharunnasha Antora
Data Collectors	Susmita Saha Sadiya Islam Tishama Chakrabarty Rabeya Sultana Taposhi Tariqul Islam Fatema Akter Ashraf Hossain Nasirul Islam Rockey

2.5 Timeframe

The provided internship timeframe outlines the various activities, locations, and duration of the internship. It appears to involve training, fieldwork, and data collection, with a return to Dhaka on the final day. The specific activities at each location are related to the project's objectives and goals.

Table 2.3: Internship time frame

Time-frames	Location	Days	Activities
28.08.2023 – 31.08.2023	DSC Campus	4 Days	Training session
01.09.2023 - 02.09.2023	Satkhira	2 Days	Field Training
03.09.2023 - 04.09.2023	Gabura Union (Satkhira)	2 Days	Data collection
05.09.2023 - 06.09.2023	Koyra Upazila (Khulna)	2 Days	Data collection
07.09.2023-08.09.2023	Dakshin Bedkashi Union	2 Days	Data collection
09.09.2023	Return to Dhaka		

2.6 Maps

Jessore, Narail, Gopalganj, Shariatpur, Chandpur, Satkhira, Khulna, Bagerhat, Pirozpur, Jhalakati, Barguna, Barisal, Patuakhali, Bhola, Lakshmipur, Noakhali, Feni, Chittagong, and Cox's Bazar are among the 19 coastal districts that make up Bangladesh's Coastal zone.

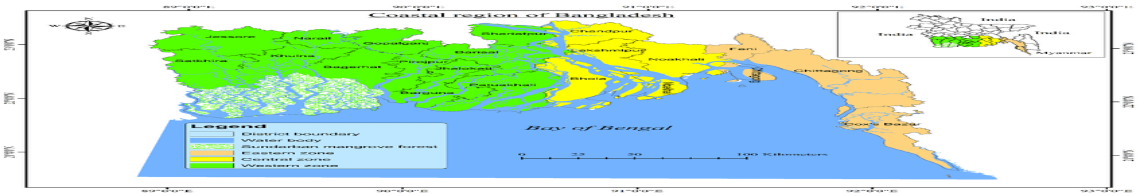


Figure 2.3: Coastal zone of Bangladesh(Hoque et al., 2019)

2.6.1 Gabura Union Satkhira

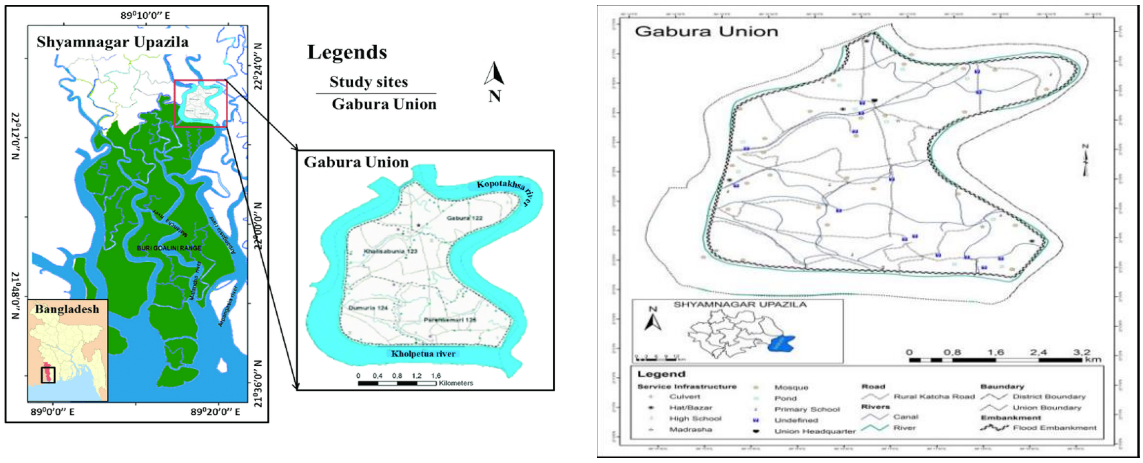


Figure 2.4: Gabura Union (Mallick et al., 2010))

2.6.2 Koyra Upazila (Khulna)

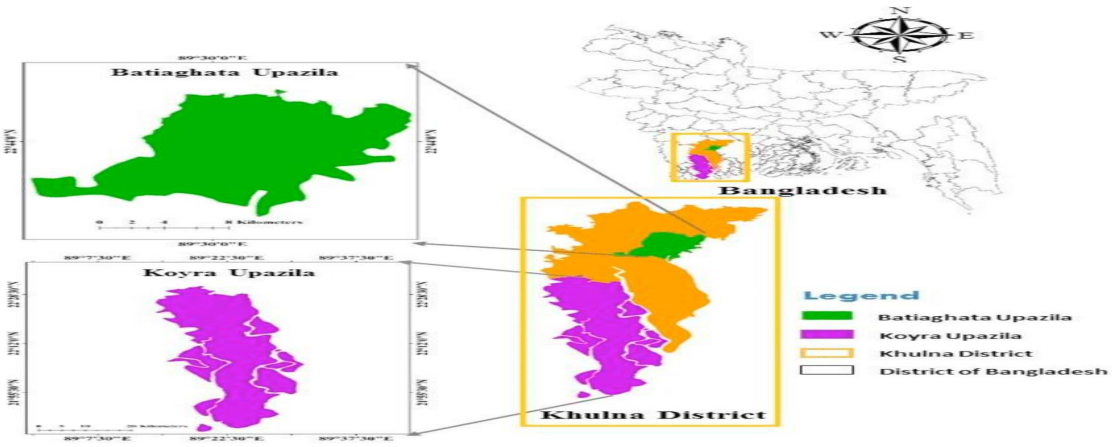


Figure 2.5: Koyra Upazila (Chowdhury et al., 2020)

2.6.3 Dakshin Bedkashi Union

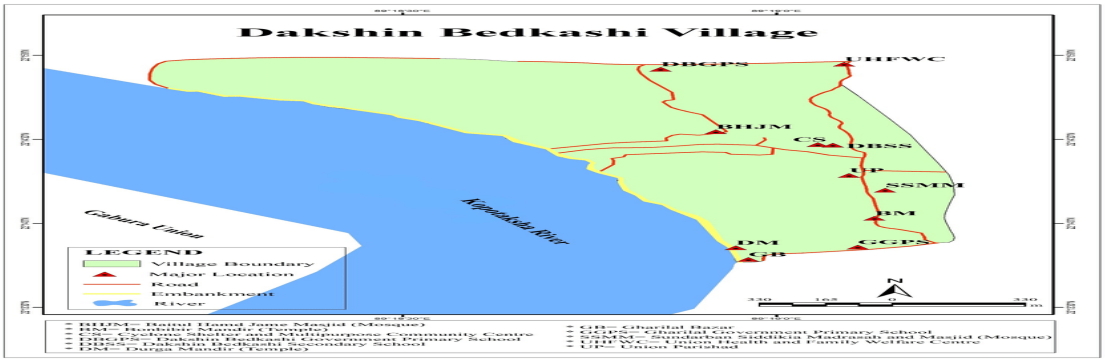


Figure 2.6: Dakshin Bedkashi Union (Saha et al., 2021)

CHAPTER 3

TRAININGS AND FIELD WORKS

3.1 Coastal Habitat

The coastal zone has unique prospects for development that may play a crucial role in mitigating the vulnerability and poverty experienced by coastal populations while also making substantial contributions to the overall development of Bangladesh. Certain opportunities remain unexplored, while others provide considerable potential for development. The region has a wide range of natural resources, including coastal fisheries and prawns, forests, salt deposits, and minerals. In recent times, the coastal regions of Bangladesh have garnered significant global recognition owing to their considerable prospects for the extraction of onshore and offshore natural gas resources. The coastal zone, including estuaries and brackish environments, harbors several ecosystems of significant conservation importance. The Sundarban, which is the world's biggest continuous mangrove environment, was designated as a World Heritage Site (WHS) in 1997 in certain areas of Bangladesh. Additionally, St. Martin's Island is known for its coral-associated habitats. The aforementioned ecosystems include characteristics that make them significant in terms of biodiversity while also serving as the fundamental ecological basis for a crucial shared resource - the fisheries and biological variety of the Bay of Bengal (BOB). Coastal ecosystems have a crucial role in providing a wide range of ecological and economic functions, such as safeguarding shorelines, supporting thriving commercial and recreational fisheries, and facilitating nutrient cycling. Key coastal habitats, such as seagrass meadows, marshes, and mangroves, are highly esteemed due to their exceptional production. This productivity sustains a substantial number and variety of fish, as well as prawns, oysters, crabs, and several other invertebrates. Near-shore environments are sometimes regarded as "nurseries" because of their substantial presence of young fish and shellfish. The crucial ecological function of coastal estuaries and marine ecosystems is well acknowledged and often used to advocate for the preservation and safeguarding of these regions. The mangrove ecosystem has a direct correlation with the increased production of nursery grounds for marine fish and shellfish fauna (Hussain & Hoq, 2010). Additionally, it provides protection from tidal surges and storms.

3.2 Climate Change Impact

The repercussions of climate change have been seen to have significant and expensive effects on coastal systems. The alteration of soil moisture and runoff to the shore is anticipated as a consequence of increasing temperature and changing rainfall patterns. The increase in sea level is anticipated to result in the retreat of coastal shorelines, exacerbating erosion and land loss. Additionally, low-lying regions are expected to experience more frequent and may be permanent inundation due to the encroaching sea. The salt levels in estuaries, coastal wetlands, and tidal rivers are anticipated to rise, resulting in the reconfiguration of coastal ecosystems and their subsequent displacement towards interior areas. According to several studies, it is

expected that there will be an escalation in both the strength and frequency of tropical cyclones. This, in turn, would lead to a further acceleration of shoreline retreat and the loss of wetlands in low-lying coastal areas (Burkett et al., 2008). Climate change poses significant issues in relation to the quantity, distribution, recruitment, and migratory patterns of many aquatic species, including invertebrates, fish, sea turtles, and cetaceans. At present, there exists a limited focus on environmental sustainability and the consequences of climate change within the realm of biodiversity. Moreover, this attention has not been effectively turned into tangible strategies for adapting to these challenges and transforming livelihoods. However, the productivity of marine and coastal biodiversity, including fisheries, may be negatively affected by climate change. This can have consequences for future catch levels and the capacity of fisheries to recover. These impacts are primarily driven by changes in the availability of food, alterations in habitat, and shifts in ocean conditions that are suitable for fish stocks. The coastal regions of Bangladesh will experience many climate change consequences, including alterations in temperature and rainfall patterns, rising sea levels, shifts in the frequency and severity of cyclones, storm surges, and changes in river and soil salinity. Furthermore, the presence of salt has an influence on both terrestrial and aquatic environments inside coastal regions. The impact of climate change is progressively expanding to include inland water bodies and soil. The steady infiltration of saline into the coastal regions of Bangladesh poses a significant danger to the primary agricultural system, coastal biodiversity, and human health. According to the Soil Resources Development Institute (SRDI), the extent of salinity-affected land in Bangladesh was 83.3 million hectares in 1973. This figure then rose to 102 million hectares in 2000 and further climbed to 105.6 million hectares in 2009. The trend of increasing salinity-affected land has persisted beyond 2009. Over the course of the last 35 years, there has been a notable rise in saline levels, with an approximate increase of 26 percent seen across the nation. This salinity expansion has not been limited to coastal regions alone but has also extended into non-coastal areas. The alterations in river salt levels and the accessibility of freshwater will have a significant impact on the productivity of fisheries. The potential consequences of this phenomenon may have a negative impact on the natural habitats of freshwater fish and giant prawn species. Furthermore, the rise in salt levels might potentially lead to a transition within the Sundarbans mangrove forest, resulting in a shift from the dominating and economically valuable Sundari species to the Gewa and Goran species. According to a study conducted by the International Food Policy Research Institute (IFPRI) and the Ohio State University in 2018, it is anticipated that the districts of Chittagong and Khulna in Bangladesh will experience the most significant influx of migrants within their respective districts due to the escalating levels of soil salinity. The estimated number of migrants per year is projected to range between 15,000 and 30,000. Societies everywhere have always endeavored to adjust and mitigate their susceptibility to the repercussions of weather and climatic events, such as floods, droughts, and storms. However, it will be imperative to implement additional adaptation measures at both regional and local levels in order to mitigate the adverse impacts of the projected changes and fluctuations in the climate. These measures will complement the extensive mitigation strategies that are expected to be implemented during the next two to three decades, as outlined in the IPCC report of 2007. The only reliance on adaptation measures is unlikely to fully mitigate the projected impacts of climate change, particularly over an extended timeframe, given the evident amplification of most consequences.

There exists a multitude of potential adaption strategies. However, it is imperative that the ongoing efforts be strengthened to mitigate the vulnerability in light of the ongoing climate change phenomenon. There are many hurdles, limitations, and associated expenses that are not usually fully understood.

3.3 Coastal Hazards

Climate change poses a substantial coastal threat. Bangladesh is considered to be among the nations that are very susceptible to experiencing detrimental consequences as a result of human-induced climate change. Despite Bangladesh's meager contribution to global greenhouse gas emissions, accounting for less than 0.1% of the total emissions, it is important to consider its impact within the broader context of climate change. Coastal risk in Bangladesh is considered a significant concern because of its intricate association with several other natural disasters. A hypothetical increase of 1 meter in sea level would result in the submergence of about 18% of the whole land area of Bangladesh. According to a study, there is evidence to suggest that areas experiencing extensive flooding, namely those with a water depth above 100 cm and lasting for a length exceeding 9 months, are projected to grow by 29% compared to the baseline year of 2000. This increase is attributed to a sea level rise of 88 cm. In 1973, the extent of salinity-affected land in Bangladesh was recorded at 83.3 million hectares. By the year 2000, this figure had risen to 102 million hectares and further expanded to 105.6 million hectares in 2009. This trend of increasing salinity-affected land continues to persist. Coastal flooding is a prevalent issue in the region since almost 50% of the land lies at an elevation of fewer than 8 meters above sea level, coupled with a coastline spanning around 600 km. Bangladesh has a heightened susceptibility to tropical cyclones, as shown by the significant toll of around 718,000 fatalities attributed to these weather phenomena during the preceding half-century. The western coastal zone has heightened susceptibility to surge flooding as a consequence of its geographical characteristics, including its low-lying topography and inadequate resilience against surge waves. According to research using Geographic Information Systems (GIS), it was determined that a cumulative area of 1183 km2 experienced erosion at a rate of 118.3 km2 per year between the years 1995 and 2005. Additionally, an area of 1194 km2 was eroded between 2005 and 2015 in the central region of the coastal zone in Bangladesh. Significant erosional processes were seen in the Meghna estuary region and along the coastlines of prominent islands, including the eastern coast of Bhola, the northern coast of Hatiya, and the southwestern shore of Sandwip. The future susceptibility to vulnerability in the coastal area of Bangladesh is projected to be much greater than the current state.

It is anticipated that there will be an increase in the frequency and intensity of natural catastrophes, including cyclones, storm surges, floods, and droughts, in the coming years. The climatic sensitivity of the coastal area of Bangladesh is expected to be heightened due to its topographical characteristics, high population density, and prevalent poverty. The vulnerability of the coastal areas in Bangladesh is higher in the central and western regions. The western section, mostly occupied by the Sundarbans, consists of low-lying land areas. On the other hand, the center part is characterized by a more dynamic nature within the coastal zone of Bangladesh.

3.4 Data collection framework

3.4.1 Quantitative Data

Quantitative data is used in study scenarios when the objective is to quantify a certain issue, addressing inquiries pertaining to "what," "how many," and "how often." This particular kind of data is often used in mathematical computations, algorithmic processes, and statistical examinations.

Quantitative data refers to information that may be measured or expressed in numerical form and discrete units. Among many types of data, quantitative data has several instances.

- The revenue is measured in terms of monetary units, namely in dollars.
- The weight may be measured in either kilograms or pounds.
- The measurement of age may be expressed in either months or years.
- The measurement of distance may be expressed in either miles or kilometers.
- The temporal measurement may be expressed in either days or weeks.
- The findings of the experiment

3.4.2 Qualitative Data

Qualitative data refers to information not amenable to quantification, measurement, or straightforward representation using numerical values. Data is gathered from many sources, including text, audio, and pictures, and then disseminated using data visualization techniques such as word clouds, timelines, graph databases, idea maps, and infographics.

The objective of qualitative data analysis is to address inquiries about individuals' behavioral patterns and the underlying factors that drive their behaviors. Gathering and manipulating this kind of data may be labor-intensive since it requires thoughtful consideration on the part of the analyst. A professional who engages in the analysis and interpretation of qualitative data is often referred to as a qualitative researcher or qualitative analyst.

Qualitative data analytics (QDA) software is widely used across several research domains, including healthcare, business, and marketing, among others. In the field of statistics, qualitative data is sometimes referred to as categorical data.

3.4.2.1 Qualitative data collection methods

Qualitative data is often acquired via the means of direct or indirect observation, as well as through the use of open-ended questioning techniques. Commonly used data-collecting strategies include the following:

- The method of gathering data via face-to-face conversations, often known as interviews, is widely used in academic research.
- Focus groups are a qualitative research method that involves a small group of individuals who are brought together to discuss a certain topic or issue. This method allows researchers to get in-depth

- Survey questions that allow for open-ended responses.
- Fieldwork is a research method that involves the collection of data and information directly from the natural environment or real-world settings rather than
- Drawing information from pre-existing data sources.
- Participant observation is a research method that involves the active involvement of the researcher in the social setting being studied.
- Case studies are a research method that involves in-depth analysis of a particular individual, group, or situation. This approach allows for a comprehensive examination of the subject matter, providing
- Cultural research, also known as ethnographic research.

3.4.3 Mixed Method Data Collection

A mixed methods study integrates the collection and analysis of both quantitative and qualitative data within a single research endeavor. Individually, these methodologies possess the capacity to address distinct inquiries, so amalgamating them may provide more comprehensive and profound insights.

- One advantage of using a mixed methods approach is the ability to mitigate the constraints inherent in both quantitative and qualitative methodologies.
- The use of this approach may provide more robust evidence and enhance the level of trust in the obtained conclusions.
- The integration of many methods may provide more detailed and specific outcomes compared to the use of each individual approach in isolation.

There are some disadvantages associated with this approach.

- Executing it might provide a higher level of complexity.
- Utilizing a singular approach may need a higher level of knowledge in data collection, analysis, and result interpretation compared to employing many methods.
- The integration of many methodologies necessitates additional resources, including temporal and financial investments.

3.4.4 Ice-Breaking Process

An icebreaker is a concise facilitation activity designed to assist individuals within a group in initiating the process of collaboration or team formation. Icebreakers are often used as a recreational activity aimed at fostering a sense of camaraderie within a group, facilitating interpersonal connections among its participants. Frequently, individuals prioritize the exchange of personal information, including names, interests, and other related details. Ice-breakers are often used at social events, including parties, with the purpose of facilitating introductions among attendees who may be unfamiliar with each other.

Icebreakers are often seen as essential for activities that need active involvement and effective communication among participants. These activities contribute to generating interest and promoting equitable participation among all participants in achieving the objectives of the agenda.

These activities have the potential to dismantle the barriers that exist inside the workplace by fostering collaboration and inclusivity among individuals from various departments and hierarchical positions within the organization. They serve as an effective means to establish an initial sense of ease among participants and facilitate engagement via conversation and laughter. This is particularly advantageous when the individuals involved are employed in disparate departments or have varying hierarchical positions within the organization.

- Moreover, a successful session will facilitate the initiation of dialogue and reinforce the central theme of the session.
- Ensure that participants engage in a constructive and mutually beneficial exchange, fostering a positive and enjoyable session experience.
- The purpose of these sessions is to facilitate social interaction and provide a comfortable atmosphere during an event, as indicated by their name. These sessions are mostly used in situations when individuals who typically do not collaborate or have no prior acquaintance convene to pursue a common purpose.
- There are many instances in which individuals should contemplate using icebreakers.
- The participants in the study exhibit a diverse range of backgrounds.
- In order to effectively work towards a shared aim, individuals need to promptly establish interpersonal connections.
- The team is still in its nascent phase.
- A significant proportion of those interested in the matter at hand have little familiarity with the subjects under discussion.
- In the role of a facilitator, it is important to establish a rapport with participants and foster mutual familiarity.

3.4.5 Focus Group Discussion

A Focus Group Discussion (FGD) is a qualitative research methodology and data-gathering approach that involves the participation of a specifically chosen group of individuals who engage in an in-depth discussion about a predetermined subject or problem. This discussion is supervised by an external moderator who has professional expertise in the field. This methodology is designed to elicit the attitudes, perceptions, knowledge, experiences, and practices of participants, which are exchanged through interactions with various individuals. The methodology is predicated on the supposition that the group dynamics elicited during a focus group discussion (FGD) facilitate the identification and elucidation of collective knowledge within groups and communities, a task that would otherwise be challenging to do via a series of individual interviews. However, it should be noted that this approach does not assume A) an equal distribution of information among a given population under study, nor does it assume B) the existence of universally shared and homogenous knowledge within each society. An FDG, or focus group discussion, enables the researcher to elicit both the collective narrative and individual variations in experiences, perspectives, and worldviews via open discussion rounds, including the participants.

Table 4.1: Characteristics of different qualitative data collection techniques

	Focus Group Discussion (FGD)	Individual Qualitative Interview
Participants	A group of individuals who possess a shared quality or set of characteristics that have significance within the context of the investigation.	One interviewee was selected as a representative due to their unique and significant personal attribute having particular relevance from a research standpoint.
Mode of Conduct	The approach used in this study might be characterized as semi-structured, including meticulous planning and deliberate execution.	The data collection methods used in this study varied from semi-structured to unstructured. These methods were carefully designed and conducted with precision.
Scope of Insights	Frequently, a wide range of perspectives, ideas, and personal encounters are considered, particularly emphasizing the dynamics of social engagement among individuals.	This limited range of perspectives, ideas, and personal encounters offers profound individual observations.
Level of Focus	There is a significant emphasis placed on the specified topic(s).	The level of attention exhibits variability contingent upon the extent of structure.
Degree of Participation	In instances when moderation is conducted with precision and sufficiency, all participants make an equitable contribution to the discourse.	The whole of the interview is focused on exploring the individual's knowledge, attitudes, views, and experiences.

3.4.6 Counselling After Data Collection

The primary objective of a counseling interview is to provide the interviewee with valuable insights, recommendations, or guidance. The counseling session starts by engaging in the process of gathering pertinent information, then progressing towards giving direction, and ultimately culminating in the implementation of psychological interventions to address the identified issue.

3.5 Training sessions

Figure 3.1: Training session at Daffodil International University

3.6 Field Works


Figure 4.1: Training session before field work

Figure 4.2: Data collection from respondent (03.09.2023 Gabura Union)


Figure 4.3: Focus group discussion


Figure 4.4: Data collection from respondent (05.09.2023 Koyra)


Figure 4.5: Data collection from respondent (06.09.2023 Koyra)


Figure 4.6: Data collection from respondent (07.09.2023 Dakshin Bedkashi)


Figure 4.7: Data collection from respondent (08.09.2023 Dakshin Bedkashi)

CHAPTER 5

CONCLUSION

5.1 Learning outcome

Upon completing this internship, I have achieved the following learning outcomes:

1. I have gained a deep understanding of the challenges and disparities faced by disadvantaged pregnant women in coastal regions, particularly in Bangladesh.
2. I learned how to develop community-led models that empower coastal pregnant women and their communities. This includes fostering community participation, building partnerships, and facilitating community-driven health initiatives.
3. I have gained proficient knowledge in conducting health assessments, monitoring maternal health indicators, and tracking the progress of interventions to improve the health status of coastal pregnant women.
4. I have also understood the importance of data collection and analysis in decision-making.
5. I have developed the cultural competence and interpersonal skills to work effectively with diverse coastal communities.

5.2 Conclusion

The initiative to develop resilient adaptation strategies for mothers in coastal Bangladesh is a crucial endeavor with far-reaching implications. Coastal regions of Bangladesh are particularly vulnerable to the adverse impacts of climate change, including rising sea levels, increased salinity, and extreme weather events. Within these communities, mothers often bear the brunt of these challenges, as they are responsible for the well-being of their families. The development and implementation of resilient adaptation strategies aim to empower and support these mothers in navigating the complex realities of coastal life. These strategies encompass a range of interventions, from improving access to healthcare and education to enhancing livelihood opportunities and disaster preparedness. They are designed not only to alleviate immediate hardships but also to build long-term resilience, ensuring that mothers and their families can thrive in the face of ongoing environmental changes. This initiative underscores the importance of a multi-faceted approach, combining local knowledge and international support. By involving various stakeholders, such as government agencies, non-governmental organizations, and community leaders, the project leverages a collective effort to address the unique needs of mothers in coastal Bangladesh comprehensively. In the broader context, the success of this project is not just a local concern but has global significance. It exemplifies the type of innovative, community-based solutions that are necessary in our ever-changing world, where climate change threatens the most vulnerable. The knowledge gained and the models

developed in this endeavor can serve as an inspiration for similar projects worldwide, providing lessons and best practices for building resilience in the face of climate-related challenges. As the project unfolds and adaptation strategies are refined, the hope is that mothers in coastal Bangladesh will not only become more resilient but also serve as role models for adaptation and community empowerment. By investing in the well-being and capacity of these mothers, we are investing in the sustainable future of entire communities and, by extension, the planet.

References

Chowdhury, M. A., Hasan, M. K., Hasan, M. R., & Younos, T. B. (2020). Climate change impacts and adaptations on health of Internally Displaced People (IDP): An exploratory study on coastal areas of Bangladesh. *Heliyon*, *6*(9).

Hoque, M. Z., Cui, S., Xu, L., Islam, I., Tang, J., & Ding, S. (2019). Assessing agricultural livelihood vulnerability to climate change in coastal Bangladesh. *International journal of environmental research and public health*, *16*(22), 4552.

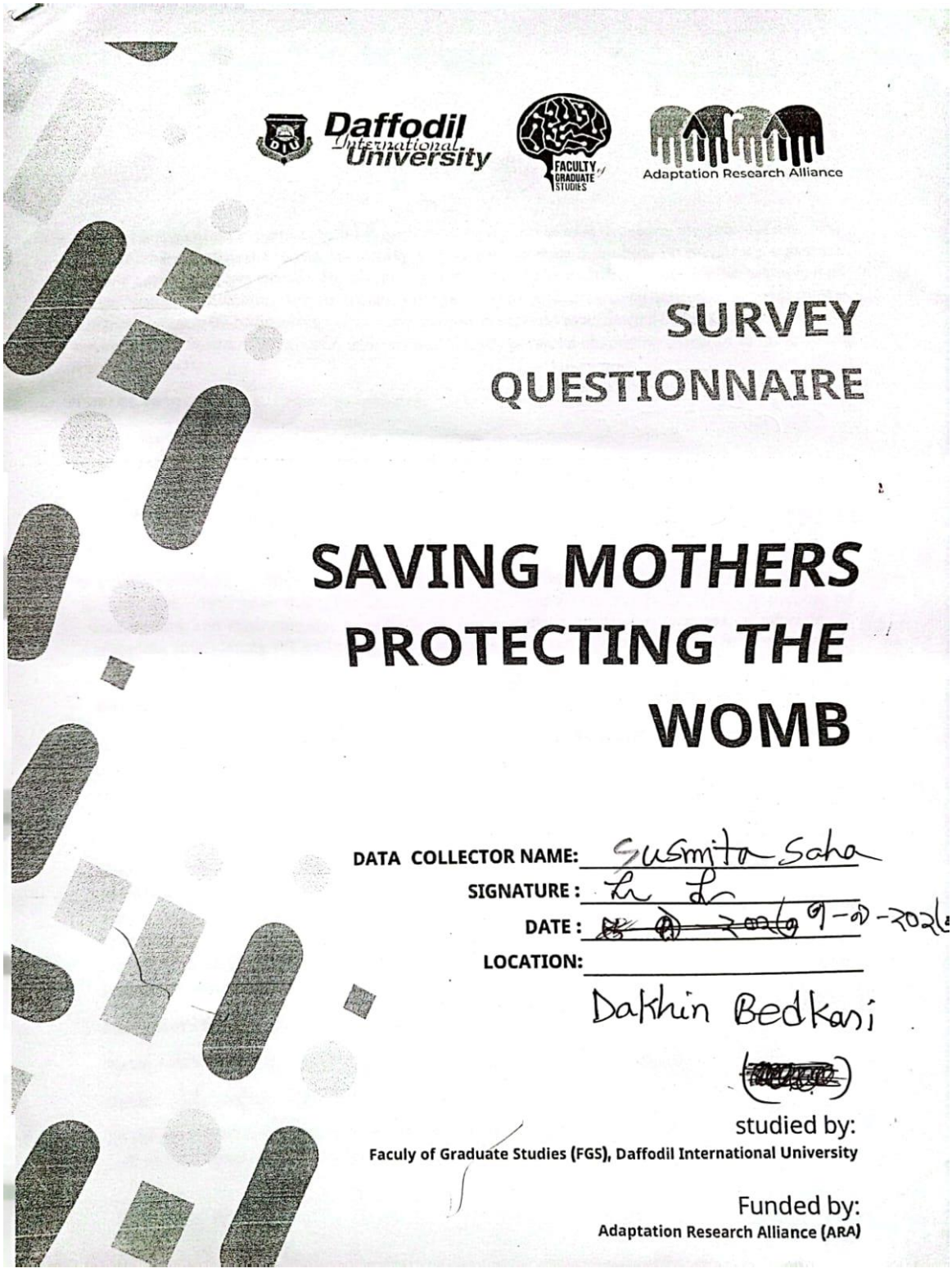
Mallick, B., Das, U. K., Islam, S. S., & Das, S. K. (2010). Vulnerability due to lack of infrastructure of coastal livelihood during cyclone Aila 2009 In Bangladesh. *Khulna University Studies*, 119-126.

Rashid, S. M. A. (2019). Coastal Biodiversity–A Review. *Report prepared for long term monitoring research and analysis of Bangladesh coastal zone*.

Saha, S. K., & Pittock, J. (2021). Responses to cyclone warnings: The case of Cyclone Mora (2017) in Bangladesh. *Sustainability*, *13*(19), 11012.

Appendices

Appendix 01: Case study



CONSENT FORM

You are being invited to participate in a groundbreaking study that aims to explore the potential effects of climate change-induced impacts, specifically high saline water consumption, on pregnancy outcomes among coastal pregnant women. The purpose of this study is to investigate the relationship between high saline water consumption due to climate change impacts and pregnancy outcomes among coastal pregnant women. By participating in this study, you will contribute to advancing our understanding of how environmental factors might affect pregnancy and identify potential adaptation pathways to mitigate any negative impacts.

If you agree to participate, you will be asked to:

1. Provide demographic information, medical history, and pregnancy details.
2. Participate in interviews or surveys about your water consumption habits, health, and well-being.
3. Allow access to your medical records related to your pregnancy and its outcomes.
4. Potentially undergo physical examinations and blood pressure test related to pregnancy outcomes.

In addition to the information provided above, we would also like to request your consent for the use of pictures and videos taken during the study. These images and videos may be used for the purpose of documenting and illustrating the study findings in presentations, reports, publications, or educational materials. Your identity will be kept confidential, and any images or videos used will be appropriately anonymized.

Privacy:

Your privacy is of utmost importance. All information collected during this study will be kept confidential to the extent permitted by law. Your data will be assigned a unique identifier, and any published results will be presented in a way that does not reveal your identity.

Consent:

I have read and understood the information provided in this consent form, including the picture and video consent section. I have had the opportunity to ask questions and have received satisfactory answers. By signing below, I freely give my consent to participate in the study titled "Pioneering Study on Pregnancy Outcomes, Adaptation Pathways, and High Saline Water Consumption in Coastal Areas Affected by Climate Change," including the use of pictures and videos as described above. I understand that my participation is voluntary and that I may withdraw at any time without consequence.

Participant's Name: [illegible]

Participant's Signature: ✓

Date: ~~৬-৯-২০২৩~~ ৭-৯-২০২৩

[If the participant is unable to provide a written signature, an alternative process for indicating consent will be established in accordance with ethical guidelines.]

Demographic Information

1	Participant's Name:	ফুলকুমার
2	Age (Year):	
3	Religion:	☑ Muslim ☐ Hindu ☐ Buddhist ☐ Christian ☐ Other (specify.....)
4	Participant's Education Level:	☑ No formal education ☐ Primary school ☐ Secondary school ☐ Vocational/trade school ☐ Tertiary level
5	Participant's Employment Status:	☐ Employed ☑ Unemployed ☐ Self-employed ☐ Other (specify.....)
6	Participant's Occupation:	☑ Housewife ☐ Fisherwoman ☐ Farmer ☐ Day Laborer ☐ Other (specify.....)
7	Socio-economic status:	☑ Low ($1,025 or less) ☐ Lower middle ($1,026 to $4035) ☐ Upper middle ($4036 to $12,475) ☐ High ($12,476 or more)
8	Household size:	৯
9	Number of children:	২
10	Number of earning members:	১
11	Monthly family income:	১৫০০/৪৫ depend on situation
12	Blood Pressure (e.g.,120/80)	
13	Height:	৫
14	Weight:	50
15	BMI [weight (kg) / height (m)^2]:	SCORE ☑ Underweight [less than 18.5] ☐ Normal Weight [18.5 - 24.9] ☐ Overweight [25 - 29.9] ☐ Obese (Class I) [30 - 34.9] ☐ Obese (Class I) [35 - 39.9] ☐ Obese (Class I) [40 or higher]

Pregnancy Outcomes & Complications

1	At present, how many children do you have?	8
2	How long have you been married?	3 6
3	During this time, how many times have you been pregnant?	6
4	During your pregnancies, did you experience any miscarriages or stillbirths?	☐ Yes ☐ No
5	If yes, how many occurrences were there?	2
6	Have you experienced any complications during any of your pregnancies?	☐ Yes ☐ No
7	*If yes, please specify the complications you faced*	See table below
8	Which trimester did the complications occur in?	☐ First trimester ☐ Second trimester ☐ Third trimester ☐ Throughout the pregnancy
9	During pregnancy, have you noticed an increase in thirst or feeling constantly thirsty?	☐ Yes ☐ No
10	If yes, how frequently are you experiencing this increased thirst?	☐ Always ☐ Very Frequently ☐ Occasionally ☐ Rarely ☐ Very Rarely
11	During pregnancy, have you experienced any muscle cramps, fatigue, or irregular heartbeats?	☐ Yes ☐ No
12	If yes, how frequently are you experiencing these symptoms?	☐ Always ☐ Very Frequently

Complications	Rank
☐ Gestational Diabetes	
☐ Pre-eclampsia	
☐ Gestational	
☐ Hypertension	
☐ Kidney problem	
☐ Bleeding	
☐ Preterm labor	6
☐ Low birth weight	3
☐ High birth weight	
☐ Miscarriage	1
☐ Stillbirth	2
☐ Others (Please specify)	

Drinking Water Sources and Salinity

1	What is the primary source of drinking water in your area?	**Dry season** ☐ Shallow tube-well ☐ Deep tube-well ☐ River ☐ Cannel ☑ Pond ☐ Rainwater harvesting ☐ Filter ☐ Others (Specify) লোনাপানি	**Rainy season** ☐ Shallow tube-well ☐ Deep tube-well ☐ River ☐ Cannel ☑ Pond ☑ Rainwater ☐ Filter ☐ Others (Specify)
2	Did you consume this water while you were pregnant as well?	☑ Yes ☐ No	
3	*How many liters of water do you drink every day?*	☐ Less than 1 liter ☑ 1-2 liters ☐ 2-3 liters ☐ More than 3 liters	
4	*Do you utilize this water for cooking as well?*	☑ Yes ☐ No	
5	Are the drinking water sources in your region more dependent on surface water (rivers, lakes) or groundwater (tube-well)?	☑ Surface water ☐ Groundwater	
6	Have you ever faced issues with the quality or availability of drinking water? If yes, could you briefly describe the situation?	ঘোলাপানি, ডায়রিয়া, প্রস্রাবে সমস্যা,	
7	Are you familiar with the concept of water salinity? How would you explain it in your own words?	হ্যাঁ, স্বাদ নোনতা	

Daffodil International University

FACULTY GRADUATE

Adaptation Research Alliance

8	In your area, do you face challenges with high salinity levels in drinking water?	☑ Yes ☐ No
9	If yes, could you briefly describe the challenges?	ডায়রিয়া, পেট ব্যথা, রক্ত কম। ঘুম নাই, প্রসাবে জ্বালা
10	Were any of the pregnancies conceived while consuming water from a source that you suspect had high salinity?	☐ Yes ☐ No ☑ Unsure
11	During any of your pregnancies, did you relocate or change your primary residence?	☑ Yes ☐ No
12	If yes, did this change result in a different primary water source?	☐ Yes ☐ No
13	In your opinion, which sources of drinking water are more prone to salinity issues: surface water or groundwater?	☑ Surface water ☐ Groundwater
14	Were any supplements or dietary changes recommended to you during your pregnancy to counteract high salinity?	☐ Yes ☑ No ☐ Unsure
15	Have you personally taken any actions to address drinking water salinity or improve the quality of water you consume?	☐ Yes ☑ No
16	If yes, how? Please describe	
17	Do you take extra salt?	☑ Yes ☐ No
18	If yes, then how many times a day?	৩
19	How much money you spend for buying salt in a week/month	৩ প্যাকেট

Daffodil International University

Please rate the following statements using a 7-point scale, where 1 = Strongly disagree and 7 = Strongly Agree.

20	The taste and quality of the drinking water are affected by the level of salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
21	The taste of the drinking water has changed noticeably over the years due to the high salinity levels.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
22	I am concerned about the potential health risks associated with consuming water with high salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
23	The availability of safe and drinkable water is compromised due to the salinity issue.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
24	I am concerned that drinking water with high salt content during pregnancy might have contributed to these complications.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

High Water Salinity and Nutritional Impact

Please rate the following statements using a 7-point scale, where 1 = Strongly disagree and 7 = Strongly Agree.

1	*The high-water salinity in the coastal area affects the availability of fresh and nutritious foods.*	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
2	I find it difficult to maintain a well-balanced diet during pregnancy due to the limited nutritional options caused by high water salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
3	The consumption of locally available foods is negatively impacted by the salinity in the water.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

High Water Salinity and Economic Impact

Please rate the following statements using a 7-point scale, where 1 = Strongly disagree and 7 = Strongly Agree.

1	The cost of purchasing bottled water or alternative water sources has increased significantly due to water salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
2	Our family has had to cut back on other expenses to afford resources needed to cope with water salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
3	High water salinity has led to unexpected financial burdens related to healthcare and well-being during pregnancy.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
4	The economic strain caused by water salinity has affected our ability to save for future expenses.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
5	We have had to allocate a significant portion of our income to address the challenges posed by water salinity	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Daffodil International University

Adaptation Research Alliance

High Water Salinity and Mental Health

Please rate the following statements using a 7-point scale, where 1 = Strongly disagree and 7 = Strongly Agree.

1	Water salinity has contributed to feelings of frustration and helplessness during my pregnancy.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
2	I feel overwhelmed by the constant need to manage the effects of water salinity on daily life.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
3	I find it difficult to stay optimistic and positive in the face of the challenges posed by water salinity.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Coping and Adaptations Mechanisms

1	Which of the following adaptation measures have you implemented to deal with increased salinity in your drinking water?	☐ Using a different water source ☐ Boiling water before consumption ☐ Using water purifiers/filters ☐ Buying bottled water ☐ Using traditional purification methods (like sedimentation or cloth filtering) ☐ Other (Specify.....) (1) Tap water (2) [illegible]
2	If you've shifted to a different water source, how did you identify this source as being safer or better?	Tap water – [illegible] [illegible] – [illegible]
3	How sustainable do you believe your current coping/adaptation measures are for the long term?	☐ Highly sustainable ☐ Moderately sustainable ☐ Not sustainable ☐ Unsure
4	In areas where drinking water salinity is a concern, what strategies (short term/long term) have local governments or organizations employed to ensure a safe and consistent supply of freshwater to residents?	long term

Daffodil International University

Adaptation Research Alliance

5	Are there any examples of successful community-led initiatives aimed at adapting to or mitigating the effects of drinking water salinity? What made these initiatives effective?	

Medical History, Records and Dietary Habits

1	Were you recommended or prescribed any medications related to complications which you believe might be connected to high salinity?	☐ Yes ☑ No
2	If yes, please specify	
3	How would you describe your salt intake through diet?	☑ High ☐ Moderate ☐ Low ☐ Unsure
4	Are there particular foods or dishes you consume regularly that you believe have high salt content?	☐ Yes ☑ No
5	If yes, please list them	
6	Have you made any efforts to reduce salt intake in your diet during pregnancy?	☐ Yes ☑ No

Knowledge and Perceptions

1	Before this questionnaire, were you aware of any potential risks associated with consuming high-salinity water during pregnancy?	☐ Yes ☑ No
2	Do you know of any other community members or relatives who believe that salinity in drinking water impacted their pregnancy outcomes?	☐ Yes ☑ No
3	In your opinion, how important is it for communities to address water salinity issues?	☐ Extremely important ☐ Very important ☑ Moderately important ☐ Slightly important ☐ Not at all important

Daffodil International University

Adaptation Research Alliance

4	How important do you think the quality of drinking water is for your health and the health of your unborn child during pregnancy?	☐ Extremely important ☑ Very important ☐ Moderately important ☐ Slightly important ☐ Not at all important
5	Have you received any information or advice from healthcare providers, family, or friends regarding the potential effects of consuming water with elevated salinity during pregnancy? If so, could you share what you've heard and your thoughts on it?	Tap water আর্সেনিকমুক্ত কিছু সমস্যা নেমতো

Community & Governmental Support

1	Which local community organizations or groups, if any, have you heard of that are actively addressing the saline water issue? Please list them.	উদ্দীপন, brac বিভিন্ন টাংকি দেয়। ~~কিছু~~
2	Have you participated in any community meetings, workshops, or forums specifically discussing the saline water problem?	☐ Yes ☑ No
3	If yes, how often?	☐ Rarely ☐ Sometimes ☐ Often ☐ Always
4	Describe any specific interventions or solutions proposed by these community groups or at such forums.	
5	In your opinion, how effective have local community initiatives been in addressing and managing the saline water crisis?	☐ Highly effective ☐ Moderately effective ☐ Slightly effective ☑ Not effective at all ☐ Unsure
6	How would you rate the visibility and communication efforts of these community organizations regarding the saline water issue?	☐ Excellent ☐ Good ☐ Average ☑ Poor ☐ Very poor

Daffodil International University

Adaptation Research Alliance

7	Are you aware of any collaboration between community organizations and governmental agencies on this issue? Please provide details.	না
8	From the following list, which actions have been taken by the local or national government concerning the saline water problem in your region?	☐ Distribution of water purifiers ☐ Public awareness campaigns ☐ Establishing alternative water sources ☐ Collaborations with international agencies ☐ Provision of subsidies for water treatment ☑ None ☐ Other (Specify)
9	In your view, how timely has the governmental response been to the saline water crisis?	☐ Very timely ☐ Somewhat timely ☐ Neutral ☐ Delayed ☑ Extremely delayed
10	Do you believe there's adequate representation of affected individuals or communities in decision-making processes related to the saline water issue at the government level?	☐ Yes ☐ No ☑ Not sure
11	How well do you believe the government understands and prioritizes the health implications of saline water, especially concerning pregnancy outcomes?	☐ Very well ☐ Moderately ☐ Neutral ☑ Poorly ☐ Very poorly

Daffodil International University

Adaptation Research Alliance