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FAHMID AL ZAID

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Members of the Examining Committee:

Supervisor:

dr. Luisa Cortesi

Second Reader:

dr. (Christina) C Sathyamala

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Disclaimer:

This document represents part of the author's study programme while at the International Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

Inquiries:

International Institute of Social Studies
P.O. Box 29776
2502 LT The Hague
The Netherlands

t: +31 70 426 0460
e: info@iss.nl
w: www.iss.nl
fb: <http://www.facebook.com/iss.nl>
twitter: [@issnl](https://twitter.com/issnl)

Location:

Kortenaerkade 12
2518 AX The Hague
The Netherlands

Dedicated to-

Rokeya Begum,

My maternal grandmother whom I lost in January 26, 2021

Raasheed Mahmood,

My teacher, colleague and friend whom I lost in 31 March, 2021

"I suppose in the end, the whole of life becomes an act of letting go, but what always hurts the most is not taking a moment to say goodbye".

- Irrfan Khan's dialogue in *Life of Pi*

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List of Acronyms

- BELA: Bangladesh Environmental Lawyers' Association
CBNRM: community-based natural resource management
CEIP: Coastal Embankment Improvement Project
CEP: Coastal Embankment Projects
DPHE: Department of Public Health Engineering
DPs: Desalination Plants
HYV: High Yielding Varieties
LGRD: Local Government, Rural Development
MP: Parliament Member
NGO: Non-Government Organization
PSFs: Pond Sand Filters
RO: Reverse Osmosis
RWH: Rainwater Harvesting
STS: Science and Technology Studies
UP: Union Parisad
WDB: Water Development Board

Acknowledgement

Writing, whether it is a work of fiction or non-fiction, report or research, is not a solitary act, as it is mistakenly assumed. Though my name is on the title page as an ‘author’ of this research paper (RP), I genuinely don’t believe that I have written it alone.

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Abstract

This research explores how people of the Gabura Island- a Union of Shyamnagar subdistrict under Satkhira district in Southwest delta of Bangladesh- deals with water scarcity. More specifically, how the social management, infrastructures, technologies and market are shaping fresh water distribution among the Islanders. The southwest delta of Bangladesh is ecologically fragile and socially vulnerable. Climatic hazards like cyclone, tidal surge, salinity intrusion, flood, and river bank erosion are very frequent and these aggravate fresh water scarcity day by day. Adopting political ecology, science and technology studies, anthropology of infrastructures as theoretical framework and based on qualitative interviews, this research provides an analysis of how fresh water scarcity is produced, and how socio-economic differences play a role in accessing fresh water in the community and household level. It also raises questions about the way development agencies like NGOs provide water service to the community. The findings show that NGO driven projects and development assistances sometimes do not bring any genuine change, rather, they reproduce the existing socio-economic differences.

Relevance to Development Studies

Water is the most important element of existence for all life forms and core of sustainable development. By analysing the management and distribution of fresh water in an Island of Southwest delta of Bangladesh, this research investigates how socio-economic differences among the local community create unequal access to fresh water. Research on consumption, distribution and access to fresh water is important as it is intricately entangled with coastal ecosystem. This research contributes to the broad theorization of water governance and hydro-politics of coastal area where water plays a crucial role as Bangladesh is portrayed as one of the most vulnerable counties due to global sea rise. In general, the research shows how development studies need to look at the distribution of water among its users and how power relation, socio-economic difference and development assistance shape the management and distribution of water as material resources. It also claims that people's opinion and voices should be recognized into any development intervention to make life and livelihood more sustainable.

Keywords:

Water scarcity, social management, political ecology, technology, infrastructure, community, NGOs

Chapter 1

Introduction

1.1 Setting the Scene

Rokeya wakes up very early in the morning while everybody is sleeping in the house. Her day starts with a specific job: 20 minutes walking to a community water pump from the nearby village. She awaits to be accompanied by the other women from her neighbourhood. Before the cyclone *Amphan* in 2020, the nearest community water pump, popularly known as PSF (Pond Sand Filter), was only five minutes walking from her home. But the cyclone hit on the coastal area and due to the collapse of the embankment, which protects the Island from the saline water of the surrounding tidal rivers, many fresh water ponds were contaminated where PSF water pump had been connected. Rokeya's village is filled with numerous shrimp farms with saline water and there are few fresh water ponds which are used for community drinking and other domestic purposes. When the embankment collapses, the saline water from the tidal surge mingles with the shrimp farms, overflows and contaminates all the fresh water ponds instantly. Rokeya's home is very close the embankment and their community PSF fresh water pond was contaminated by the saline water after the embankment collapse. Now, Rokeya has to walk more than 20 minutes to fetch all the fresh water for her family. Carrying water with a jar on her hips twice a day is an extremely difficult task. Rokeya's husband is a day labourer. During the Winter, he migrates in some of the brickfields where he works as labourer for up to six months. Rokeya also catches shrimp larvae from the rivers and sell them to the shrimp farms. Her family doesn't have big water tanks, like many wealthy households in the Island have, to store huge amount of rainwater during the Monsoon for several months. It is also difficult for her family to buy water from the Desalination Plants (DPs) during the Summer. As the fresh water scarcity increases every year in the village, community based PSF water pump is the only hope for Rokeya.

Like Rokeya and her family, all the poor households in the village have to struggle everyday with the fresh water scarcity. I start with Rokeya's struggle with fresh water scarcity because I believe it captures almost all the aspects that this research tries to investigate. This research aims to explore how people of the Gabura Island- a Union of Shyamnagar subdistrict under Satkhira district in Southwest delta of Bangladesh- deals with water scarcity. More specifically, how the social management, infrastructures, technologies and market are shaping fresh water distribution among them. The southwest delta of Bangladesh is ecologically fragile and socially vulnerable. Climatic hazards like cyclone, tidal surge, salinity, flood, and river bank erosion are very frequent and these aggravate fresh water scarcity day by day. This research provides an analysis of how fresh water scarcity is experienced, and how socio-economic differences play a role in accessing fresh water in the community level. It also raises questions about the way development agencies like NGOs provide water service to the community.

1.2 Scarcity, Infrastructures and Salinity

Construction of water scarcity and academic debates on it is one of the most important elements for this research to understand why drinking water becomes scarce in the coastal area. Water scarcity should be looked at as socially constructed phenomena and highly politicized concept that needs to be put into broader political, economic, geographical and historical contexts (Arsel and Spoor, 2010, p. 9). The distributional, relational and anthropogenic dimension of water scarcity is associated with socio-political, institutional and hydrological factors (Mehta, 2003, p. 5066, Barnes, 2009). The consumption, distribution and management of water have something to do with the production of water scarcity. As society is structured around multiple inequalities in terms of class, race, gender, ethnicity; access to water and its distribution among the members of a society in a scarce environment have been hindered by

those inequalities (Rodríguez-Labajos and Martínez-Alier, 2015, p. 543). So, different struggles by the different actors over the access to water are one of the important aspects for any research on water management.

Besides, water infrastructures in coastal Bangladesh are also very important catalyst for water management and distribution. It was during the 1950s when East Pakistani (Now Bangladesh) government asked the Dutch government to assist in conserving the coastal ecosystem from periodic floods and devastating impacts of cyclone which continued till today (Hasan, Evers and Zwartveen, 2020). However, construction of water infrastructures in the coastal area of Bangladesh was initiated by embankments, sluice gates and polders to promote the Green Revolution during the 1960s and 70s. From the 1960s to 1980s, the national government under the 'Coastal Embankment Projects' built 37 polders, 1566 kilometers of embankments and 282 sluice gates throughout the Southwest coastal region along with canals for tidal managements (Afroz, Cramb and Grunbuhel, 2016, p. 22).

The constant 'polderization' of the coastal ecosystem through water infrastructures contributed so far the increasing salinization process. These polders and later flood control and irrigation projects increased the high yielding varieties of rice cultivation but changed the coastal ecosystem in a massive scale. This intervention was also poorly managed by the local water and infrastructure bureaucracy, namely, Water Development Board (WDB) and Local Government, Rural Development (LGRD), which also disrupted the coastal ecosystem (Huq and Easher, 2020). Besides, the construction of Farakka Barrage by the Indian government on the River Ganges (Padma in Bangladesh) also disrupted the flow of fresh water from the upstream which ultimately scaled up the salinity level in the tidal rivers of the Southwest region of Bangladesh (Samad, 2016). Knowledge and opinion of the local community was never taken into account during this process. On the other side, commercial shrimp farming in the Southwest Bangladesh, hailed as 'white gold' by the government, largely contributes to the livelihood of the people but increases salinity intrusion through the contamination of soil and fresh water sources (Hoque, Quinn, and Sallu, 2017).

1.3 Community, Participation and NGOs

A number of social and developmental arrangement have been devised for the fresh water management in the coastal area of Bangladesh targeting community, household and market. Community based water management is a by-product of larger discourses on 'community-based natural resource management' (CBNRM). The idea of CBNRM is based on the assumption that localized communities are able to manage their own natural resources in a more efficient, sustainable and equitable way (Blaikie, 2006). The apparent failure of state and market mechanism to provoke sustainable and equitable distribution of natural resources in the developing world have tempted community-based alternatives (Li, 1996; Agrawal and Gibson, 1999; Cortesi, 2014). In the 1990s, this community-driven development intervention was fully integrated into international development discourse by transferring power and authority to several local organizations; a process of decentralization which is seen as fundamental toward achieving grassroots democracy (Menon et al. 2007).

But the idea of homogenous, apolitical, unified and idealized 'community' is challenged by several scholars. When the idea of 'community' is translated into policy, it creates some myths. While these myths provide creative inspiration for the policy makers, they can mystify important contradictions and realities; thus legitimize the status quo in such a way that ultimately supports the powerful groups of the society (de Neufville and Barton, 1987, p. 181). Sometimes, community is viewed as homogenous, holds shared understanding and hence the internal differentiation and power structure are overlooked (Agrawal and Ostrom, 2001).

Scholars also criticized the idea of ‘community’ as homogenous entity which overlooks the complex realities where access to water may vary by hierarchical system of differentiation in the society (Sultana, 2009). This conceptualization of community is neither practical nor feasible as a development strategy. This idealized version of community harms the overall grassroots development process. Environmental NGOs in Bangladesh, mostly work on the coastal area, have a very non-critical view on community, participation and development (Islam, 2016). Like the idea of ‘community’, the emergence of ‘participatory development’ was also initially justified in terms of sustainability, empowerment and a greater participation of local people in the development process (Cooke and Kothari, 2001, p. 5). But the idea of ‘participation’ in the development project is also criticized in the sense that participatory planning may be viewed as the manipulation of new knowledge of the international agency rather than incorporating people’s ‘participation’ (Mosse, 2001).

The community-based water management in the Southwest delta of Bangladesh provides a unique opportunity to examine its strength and weakness. It is important to look at the socio-economic and political conditions under which its ‘success’ and ‘failure’ are claimed. While the model of ‘tragedy of the commons’ (Hardin, 1968) has a demographic provocation, I will examine to go beyond the demographic factors behind the tragedy of the commons. Besides, conditions under which the institutional arrangements fail to produce the collective responsibility must be investigated (Ostrom, 1990) during any community based resource management.

While community-based water management has failed in many parts of the coastal area, it has generated decentralization and marketization of water distribution. Many development agencies believe that household-based water management is one of the alternative ways. This form of management expects to bring economic benefits, efficiency and environmental positivity (Pavolova, et al. 2019). It is based upon the assumption that many a times communities are reluctant to pay much attention to natural resource management; there exists a collective action problem, so it is better to handover the responsibility to the individual households and the problem of participation, trust and cooperation will be solved (Harvey and Reed, 2007, p. 374). While rain water harvesting by the household is a traditional way for securing water, armed and inspired with the doctrine of methodological individualism and rational choice theory (Andresen, 2004), NGOs are giving multiple supports to the households for promoting this strategy. That means every household becomes aware of the fact that water is everybody’s business, not a common anymore (Agarwal and Narain, 1999). It is the individual not the community which is responsible for managing water for themselves.

One of the principle areas of interests for this research is to investigate the role of NGOs in solving water crisis in the study Island. NGOs provide supports and development assistances in three different types of water distribution among the local community: community based water management (PSF), household based rainwater management (RWH) and market based desalination plants (DPs). Though NGOs have always been praised for their involvement and connection with the local community and grassroots level (Fisher, 1997), sustainability and proper continuation of the water distribution, in community or household level, without the NGOs are largely unanswered (Mosse, 1999, p. 329). We need to know the nature of participation and what is expected in a given situation. What does participation mean to the community people and NGOs? The importance of participation in development discourse invites community people in such terms and conditions that many times they can’t challenge (Cooke and Kothari, 2001). In fact, how NGOs ensure the issues of development, sustainability and participation among the different socio-economic groups of water users in the study Island is under critical investigation in this research.

1.4 Theoretical Framework

This research draws on three theoretically connected frameworks: political ecology, science and technology studies and anthropology of infrastructure. Political ecology is an interdisciplinary field of research which focuses on the interaction between human society and environment from a political economic perspective; that means, it looks at the politicized dimension of society-environment interaction (Robbins, 2012; Peet, Robbins and Watts, 2011). Political ecology emerged out as a reaction against Neo-Malthusian interpretation about environmental degradation (Bryant, 2001) and apolitical ecological explanation of change (Robbins, 2012). Two most influential themes are found on political ecological literature: the first revolves around the connection between unequal power exchange and conflict over the access of environmental resources; and the second concerns the way discursive knowledge about environment is constructed politically based on unequal power dynamics of a society (Bryant, 1998). To the political ecologists, every environment is a 'politicized environment' which means environmental problems can't be explained in isolation without taking political and economic context within which they occur (Bailey and Bryant, 1997, p. 28). While I acknowledge the variation that political ecology as a research paradigm has many global and transnational dimensions that are extremely important, this research is particularly focused on the local aspects of a particular place.

The development of 'political ecology of water' as a sub-field grabs the specific attention for this research. While fresh water scarcity is very visible in the coastal ecosystem and apparently looks like a biophysical problem, it also reflects on how water is valued, both cultural and economic meaning is attached to it; and how access and patterns of water use, the control over it, its management and distribution are also very important (Johnston, 2003, p. 74). Two important aspects of political ecological understanding of water are important in this regard: how the distribution of water has been shaped by the power relation and how water itself shapes those power dynamics. Here, water becomes not only crucial to understanding of the production and reproduction of power but also it provides a better glimpse of current ongoing predicament of governance and development as a whole (Loftus, 2009, p. 954). Political nature of water no longer keeps it 'natural', rather generates water scarcity through socio-political process, exclusion, discrimination and biases (Mehta, 2014, p. 61). Besides, a number of political ecological studies of water have shown the impacts of large scale water infrastructures on the relation between society and environment as well as how ignoring the local dynamics, local knowledge and local level public opinion (Adams, 2009) brings negative consequences. Thus, in this research, I will investigate water not as a given or preexisting natural things or objects but as a scarce resource that comes into society as a politically mediated product through different levels, actors and institutions.

Scholars of Science and Technology Studies (STS) offer us some fresh insights on the interaction between the technology and society (Latour, 2000; Fischer, 2007). Modern technologies are invented and used for multiple purposes. Regardless of the purposes for which technological devices are designed, produced and invented, their effect is to modify the relationships among the different groups. So, paying attention to the technological use can tell us about the development of society, and political and ethical dimension of its uses and misuses (Bijker 2007; von Schnitzler, 2013). A major contribution of this theoretical field is the argument that technology is not something external to society, nor it influences simply the social and political relation. Rather, technology shapes society, how people interact with their surroundings and also how society shapes the use of technology. (Kline and Pinch, 1996). In fact, technology is not out there, as it is mistakenly assumed, waiting to be used by the human, rather the ways in which we know and represent both nature and society are not

separable from the ways in which we live in through the interaction of the technologies (Jasanoff, 2014).

Technologies of water control and distribution among its users are deeply social and political in nature and become more dynamics in the context of development intervention. Technologies not only contribute in an unevenly distributed benefits among its users but also they create several risks and hazards (Sismondo, 2010, p. 10). So, acceptability and sustainability of a technology depends on its users, how they perceive it, and how they handle it. As a result, technology is not neutral. It has class and gender dimension which means different socio-economic classes and gender groups receive technology in a different way.

Anthropology of infrastructure began to draw from a diverse source of interests like STS and ethnographic approaches to the analysis of technological systems, social change, and development (Harvey and Knox, 2015, p.4). Anthropological works on infrastructures (Anand, Appel, and Gupta, 2018; Larkin, 2013; Hetherington, 2019) vehemently argue that material infrastructures have a special role on how it impacts both on environment and society and also their mutual interactions. Infrastructures are made by the government and maintained by the local bureaucracy, and these infrastructures are an important part of political rationality which gives rise to an apparatus of governmentality (Larkin, 2013, p. 328). While building public infrastructure has often been seen as an effective means to serve the public interest in the name of welfare, scholars argue that infrastructures become visible through its shortcomings, failures and violence (Star, 1999). Thus, studying infrastructures, in this case water infrastructures, can actually tell us a lot about political intensions of governmentality and development politics.

A major analytical challenge is to understand under which conditions the infrastructure becomes violent, for whom, why and who are responsible for it (Rodgers and O'Neill, 2012, p. 402). My interest on water infrastructures as a dynamic relational form provides not only analytical possibilities but also offers irregularity, conflict, corruption, competition and power dynamics in the coastal Bangladesh. So, water in coastal area is not an object, not a natural thing but a resource which are managed and controlled by several actors in different ways. In this process, material infrastructures, its users and managers play a critical role to control and manipulate the water flow.

1.5 Research Question

How do inhabitants of Gabura Island manage their fresh water whose scarcity is occurred due to the risk of periodic cyclones, embankment collapse and shrimp farming in saline water?

To provide an answer for my research question, I further formulate several research sub-questions which are needed understanding the context and background under which production, consumption and distribution of water works in the study Island:

- 1) How is water scarcity created, experienced, confronted by the coastal community?
- 2) How do socio-economic differences and community dynamics create unequal access to the water distribution among the Islanders?
- 3) How is water distributed among the different groups of the people and which social technologies, practices and institutions create them?
- 4) How does water distribution process raise the questions towards the idea of development, community and participation provided by NGOs?

1.6 Research Methodology

I first visited Gabura in 2010 just a few months after cyclone *Aila* hit on the Island. I went there as volunteer on behalf of a network of NGOs whose primary job was to provide safe drinking water to the Islanders. I spent few hours on the Island and observed the scar of cyclone everywhere. That brief encounter with the Island was remained in my thoughts for the next few years and beyond. However, after eleven years, while working on my RP, when the opportunity presented itself to conduct research, I immediately thought about returning back to Gabura. My research topic and question were expected to be explored by participatory observation. But, due to pandemic, the impossibility of going back to Bangladesh for in-person fieldwork was in part of an issue of personal safety. It was also an ethical dilemma for possibility of my role in spreading virus among the research participants. Despite this being a challenge, I use this as an opportunity to rethink the idea of ‘field’ and ‘fieldwork’. As a result, I hired a research assistant and used online interview via internet telephone, messenger and WhatsApp for collecting primary data for this research.

1.6.1 Field as a series of networks

The shifting idea of ‘field’ as a single, geographical place to ‘field’ as a series of network helped me to reorganize my methodology for this research. I also acknowledge that the Malinowskian image of fieldwork in a territorially bounded, localized community in a highly connected world is contested everywhere (Gupta and Ferguson, 1997, p. 4). And yet, not being able to be in-person there adds a considerable layer of epistemological tests. In particular, as this research is about environmental challenges that local people face and experience, not being able to observe the people in their actual physical and social environment adds another layer of difficulty. Though fieldwork in a particular geographical location creates a sense of ‘being there’ (Borneman and Hammoudi, 2009), this research was completely done without such direct in-person fieldwork by me.

Under this circumstance, the field is assumed as a series of networks (Burrell, 2009) rather than a single site or location as an alternative configuration. I conceived of the field composed of several sites such as my room in the Netherlands, the Island Gabura and the internet as an intricately connected space. How could I imagine ‘people’ and ‘field’ as a researcher when I am not ‘there’ in person? I am continuously questioning the idea of ‘field’ and its ‘single-sitedness’, and my own experience and role as a researcher in it. For me, ‘field’ is everywhere. Sometimes, it is my room, sometimes it is the people and place, sometimes it is the internet space. Or sometimes, it is the combination of all theses. It is a transformative feeling for me from ‘being there’ to ‘being everywhere’ in the process of my research.

1.6.2 Research Assistant

Through my personal connection, I hired a research assistant, Md. Helaluzzaman, who is 23 and a student of the University of Dhaka. He is born and brought up in the Island. His father owns two acres of shrimp farms and are respected by the community people. After our initial conversation, we exchanged our WhatsApp number and our regular conversation became part of my daily life.

In fact, I looked for a research assistant who would be a student and also familiar with the Island. University students are usually familiar with research and smart in handling technologies. Besides, as Helaluzzaman is a local, he is very much familiar with the social and physical environment of the Island. In the pandemic context, a research assistant from the outside would be difficult to be accepted among the local people. It would have also been unsafe for the research assistant from the outside to travel during the pandemic. Due to my physical

absence, a local like Helaluzzaman from the Island is in a better position to explain the physical environment. He is also well accepted by the community people as not many youths from the Island have the luck to go to university before him. Besides, he is well connected with the outside such as NGOs staff, journalists, members of the Union Parisad and this research is highly benefited from his acceptance, familiarity and connection.

Initially, Helaluzzaman and I talked about the socio-economic structure, the physical environment, shrimp farming, water bodies, embankments, cyclones and riverbank erosion etc. After the first phase of familiarity, our conversation was more focused on my research topic and questions, how this research should be conducted. As he didn't have any previous experience with research, we talked about how to conduct interview, how to take fieldnotes and write field reports etc. I also sent some interview guides so that he could effectively conduct in-depth interview with the local people.

1.6.3 Online Interview and Internet

I also conducted several interviews with local people. I managed to create some forms of relationship with the research participants, even though it was online. Interview with the local people did take place in a time when they have more leisure, especially during the evening when people would come back from their work, have dinner and say their prayers. So, the local people didn't find the interview moment as burdensome. During one interview over the phone, interviewees asked me questions like, 'in which country you are in? What is the corona situation there? Did you get your vaccine? How is the snow?' etc. Questions like these from them were very common and their inquisitiveness pushed me more to share about myself and made the interviewing process more interactive.

Internet and Facebook also helped me to imagine my research site in several ways. I downloaded a map of Gabura, printed and hanged it on the wall in front of my reading table. Besides, watching Gabura in *Google Maps* became a bed time habit for me. Those cartographic imagination helped me to think about the Island in a more creative way. Besides, I joined in a Facebook group called, *Gabura Welfare Society*, which have 3400 members. Group members always share local news and discuss several problems like embankments, cyclones, shrimp cultivation, tiger attacks. From their posts and comments, I also received a plethora of social and ecological life of the Island and Islanders.

Helaluzzaman conducted 24 interviews and I conducted 15 interviews. Overall, a total of 39 in depth interviews were carried out for this research. Most of the data were collected during the Summer of 2021. Different users of water from the all socio-economic backgrounds like shrimp farmers, day laborers, forest going people, indigenous people are interviewed for this research. Also NGO officials and government staffs are also interviewed for this research.

1.6.4 Ethical Issues and Challenges

All necessary steps were maintained throughout the research process for upholding the ethical standards. Particularly in the pandemic context, I always cautioned and monitored my research assistant to be careful about the process of physical interaction with the research participants. This was also one of the reasons we didn't conduct any focus group discussion. Prior to each interview, the respondents were requested for their suitable time and place. After confirming this, the interviews were conducted. Verbal consents were taken during the interview process and capturing the pictures. All names mentioned in this research are fictionalized except the research assistant's name. Helaluzzaman had to sign a 'non-disclosure form' when he agreed upon the terms and conditions as a research assistant.

I have tried to overcome the dependency on my research assistance for accessing empirical data for this research. That is why I also conducted parallel interviews with the local people to accelerate my interaction. Through this group, *Gabura Welfare Society*, I got the opportunity of finding other contacts and sources which were not passing through my research assistant. Though I conducted my remote interviews with the local people, I was aware of the biases due to my positionality as middle class and familiarity since I speak the same language and come from the same country. Besides, I clarified to the local people from the outset that this research would not bring any material benefits for them. Though I would expand this research into books or publish articles in the future, that does not bring any material benefits to me. So, I clarified to them that I am doing this work for purely academic purpose.

1.7 Structure of this Research Paper

This RP is divided into six chapters. The first chapter shows the research context, questions with theoretical and methodological clarification. In the second chapter, I show how and under which conditions, water scarcity in the Gabura is created and experienced. Island profile with socioeconomic background, living condition, physical environment are also discussed in this chapter. Next three chapters focus on the water management and distribution in the Gabura, namely PSF (Pond Sand Filters), RWH (Rainwater Harvesting) and DPs (Desalination Plants) and the role of NGOs play in it. Specifically, chapter three deals with PSFs where I examine the difficulties and challenges of the community based water management in Gabura. Chapter four deals with RWH where I explain why the so-called ‘modernization’ of rainwater harvesting as ‘development assistance’ by the NGOs don’t benefit the poor households. In chapter five, I explain the commoditization of fresh water through DPs where it is shown the problems of water commodification among the inhabitants. I will also present an alternative view against the idea of water as commodity and resource through Munda indigenous cosmology and value system. In the final chapter, I review my overall discussion and reflect my thoughts on the research.

Chapter 2

People, Place and Scarcity

2.1 The Island

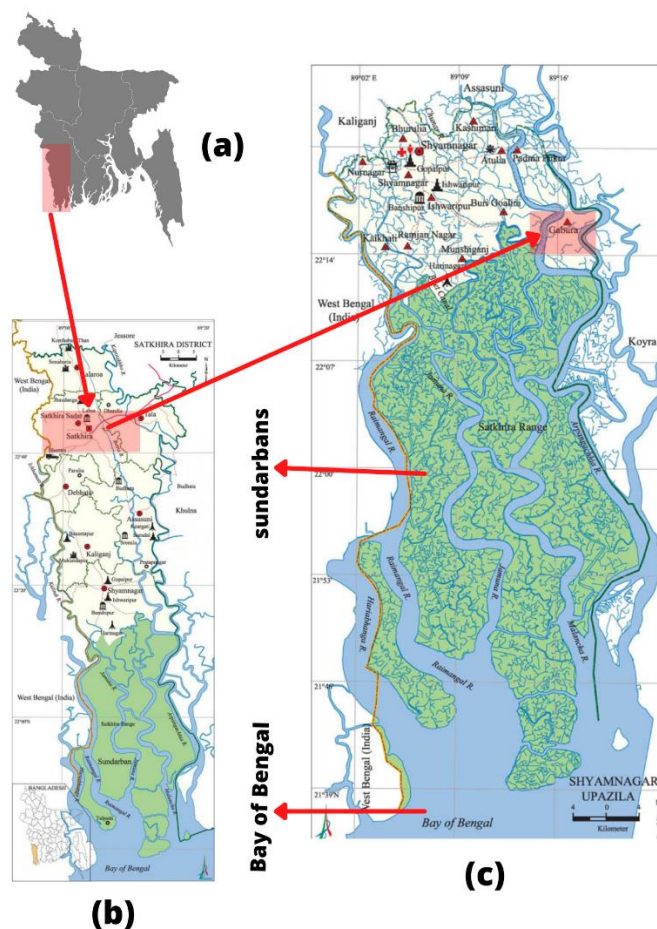
Gabura is a large riverine Island in Shyamnagar subdistrict under Satkhira district in South-west delta of Bangladesh. The Island has a total population of 38,825 with 6753 households with 19307 male and 19518 female. Gabura is also an Union Parisad (UP), the lowest administrative unit of Bangladesh and is divided into 4 mouzas, 9 wards and 15 villages. The Bay of Bengal is situated 120 kilometers south to this Island. It is surrounded by two big tidal rivers, namely the *Kopotakkebo* and *Kholpetua*. The *Kopotakkebo* river separates the Island from the mainland in the northern side and flows across the eastern side. This river also separates the Island from the Sundarbans, the largest mangrove forest in the world, and runs across the east to west.

According to local sources, once upon a time, Gabura was a part of Sundarbans. Kausar Ali Gazi, one of the senior inhabitants of the Island told me when I asked him about the settlement history of the Island-

“We heard from our grandfather that Gabura was a part of Sundarbans (*bada*). Local fishermen took rest on the Island when they went to the forest for fishing. At that time, the Island was covered with mangrove trees, and many people from the adjacent areas started to come here for collecting fuel wood, honey, fish etc. Sometimes, they had to stay there for longer time. Then, they built temporary settlements with local housing materials. Slowly, fishermen, farmers, boatmen and poor people from the surrounding mainland started to visit this Island regularly.”

After the British conquest of Bengal in 1757, Sundarbans and its surrounding areas had been targeted for accelerating revenue collection. The ‘Permanent Settlement Act’ of 1793 in colonial Bengal encouraged local landlords to expand their agricultural territories by clearing forest in the southwest delta (Iqbal, 2010; Jalais, 2010; Mukhopadhyay, 2016). Landlords of the Sundarban areas brought several indigenous community, including Munda, from the different parts of India, in the surrounding areas of Sundarbans to clear the forest. The Munda indigenous people started to cultivate Gabura, and its adjacent places like Padmapukur, Munshiganj, Koukhali Unions. Bengali tenants joined later. The word ‘Gabura’ came from the Bengali word *Gabur* which means strength and youth. According to local people, the struggle for making this Island habitable inspired them to call it Gabura.

Gabura is protected with earthen embankment which is 28.83 kilometers long under polder number 15. All the roads inside the Island are mud-made and during the Monsoon, it is very difficult to access. There are two government community clinics, twelve primary schools, two higher secondary schools in the Island. Sometimes, NGOs set up medical camps for temporary health cares. Though entire Island is devoted to shrimp farms, only a small portion of Island’s agricultural lands are used for rice cultivation, particularly in *Dumuria* and *Chadnimukha* wards, where the salinity on water and soil is not so intense due to its high elevation. The Island is very prone to cyclones, tidal surge, river bank erosion and flooding almost every year.



[Map1: Bangladesh, Satkhira, Shyamnagar and Gabura]

2.2 The People

There are mainly three categories of people based on land ownership. A small segment of its population owns majority of its agricultural lands and shrimp farms. They basically started commercial shrimp cultivation by turning their agricultural lands into shrimp farms. Some of them own more than 50 acres of shrimp farms. These ‘village elites’ draw their social status from their economic condition and political connection. There is another category of shrimp farmers who own 5 to 25 acres of shrimp farms. Their socio-economic condition is also good but they are not that much powerful like the shrimp elites. Majority of the Islanders don’t own any lands except the homestead. They work on the shrimp farms as day labours or collect shrimp larvae from the rivers and sell to the shrimp farms in a daily basis. Many landless households take shrimp farms as ‘share-farming’ (*borga*) from the big shrimp farmers. Another landless category, locally called as *mouwalli* (honey collector) and *banwalli* (wood collector), is the forest going people who depends on the Sundarbans. While out-migration as a livelihood strategy for the Islanders was not new, many Islanders migrate in the brick fields of Chittagong, a port city of Bangladesh, as labourers for several months.

Socio-economic hierarchy is based on land ownership, shrimp farm, ability of capital investment and political connection. The landowning class converted their rice fields into shrimp

farms three decades ago. All of the wealthy households in the Island are involved in shrimp farming. Their shrimp fields are share-farmed by other landless households of the Island. Shrimp elites are not only occupy a higher place in the society in terms of economic position but also politically influential. Chairman and all the members of the Union Parisad (UP) have huge amount of shrimp farms in the Island. Some of them don't live in the Island. They have bought new lands or built new houses in the towns. Sharefarmers take care of their shrimp fields. These 'shrimp elites' own most of the shrimp farms in Gabura.

The forest dependent groups and fishermen live on the southern and western part of the Island from where the access to the Sundarbans is straight forward. In terms of religion, ninety six percent of the Islanders are Muslim and the rest of them are Hindu and Munda indigenous people. There are approximately 500 Hindu households in *Khlopetua* and *Jelekhali* wards. While few Hindu have lands and shrimp farms, majority of them are poor and wage labourers. Besides, there are 27 Munda indigenous households live in the Island. All of them are wage labourers, catch fish from nearby rivers and canals, go to forest for honey collection and crab hunting. Munda women also do the same works.

While women from the well-off households don't work outside, women and even girls from the poor households earn for their families. Though women and girls are not employed in the shrimp farms, many of them catch shrimp larvae from the rivers and sell to the shrimp farms. Though there is not much livestock rearing in the Island due to the lack of vegetation, women usually try some homestead gardening for household consumption if there exist any nearby any ponds to water them regularly. Child (girl) marriage and school dropout is high among the poor households of the Island.

2.3 Contextualizing Fresh Water Scarcity

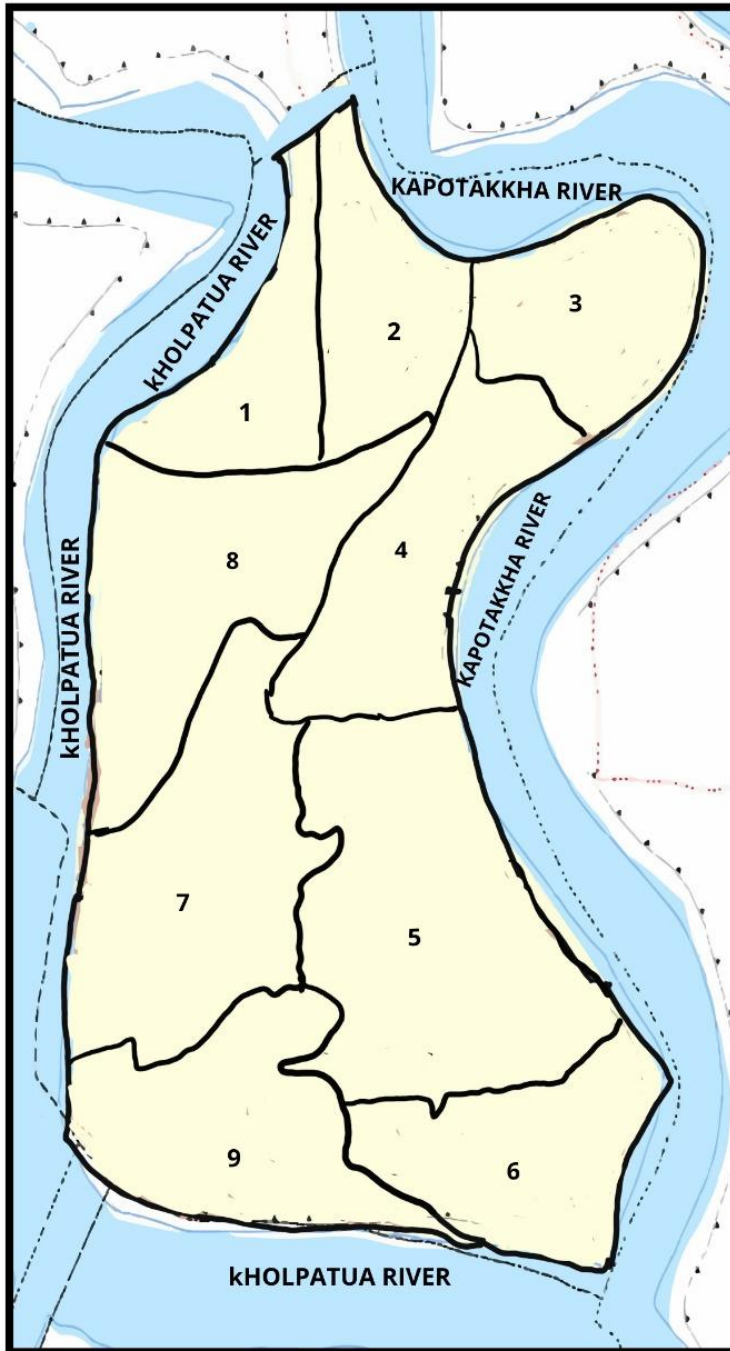
Generally, when we hear the word water scarcity, it reminds us about the lack or unavailability of water. This definition of scarcity we usually find in the arid, drought-prone regions where both lack of water bodies and erratic rainfall cause the situation; and later anthropogenic intervention into the environment aggravates it. However, fresh water scarcity in coastal region has a different image than this. Inhabitants are surrounded by abundance of saline water but their struggle is to keep the fresh water separate from the saline water. In Gabura, though the problem of water scarcity is a phenomenon that people face in their everyday life, its manifestation becomes extreme during the Winter and Summer. During the Summer, majority of fresh water ponds become dry. Numbers of community water pump also decline. The rainwater storage is almost finished. There is not much vegetation in the Island and heat from the sun light becomes unbearable. Let's have a look at some critical factors such as shrimp farming, cyclone, embankment and salinity intrusion to contextualize the fresh water scarcity in Gabura, how it is created and experienced by the local people.

2.3.1. Commercial Shrimp Farming

"We are surrounded by saline water. You can't stop it now. So, the best way to take the advantage of it. Shrimp is a big industry. People get economic benefits very quickly. Poor people are also getting works. Landless people are also doing share-farming. It will be wise to take the advantage of saline intrusion in this Island."

Saifullah, owner of more than 30 acres of shrimp farms answered me when I asked about the economic benefits and negative impacts of shrimp farming in the Island. Those who have big, medium or small shrimp farms in the Island always start with a positive answer about it, though they don't deny the negative consequences of shrimp farming. I also found

almost similar opinions from Shahin Mollah, who works in a regional NGO as a project manager, when we talked about the climate change adaptation practices for the coastal community. He opined that we need to do two things regarding climate change adaptation: to invent saline tolerant rice variety and combine it with shrimp cultivation.



[Map 2: Gabura Island]

The ecological and socio-political impacts of shrimp farms on the coastal area have to be taken into consideration for any discussion of fresh water scarcity. Export oriented shrimp sector of Bangladesh emerged in 1970s centring the coastal region. Development agencies and international banks began to fund and motivating Bangladesh to commercialize shrimp farming in a big scale (Adnan, 2013, p.105-16). Also due to global rise of sea-food consumption, the local economy of the southwest Bangladesh had been subjected to the

actions of the governments of rich country, international trading and processing companies, and global governance agencies (Pokrant, 2014, p. 118). Bangladesh government introduced the ‘Shrimp Mohal Management Policy’ which encouraged the encroachment of public lands and water bodies into shrimp farms. Government, market and development aid agencies continue to support shrimp farming as part of the process of ‘ecological modernization’ (Fisher and Freudenburg, 2001) by claiming economic benefits of ecological changes without thinking community’s socio-economic and political dimensions.

Initially, commercial shrimp farming was challenged in several places of Southwest Bangladesh by local people and grassroots organizations. During the 1980s and 90s, appropriation of private and public lands and communal water bodies generated huge resentments and angers among the local people which resulted in several peasant resistance (Paprocki and Cons, 2014; Pokrant, 2014). One of the common features of all these peasant movements, explained with accumulation by dispossession (Harvey, 2004; Adnan, 2013; Martinez-Alier, 2001), was the land grabbing and destruction of common pool resources like ponds, canals and grazing lands which are integral part of fresh water ecosystem. NGOs like *Nijera Kori*, *Uttoron*, *BELA* still oppose shrimp cultivation in the coastal area (Rahman et al. 2013).



[Figure 1: commercial shrimp farming in Gabura]

Fishing, including catching prawns and crabs, in the tidal rivers and inside Sundarbans is one of the major livelihood sources for the Gabura Islanders for many years. But the advent of large and medium scale commercial shrimp farming in Gabura started in the early 1990s. I asked few shrimp farmers why there was no opposition or resistance to the shrimp farming when it started on the Island. A member of the Gabura Union Parisad, also a shrimp farmer, reported-

“We were all overwhelmed by the economic benefits that shrimp brought so quickly. At that time, rice cultivation was not profitable. It was not possible to earn much cash by selling agricultural products to the markets. We all needed cash because we started sending our children to the schools and colleges. We wanted to buy TV, ride motor bike, to go to the town. Shrimp brought cash in our hands so that we could enjoy all these things like the city people. I don’t see any wrong in it.”

I asked several shrimp farmers that whether they received any opposition from the Islanders when they started shrimp farming or was there any grassroots organizations which mobilized rice farmers against the shrimp farming in the Island. I didn't find any answers on these questions. But it is evident that failure to oppose shrimp farming in Gabura has deep consequences not only for the land and agrarian changes but also in creating fresh water scarcity.

Alongside agrarian changes in the local community, shrimp farming has adverse ecological and health impacts in the Island. Shrimp farmers apply several chemicals and pesticides to the farms either to keep the shrimp healthy or to control diseases. When their farms are overflowed by the tidal surges during cyclone, these chemicals are mixed with fresh water ponds very easily (Ali, 2006). Discharge of salty water from the shrimp farms also causes salinization to the adjoining areas where fresh water sources and rice fields exist (Hossain, Uddin, and Fakhruddin, 2013, p. 320). Salinity reduces soil quality, it increases acidity of soils, reduces the area under rice cultivation, kills vegetation and fodder supply for livestock. Besides, repeated opening of the sluice gates for bringing saline water causes heavy sedimentation in canal bed and waterlogging too (Karim, 2006, p. 69). As a result, shrimp farming destroys the fresh water ecosystem in Gabura and most importantly, it also weakens the embankment which is prone to collapse during cyclones every year.

2.3.2 Embankment and Cyclone

Cyclone *Yaas* made landfall in the morning of 26th May, 2021. All the southwest delta of Bangladesh, mainly Bagerhat, Khulna and Satkhira districts, also faced severe infrastructural damages due to this. After the cyclone, two unusual events took place. Thousands of people from *Doshbaliya* village under Koira subdistrict, adjacent to Gabura Island, gathered on the embankment to repair it with their voluntary labor. Md. Akhtaruzzaman, a parliament member from the ruling party, tried to reach there by a troller across the *Kopotakkeho* river. As soon as he got closer to the embankment, despite getting attention and greetings, local people started throwing mud towards him. Akhtaruzzaman and his companions, including the policemen, were surprised to see people's wrath and reaction and instead of anchoring the troller on the embankment, they returned to the shore.

In the next month, another parliament member of the ruling party, SM Shahjada, on 16th June, 2021, stood in the national parliament and wrote a placard around his neck that said, "no more demand; we don't want relief, we want embankment". Mr. Shahjada, a parliamentary member from Patuakhali coastal district, said that when he visited his constituency after the cyclone *Yaas*, he faced people's anger and frustration. "Local people don't want relief anymore, they want a permanent solution to the embankment." He said to his speech. His photo, with placard around his neck, got viral immediately.

The two events uphold the fact that embankment is not only a crucial infrastructure for the coastal community but also a critical issue for developmental politics in Bangladesh for so long. Most of the households in the coastal region is vulnerable for their houses are not built with disaster resilient materials due to lack of material resources. Natural hazard is not considered as 'disaster' until a group of vulnerable people are exposed (Blaikie et al. 2004) to it. People's vulnerability, life and livelihood, particularly during any disasters like cyclone, could have been reduced if the embankment is protected from the cyclone.

Though the Southwest delta management in Bangladesh through water infrastructures like polders, embankments, sluice gates has a relatively new history, the idea of 'hydraulic technology transfer' (Headrick, 1988, p. 171) in controlling water and land in the promise of developmentalism has its colonial root. Water infrastructures can't be understood as concrete

entities that are replicated easily and evenly over any society and environment. Particularly, the connection between development and infrastructures have brought so many new complications on the social and environmental landscapes of delta region in Bangladesh. From ‘invasive infrastructures’ (Spice, 2018) during colonial time to policy transfer like ‘Delta Plan 2100’ (Hasan, Evers and Zwartveen, 2020) in recent development era, there always exists a gap between rhetoric and reality.

During 1960s, when Bangladesh was under East Pakistani rule, construction of large scale polders through ‘Coastal Embankment Projects’ (CEP) was part of a solution to the flood management by building 4000 km of embankments in the entire coastal area. This massive construction led to changes in delta hydromorphology, resulting the disruption of traditional flood drainage system, loss of ecosystem, fresh water fish population, salinity intrusion, river bank erosion (Dewan, Mukherji and Buisson, 2015, p. 405). Besides, the construction of large dam *Ganga Barrage* by India on the upstream (Padma in Bangladesh), overuse of surface and underground water during ‘Green Revolution’, accelerated many ecological and socio-economic problems in delta region of Bangladesh. Several indigenous practices of embankment management such as ‘*doser badh*’ (embankment construction by the community) or ‘*ostomashi badh*’ (embankment for 8 months), construction of low dykes and wooden sluice gate to manage the tidal water and flood was also lost (Nowreen, Jalal and Khan, 2014, p. 266). Very recently, Coastal Embankment Improvement Project (CEIP) also has opened up the ground for debate on the ‘depolderisation’ (Paprocki, 2019, p. 307) for this region among the experts.

Gabura has 28.83 kilometres of earthen protection embankment which surrounds the whole island. Islanders strongly believe that embankment is absolutely essential for their survival. Interestingly, many wealthy inhabitants of the Island live outside the Island. I asked Muzib Ahmed, who is a big shrimp farmer and live outside the Island, and he reported-

“I saw in my childhood that few wealthy villagers live outside this Island. So, this is not new to us. What is new is that this tendency has increased after the Aila in 2009. Life is difficult here. If we have enough money, why don’t we enjoy the luxury in the town and city. Besides, due to lack of concrete embankment, Gabura will disappear from the map in the future. We have heard about climate change, right?”

This dystopian future of Gabura is imagined by many villagers due to recent collapses of embankment due to frequent cyclone in this region. The cyclones *Sidr* in 2009, *Aila* in 2009, *Bulbul* in 2019, *Amphan* in 2020 and *Yaas* in 2021 damaged Gabura’s embankments in several points. Gabura’s embankment is simply made of mud, bamboo and sand. No concrete block is used.

Like all Islanders, Muzib and Tapon were very anxious about the weak embankment during the cyclone *Yaas* on May, 2021. Muzib is one the big shrimp farmers in the Island. He owns 25 acres of farms. He lives in the town with his family. On the other hand, Tapon is a day labourer. His only house is very close to the embankment. He knows tidal surge would hit on his homestead first if embankment collapses. Both of their anxieties are related with socio-economic position in the society. While Muzib is more concerned about his shrimp farms and investment, Tapon is anxious about his house, food and fresh water.



[Figure 2: Collapse of embankment during cyclone *Yaas*]

Two points of Gabura's embankment were broken by the cyclone *Yaas* in 2021 and tidal surge quickly swallowed many parts of the Island. People started to hear announcement from the village mosque: "embankment is broken by the tidal surge. saline water is coming inside. We need to repair the embankment. Come quickly at the broken points with sacks, spade, bamboo, whether you have". The villagers reported about two weak points of the embankment to the Water Development Board (WDB) but they didn't respond timely. Now, people know what they should do. They experienced the same thing during the *Aila* in 2009, *Amphan* in 2020. Whole community, irrespective of socio-economic positions, plunge into repairing the embankment voluntarily.

2.4 Conclusion

This spontaneous collective responsibility among the community people during the collapse of the embankment due to cyclone reminds us the fact that an act of cooperation and solidarity simultaneously means an act of rejection and mistrust (Douglas, 1986, p.1) to the public institutions like Water Development Board (WDB). But the question is while the entire community cooperate and contribute in repairing the embankment, the same spontaneous collective action and responsibility is hard to be found in managing shared water resource in the study Island. I will discuss this issue in the next chapter.

Chapter 3

Community based Water Management

3.1 Introduction

Monsoor Mia owns ten acres of shrimp farms. He has two sons who also look after the farms and do additional business in the town. He is a wealthy man, has money and *paka bari* (modern house). After the *Aila* in 2009, when many fresh water ponds were destroyed, sufferings from water scarcity aggravated. One day, Monsoor Mia decided to devote one of his ponds, which is very close to his house, to instal the PSF (Pond Sand Filter) so that people from his village could collect fresh water from it. After the initial inspection by one of the NGOs, Monsoor's pond was selected for installing PSF. Sakur Mazid is a neighbour of Monsoor Mia and after the *Aila*, his family suffered a lot due to water scarcity. His wife used to walk two kilometres ever day to fetch fresh water. Sakur's family is poor. He lives on wage labours which are seasonal and temporary. "When I heard that Monsoor Mia wants to devote his fresh water ponds for PSF, I became very happy because of my wife. She collects water from faraway place." Sakur continued. Then, PFS was installed, the committee was formed and the two years it worked well. Once, PSF required an minor repairment and Monsoor Mia paid this money from his pocket. Five years ago, after Monsoor's death, his elder son decided to cultivate fish in the pond. "We didn't dare to oppose because the pond is their property. Monsoor Mia was a very good man. He cared for us. But his elder son doesn't understand anything except money. Now, my wife brings water from another PSF which is one kilometre away from my house." Sakur finished.

Like Sakur's family, many poor households are highly dependent on the PSF water in Gabura. PSF is a simple technology, consists of a hand pump to extract water from the pond into a raised filter bed which contains grave and sand. After passing through the filter, water is stored in a huge chamber from which it can be collected by tap or tube-well (Hasan, et al. 2020). Earlier, local people used to drink pond water in Summer and rainwater in Monsoon. One of the major blows for the fresh water ponds in Gabura was the horrific flood in 1995, when all the fresh water ponds were completely washed away by the flooded saline water and human deaths from the water borne diseases made the Islanders very anxious. First PSF was installed in Gabura in 2000 by NGOs but after the cyclone *Sidr* in 2007 and *Aila* in 2009, fresh water scarcity has worsened in Gabura. NGOs like *Shushilon, Islamic Relief, World Vison, Leaders* are providing support in PSFs.

This chapter deals with community based water management called PSFs. There are 40 PSFs in Gabura but majority of them are not functioning well. This community water management requires infrastructural, technological and social arrangement for its functionality. This chapter problematizes the notion of 'community' and 'participation' deployed by NGOs and examines the features, contradictions, and paradox that surround the social management of water by the community in Gabura.

3.2 Community formation and its Changes

To understand 'community' and under which conditions it changes is crucial in understanding any community based resource sharing in rural Bangladesh. Before the advent of shrimp farming in Gabura, people cultivate rice. Big landowners gave their rice fields to the landless and small holders for sharecropping. In this way, different categories of people were attached into an intricate agrarian mode of production. But the advent of commercial shrimp farming in Gabura brought changes in this agrarian world and hence the formation of the community.

Two modes of dispossessions found due to the advent of shrimp farming: one is public land grabbing during the booming of shrimp farms (Paprocki, 2019, p. 305) by the shrimp (village) elites. When I wanted to talk about this with one of the members of Union Parisad, he bypassed the issue and told me, “The land department can give you more information about this. But in Gabura, we don’t have much public lands.” But the same issue was discussed with a honey collector and he told me, “Gabura have many public lands. Everybody knows who garbs this and how it is done. It is an open secret.” The encroachment of public land and water bodies are used for shrimp cultivation by the shrimp elites who are hugely benefited from it. They are influential people, they have political connection.

Another important change among the community due to shrimp farming is depeasantization, landlessness and production of surplus labour in the local economy (Paprocki and Cons, 2014, p. 1110). In Gabura, only few people work in the shrimp farms as wage labourers or care taker as it requires very little labour supply. One of the impact of depeasantization and surplus labour production is the out-migration in search of livelihood. Majority of the men from the poor and extreme poor households, aged between 15-30, usually migrate to several brickfields for maximum seven months. This displacement does have effects on the community formation too.

Changes in the relationship between former sharecroppers, wage labourers and the landed class is an important aspect in community formation. Abdullah, who works in the brick fields in the port city, stated-

“my father was a good farmer. He used to take one of our neighbour’s rice fields for sharecropping. When our neighbour decided to convert his rice fields into shrimp farms, my father was not chosen as caretaker because of his age. We had a good relation with the land owner. He was kind and took care of us during my sister’s wedding. After the death of my father, I don’t visit him anymore. They are very rich now.”

Not all farmers willingly started shrimp farming. When shrimp farming started in Gabura, salinity contaminated its adjoining rice fields. After few years, productivity of the adjoining rice fields became low due to saline contamination. Then, the rice farmers had to take two decisions: either he would convert rice farms into shrimp farms or he would sell farms to the shrimp farmers. “ I was forced to sell my rice farm to a shrimp farmer. But I lost my land for ever.” One of my respondents told me. This change in landownership pattern also affected the structure and feeling of the community.

People have a negative attitude towards the big shrimp farmers regarding the collapse of embankment. When I asked about the collapse to one of my respondents, he replied, “outside people always blame cyclone and tidal surge for the collapse. Even journalists report that rats make big holes and weaken embankment. But, one of the main reasons for this collapse is shrimp cultivation. Shrimp farmers cut the embankment illegally and bring saline water from the rivers regularly. Even, our sluice gates don’t open anymore.”

This attitude towards the wealthy shrimp farmers by the villagers don’t show a ‘sense of belongingness’ among themselves.



[Figure 3: Community based water pump (PSF)]

In fact, the way rice farming Island has been transformed into a shrimp zone, the way livelihood, social structure and the relationship among the different social classes have been altered; social solidarity, mutual trust and exchange among the community members have been changed. Research in many shrimp zones in Bangladesh also shows that influx of shrimp farms has eroded social cohesion and community oriented ways of living (Paprocki and Cons, 2014, p. 1118). Now, the NGOs take this ‘community’ as a major driver for designing community based water management. How the collective responsibility in a common resource sharing is shaped by the existing socio-economic structure of a community? Does this social management more or less ensures the participation among the community?

3.3 Actual Scenario of Community Water management in Gabura

I have identified several phenomena through which we can have a look at the reality of community water management in Gabura. These phenomena are embedded into the social structure, socio-economic condition, resource control, environmental changes, political dynamics and outside connection of a community.

3.3.1 Elite Dependency, Inclusion and Capture

Despite the fact that ‘elite exclusion’ (Wong, 2013) is one of the preconditions for any community based natural resource management, dependency on the village elites in Gabura is a salient features of the PSFs. Usually, people with better socio-economic condition in the village have fresh water ponds for their own use. The first precondition for installing a PSF technology is to find a suitable fresh water pond and for this, NGOs have to rely on the mercy of the well-off families. But many times, it is seen that wealthy people could withdraw their supports from the ponds whenever they find any solid excuses. In this way, PSF is not dependent on the ‘community’, it depends on the mercy of village elites.

Majority of the PSF ponds in Gabura are privately owned and it has both advantages and limitations. NGOs are obliged to incorporate the owners of the pond in the management

committee. For example, the pond owner is generally chosen as either president or secretary for the PSF committee as such position is seen as a symbol of social prestige in the community. NGOs incorporate them in the committee as a deliberate strategy to trickle-down the benefits among the water users. Besides, privately owned fresh water ponds are taken care of because owners extract other benefits from it. Nazim Uddin, an NGO staff told me, “management of fresh water pond requires money and labour to recover from saline contamination after the cyclone. Owners clean the pond quickly because they need it for other purposes.”

Elites’ incorporation is also voluntary in many cases. The village elites use this advantage on several purposes depending on their intentions. For example, the UP Chairman of Gabura built a PSF in his pond for the community. All the water users are the potential voters for him. This *jono-seba* (service to the people) is a part of political campaign for the Chairman. There is also a tendency for the local political leaders to take credits from NGOs’ interventions. When the desalination plant was built in Gabura, its inauguration ceremony was jointly attended by NGO and Union’s chairman and its members. By their presence, local politicians convey the message that they too have ‘contribution’ to this development intervention.

Any community based resource management is susceptible to ‘elite capture’ (Arnall et al. 2013). Since elite dependency in the PSF ponds is noticeable, I haven’t found any evidence of capturing the project benefits directly from the PSF. But, NGO staff and local people always give an impression that ponds on public lands and water bodies would have been more sustainable for the PSFs. In Gabura, people don’t want to talk openly about the encroachment of the public lands and water bodies but they also acknowledge that who are responsible for this. One of my respondents told me-

“Public land and water bodies are plenty in our Island. But influential peoples captured it many years ago. They made shrimp farms in those lands and gave other farmers as *borga* (share-farming) and earn profit. No one could touch them. If fresh water pond could be built on these public lands and water bodies, then, there will be no water scarcity in Gabura. Only government can do this.”

3.3.2 Selection of the Regulatory Committee

When PSF is installed by NGOs in someone’s pond, it immediately forms a committee with 9-11 members from the community. This ‘regulatory committee’ is not an external body, rather is chosen from the community so that intimate knowledge and information about each could be deployed for a system of monitoring and enforcement (Agrawal, 2005, p. 93). But the selection process of the PSF committee has several drawbacks in the rural contexts.

Selection process of the committee is not ‘participatory’. People are chosen for the committee who are old, economically well-off, politically powerful, and well connected. Members from the poor or extreme poor households are rarely chosen. Rather, poor people work voluntary when it is needed. During any emergency, these poor people act and respond quickly though they are not committee members. “Last year, after the cyclone, I went to the local market to bring the mechanics for the repairment of PSF. But this is not my job. I only did this because the secretary requested me.” One of the respondents replied when he was asked about it.

Though NGOs are supposed to take part in the selection process, many a time, it has been observed that NGOs ask the Chairman or members of the UP to choose the committee member for the PSF. As a result, people who have good terms with the UP get place in the

committee. People who are good at talking and explaining things when NGO staffs and foreign donors visit are also chosen in the committee.

NGOs provide training on how to maintenance the PSF technology and most of the time they ask UPs to choose its participants. One of respondents shared an interesting anecdote,

“Amzad Munshi from our village is always called upon when NGO staffs and foreigners visit us. He was a good student during his childhood but couldn’t continue his study due to poverty. He was even taken to Thailand by one NGO for a training. Every NGOs know him. Even people from Dhaka also look for him when they visit us. Amzad is very famous!”

As a result, rather than being participatory, the selection process of the PSF committee is very ‘top-down’ and biased from the very beginning.

Biasness continues even NGOs choose ponds for the PSF. As donating ponds and taking a place in the committee is a matter of social prestige, wealthy people voluntarily want to devote pond for the PSF even if there already exists another PSF in the same village. In this way, water service from the PSF is asymmetrically distributed among its users due to the wrong process of pond selection. If PSF is unused for a long time, it doesn’t work. So, it is the wish of the pond owner which promotes a PSF rather than being participatory. PSF instalment on the privately owned ponds doesn’t necessarily enhance the community ownership and participation among the water users.

3.3.3 Lack of Shared Responsibility

Participation and shared responsibility among the PSF users have also a class character. Well-off households can easily bring water from alternative sources such as RWH and DPs during the Summer. Many a times, PSF committee are reluctant to take initiatives when PSF needs repairment and maintenance as they have alternative sources. On the other hand, users from the poor households lack economic motivation for donation and expect committee members, as they are well-off, to take the initial move. “I could have cultivated fish in the pond but I have devoted it for the PSF. What can I do more than that? People should not expect too much. They should take some responsibilities.” This is how one PSF secretary and owner of the pond expressed his opinion about the shared responsibility. I also asked Nuruddin, a poor villager whose family uses the same PSF, about the lack of shared responsibility and donation. He replied-

“I am a daily labourer. I live hand to mouth. On two occasions, I was asked to contribute in a time when I didn’t have any savings. Buying food for my family is the top most priority. Not all the time but sometimes donation becomes difficult for people like me.”

NGOs’ shared responsibility about the management process of the PSF is also important. They help to organize and form the regulatory committee for the PSFs. When the project is over, the NGOs lost their interest in PSF. Then, the responsibility goes to the committee and community. Zakir Hossain, a project coordinator of an NGO, explained-

“Preparing a pond, installing a PSF technology and its regular maintenance are not cheap and require constant monitoring and labour. When the project is over, NGOs lose their interest and responsibility goes on the committee. The committee, most of the time and for many reasons, doesn’t work. As a result, most PSFs fail or malfunction.”

Excessive dependency on the NGOs is also seen as one of the limitations of making sense of ownership. Another NGO staff, who works on Gabura, explained-

“Gabura is a very relief prone area. Especially, after the *Sidr, Aila*, and NGOs provide huge amount of relief to the Islanders. Due to its dependency on relief works and rehabilitation, many people lack the motivation for voluntary work. Excessive intervention of NGOs in Gabura is responsible for this mentality among the local people.”

NGOs’ inability to play a role in resolving internal conflicts is also mention worthy. When any conflicting situation arises in the committee or community regarding PSFs technologies, ponds or water redistribution, NGOs don’t much interfere. They are reluctant to take the role of ‘mediator’ among the community. For example, PSF technology and formation of the committee would have been better if ponds could be constructed on the public lands and water bodies. But NGOs don’t have the capacity to extirpate the encroachment. “We don’t want to involve into local politics. Keeping good relation with local political authority and government is one of the keys working in the rural area. We need to be strategic here.” As an NGO staffs opined very strongly.

3.4 Women and Community Water Management

Sufia khatun wakes up very early in the morning, finishes her prayers and waits for the fellow women. Every morning she and other women goes to a faraway PSF to fetch fresh water. The most closet PSF pond, which is only five minutes walking, was contaminated by the saline water during the cyclone *Yaas* and since then, fresh water collection for her has become a troublesome job. This year, the monsoon already passed and it didn’t help to neutralize the salty water of the nearby PSF pond. Sufia and other women now walk nearly two kilometres every day to bring water from another PSF which was not contaminated during the last cyclone. She said-



[Figure 4: Women are returning from the PSF]

“Only during the monsoon, we don’t need to walk for the water. Rest of the eight to nine months, we collect water from the PSF ponds. This year, the cyclone eats another PSF pond. The next year, it will be another if cyclone hits. No one knows when this PSF will start again.”

In rural Bangladesh, generally, water related household activities are performed by the women, irrespective of their socio-economic backgrounds. While women from well-off households usually don’t go outside for fetching fresh water as they have alternative sources for the whole year, women from the poor households are dependent on PSFs due to their lack of access to other sources of water.

Cultural norms, socio-economic positions and ecological conditions create many vulnerabilities among women in the rural area. It is expected that wife will serve food her husband or parents-in-law first, then children. She will be the last who would receive the rest. This gender norms in rural area plays a role in drinking less water among the women during the Summer. After the advent of shrimp cultivation, many poor women are involved in shrimp larvae collection from the rivers and canals. So, they have to stay a longer time in the saline water. Particularly, during the menstruation, women face many gynaecological problems due to their long stay in saline water. In many cases, they need to go to the towns for treatment which is an economic burden for them. The economic unfreedom of these poor women has turned out to these kinds of health fatalities.

Poor households still rely on PSF water during the dry season. Collecting water from the PSF ponds, through a long walk, is always a critical issue for the rural women. Generally, women collect water twice a day, very early in the morning and before the dawn. They carry their earthen pitchers with water on their hips. As PSF ponds are decreasing day by day, women need to walk for more than 20/30 minutes to collect their water. Sometimes, young girls are forced to go out for collecting water as their mothers are occupied with household works and they become victims of eve teasing.

Women from the same neighbourhood usually plan to go to PSFs as a group at a specific time. Particularly, during the weekly bazar day, women feel very uncomfortable going to PSFs. Kamrunnahar said-

“Our PSF is on the other side of the road. It would have been good if the PSF is in our settlement. After the *Amphan* cyclone, PSF in our village doesn't work. We have to pass through many places where men gather. That PSF is very close to bazar. Men always gather there. They also come to PSF for collecting water for their activities in the shops. We wait until they finish taking water.”

I also heard from my research assistant that last year, a pregnant women was forced to fetch water for her family as his husband was ill for several days and her only daughter was in school. Though she was accompanied with fellow women, during the walk, she suddenly fell down on the road and was taken to the clinic immediately but her foetus was badly damaged. She was immediately forced to undergo for an abortion.

Representation of women in the PSF committees is very low. Sufia Khatun was asked why there are few women or no women in the committee while they are the primary users of the PSF water, she replied-

“when PSF stop working, we just inform our husbands or NGOs or committee members and they take care of it. We don't know how to fix this. Men come from the outsides to repair it. Parts and machines are also bought from the local market. This is men's business. We don't understand it.”

All men and even NGOs staff think that men should be in charge of this. In one case, I found that a woman is chosen as cashier in the PSF committee as it is generally assumed that women are more trustworthy than men in financial issue. Besides, no one asked women about what should be the appropriate technology in PSFs. As water user and collector, women's experience and opinion should have been taken before any technological intervention in water management takes place. It is also believed that men are capable of handling and maintaining technology and also responsible for its maintenance. If women are not the decision maker of the water management and they are simply users, then the notion of 'participation' in such development intervention is being questionable.

In fact, I intend to bring a gender perspective to this work since women are the exclusive users and collectors of fresh water in rural areas. But, I acknowledge that I am a man and my research assistant is also a male. Sometimes, it is difficult to make access to the women's world. I tried to interview women directly but talking with an unknown male like me over the telephone is difficult for rural women. To overcome this, I talked with the mother of my research assistant and also a female school teacher from the Island to get a glimpse of the women's involvement in water collection and management.

3.5 Conclusion

Community based natural resource management has largely been failed to deliver the expected and predicted benefits to the local communities (Blaikie, 2006, p. 1943). The 'community' from the previous paddy growing Gabura has been underwent for a massive changes in last few decades after it has been replaced by commercial shrimp farming. Agrarian, socio-economic, environmental changes and developmental interventions which occurred during this time has a massive impact on the community formation. As a result, 'turn to community' (Agrawal, 1999, p. 99) and its spontaneous 'participation' often does not work. The NGOs also idealize a homogenous, apolitical and static image of the community which doesn't match with the existing social reality and they also view individual as independent of government, law and wider political system (Mosse, 2003, p. 17). This deployment of 'community' and 'participation' by the development agencies becomes an imposition and this process can't dismantle the existing social hierarchy. Due to its apparent failure, now, the development agencies have targeted households and market as sites for solving water crisis in the Gabura which are discussed in the next two chapters.

Chapter 4

Household Based Water Management

4.1 Introduction

At the end of April, 2021, more than 200 Islanders from different villages gathered in the open field around 11 am to pray to the Allah. This mass praying was followed by *payesh* (a sweet item made from aromatic rice, milk and sugar) distribution among the participants. One of the participants in the mass praying, Subhan shah (57), told-

“Rain is a gift from the Allah. If we pray for the rain to the Allah with pure heart, then Allah will listen to us. It exactly happened few months ago in Gabura. Allah listened our prayers. Just after three days of the mass praying, the Monsoon started with heavy shower in our area.”

This event proves the importance of Monsoon and rain water for the Islanders. Among them, there exists a moral ecological understanding of water scarcity. It tells us how people, with their values and beliefs (here religious), read nature, understand it (Baker et al. 2017) and seek solution to the Almighty. Demand for fresh water becomes high during the Summer when PSF ponds are almost dried up. The Islanders have nothing to do but to wait for the Monsoon by which ponds will be refilled and individual households start storing water.

In recent times, rainwater harvesting techniques have received considerable attention and acceptance among the governmental, non-governmental organizations, international aid organizations and local people too (Islam, 2019). This chapter deals with the rainwater harvesting system (RWHS) in the Island. It focuses on why and how the rainwater harvesting techniques become popular among the certain category of households and why the NGOs actively promote this technique in the entire region.

4.2 Poverty of Rainwater Harvesting

There are two types of rain water harvesting in the Island. One is ‘traditional’ way: when the rain comes, different sizes of pots and bowls are kept under the sky. These are filled with water, are stored and later consumed as quickly as possible. Poor households store the rainwater into earthen pot (locally called as *maati/jala*). The other technique, so called ‘modern’ system which is promoted by the NGOs, requires good infrastructural arrangements like roof with tin or tiles, gutter, pipe, and large plastic tanks etc. Harvested rainwater in a large plastic tank (2000 liters) can satisfy a household’s cooking and drinking demand for seven to eight months long. In Gabura, after the advent of shrimp cultivation, many households have pulled themselves into a better socio-economic position and they have installed all the infrastructures related with rainwater harvesting and storage for a long period of time. 2000-1500 liter of plastic tank can be bought from the local market with 15000-20000 BDT.

But poor households rely on the ‘traditional’ technique of harvesting rainwater. Abdul Baten, who works on the brick fields, said-

“My wife and daughters collect water everyday from faraway place and it is becoming difficult day by day. When it rains, my wife feels very relax because she doesn’t need to go out every day to collect water and also we could store some water for future into small earthen or plastic jar. If we have a good harvesting system like the rich people do, then it would have been very relax for my wife. But, you know, to install such system into your house, money is needed. I live hand to mouth. It is not possible for me.”

So, maximum utilization of rainwater depends on the socio-economic conditions of the household in the study Island.

4.3 An invented solution for whom?

In one evening, my research assistant Helaluzzaman told me-

“few days ago, I was just talking about your research with my parents on the dining table. My mother said that we used to drink water from the ponds whole year and rain water in the Monsoon during the childhood. Rainwater collection and drinking is our tradition. My parents also did that. When we were young, during the Monsoon, children were ordered by their parents to catch the water in cooking utensils. For us, it was fun. Now, the NGOs have made it a new system by their interventions. Rainwater harvesting is not new.”

This remark indicates an interesting fact about the nature of NGOs intervention into the solving of water scarcity in Gabura. Catching and storing rainwater in traditional manner for domestic purpose is nothing new to a community who are surrounded by salinity. Recent NGOs’ intervention into this realm with modern equipment and infrastructures has sparked a debate on how the traditional practices by the community become the ideology of development apparatus (Cortesi, 2014). The use of tradition by the NGOs in a slightly moderated way increases the acceptability among the local community.



[Figure 5: Traditional method of rainwater harvesting]

During my interview with well-off households about the water scarcity in Gabura, they gave two specific impressions: rainwater harvesting has a future and ‘traditional’ harvesting technique is not ‘efficient’ and ‘healthy’. Sorifullah, who owns a medium shrimp farm and has a modern rainwater harvesting system in his house, told me, “PSF is not possible in here anymore. It is very difficult to maintain PSF. So, rainwater is the only hope to live in this Island.” I also found similar impression when I talked with NGO staff about the prospect of rainwater harvesting. Ekramul Alam, branch manager of an NGO, also told me-

“We are promoting rainwater harvesting in the household level for a number of reasons for Gabura. First, the issue of climate change adaptation has encouraged the aid organizations to promote it in places like Gabura. Second, traditional way of harvesting rainwater has some problems and limitations. Third, and more importantly, if you ask women about why do they prefer rainwater harvesting, then, they would reply that they don’t need to go out for water if a household is equipped with modern system of rainwater.”

Of course, rainwater has some advantages like it doesn’t have any arsenic, it is also free from bacteria and salinity, it tastes better, it can easily be collected. But, NGOs are continuously claiming that ‘traditional’ system of rainwater harvesting and storage system is not ‘healthy’ and ‘sustainable’. Rather, they prefer modern methods, equipment and infrastructure for it. But the question is why they are promoting this and how socio-economic conditions of the people play a role in it.

So, I asked Abdul Baten that NGOs in the Gabura after the *Aila* in 2009 provided plastic tanks for storing rainwater and whether or not he did receive any of it. He replied sarcastically-

“the cyclone Aila made us all equal. Even rich households of the Gabura lost so many valuable assets during the tidal surge. NGO support is not always for the poor people. Besides, most of the time, I don’t live in Gabura. I don’t know what NGOs give us. Even I don’t know any NGO staff. My wife knows better than me about NGOs because she took micro-credits from them.”

3.4 Intervention of NGOs

Since majority of the PSFs are in decline in Gabura, NGOs are now shifting their focus from the community to household. Household based ‘modern’ rainwater harvesting technique is expensive and its sustainability depends on the socio-economic conditions of the households. Why are NGOs promoting household based rainwater harvesting? How does the ‘development assistance’ of NGOs reach at the bottom of the community? Do all people receive benefits?

Though there are few NGOs in Gabura which support households for catching and storing rainwater, I have focused on one local NGO. I tried to find out why NGOs promote rainwater harvesting in the study Island. Several NGO staff gave me straightforward answer. They said that RWH system is one of the potential yet underused resources in the context of climate change. There is a pressure from the donor agencies to ‘modernize’ rainwater harvesting in the coastal region. Though recent data shows that southwest delta receives less rainfall comparing other parts of Bangladesh (Abedin and Shaw, 2017, p. 444), NGOs generally work on the grassroots level, and they always encourage place-based local adaptation practices to the global problems (Crate, 2011 p.179). So, the promotion of RWH by the development industry as an adaptive strategy for the coastal region in the context of climate change is growing rapidly.

There exists another reason why the NGOs promote rainwater harvesting. My conversation with another NGO staff, Taposh, leads me to a different and difficult area regarding the promotion of RWH system in recent years. The first thing he told me about RWHS:

“Rainwater harvesting is better than PSF but it is costly. RWH in Gabura is household based, the household controls it, use its water for themselves. The household looks after it because it is entirely their property and they will benefit themselves, not the others”.



[Figure 6: Modern methods of rainwater harvesting]

Household based management doesn't have any collective action problem that is seen on the community based water management like PSFs. Here, NGO perspectives are narrowly utilitarian and economistic, focusing on individual (household) by isolating from the other aspects of social and cultural life (Mosse, 2003, p. 17). NGOs believe that individual can manage their resource better because they have a self-interest motivation for doing this. In RWH system, NGOs don't have to deal with social hierarchy in the community level. Here, individual ownership helps achieving more sustainable use and distribution of drinking water.

But the way NGOs operate this 'development assistance' to the Islanders is problematic and it raises questions on the intension of 'doing good'. In last five years, a local NGO provided three hundred plastic water tanks (mostly 2000 to 1500 litres) to the Islanders. First, ten water tanks were given to poor households as free. Then, they sold rest of the tanks to many families and the household had to pay the price through 44 instalments in a year for the water tanks. More interestingly, the same NGO provides micro-credits to the Islanders. So, the tank borrowers took loans either from the same NGO, other NGOs or money lenders to pay back the 44 instalments.

NGOs are not providing water tanks as 'development assistance' to those households which don't have the capacity to pay back the instalments by their own. Even, NGOs usually choose those well-off households whose roof is already made with tin or tiles, which is an indicator of good economic condition of the households. This form of commercialization of 'development assistance', armed with micro-credit (Yamada, 2021, p. 37), could never ensure sustainable water management among the poor people.

3.5 Women and Rainwater Harvesting

women from well-off households in Gabura usually don't go to PSFs to collect water as they heavily rely on the other sources of fresh water like RWH and DPs. Ayesha Begum, housewife of a medium shrimp farm owner and mother of my research assistant, stated-

"I used to collect water from the nearby pond but after installing the water tank inside the house, I no longer go outside. I am not comfortable with outside world like our children do. But, everyday walking for water is a tenacious act. Now, we have 2000 liters of tank for storing rainwater for a long time. Your uncle takes care of the rainwater storage system, its instalment and repairment. Your uncle buy water from the desalination plants when we need it."

Though in development literature, the water collection for women is represented as oppressive, traditional, unclean, arduous, and disliked by women (Van Houweling, 2015), walking to PSFs for water is not always mirthless for women. During a conversation, one respondent mentioned that water collection from the PSFs is one the activities outside home they enjoy the most. PSF pond is a site of bonding and social networking with other women for their daughter's marriage, instalment about the micro-credit etc. This is the only place where they get leisure, free from household activities, and gossip and complain about their husbands to each other. Increase in rainwater harvesting and decline of PSF reduces the social interaction among many women.

Though few says that rainwater harvesting has several advantages for the women, in this system, it is the NGOs and market availability which ultimately decide what would be the proper technology and material infrastructure. Women are just users of this technology. So, women's empowerment and participation in any water management system, either community based or household based, should be assessed by their ability in decision making process and accessing the benefits (Sultana, 2009, p. 351) which are important aspects in the development discourse.

3.6 Conclusion

It is clear that modern RWH system is popular among the wealthy households and NGOs are promoting this method to those households which have capacity to buy it. But the poor households have to rely on the PSF and traditional way of harvesting and storing rainwater. NGOs intervention and support to market based solution to the water scarcity also suffers the same problems which is the subject matter of next chapter.

Chapter 5

Market Based Water Management

5.1 Introduction

In 2015, the opening of Desalination Plant (DP) in Gabura made a headline in local print media. Chairman of the UP inaugurated this DP and UP members and executive director of a local NGO were also present. This DP is built at the middle of the Island so that everybody can get equal access in terms of transportation.

“This technology is new to us. It is like a magic!”.

This is how Abul Hasan expressed his excitement when I asked him about DPs in Gabura. Abul is a shrimp farmers who has electricity, TV, modern water tank in his home and a motorbike. During the Summer, when the rainwater from the storage is finished, people like Abul buy water from the DPs. Later, I was talking with another NGO staff, Shahin Alam, and he told me enthusiastically-

“Salinity will increase in this region. Because you can’t control the cyclones, stop the shrimp farming. Fresh water crisis is a by-product of these two. We are surrounded by saline water. So, if you ask me, then I would say the only long term, viable solution to water crisis is desalination plant. It is becoming popular very quickly in this region.”

I asked him a follow up question:

“Yes, but do you think poor people in Gabura have the ability to buy water from the DP as they suffer most due to water shortage?”

Shahin Alam replied immediately:

“Yes, you are right. This is a problem. That’s way households with descent income only buy water. It works for those who have money”.

Now, Shahin’s voice didn’t seem as loud as before. While scholars urge to see water as part of global common than commodity (Shiva, 2002), this transformation of water, from commons to commodity, is a new thing in the coastal area of Bangladesh. Commodities are generally associated with capitalism and closely linked with marketization, commercialization and privatization (Harvey, 2005). This chapter discusses the impact of market oriented solution to water scarcity in Gabura. It also presents an alternative view of water which could help to rethink the commercialization of water in the rural area.

5.2 An overview of DPs

Fresh water through DPs is the most newest intervention by the NGO sector in Gabura. There has been an effort through technological and market intervention to solve the water scarcity in Southwest delta of Bangladesh. Small scale DPs, known as Reverse Osmosis (RO), in that region are built between 2012 and 2015 (Islam, Akber and Ghosh, 2018, p. 1607). Through the DPs, water commercialization has been started in that region in the rural community and household level.



[Figure 7: Desalination Plant]

There are two DPs in Gabura. These two DPs are built at the end of 2015 with the financial support from European Union and technical support from a regional NGO, *Nonyabeki-Gonomukhi Foundation* (NGF). One villager devoted his land to build the DP and the NGO gave him the ‘ownership’ of the Plant. The condition is the Plant’s owner will run it during the Summer and no economic benefits will be shared with the NGO. The owner will take care of the maintenance cost and neither community people nor the NGO will interfere about the price of the Plant’s water.

During the Summer and Winter when the water scarcity becomes acute, DPs provide water to those who can afford. One plant is capable of desalinating 1000-1500 litres of water every day. Water is extracted from the underground (because it is saline water) and went through the machines for desalination. The discharged saline water from the DPs caused few problems. The Islanders, after the initial euphoria, started to talk about the sustainability and affordability of this ‘new water’ and its technology.

5.3 Economy of Water as Commodity

Baki Billah lives in the middle of the Island where water crisis is very acute. He doesn’t have any permanent occupation. Usually, he works as labourer in shrimp farm, brick factory, rice field. Sometimes, he goes to Sundarbans for collecting honey. He has three kids and a wife. Billah’s monthly income is around 5000 to 7000 BDT. Most of the time, his family collects water from PSFs and also stores rainwater during Monsoon. He doesn’t have big water tanks for storing rainwater for long time. But during the Summer, when PSF ponds are almost dried up and there is no rainwater, he is forced to buy water from the DPs. He said-

“25 kg water dram costs 15 BDT. Then add 10 BDT as carrying cost. Total 25 BDT for 25 kg water. I have five members in my family. If we start using water for cooking too, and if there are any guests for few days in the family, then the water doesn’t last long. I am a day labourer but during the Summer, I spend 500-600 BDT for water in each month. It is very tough for people like us.”

For the low income households, buying water from the DPs in Summer and Winter is hard. Besides, pandemic puts restrictions to the shrimp export and the farms reduce workforce drastically in Bangladesh. Also, the prolong lockdown to stop the Delta variant in Bangladesh during the early months of 2021 affected poor households adversely as most of them depend on wage work. Under this economic hardship, people like Billah, spending money for domestic water worsens their economic burden. On the other hand, well-off households in Gabura use DPs water for both drinking and cooking. When they need water during the Summer, they just give a mobile call to the Plant’s owner and the water arrives at the door. During that time, wealthy households can invite guests and relatives.

Poor households are not happy with the DP for one particular reason. The price of the DP water is completely in the hands of the owner. When the DP was built, the maintenance cost was not high. Even, the owner supplied water to many poor households without money. But, when DP was converted from solar energy to electricity (Gabura was included into national grid in 2019 and managing solar battery was a problem), maintenance cost increased and it stopped delivering water without money. When the DP started in 2015, water was 30 paisa per litre but now it is 50 paisa. Besides, DP owner has .5 acre of shrimp farms. So, selling water from this DP during summer brings an opportunity for him to make money. He said-

“NGO doesn’t take any benefit from the sale. The NGO doesn’t look after it. During the first and second year, the NGO was little bit active about the DP, but after that, it didn’t bother. I have hired few people for maintenance of this DP. Almost all the benefits are used behind the maintenance. The price of the water is subjected to many issues. I can’t control them all the time.”

Rather than ensuring participation, NGO handed over the DP to an individual and made it as private enterprise. Many NGOs believe that to ensure the sustainability and functionality, commercialization is one of the best solutions. Technological intervention in solving water scarcity always lead to a process of marketization. For DP technology to be socially sustainable in a community, it must be accepted by the community. But due to economic pressure, not all households have the same capacity to create equal access to DP water supply.

Buying water, for poor and rich households, is a new thing among the Islanders. Assessing such a change, water from commons to commodity, is simultaneously moral and political (Appadurai, 1990). It is moral in the sense that the villagers never thought that they have to buy water to satisfy their needs in this Island. It also limits their sociality such as poor households usually don’t invite guests and relatives during the Summer. It is also political because it entails debate about whose development, whose participation, whose preference counts and how to measure development among the water users.

5.4 Is Water Only a Resource?

Water is viewed from different perspectives by different people. River water is viewed as separated from the land (Cortesi, 2021) and development experts, policy makers, scientists, bureaucrats also misread water and landscapes (Dewan, 2021). Most of the water users in Gabura view water as natural resource. As, it is viewed as resource, everybody wants to control it. The advent of water in the taps, pipe, tank and bottle force us to forget that before the flow of water through these material things, water is a gift from nature (Shiva, 2002, p. 131). Viewing water as a resource has a long tradition in western (modern) discourse of

resource management. Seeing nature as resource is ingrained into the western, ethnocentric, supremacist, racist, misogynistic and Eurocentric knowledge tradition. This outlook shatters other ways of seeing the nature, known as epistemicide (Santos, 2014, p. 153). But, in the alternative knowledge tradition, nature is comparable to Mother Earth. Mother is not an object, not a resource, it is sacred and to be respected (Escobar, 2016, p.16).

To the Munda indigenous people of the Gabura, water is not exclusively a resource, an object only. The Munda live in several small settlements near Sundarban forest in Shyamnagar and Tala sub-district (Satkhira district), and Koira sub-districts (Khulna district). There are total of 29 villages, 695 families in three different subdistricts with 3,675 population (Perucca and Munda, 2010). As previously mentioned, Munda people are the first inhabitant of the Gabura Island. They have a sense of 'ancestrality' in this Island (Escobar, 2016, p. 19); which means an ancestral mandate that inspires them not to leave their habitat. There are 27 Munda households living in few villages of Gabura. These villages are very close to Sundarbans forest and all of them are dependent on the forest resources like honey, woods, crabs and fishes. They don't own any agricultural lands or shrimp farms because their lands were 'taken' by document forgery, threats. In some cases, they were forced to sell due to family crisis or debt at a very cheap price to Bengali neighbours.

I haven't done much research among the Munda indigenous people and doing research among them is not an easy task though they live in the same Island. Though they can speak Bangla, culturally and linguistically, they are much different and it is not easy to grasp the complexity of their life through a research assistant and remote telephone interview. My research assistant conducted one interview with them and I managed to talk over telephone with two Munda. Though this section lacks the empirical findings, I intend to do more serious work on them later but bringing Munda's water cosmology in this section hints an important point for this research too.

However, it is important to see their relationship with the natural world like forest and water. Munda are divided into several clans but the *Tut* clan believes that they have come from the *Sundari* tree and *Baghor* clan claim that they are originated from the tigers. Besides, a number of gods and deities among the Munda play an important role in how do they interact with the nature. I will focus on *Bonbibibi* and *Gongga Debi*, two important deities for the Munda people.

As they heavily depend on the forest for their livelihood, and the forest is filled with tigers, crocodiles, snakes, and pirates; they worship *Bonbibibi*. While *Bonbibibi*, the woman of the forest-according to the legend, was sent by the Allah to protect people against a man-eating half-Brahmin sage, her worshippers don't think in terms of religion but as forest super-power who offers her protection over any individuals of all community equally (Jalais, 2010, p. 69). All forest going people, including Munda, believe that they will be protected from the attack of tigers, crocodiles and snakes if they worship *Bonbibibi*. Another deity, *Gangga devi*, is worshipped in the name of the river Ganga at the start of the year. Munda believe that *Gangga devi*, a female deity, controls the flow of fresh and salt water in the river. It is Her wish when rivers will be flooded with salt and fresh water. Her worship becomes irregular among the Munda community in recent times.

Water is also sacred to Munda if we look at their water use beyond drinking, bathing, cooking and washing. There exist some symbolic domains of the Munda society where fresh water plays ritualistic role. Fresh water, together with rice, is the main ingredient of making indigenous alcohol which is used in all festivals. Munda's social life is organized around the fresh

water pond. Many rituals require fresh water, many of it can't be performed by the saline water because the Munda consider it as profane. Sometimes, they spread the ritualized water, which they consider as sacred, over the rice field, vegetable orchards in the hope of getting a good harvest.

5.5 Conclusion

The Munda people are not responsible for what is happening in Gabura in terms of environmental, social and economic changes. They are the worst victim of these changes. But their indigenous cosmology is one of the sites where continuous effort should be pondered to go beyond the western (modern) epistemological framework, which means another way of seeing, understanding the natural world. Whereas all the sweet water ponds, canals, tank waters are seen by the majority of the Islanders as resource, the Munda indigenous people view these sites as part of them. Their eyes of relationality, manifold relations present a different form of water world which is largely unknown to us. What interests me is that there exists a different world view, different ontology among the Munda indigenous people of the Island which could be a starting point of a 'pluriversal worlds' (Escobar, 2016, p. 2) where many worlds would fit. However, role of indigenous cosmologies and practices in challenging the dominant discourses and capitalist logics (Wutich and Beresford, 2019, p. 169) is still unexplored in many contexts of water resource management in Bangladesh.

Chapter 6

Summary and Conclusion

In this RP, my attempt was to answer to the question “*How do inhabitants of Gabura Island manage their fresh water whose scarcity is occurred due to the risk of periodic cyclones, embankment collapse and shrimp farming in saline water?*”. I used political ecology, science and technology studies and anthropology of infrastructure as theoretical frameworks to understand how social management, water technologies and modern infrastructures are used to distribute fresh water among the inhabitants of the Gabura, an Island located in Southwest delta of Bangladesh. Although in-person fieldwork was primarily designed, I had to cancel it due to the pandemic. So, I hired a research assistant from the Island who conducted qualitative interview with the local people. In-depth interviews with local people over various social media were also conducted by me.

For the Islanders, fresh water scarcity is not ‘natural’ or ‘given’; rather, it is caused by shrimp cultivation, periodic cyclone, collapse of embankment and salinity intrusion. Each year, cyclones hit on the Island and the protection embankment collapses. Saline water from the tidal surges destroys houses, life, livelihood and other materials resources. People put in voluntary labour to repair any collapsed embankment. This type of collective and shared responsibility is absent in case of the community-based water management.

This research mainly looks at three different types of water management and distribution among the Islanders: community-based PSFs (Pond Sand Filters), household based RWH (Rainwater Harvesting) and market-based DPs (Desalination Plants). Mostly the poor households rely on the PSFs due to their limited access to other forms of fresh water sources. Moreover, number of fresh water ponds is gradually decreasing due to salinity, collapse of embankment and cyclone. Mainly, NGOs provide support for PSF technologies and form a regulatory committee among the community for the water management and distribution. It finds that commercial shrimp farming has changed the community in last three decades, leading to less longevity of the community-based water pumps. It has also been found that NGOs conceptualize the community as homogenous, apolitical and static entity. Besides, elite dependency, inclusion and capture, biasness in the selection process, encroachment of public lands and water bodies prevent well-functioning the community-based water management on the Island.

With pressure increasing on community-based water management, NGOs provide supports to the Islanders in harvesting rainwater. NGOs facilitate supports to ‘modernize’ the traditional and generational practice of rainwater harvesting by providing big plastic water tanks for prolonged preservation. But NGOs provide water tanks as ‘development assistance’ to those who have prerequisites for harvesting clean water, such as tile- or tin-roofs. Besides, those households receive the tanks from NGOs on instalments through micro-credits. This commercialization of NGOs’ development assistance will never solve fresh water scarcity in the Island. It raises many questions of NGOs’ led ‘participation’ and ‘development’ among the Islanders.

Another NGO-led support-solution is the construction of two DPs (desalination plants) in the Island. Selling fresh water from DPs among the Islanders during the Summer is another new phenomenon to address the scarcity. This market-based solution, which makes water as commodity, also benefits wealthy households. Such commodification has no benefit for the poor households of the Island.

Research findings show that women are not much valued in the community-based water management initiative, albeit being main collectors and users of fresh water. Neither their opinion is taken before deployment of any new water technologies and infrastructure. They are largely absent in decision making process. Household based rainwater harvesting and buying water from the desalination plants benefit women from the well-off households. But, the struggle for the women from the poor household aggravates as fresh water sources are petering out.

Overall, this research shows that socio-economic condition and control over natural resources makes a difference on how the Islanders manage their fresh water scarcity and distribution. The apparent failure of community-based water management has brought household and market-based water distribution among the Islanders. The 'development assistance' of NGOs in the fresh water sectors leads towards water commodification and marketization. The ultimate failure of the solution providers is to view water not as a sharable common but as a commodifiable, manageable resource. This RP hints to a need of change in such attitude to solve the increasing water scarcity.

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Appendix 1: Interview Guide

I. Commercial Shrimp farmig

when you started your farms ? Did you cultivate rice before? Why you started shrimp? How much money do you earn from shrimp? Did you involve in conflict with someone because of shrimp farm? How are you benefited from the shrimp? Where do you work as labourer? How much do you earn daily? From where do you get drinking water? Who controls public lands and water bodies? Why fresh water ponds are not possible to built on the public lands and water bodies? What are the relationship between water scarcity and dispossession of the public lands?

II. Cyclone and Embankment

Why does the embakment collapse during every cyclone? How does embankment become weak? Why Water Development Board doesnt respond during emergency? What happens when embakment collapses? Why community people provide voluntary labour to repair embakment each time? In which time of a year, cyclone hits? What types of help you get from the government and NGOs after cyclone? Are cyclone shelters enough for the Island?

III. Pond Sand Filters (PSFs)

How does PSF work? When PSF started in the Island? How do you form a committee? Who are the committee members? How do you select committee member? Who distribute the responsibilities among the member? What are the problems that committee face during the management of PSF? WHAT are the advantages and disadvantages of PSF water pump in private and public ponds? Why the maintenance of PSF and its ponds are difficult among the community? Why PSF community water pump is dependent on the wealthy people and NGO? Why NGOs cant play a proper role in PSF management? Who are responsible for selection of the ponds and formation of regulatory committee for the PSF? Why NGOs fail to follow up the PSF after the end of the project? What types of problem women face when they come out for collecting PSF water? What are the social benefits of collecting water from the PSF?

IV. Rainwater Harvesting (RWH)

Why traditional rainwater harvesting is considered 'unhealthy' and unsustainable? What are the advantages and disadvantages of rainwater harvesting? Why NGOs sell plastic water tanks among the households? What are the impact of NGOs commercialization of development assistance? Why NGOs promote rainwater harvesting? Why NGOs choose economically better households for providing plastic water tanks?

V. Desalination Plants (DPs)

Who built the DP? How much do you charge water? How do you use the profits? Does the owner share the benefit with NGO? Do poor households use DP's water only for cooking? How does the DP's water benefit poor household? Why do wealthy households buy water? Why does the DP onwer increase the price of the DP's water? How much water do you buy? How much money do you spend for this? When do you need to buy water and why? Do you use water only for drinking or other domestic uses like bathing, washing, cocking? Do you feel economic pressure due to buying water from the DP? Would oyu please describe the problem? When you dont have money, how do you manage water? Do you borrow water from your relatives and neighbours?

Appendix 2: Non-Disclosure form

I, Md Helaluzzaman, will help Fahmid Al Zaid with the research study titled “*Technologies of Water Control and Social Management in Flooded Coastal Bangladesh*”, as a research assistant. My role will be to conduct interviews with the community people, and act as a local coordinator during the research process.

As a research assistant:

1. I will not disclose the names of any participants in the study.
2. I will not disclose personal information collected from any participants in the study.
3. I will not disclose any participant responses.
4. I will not disclose any data.
5. I will not discuss the research with anyone other than the researcher.
6. I will keep all paper information secured while it is in my possession.
7. I will keep all recording, photos secured while it is in my possession.
8. I will return all information to the researcher when I am finished with my work.
9. I will destroy any extra copies that were made during my work.
10. Other (researcher add items if needed).

Helaluzzaman

1st June, 2021

.....
Signature

.....
Date

Name: Md Helaluzzaman
Phone: +8801973280582
Email: md-2017316532@ling.du.ac.bd