

Fisher engagements with transition in a small-scale inland fishery: long-term structural change, fisher agency, and wellbeing in Parbatipur Sub-district, Bangladesh

By

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Dedication

Dedicated to my son, Taseen Mahfuz Shayaan

Acknowledgement

There are many people who have given their assistance and support throughout the production of this thesis and throughout my academic career. I would like to begin by thanking the Naya Jelapara fishing community members who participated in this study, allow me in their occupational and personal life, and contributed to this study through their time and valuable opinions.

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Abstract

Over the last five decades, the inland fisheries sector in Bangladesh has gone through massive and multidimensional structural changes, ranging from infrastructural changes to changes in attitudes, governance, and management. These changes have led to a fundamental transition in the inland fisheries in Bangladesh since the 1990s through the direct intervention of the state: from supply dominated by capture fisheries to supply dominated by aquaculture. The reasons for this transition are diverse, and the effects of this transition are experienced differently by different people and groups according to their economic status, gender, religion, age and political identity. Major effects of these structural changes to fisheries are significant reduction of the length of the fishing period, gradual exclusion of generational Hindu fishers and complete exclusion of women from capture fisheries, significant decline in children's desire to engage in fishing, and the development of aquaculture at the expense of capture fisheries. These changes have increased agricultural and culture fisheries production and revenue, with two related effects. First, they have stimulated increased capitalist tendencies and inequality among fishers, leading to changes in class structure and deepening dependency on the market. Although most of these structural changes have reduced the total area and number of open water bodies, they have also created many other alternative opportunities for fishers. But, in general, most of the direct benefits of these changes have been captured by the elite. Fishers primarily have benefited from indirect benefits in the form of wage labor and partial involvement in secondary occupations. Fishers creatively responded to these structural changes and have found multiple ways to reduce the shocks, insecurity, and negative impact of these changes, and instead increase income and wellbeing. Major strategies applied by fishers to successfully tackle the adverse impacts of these changes included: diversification of livelihoods and income sources; migration, sharecropping, borrowing, and lending money; and drawing on various forms of social and kin relationships. The primary motivation of this kind of diversification is to reduce risk and uncertainty and to cope with the changing situation. It not only enhances the fishers' capability to respond to the decline in resources and income, but also enables them to accumulate capital for future investments. The impacts of these structural changes on fishers' wellbeing present a complex scenario. There is a noteworthy decline identified in their social and relational wellbeing, but simultaneously a notable improvement identified in material and other areas of social wellbeing. There is a remarkable improvement identified in fishers' overall wellbeing even after the significant decline in capture fisheries, which is surprising.

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Abbreviations and Acronyms

ASA: Association for Social Advancement
BBS: Bangladesh Bureau of Statistics
BCAS: Bangladesh Centre for Advance Studies
BDT: Bangladesh Taka
BRAC: Building Resources Across Communities
DTW: Deep Tube Wells
FAO: Food and Agriculture Organization
FGD: Focus Group Discussion
GMPF: Grameen Motsho O Pashusampad Foundation
GPGI: Global Person Generated Index
GRA: Governance Relationships Assessment
HYV: High Yield Varieties
ICDDR,B: International Centre for Diarrheal Disease Research, Bangladesh
IIED: International Institute for Environment and Development
LLP: Low Lift Pumps
MDG: Millennium Development Goals
MoL: Ministry of Land
MP: Member of Parliament
MPO: Master Plan Organization
MT: Metric Tonnes
NFEP: Northwest Fisheries Extension Project
NGO: Non-Government Organization
PGI: Person Generated Index
RANQ: Resource and Needs Questionnaire
STW: Shallow Tube Wells
TBP: Teesta Barrage Project
UFO: Upazila Fisheries Officer
UNDP: United Nations Development Programme
UNO: Upazila Nirbahi Officer
UP: Union Parishad
WeD: Wellbeing in Development

Glossary

<i>Adhivasis</i>	Indigenous people
<i>Aman</i>	Rainfed rice crop
<i>Bahumokhi Samobai</i>	Multi-purpose Co-operative Society
<i>Samity</i>	
<i>Baor</i>	Oxbow lake
<i>Bazar/Hat</i>	Local market
<i>Beel</i>	Perennial water bodies / small depressed land that becomes inundated during monsoons
<i>Bigha</i>	The <i>Bigha</i> is a traditional unit of measurement of area of land. There is no standard size of <i>bigha</i> . In the study area one <i>bigha</i> consists of 60 decimals of land.
<i>Boro</i>	Winter / dry season rice
Carp fish	Carp is a common name for various species of freshwater fish of the family Cyprinidae, a very large group of fish native to Europe and Asia.
<i>Community</i>	A cluster of households within a village
<i>Decimal</i>	Unit of land area, 1 decimal = 40.48 m ²
Generational fishers	Individuals whose families have been involved in fishing for many generations
Hectare	The hectare is an SI accepted metric system unit of area equal to 10,000 m ²
<i>Jalmohal</i>	Government owned water body that is leased out for revenue collection
<i>Jele / motshojibi</i>	Commercial / subsistence fishermen
<i>Kacha road</i>	Earthen road
<i>Khas land</i>	Government owned land
<i>Mandir</i>	Hindu temple
<i>Madrasha</i>	Higher secondary school following Islamic curriculum
<i>Nomoshudra</i>	A lower scheduled caste group of Hindus
<i>Pucca road</i>	Hard bitumen surface road
<i>Samaj</i>	The wider society within and outside village
<i>Taka</i>	Local currency of Bangladesh (1 CAD = 59 BDT)
<i>Union</i>	Local government unit comprising several villages
<i>Union Parishad</i>	Local government elected body at the village headed by chairperson
<i>Upazila</i>	Sub-district level of local government consists of several <i>Union Parishads</i>
<i>Upazila Nirbahi</i>	Chief executive of <i>Upazila</i> administration appointed by the

<i>Officer</i>	government
<i>Upazila Parishad</i>	<i>Upazila</i> level council headed by elected chairperson in which all chairpersons of <i>Union Parishad</i> and <i>Upazila</i> level government officials are included as member
<i>Village</i>	Lowest rural geographic unit either equivalent to mauza or part of a mauza

Bangla and English Months

Bangla months	English months
Boishakh	April-May
Jaistha	May-June
Ashar	June-July
Srabon	July-August
Bhadra	August-September
Ashin	September-October
Kartik	October-November
Agrahayan	November-December
Poush	December-January
Magh	January-February
Falgun	February-March
Chaitra	March-April

Chapter One: Introduction

1.0 Introduction

In the recent past the world has witnessed significant increases in fish production. At the same time fishers and fisheries are facing multidimensional challenges all over the world (FAO, 2014). Fisheries play a crucial role in the life and livelihoods of millions of people, not only fishers but also others. Fisheries is not only an occupation but a way of life which is intertwined with the life, society, and culture of fishers and people related to fishing (Coulthard et al. 2011). The distinctive nature of fisheries and its embeddedness with specific contexts made it diverse, complex and dynamic, and make its governance and management challenging (Jentoft and Chuenpagdee, 2009). Therefore, understanding fisheries is also a challenge for researchers. No single perspective can alone capture the total picture of it. Therefore, the comprehensive study of fisheries requires an in-depth and a multidimensional perspective where anthropology should play an important role.

A fundamental transition has been taking place in the global fisheries sector since the 1990s; from supply dominated by capture fisheries to supply dominated by aquaculture (Belton and Thilsted, 2014). The reasons for this transition are diverse and vary from context to context, and the effects of this transition are experienced differently by different people and groups according to their socio-political and economic status. But there are few studies on the effects of transition, its impacts on the wellbeing of small-scale fishers and low-income people, and on fisher's perception about this transition (Allison, 2011; Toufique and Belton, 2014). In some countries, the transition in fisheries excludes small-scale fishers from fishing and replaces them by non-fisher elite groups (Toufique, 1997; Sultana, 2012). The dominant neo-classical economic

perspective has failed to address the multidimensional effects of this transition on the life, livelihoods, and culture of small-scale fishers.

The wellbeing approach can play a significant role in overcoming the limitations of understanding the transition of fisheries and its effects on fishers and fishing communities. The wellbeing approach provides a framework for analyzing how people in different contexts define what it is to live well. It consists of three inter-related dimensions: material, subjective and relational. The material refers to economic assets, income, and other tangible goods that are seen as important to wellbeing. The subjective refers to how individuals respond to the features of their lives, as refracted through values, beliefs and ideologies. The relational refers to social relations that are seen as important to living well. The relational dimension makes this approach distinctive in that it suggests that there is a relationality within wellbeing: that which is valued reflects one's particular position. Wellbeing analysis helps us to understand the complexity and diversity of fisheries and gives a context specific comprehensive picture and can contribute to policy formulation. Moreover, the wellbeing framework (Johnson, in press) provides a method to account for the values of small-scale fisheries both quantitatively and qualitatively through its' distinctive three-dimensional approach.

Fishing has a significant role in the life of people and the economy of Bangladesh. Fishing is not an isolated sector; it is linked with the broader geographical, economic and political aspects of a particular context. Therefore, activities and decisions beyond fishing affect fishing, which is evident in the case of Bangladesh (Lewis et al. 1996; Ali, 1997; Ali, 2000; Ahmad & Reazuddin, 1986). One of the objectives of the national development policy of Bangladesh that was formulated immediately after the independence was attaining self-sufficiency in food grains, which affected fisheries (Planning Commission, 1973). In achieving the food grains objective,

government initiatives like the infrastructural development of barrages, dam, and embankments, and promotion of chemical fertilizers brought great environmental changes that have significantly affected capture fisheries, and the life and livelihoods of fishers. Moreover, the continuation of the leasing system in fisheries resource management has displaced genuine fishers from fishing and replaced them with a non-fisher elite group. Fisheries governance in Bangladesh failed to recognize the multidimensional role of religion, class, gender and the power relations of actors related to fishing. Equally, the role of women, youth, and children from fishing communities has not received enough attention, both in government and in academic studies. Their significant role and contributions to family, society, and culture in fisheries are not yet fully recognized.

The present study has three dimensions that aim to address the questions of small-scale fisheries in Parbatipur, one of the sub-districts in northeastern region of Bangladesh. These dimensions are interrelated and relate to the study of fisheries, life, and livelihoods of fishers, women, and children in fishing communities from a socio-cultural perspective. Firstly, the study will identify the major structural changes that happened in Parbatipur since the independence of Bangladesh in 1971, and their effect on fisheries, and lives and livelihoods of fishers. In this study, structural changes not only refer to changes in economy and infrastructure but also in the governance and management, ecosystem, society, and culture (see details in chapter 2). Secondly, the experiences and responses of fishers, women, and children to these changes will be identified. Finally, possible policy interventions will be recommended based on the experience and suggestions of relevant actors i.e. fishers, women, children, and government and non-government officials. Research objectives, research questions, and the theoretical framework of this study have been set up in line with these three dimensions of the study.

1.1 Research objectives and research questions

The overall objective of the study is to identify the responses of men, women, and children to the major changes that have taken place in the fisheries of Parbatipur as a basis for identifying more socially sensitive governance interventions. The specific objectives of the study are-

- To identify the structural changes that has had impacts on the inland fisheries of Parbatipur.
- To assess the impacts of those structural changes in the small-scale fishing population of the area and how that population has responded to those impacts.
- To recognize the diverse and important roles of women, youth and children in small-scale fisheries in Parbatipur.
- Drawing on the three-dimensional social wellbeing approach, to identify the material, subjective and relational ways in which small-scale fisheries in Parbatipur are valued by men, women, and children.
- To identify promising ways for reorienting governance of small-scale fisheries to the benefit of marginalized groups and people.

Research questions: The following research questions will guide the study-

- How have small-scale fisheries in Parbatipur changed in the last four decades, and what are the internal and external factors behind these changes?
- What are the effects of these structural changes on the lives and livelihoods of fishers?
- How have the small-scale fishing population of Parbatipur responded to the effects of these structural changes?
- As a sector, what have small-scale fisheries lost and gained from these structural changes and what does society more broadly lose and gain from them?

- What is the importance of fisheries in the economy, livelihoods, and culture of Parbatipur?
- What roles do women, youth, and children play in the fisheries of Parbatipur?
- What roles do women, youth, and children from fishing families play within the household and family and in the wider society?
- How are the fisheries of Parbatipur governed?
- What are the management and operational difficulties faced by fishermen in Parbatipur?
- What are the policy barriers in fisheries hindering the growth and sustainability of fisheries in Parbatipur?
- What could be the desired roles and responsibilities of the government and other stakeholders to achieve sustainable development in fisheries in Parbatipur?

1.2 Scope of the study

Although fishing plays an important economic, social and cultural role in the lives and livelihoods of fishers, as well as in the wider society in Parbatipur, relatively little research has been done on fisheries there. Keeping this point in mind, the following points sketch out the scope of the study-

- a) There is a lack of literature which comprehensively studies the structural changes of inland fisheries of local communities in Bangladesh that have taken place in last four decades. We know very little about the structural transformation of fisheries in Parbatipur. There is little on the impact of these changes and the responses of fishers to these changes. This study will identify the changes and their impacts on the life and livelihoods of fishers, their community, and the wider context.

- b) The women, youth, and children of Parbatipur play a vital role in fisheries and the family economy, but their role is rarely recognized. Most fisheries studies overlook or undervalue women and children's role in fisheries. My study will recognize the multidimensional roles women, youth and children play in fisheries, within families and the wider society.
- c) Most government studies are on the production and development of fish. These studies overlook the socio-cultural aspect of fisheries and give emphasis only to its economic aspects. Social and relational values of small-scale fisheries are hardly found in any studies. My study will recognize, besides economic values, the material, social and cultural values of small-scale fisheries in Parbatipur.
- d) To address the development of fisheries in Parbatipur, this study will address the multidimensional challenges faced by fishers of the study area. Moreover, the study will give fisher's views on the governance of fisheries and the desired roles of different groups in the sustainable development of the sector.

1.3 Conclusion

One of the challenges of fisheries studies in Bangladesh is the lack of data evidence them. Most studies on fisheries are done from an economic perspective and very few from social or ecological perspectives. Evidence of the socio-cultural and political aspects of small-scale fisheries is rarely found. Evidence of local fisheries practices and local management are missing in these studies. In this situation, my study will recognize the varied responses to the major changes affecting the fisheries of Parbatipur, Bangladesh, and seek to propose more socially-sensitive governance responses.

Different theoretical frameworks and understanding are being developed and applied in response to the fisheries challenges all over the world. Theoretical frameworks like agrarian transition, political economy, governance, and social wellbeing enrich our understanding when studying fisheries. Fisheries have context-specific characteristics which make large-scale generalizations problematic. This research, therefore, seeks to conduct an in-depth study of fisheries in one particular context.

Chapter Two: Theoretical Framework

2.0 Introduction

Keeping the research objectives and research questions in mind, I use several theoretical frameworks to understand the structural changes affecting small-scale fisheries in Parbatipur, and the responses of fishers, women, and children to these changes. Every theoretical perspective has its strengths and weakness, but a combination of several relevant perspectives guides us to get a comprehensive picture. In relation to the three broad objectives of the study – the identification of structural changes, local responses to these changes and possible policy intervention for these changes - I use the theoretical perspectives of the political economy of agrarian transition, the political economy of governance, and the theory of wellbeing and values. In studying agrarian transition, the political economy of agrarian transition inquires into the accumulation of capital and intensification of production, changes in production relations, and the process of depeasantisation and repeasantisation, which are also evident in fisheries. It has the potential to contribute to the study of fisheries transition. Although the political economy of agrarian transition is quite successful in addressing the fisheries transition process, the roles of actors, and the impacts of transition on people, it pays less attention to policy decisions for the sustainable use of resources. Moreover, it gives greater priority to material aspects, or monetary value, and less attention to other values of resources, which sometimes leads to inappropriate understandings. The political economy of governance and the theory of wellbeing have the potential to overcome these limitations. The political economy of governance provides an analytical framework which enables us to identify actors in fisheries transition and their power relations, and how policy interacts with power. Furthermore, it gives a framework to improve governance through identification of relevant issues, addressing the power relations of actors,

and incorporating them into the decision making process. Through a three-dimensional analysis of fisheries, the theory of wellbeing can contribute both to the political economy of agrarian transition and governance. It enables us to identify the subjective, the relational and the material dimensions of fisheries thus address the limitations of the political economy of agrarian transition and provide insights into the governance system. Finally, the theory of values enables us to recognize the multidimensional values of fisheries which ultimately contribute to effective governance and improvement of the system.

2.1 Relevant concepts

2.1.1 State

Although there is no academic consensus on the most appropriate definition of the state, the most commonly accepted definition of the state is - a political organization with a defined territory, a permanent population and a government that is capable of maintaining effective control over the corresponding territory. General categories of state institutions include administrative bureaucracies, legal systems, and military or religious organizations. State and government are often used as synonyms, but in reality, there are significant differences between two. The state is a nonphysical entity; on the other hand, the government is organizations of people with certain coercive powers. The government is an administrative bureaucracy that exercises state power and controls the state apparatus.

Different state theories like instrumentalist theory and structuralist theory define state from diverse perspectives. In a very general sense, instrumentalist theory defines the state as an instrument that is used by the capitalist class to fulfill their desires. Advocates of this theory assume that capitalists control the state materially and directly through the use of legislative,

government, policy and regulations. Though this theory is very much successful in identifying the class structure of the state, it is criticized for the simplification of the nature of the capitalist class and state. The capitalist class is not a unified group, and their vested interests are not same. Furthermore, it ignores the structural constraints on the state. On the other hand, the structuralist theory examined the class character of the state in terms of the constraints on the state's actions imposed by the capitalist class structure, not in terms of who controls the state. There are two different views within the structuralist theory – political structuralism and economic structuralism. Political structuralism explains the nature of state action where the state plays a crucial role in maintaining the cohesion of social formation, and simultaneously works for the interest of the dominant classes and prevents the political organizations of dominated classes (Poulantzas 1968, 1978 in Das 1996). Here state presents itself as relatively autonomous from the dominant classes and presents itself to the dominated classes as neutral through the equal citizen concept. This relative autonomy character allows the state to intervene and serve the interest of the dominant classes. Relative autonomy does not reduce the classness of the state, but it helps the state to play its class role in a flexible way (Miliband, 1977). The economic structuralism defines state from an economic perspective where the state creates conditions for accumulation and capitalist profit, as capital cannot produce the conditions of its reproduction. The state creates the conditions for reproduction through infrastructure, legislations, regulations, repression, and safeguarding of capital.

Both the political and economic structuralism provides significant insight to define the nature of a state like Bangladesh. They show that state is not an instrument, nor a subject, but a relation, more precisely; a relation of power between classes (Das, 1996). It further shows how state policy emerges out the collision of micro-policies of the different groups and how it works

in favor of the dominant classes in the long run. In Bangladesh, the bureaucracy, international organizations such as the World Bank play a crucial role in policy formulation along with the local dominant classes (Muhammad, 2017), which ultimately work for the interest of the national and international dominant classes.

2.1.2 Structure and structural changes

In social theory, one of the prominent works on “Structure” is done by Anthony Giddens (1976) where he proposed “structure” as a process, not as a steady state. According to Giddens, structure shapes people’s practices, conversely people’s practices constitute structures. Structures don’t always constrain human agency but also enable it. People’s actions transform the very structures that gave them the capacity to act. In “The Constitution of Society,” Anthony Giddens (1984) defines structure as a combination of rules and resources. Giddens’s notion of rules is derived from the idea of langue (the abstract rules of grammatical sentences), that was later criticized by Sewell (1992) on the ground that Giddens’s notion of rules is virtual, and it fails to explain reality. Therefore, he proposed the term “schemas” which provides a fuller explanation of how reality is structured. On the other hand, resources are the media of transformative capacity. A resource is a kind of entity that serves as a source of power in social interactions. Resources are of two types, human and nonhuman, and both kinds of resources can be used to enhance or maintain power. The capabilities of resources of producing and reproducing disparities in social power are not only intrinsic to their material existence but also in social relations (Sewell, 1992).

Significant differences are found among academics regarding structural change and its determinants. In mainstream development studies, structural change is recognized as a general process of development. It refers to a change in the sector structure (such as agriculture) of the

economy. We can define it as the reallocation of economic activity across three broad sectors (agriculture, manufacturing, and servicing) that accompany the process of modern economic growth. For example, in the context of Bangladesh, in the 1970s agriculture accounted for the largest part of GDP, while now services constitute the biggest part of GDP. During the development process, some sectors become more important in comparison to other sectors. Schettkat and Yocarini (2006) identified three main determinants of structural change: cross-sector shifts in final demand, cross-sector shifts in intermediate production, and the cross-sector differences in productivity growth. On the other hand, the three most common measures of structural transformation at the sectoral level are employment shares, value added shares, and final consumption expenditure shares (Herrendorf et al. 2013). This explanation of structural change is very much demand and supply centric. A more nuanced understanding of resources and their roles and sociocultural, political, and ecological conditions are overlooked. The social theory of structural change helps us to overcome these limitations.

In social theory, William H. Sewell (1992) provides a noteworthy explanation of the structural change. He identified five conditions of structural changes. First, the multiplicities of structure - structures vary significantly at different sphere as well as within the same sphere based on types and quantities of resources. These structures operate in harmony, but they can lead to conflicting claims and empowerments. Second, schemas are transposable: they can be creatively applied to different contexts. This characteristic of schemas leads to a further change in the structure. Third, the unpredictability of resource accumulation leads to change in structure. Fourth, the intersection of structure – structures are sets of mutually sustaining schemas (rules) and resources that empower and constrain social action, and that tends to be reproduced by that social action. Finally, the agency - the capacity of agency is inherent in all humans, and it differs

in extent, both between and within societies. Agency of people and ability of transformative action differ based on their social positions such as gender, wealth, class, ethnicity, education and so. Their social positions set their ability to get knowledge and access to different kinds and amounts of resources. People, as agents, use their knowledge and resources to get some degree of control over the social relations and transform them.

This study applies a broader perspective in studying the structural change in the small-scale fisheries in Parbatipur, Bangladesh. In recognizing the cause and effects of the change this study not only considers the demand and supply conditions but also the socio-political and ecological conditions of the change. Moreover, it takes into account national, regional and international factors that have a potential impact on the change. Finally, it understands structural change as a dynamic process in which human agency is deeply implicated.

2.1.3 Class

Class is the most discussed concept in the discussion of social stratification and inequality. In general, classes are social categories used by people to rank categories within a system of economic stratification. Theoretically, classes are defined by the relationship of people to income generating resources. In this sense, classes are a relational, rather than simply a gradational concept (Wright, 2003). Both Marx and Weber reject the simple gradational definition of class, and emphasize people's social relations with economic resources in defining class.

Two of the most important view-points on social stratification and social inequality were given by the German thinkers, Karl Marx and Max Weber. Karl Marx made a seminal contribution to the concept of social stratification. Class is the main concept in Marxist explanations of social stratification and inequality. For him, stratification divides the society into

two contrary social categories (class) where one exploits the other. In this view, there are two main classes in society. First, there are those who own and control the means of production. The second group is of those who do not have any ownership or control over these things, and work for the members of the first category, and survive on the wages they receive from their employers. Thus, class is a social group whose members share a similar relationship to the means of production. Marx uses the concept of “capitalist class” for the class that owns the means of production. On the other hand, the class that does not own but works on the means of production owned by the first class is called the “working class”. Three more concepts are important in understanding Marxist’s analysis of class are: class solidarity – workers willingness to act together to achieve political and economic aims; class consciousness – consciousness of being exploited; and class conflict – the conscious and unconscious and deliberate struggle between two classes act collectively to take over ownership of the means of production (Pyakuryal, 2001). Marx believed that conflict between these two classes – capitalist and workers – is inevitable since both draw their subsistence from the profit earned.

Max Weber made an important contribution to the ideas of stratification through a multidimensional schema of stratification. Weber agreed with certain fundamental features of Marxist thought about stratification. Marx thinks that the principal form of stratification is “class”, whereas, Weber added two other dimensions: status (prestige) and power (party) with the economic dimension (class) of stratification. There are significant differences between class and status, and class and status shape inequalities differently. Class affects material wellbeing directly through the kinds of economic assets people bring to market exchanges, on the other hand, status affects material wellbeing indirectly through social honor (Weber, 1978: 935 in Wright, 2003).

Both Marx and Weber defined “class” in economic terms. Weber moves ahead of Marx and linked classes with market economics. Classes develop in market economics, where the market takes over the processes of production and distribution of produce (Pyakuryal, 2001). People sell their skills in the market and derive their livelihood from the income they get. Certain skills get a higher price in the market than certain others. The market determines the prices of property. The chances of survival of an individual, which are called “life chances”, depend upon the market situation. The individual’s skills determine his class, which is dependent upon the market. According to Marx, class that owns the means of production also controls political power, whereas, Weber thinks that ownership of the means of production may not always lead to a control over political power. Individuals get political power not because of economic power but because of their political skills. Thus, economic power and political power may not go hand in hand in modern societies.

Neo-Marxist scholars suggest that the capitalist class structure generates social division and conflict, but not necessarily solidarity or class-conscious groupings (Pakulski, 2007). Contemporary neo-Marxists broadened the class analysis through incorporating issues like gender, market skills and so on, but still belief that class is the main generative mechanism structuring inequality and division in advanced capitalism. Furthermore, neo-Marxists like Erik Wright (1997) extend the meaning of class relations, and add numerous “middle classes” to class maps. But Marxist scholars still believe that class theory and class analysis are most relevant for explaining the structure of social inequality and division in societies.

At the beginning of this study my primary focus was class, most precisely Marxist analysis of class. But during my field study I found several other types of social inequalities such as caste, gender, age, religion and so on; class inequalities are only one of them. The other kinds

of inequalities always coexist with class. Specific context and interactions with other kinds of inequalities complicated the class structure and give them context specific characteristics. Coexistence and interactions of several kinds of inequalities makes its study challenging.

2.2 Political economy of agrarian transition

In many ways, the agrarian transition is highly relevant for the fisheries sector, like in agriculture, processes of capital accumulation, modernization and intensification of production, class differentiation and struggle, and changes of relations are also evident in fisheries, especially in aquaculture (Stonich 1995, Cruz-Torres 2000 in Bush & Marschke, 2014). Processes of depeasantisation and repeasantisation are evident in fisheries, with small-scale fishers and aquaculture farmers moving into off-farm wage labor, and again returning to aquaculture after a certain period (Belton et al. 2012). Therefore, the agrarian transition has the potential to address the changes in fisheries and their implications for the lives and livelihoods of people who depend on it.

Theoretical and empirical studies from different fields show that there is no standard and unilineal path of agrarian transition, and warn about the danger of following a narrow and reductionist conceptualization of agrarian transition (Harris-White et al. 2009). The contemporary debate on agrarian transition is usually labelled as a debate between Marxist and neo - populist approaches, on the nature of change in agrarian social structure and relations. The root of this debate lies in the work of Lenin, Kautsky, and Chayanov. Among Marxists, the question of agrarian transition was a central issue, not because of agricultural development but more from a political perspective; whether the peasants act as allies of revolution to socialism or not (Maghimbi et al. 2011).

Marxists believe that transformation of a peasant economy into a capitalist system will lead to depeasantisation and proletarianization of peasant economy (Thapa, 2005). In his book, *Development of Capitalism in Russia*, Lenin (1899) argued that capitalism as a mode of production had already penetrated into the Russian countryside and a process of ‘differentiation’ was taking place. Lenin used the term ‘differentiation’ not only to refer inequality in land holding but, most importantly, to indicate the process of formation of the two classes of capitalism i.e. agrarian bourgeoisie and proletariat. On the other hand, even after the evidence of some differentiation in Russian peasantry, Chayanov argued that it is still a peasant economy on its rules of production and consumption, and explained the process of differentiation from a demographic differentiation perspective (Djurfeldt, 1982). In his explanation of peasant economy, Chayanov (1966 in Djurfeldt 1982) urged that the class differentiation as mentioned by Lenin could be interpreted as demographic differentiation. His explanation of peasant economy was based on farming households which depended on family labor and produced primarily for subsistence needs. Farming households change with the change of consumer-worker ratios of farming households. This change happened over the life cycle of farming households and reproduced generation after generation, and there is no process of class differentiation as argued by Lenin. Like Lenin, Karl Kautsky also argued for the differentiation of peasantry, but he rejects the rigid application of capitalist logic in agriculture, rather, he strongly emphasizes the specificity of agriculture (Djurfeldt, 1982; Thapa, 2005). He argued that development of capitalism in agriculture does not refer to depeasantisation and dissolution of small-scale peasant production unit. Rather, the flexible use of family labor and cooperation inspire peasant to stay on their holding until it meets its subsistence needs.

Examining the agrarian transitions and changes of social structure in post-independence India, several contemporary Marxist scholars (Patnaik, 1987; Pearse, 1980; and Byres, 1981 in Venkateswarlu, 1997) recognized the class differentiation or polarization in Indian country side. They have claimed that the income and asset inequalities among peasant households lead to class differentiation. Moreover, they argued that the introduction of the green revolution in India increased economic disparities among the peasantry through strengthening commodity relations and encouraging capitalist tendencies, which would lead to the formation of classes in India. On the contrary, the contemporary neo-populists opposed the idea of class differentiation in Indian peasantry rather they recognized the persistence of peasantry (Venkateswarlu, 1997). They argued that the inner strengths of peasantry permit it to resist the pressure of capitalist production relations. The capacity to intensify the self-exploitation of family labor enables small farms to increase their production compared to larger farms. Moreover, the household based small farms do not worry about profit as long as subsistence is met. This ability to survive without profit gives small farms greater stability even in contact with capitalist production relations (Da Corta, 1992). Different paths of agrarian transition indicate the heterogeneity of forms of its development, the risk of generalization, and the importance of investigating the peasantry according to its context (Bernstein, 1982).

Harriss (1982) identified three paths of agrarian change: (a) transformation through capitalist farming, (b) transformation by the establishment of large-scale cooperatives under state initiatives, and (c) transformation through capital intensive small-scale farming. In most of the developing countries, the state plays an important role in agrarian transitions. Often the state, directly and indirectly, encourages differentiation and the emergence of a rich peasantry through policy and programs to increase its revenue (Raikes, 1982). One of the efforts of this process is

the reform of land rights. Therefore, property rights are important to understanding the agrarian transition, as they define the use of the means of production, but the exclusive reliance on property rights for analyzing agrarian transition can lead to incorrect analysis (Harriss-White et al. 2009). Privatization of land ownership rights does not necessarily mean the existence or emergence of the land market. Both private and communal property rights can exist together. Therefore, Harriss-White et al. (2009) emphasize other catalysts of differentiation like labor, inputs, and the role of the state and politics.

The emergence of capitalist labor markets transforms labor relations in agriculture in many ways. The transition of the labor force from agriculture to capitalism does not necessarily mean a linear transition towards wage labor. Rather, various forms of labor can coexist in the same context. Commercialization of agriculture and production for the market does not necessarily mean dependence on wage labor, rather, in many contexts; family labor plays a vital role in production in spite of the existence and emergence of wage labor. This evidence challenges the idea that non-market institutional forms and processes will atrophy with the consolidation of the capitalist economy (Harriss-White et al. 2009). Institutional adaptation, continuity, and hybridity are integral to the transition until capitalist production relations are fully established in agriculture. The reasons behind the persistence of institutional diversity and hybridity are complex. In the case of Arunachal Pradesh, Harris-White et al. (2009) recognized that there are few productive reinvestments of surplus in agriculture; rather, it is invested in non-agricultural activities. In this situation, the state plays an important role in agrarian transformation and commercialization of it through policy and incentives. Moreover, state interventions and politics play a vital role in creating the landlord class. Hart's (1989) study in the context of rice economies of South East Asia supports the idea of the state's role in the

agrarian transition. He recognized the state as the central factor in the agrarian transition. As political and economic agents of the state, rural elites are co-opted into the larger power structure and accumulate capital from subsidized credit, inputs, and licenses, and they influence agricultural policy in their favor.

The transformation of agrarian production systems, commercialization, and commodification of productive resources is experienced very differently by men, women and children (Razavi, 2009; Finis, 2009; Ramamurthy, 2010). State led agrarian reform from the 1910s to the 1970s excluded women from the ownership and control of property (Razavi, 2009). This exclusion is more evident in South Asia, where state laws, customs, social norms, social relations and practices play a vital role in the exclusion process (Agarwal, 1994 in Razavi, 2009). Commercialization of agricultural resources and growing intensification of class differentiation increase pressure on women's farming; on the other hand, they increase men's control over land, labor and capital resources (Razavi, 2009). The promotion of cash crops has numerous potential negative implications for women and children, such as devaluing women's traditional knowledge of agriculture, increasing household tensions or increasing their workload. At the same time, it does not necessarily bring wholly negative effects to their lives and workloads; it might bring positive effects too (Finis, 2009; Ramamurthy, 2010). As a source of cheap labor, demand for female workers has increased with the growing commercialization of agriculture. Roles of women and children are culturally reproduced with the commercialization of agriculture, which positively or negatively affects them according to the context.

2.3 Political economy of governance

Although transition theory in fisheries addresses the process of transition, and changes in social relations, it pays less attention in policy decisions, in designing of pathways for sustainable resource management (Bush & Marschke, 2014). It also attends less to the debate over ownership of fisheries resources, the social relations that structure access to resources and market, and roles of local, national and international actors (Bush & Marschke, 2014). It also has less capacity to address the impacts of transition on ecology. The political economy of governance and the theory of wellbeing have the potential to overcome these limitations, and this leads me to use them in my study.

2.3.1 Governance

There are substantial differences in the meaning of “governance” for different actors. Among general people, a common tendency is use governance as a synonym of government. Governance not only refers to government rather it is a more complex structure and process which include several actors from local to national and international level depending on the level of governance. Governance can be structured, formal or informal. It brings different vested groups under its structure and process; sometimes it is conflictive. But at the same time it can be co-operative (Jentoft and Chuenpagdee, 2009). In general, governance refers the process of decision making. Since governance is a decision-making process it formally and informally involves different actors in decision making and implementation (Plumptre and Graham, 1999).

The World Bank (1993) defined governance as a way to manage a country’s socio-political and economic resources for its development. The UNDP provided a comprehensive definition of governance in 1997. In its policy paper, UNDP (1997) defined governance as “the

exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes, and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences" (UNDP 1997, pp.2-3). The significance of UNDP's definition of governance is, it acknowledges the important role of citizens and groups and admits their rights as citizens.

Three types of governance have been identified all over the world (Kooiman and Bavinck, 2005, Chuenpagdee and Jentoft, 2009). First, hierarchical governance, it is the most classical mode of governance. It places the state at the central and top position in the system and puts emphasis on the strong role of the state. Through regulations and many other arrangements, the state establishes and maintains its authority over citizens. With limited scope of societal participation in the governance system, sometimes hierarchical governance systems fail to understand the context of a specific problem and the way to overcome it. Second, self - governance is where actors take care of themselves without the supervision of other authorities. Many societies have their distinct informal institutions for natural resource management, which play an important role in sustainable development of the resources. Self-governance can play a vital role in the governance of common pool natural resources like fisheries. The third type of governance is co-governance, which emphasizes the active participation of society and other relevant actors in the governance system along with government bodies. Interactions are central to co-governance. Since the 1990s, in fisheries, co-management - a type of co-governance - has had a great deal of attention as a promising form of governance (Pomeroy and Berkes 1997).

2.3.2 Political economy of governance

Power is an indispensable aspect of governance and management. It is inherent in all interactions, social practices, communication and economic exchange. The contradictory facets of power make governance challenging; power can be used as a positive and constructive force, but it can also be used negatively as a destructive force. Therefore, lack of power is frustrating but the presence of power may also create risk (Jentoft, 2007). In fisheries, every actor in it and their relations implies power, though the relations are not equal. Among the actors, the state is most powerful, which creates risks. The state may be criticized for being biased for specific groups, or for its ineffectiveness in dealing with local issues (Marchak 1987; Cicin-Sain and Knecht 1998 in Jentoft 2007). Moreover, politically and economically dominant institutions and groups create specific kinds of scientific knowledge which undermine the traditional knowledge of users and monopolize it through its political power (Berkes, 1999), which further legitimize the exercise of power and increase its domination.

Fisheries are embedded in a matrix of political institutions and these institutions, along with other relevant actors, determine the governance and management of a fishery (Jentoft, 2007; Deacon, 2010). Therefore, the efficacy of fisheries management depends on its institutions, how much it is capable of identifying and addressing the social structure, and the socio-cultural process of fishers and the values, beliefs, norms of actors related to a fishery (Jentoft, 2004). Among those institutions, property rights are most important in fisheries governance. In fisheries, resource management is very much linked with property rights regimes because they define rights and authority over resources, decide how the resource is used, and how the benefits of the resources are distributed among various parties (Jentoft, 2007; Deacon, 2010). It also defines the method, time and place of harvest, and controlled by the government via regulation.

Exclusively government has the power to enforce the property rights. But in a political system dominated by elite groups, the government sometimes fails to enforce harvest rights, or it transfers the resource to powerful groups to gain and hold power (Deacon, 2010). Moreover, in an elite dominated governing system there is a growing tendency to use government authority for private gain, which make the non-elites more vulnerable regards to the rights and control over resources until they gain political power to balance the power relations (Deacon, 2010). Therefore, it is argued that fisheries management always serves some interests more than others (Flyvbjerg 2001 in Jentoft 2007). Intentionally or unintentionally fisheries management takes a position on relations of power, and conflict among actors, which makes it inherently political (Jentoft, 2007).

The returns of natural resources are valued differently by various groups. When the resources are controlled by the parties who value the return most highly, this can ensure more sustainable use of them and maximize the return when compared to parties who give the resources less value. If the resources are managed by the elite controlled government, who mostly give preferences to the economic value of resources and personal gain, this group may overlook and neglect their other values, which may lead to the depletion of the resource (Deacon, 2010). At the same time, users who give high value to the resource may find it difficult to manage resources due to their lack of political power and the absence of backing from the state. Furthermore, the elite may invest less in improving the resource than the users whose lives and livelihoods are directly involved with it, as they have other options for income and are uncertain about their future political power (Deacon, 2010). Therefore, one of the primary jobs of ‘good’ governance, i.e. one oriented toward the wellbeing of people, is identifying the parties who value the return and sustainable use of the resource. The state needs to protect user’s rights over

resources through monitoring and enforcement. The state can improve the governance of resources by settling disputes and by coordinating the use of shared resources. Also, the state can help users to overcome problems through policy support and infrastructural development.

The complexity, diversity, and dynamics of fisheries increase the interdependencies among government, civil society and market organization (Pascual-Fernández et al. 2005). Their interdependencies emphasize the necessity of governance to effectively and successfully foster communication among these actors (Jentoft et al. 2005). As a form of interactive governance, co-management may create the opportunity for cooperation among state, civil and market-based organizations. It has to, however, pay close attention to power relations and try to minimize inequality.

2.3.3 Political economy of co-management

The concept of co-management revolves around the idea of shared roles and responsibilities between government authorities and community institutions (Sen and Nielson 1996 in Njaya et al. 2012). Co-management attempts to establish and increase active community participation in fisheries management systems. It is a kind of solution to the legitimacy crisis of fisheries management. Furthermore, it recognizes the unequal power relations of management and attempts to counter them (Jentoft, 2007). Therefore, it is defined as power-sharing (Jentoft 2007). Moreover, it attempts to restructure power relations and move towards an equal sharing of power among interested stakeholders (Pinkerton 1989; Pomeroy 2003 in Jentoft, 2007). Fisheries co-management does not mean ignoring power; rather it attempts to create a level playing field for all relevant stakeholders, which ultimately leads to empowerment. Jentoft et al. (1997) define co-

management in fisheries as a system of inclusion and participation of relevant stakeholders in making key decisions about fish catching, fish harvesting, and fishing rights.

Despite these promises, community involvement in natural resource management has recently come under criticism, especially with regard to the issue of “elite capture” (Béné and Neiland, 2006), whereby particular individuals or groups (usually amongst the local elites) “hijack” the benefit of the systems and use it for their interests (Njaya et al. 2012). In co-management, government and the fishers are not the only actors involved in the system rather it made up of multiple actors, and each actor tries to influence the management system. Persons, groups, institutions, who have more access to socio-political and economic power are in a superior position and influenced the decisions making process and use it for personal benefit. Therefore, the most influential actors are not the fishers, whose voice and interests are often ignored or poorly represented, but those other local actors who influence the systems in various ways and through various channels of power. In co-management, the process of empowerment sometimes becomes a process of deprivation due to the imbalance of power of the actors. Despite these limitations (Béné and Neiland, 2006) co-management is still one of the best options in fisheries governance, which attempts to address the reality and particularity of a fishery, and allows the active role of the state, market and civil society groups in fisheries governance and management.

2.4 Theory of Wellbeing

Small-scale fisheries make multiple contributions to society, culture, and economy, which are not always recognized by the governance system, and, as a result, the latter fails to incorporate them into policy and decision-making processes. The wellbeing framework can contribute to

overcoming these limitations of fisheries governance, as well as providing a broader conception of the socio-cultural benefit of fisheries than other contemporary fisheries frameworks (Weerantunge et al. 2014). It can contribute to fisheries governance and can contribute to policy through the recognition of the non-material benefits of fisheries, and by furnishing a deeper understanding of the social and economic dynamics of fishing communities (McGregor, 2008, 2009; Coulthard et al. 2011).

As a concept and methodology, wellbeing has become popular among academics and development practitioners since the 1970s. It is hard to define wellbeing since the meaning of the term varies from person to person. Although different institutions and writers define wellbeing differently, there nonetheless is some consensus. In its definition of wellbeing, The UN Declaration on the Right to Development (1986) recognizes that the goal of the development process is the constant improvement of wellbeing, where people have active, free and meaningful participation in the development process and the distribution of benefits resulting there from. The definition of the wellbeing of the New Economics Foundation (NEF) comprises two main elements: i.e. feeling good and functioning well. They propose wellbeing as a dynamic process which relates to other external factors and conditions (White, 2009). Defining wellbeing, Robert Chambers (2004) brings the notion of 'responsible wellbeing' which gives emphasis on material factors and power. He argues for understanding development beyond economic growth and in a more inclusive way which includes living standards, access to basic services, security, and freedom, good relationships, creativity, fulfillment and fun (Chambers, 2004:10)

The Wellbeing in Development Countries Research Group (WeD) gives a three-dimensional definition of wellbeing i.e. material, relational and subjective. The material refers to

mostly to economic assets and income but is not necessarily restricted to this. The relational refers to the quality of social interactions, while the subjective refers to how individuals respond to the features of their lives, as refracted through values, beliefs and ideologies. McGregor describes material, relational and subjective wellbeing differently i.e. “what people have or do not have (material); what people do or cannot do with it (relational); what people think or feel (subjective)” (McGregor, 2007: 317). Although the material, relational and subjective dimensions of wellbeing refer to different elements of life, they are interdependent and intrinsically linked. Therefore wellbeing does not belong to individuals rather it belongs to relationships (White, 2009 & 2010). Although these wellbeing approaches differ from each other in many aspects, they have some consensus (White, 2009). First, wellbeing needs to be assessed from multidimensional aspects which include different aspects of life. Second, wellbeing has a moral value, and it can vary people to people depending on age, gender, class, ethnicity and many other factors. Third, wellbeing is a process, not a state. Fourth, wellbeing does not only depend on individuals but on the context in which they live (White, 2009).

The wellbeing approach recognizes that individual people differ from each other in many ways, therefore, it emphasizes understanding people’s differences. On the other hand, fisheries are a highly complex and diversified sector, where substantial differences found among fishers depending on multiple factors. In this context, wellbeing analysis can play a significant role in fisheries governance and policy formulations by understanding the differences and heterogeneity of the sector (McGregor, 2009; Coulthard et al. 2011). The WeD research project developed an extensive toolkit to investigate the three-dimensional wellbeing and the socio-cultural context of fisheries. The toolkit consists of four methods; each method identified separate aspects of wellbeing. The first method is community profiling, which describes the external conditions in

which people live and how wellbeing is pursued. Second is the resource questionnaire, which identifies material wellbeing through a household survey of fisheries households. The questionnaires collect data on human education, natural resources, income sources and community associations. Third, the Governance Relationship Assessment (GRA) survey identifies the relational wellbeing. Fourth, Global Person Generated Index (GPGI) identifies the subjective wellbeing (Britton & Coulthard, 2012). Thus the wellbeing toolkit enables us to recognize the experiences of each person, the effects of external and internal changes in social structure, and people's responses to these changes through its distinctive three-dimensional analyses.

2.5 Values of small-scale fisheries

Goods themselves are neutral, but their uses are social. Values are not inherent in the objects, but a judgment always remains inherent in the subject, and the value of that object depends on this judgment (Simmel 1990:63). Values are not fixed rather they are always in the process of changing. Therefore it is important to understand the cultural construction of value. The value of any object is related to its users 'desire', we identify those objects as valuable which we which we most desire to acquire or retain. Moeran (2012: 4-7) identifies four variables in the cultural construction of value. These are, (i) technical values, hold by those who are involved in the technical production of any creation, (ii) conceptual values, these values develop the ways in which an object is perceived and symbolized, (iii) social values, these values derive from social networks and depends on the actors involved with its production and consumption, (iv) commodity values, these values are related to exchange value and it is fixed to objects on the market.

In the neo-classical economic perspective, values are expressed through the money metric. This perspective of value only considers the quantitative contribution of the objects. It fails to address the qualitative contributions of any objects. In evaluating the values of small-scale fisheries, Johnson (2017) argues that the economic perspective is inadequate to evaluate the values of small-scale fisheries as it fails to address the qualitative i.e. socio-cultural contributions of it. Fisheries are closely linked to the environment, society, and people connected with it and beyond. Fisheries are not only an occupation rather a way of life. Therefore, Johnson argues for the values of small-scale fisheries not just their economic value.

Inspired by social wellbeing approach, Johnson (2017) proposes a framework to address the values of small-scale fisheries based on a social wellbeing approach. In evaluating small-scale fisheries, this framework considers their objective, subjective and relational dimensions. The objective dimension helps to identify the quantitative or economic and other material values ascribed to small-scale fisheries. The subjective dimension recognizes the distinctive meanings, perceptions, identities, and cultural qualities of small-scale fisheries that are valued. Finally, the relational dimension identifies the valued social relations of different actors, their variations, distinctiveness and more. This wellbeing-based interpretive framework allows us to identify the qualitative along with quantitative values of small-scale fisheries.

2.6 Conclusion

The political economy of agrarian transitions enables us to identify the accumulation of capital and intensification of production in fisheries, shifts in control over capital, labor, and resources, and changes in social and political relations. On the other hand, the political economy of governance recognizes the actors related to the transition, power relations of actors, and

interactions between policy and power. Moreover, it provides the framework to improve the governance system for the benefit of people through the incorporation of recommendations made by the actors in the policy decision-making process, often through co-management type arrangements. The theory of wellbeing and values provide a comprehensive picture of fisheries through its distinctive three-dimensional analyses and can contribute to the analysis of fisheries transitions and governance.

The theoretical perspective of the political economy of agrarian transition and governance provides the analytical framework to identify the fisheries transition in Parbatipur, the roles of actors, changes in socio-economic relations, and the impacts of these changes on the lives and livelihoods of fishers and the people related to them. The wellbeing framework helps identify the diverse responses and roles of fishermen, women, and children in relation to these changes, and recognizes the multidimensional and valuable contributions of fisheries in the lives and livelihoods of fishers and others, in the culture and society of Parbatipur. In the context of fisheries transition in Parbatipur, possible policy recommendations will be made based on the experiences of fishers and other relevant actors, identified by each of the theoretical frameworks mentioned above.

Chapter Three: Methodology

3.0 Introduction

Studying the complex and diverse field of fisheries is a challenge. Therefore, I used a mixed methods approach, in which I combined qualitative and quantitative methods in my study. The mix of methods permits triangulation and increased the validity and reliability of my data (Beebe 1995). My study follows a wellbeing framework (Coulthard et al., 2015) to identify the structural and subsequent changes in the small-scale fisheries in Partbatipur, and responses of fishermen, women and children to these changes. The framework is also very helpful to identify possible policy interventions to address these changes for the benefit of fisheries and fishers. The fieldwork of this study started in April 2016 and ended in July 2016.

My house is close to the field site, and I already had connections with the fishing community. Some of the fishermen whom I knew helped me to enter into the field and allowed me to build rapport in the community. The dialect of the fishers is the same as mine which gave me an advantage when interacting with them. Although I lived in my house, I spent most of my time in the field and attended their fishing, households, and community events. I also hired a youth as a research assistant from the community to assist me to interact with the fishermen, women, and children. I was both insider and outsider in this study, an insider in this sense that my participants and I share the same locality, language, and in some cases the same religion. On the other hand, my socio-economic and political position is different from the fishers which made me an outsider. Both positions have advantages and disadvantages, being insider increases your access, make you one of them, increases the researcher's ability ask more meaningful questions, understand non-verbal cues, and produce more 'authentic' description. But at the same time

being an insider raises the risk of inherent bias and the greater difficulty of adopting an external perspective.

3.1 Positionality

I am a Muslim, middle-class, educated, married male researcher, who grew up in an urban context and is now studying in Canada. Throughout the study, I was attentive to my position, my differences (gender, class, religion and marital status) from my research collaborators, and power relations with my respondents and their possible impact on the study. I believe it's not possible for a researcher to be neutral or value free in social science research but if you are aware of your position and its possible impacts on the study, then it gives you an opportunity to minimize them. Following this idea, I tried to be reflexive and minimize these differences throughout my study.

At the beginning of my fieldwork, I was asked by almost everyone whom I encountered which family I come from, who is my father, mother, grandfather, etc. All of these were ways of identifying me in their terms rather than relying on my identity described on the research consent form. The older persons of the fishing community know my mother and maternal grandparents very well as their house is very close to the community. On the other hand, my father was the first graduate from that locality, and he had good relations with people of all strata of the locality. Therefore, he was well known to them. These identities played a crucial role in getting access to the community and in building trusting relationships with my respondents. In number of cases, one participant introduced me to others. Except one, everyone cordially agreed for an interview. One older Fisher, who is also in a leading position in the Fisher Association, was suspicious about my research purpose. I briefed him my research purpose and requested him to take time and call me if he changed his mind. At the end of the fieldwork, he changed his mind

and agreed to give an interview. His eldest son knows my eldest brother very well when his son assured him of my research purpose, he changed his mind.

I believe interviews should be done between equals. Therefore, I always tried to empower my participants in the interviews. I always told them that I came here to learn and they are the expert of their professions, which gives them more knowledge and skills than others. They decided the time and place of the interview and had the authority to postpone it anytime or withdraw any comments from the interview. In a number of incidents, I was counter questioned what I would do if was in that situation or what we usually do in our culture. Regarding the question of a household asset or wellbeing ranking, I had to answer to the participants in a number of occasions. Moreover, all throughout my interaction with the participants and villagers, I used the terms of respect (*adab* for older than me; *kmon acho / achen* for those younger). I spoke in a tone and manner that indicate my respect for them.

Women of the low caste Hindu fishing community comparatively enjoy more freedom and have greater mobility than Muslim women. Therefore, gender did not pose serious problems to my relationships with my respondents. Even after this greater access to the community, I was concerned about the possible impact of my male gender identity in inviting women and girls to participate in my study and possible impact in the interview itself. My being married and parent of a child help me to secure the participation of young girls. Married men in the locality are privileged over those who are unmarried in getting access to talking to young girls. I was aware how women's participations could be perceived by their family members, relatives, and neighbors, and that they would be concerned about protecting themselves from suspicions of social misconduct. To protect my female respondents and avoid any suspicion about our relationships, I built relationships with the other members of their households, especially with

the male members, and arranged the interviews in an open space within the households. The advantage of this was that households could then allow their women and girls to be interviewed without the presence of a third person as both the interviewer and interviewee could be observed by household members who were around. I was concerned about the use of vocabulary that might put the women and girls in an uneasy and awkward position. My fluency in native language helped me make the interviews more interactive, with moments of humor, which put them at their ease.

As a member of the greater community, I knew the embodied differences of the people and was concerned about the effects of embodied performance in the research process. There are separate dress codes for men and women. Men wear *lungi* and a shirt or *Punjabi* (occasionally they wear *dhoti* and *Punjabi*) and the young boys wear pants or *lungi* and a shirt or a T-shirt. On the other hand, married women wear *shari* and *blouse*, whereas, unmarried girls wear *salwar* and *kamiz*. Married Hindu women wear *shidur* on their forehead. Knowledge of these signs of embodied difference is important as the level of respect and greetings vary according to age and gender. Moreover, my earlier experiences help me to understand their bodily expression – comfort, discomfort, happiness and sorrow, which helped me interact with them effectively. Throughout my study, I wore a *lungi* and t-shirt or pants and a shirt in order to dress in a way that was familiar. I had lunch and dinner with them in their households, went to fishing with them, participated their religious and social festivals, and stood by them in their crisis moments. My participation in their daily activities and effort to be one of them significantly contributed to minimizing our social and class status differences and building trusty and healthy relationships. Even after a year of my fieldwork whenever they meet any of my family members they ask about

me and sending greetings through them. I believe this shows the degree to which I established trusting and respectful relationships with my participants.

3.2 Methodology

The wellbeing framework, developed by Coulthard et al. (2015) based on their research on wellbeing in fishing-dependent communities in India and Sri Lanka, is used in this study. This framework enables me to identify the structural changes that have taken place in the inland fisheries of Parbatipur and assess their impacts on fishers, affected non-fishers and community through its three-dimensional inquiry. The framework has three inter-related dimensions which address three different aspects of fisheries and collectively provide a comprehensive picture and understanding of fisheries and fishers' lives. The dimensions are, a) the material dimension, which addresses the resources a person, has, and to what extent his / her human needs are met or denied; b) the subjective dimension, which consider people's perceptions and feelings about their lives; and c) the relational dimension, which addresses how social relations enable or restrict people from access to resources and enjoyment of life (Coulthard et al., 2015). Specific tools are used to address different kinds of wellbeing as proposed by the wellbeing framework (Coulthard et al., 2015). Material wellbeing is identified through a semi-structured survey using the Resources and Needs Questionnaire (RANQ). Global Person Generated Index (GPGI) is used to identify subjective wellbeing. Finally, the Governance Relationships Assessment (GRA) is used to identify relational wellbeing which enabled me to explore the relationships among the actors in Parbatipur fisheries and how these relationships influence fisheries governance, and fishers' lives and livelihoods. The framework has the potential to address the questions of fisheries transition and governance from an in-depth socio-cultural perspective.

The fieldwork started with participant observation followed by a household survey, in-depth interviews and focus group discussions. Participant observation allowed me to observe and understand my informants' lives, livelihoods, and culture and helped me to develop respectful relationships with them. My presence and participation in their daily activities and growing relationships created a positive environment for the household survey and the in-depth interviews. I participated in fisher's household activities, community events, and fishing activities like preparation, catching, and marketing of fish. My participation and observation helped me to recognize the structural changes and impacts on fisheries and fishers' lives and livelihoods. Moreover, it allowed me to identify the multidimensional responses of fishers, women, and children to these changes, and their perceptions of the changes and impacts on their life.

To recognize the relevant social, economic, political, cultural and environmental factors of the study area, a detailed community profile was developed at the beginning of the study. This community profile exclusively followed the wellbeing framework and was developed through participant observation, household surveys, group discussions, and secondary data. Following Coulthard et al. (2015), the community profile consisted of physical data, which is a description of institutions, population, fisheries resources, and major changes in the locality. It provided a comprehensive picture of the locality and small-scale fisheries and helps to understand the specificity of the context which is very important in to interpret data collected through other methods in the research.

A household survey was carried out in the study area, after the primary contact and rapport building through participation observation. The survey provided general information on fishers' socio-economic conditions, structural changes in fisheries and the impacts of those

change on fishing and fishers' lives and livelihoods. The survey was conducted at the household level and both men and women of the household were included in the survey. The questionnaire of the survey was semi-structured and constructed from the Resource and Needs Questionnaire (RANQ), the Person Generated Index (GPI), and the Governance Relationships Assessment (GRA).

For in-depth information, I conducted 22 in-depth interviews with fishermen, women, and children. Among the twenty-two interviews, seven interviews were undertaken with fishermen, seven with women of the fishing households, five with children (three girls & two boys) from the fishing community and three with government and non-government officials of the fisheries sector. Primary findings obtained through participation observation and the survey guided me to identify my respondents and also helped to identify specific issues related to the objectives of the study for fruitful discussion. The specific objective of applying this method was to identify the roles and responses of fishermen, women, and children, and explore possible policy interventions to address these changes in benefits for fishers and other marginalized peoples or groups. The questionnaires were mostly open-ended and also emerged from the Resources and Needs Questionnaire (RANQ), the Person Generated Index (GPI), and the Governance Relationship Assessment (GRA) which cover different areas of human wellbeing. The Resources and Needs Questionnaire (RANQ) identifies the material wellbeing of people, what resources they have, their basic needs and how well their needs are being met. The Global Person Generated Index (GPGI) addresses the subject's perceptions and level of satisfaction with their life, livelihoods, and the resources upon which they rely. Finally, the Governance Relationship Assessment (GRA) assesses the social relationships of the subjects. In this study, I use the GRA to identify the relevant social relationships of the fishers and the level of

satisfaction in these relationships. To assess the satisfaction level of fishers with different relevant actors of fisheries a satisfaction scale is used exclusively following the Governance Relationship Assessment (GRA). The scale is divided into five parts (i.e. very satisfied, somewhat satisfied, neutral, somewhat dissatisfied and very unsatisfied) which correspond to five different levels of satisfaction. This satisfaction scale helps us to understand the subjective view of the respondents.

Eight focus group discussions (FGD) were also carried out for more representative information on the changes in fisheries, as well as to obtain responses from different actors, and their recommendations to address the effects of changes in an effective way while maintaining the benefit of fisheries. Among the FGDs, three were carried out with fishermen, two with fisherwomen, two with children from the fishing community, and one was a mixed group discussion. FGDs were done at the mid-point of the fieldwork. The intent of the FGDs was to verify the information which was obtained through the survey and interviews and to get clarifications and further information on the issues raised through the interviews. The discussions were interactive, and I was aware of group composition and power relations.

Besides the primary data collected through field work, secondary documents were collected and used to understand the context. Books, reports, articles on fisheries and the study area, government documents, and reports of NGOs working in the area were reviewed for an in-depth understanding of small-scale fisheries, the socio-political context of the study area, governance, and management of fisheries. I developed a code book to analyze and interpret the qualitative data. Atlas.ti software was used in coding and the analysis of data. Atlas.ti helped me to code the data gathered through fieldwork, develop memos based on the findings, and establish linkages among the findings.

3.3 Challenges of implementing the wellbeing model

The application of the wellbeing framework to the study of a complex and dynamic field like small-scale fisheries leads to significant challenges, especially when undertaking interviews with fishers, women, and children simultaneously. I found it challenging at various level, at the methodological level it felt challenging to determine suitable indicators for respondents of different ages and genders for the same research question. Another challenge was the measurement of subjective wellbeing. I found it challenging to use the satisfaction scale to rate ‘satisfaction’ or ‘happiness’ level. Though the rating very much depends on personal experience and satisfaction of the respondents, I found significant discrepancies in the ratings of respondents from almost the same socio-economic conditions. For example, I interviewed two respondents who came from same background. One rated his satisfaction level as four which means good, but the other rated his satisfaction as two, or poor. At the end of the interview I asked all of my interviewees about their overall wellbeing status, I noticed respondents facing difficulty in describing their overall wellbeing status as some of them found significant differences among their material, subjective and relational wellbeing. As most of my respondents were illiterate, I had to fill out the questionnaire according to their answer. I assumed that my presence might influence some of the respondents in answering their life satisfaction level as, in Bangladeshi culture, people do not want to disclose their misery or want, instead they like to present their lives as happy. An anonymous, self-completed questionnaire might present different data.

I found that a respondent’s current situation strongly influenced their subjective and relational wellbeing compared to the material. I noticed that even when a respondent’s overall wellbeing improved significantly in the last couple of years, if one recent activity went against them, it affected their overall wellbeing or life satisfaction level. For example, the incident of

illegal seizure of the fishers' leased pond (see chapter six for details) greatly affected the satisfaction level of the leases though they spoke of significant improvements in other areas of their lives. Recent incidents seem to have a strong influence over people's subjective experience and thus may colour actual wellbeing status.

I found identification of children's perceptions of their life satisfaction, areas important for quality living, and other areas of research most challenging area. Due to the complexity of the research, I only selected older children (over 14 years) for the interviews. Children of this age in the fishing community joined with their parents or elder members of the household in household work and fishing. It was my impression that these children act like an adult person and are very much influenced by the elder members of the household and community. Therefore, I found a lot of similarity found in answers of the girl child and women, and boy children with older men of the household. Before starting the study, I expected that the children's views about fisheries, life, and satisfaction would be substantially different from those of adults, but in reality, I found more similarities than differences.

My field findings and the challenges I faced during the study inspire me to work further on the wellbeing framework. I wish to further work on these issue, especially on the measurement of subjective wellbeing, and would like to develop specific methods to address the weakness in evaluating subjective wellbeing.

3.4 Ethics

Ethical considerations are fundamental in anthropological research. Every study has obligations to the participants, the community, and the discipline (Mikkelsen, 1995). This study is also conscious of ethics questions. For this study, ethics approval was taken from the Ethics Board of

the University of Manitoba and ethics guidelines were followed throughout the study. I followed three core principles of ethics i.e. respect for the person, concern for welfare, and justice (TCP, 2014). I addressed all participants in the study as dignified human beings throughout the study. The objectives and goals of the study were reviewed with informants and written consent forms were signed for each interview. The study was also concerned about the welfare of the participants as well as of the community. None of the participants of the study were harmed during the study. Furthermore, every participant was treated fairly and equitably. Anonymity and confidentiality were maintained throughout the study. Moreover, I use pseudonyms in my thesis to maintain confidentiality.

Chapter Four: The study area and socio-economic status of fishers

4.0 Introduction

The project site of this study is Naya Jelapara, a fishing community in the Manmathpur Union under the Parbatipur sub-district of Bangladesh¹ (see figure 4.1). Manmathpur is a plains area situated in the northern part of Bangladesh, and it is one of the unions with the most potential for freshwater culture and capture fisheries in Dinajpur district. Most of the people of this area are directly or indirectly involved in agriculture. Most of the fishermen of this area are Hindus, a lower scheduled caste group, publicly known as *nomoshudras*, who hold a very low status in the society. But the involvement of Muslims in fishing is increasing; most of them are seasonal fishers and do it part-time, alongside another profession. A structural transition, from inland open water capture to culture fisheries, has been taking place in the small-scale fisheries in Parbatipur. The area and production of capture fisheries has significantly decreased over last four decades, whereas culture fisheries have increased in these areas (MoL, 2015). Commercial fish farming has increased significantly over the last decade, but the participation of intergenerational fishers in fish farming is minimal. The trend is continuing (Islam and Haque, 2010). The benefits from fish farming mostly go to the non-fisher elites. Fishers, on the other hand, mostly benefited from the indirect advantages of fish farming like increased demand and higher wages of aquaculture labor.

Since independence in 1971, Bangladesh has made remarkable progress in rural development, especially after the 1990s. There have been outstanding improvements achieved in poverty reduction, education, health, sanitation, and gender equality. These improvements are evident in the fishing community. But some national economic development policies, especially

1. A Union is the smallest administrative rural geographic unit and has Union Parishad institutions. Unions are composed of Mauzas, which are the lowest administrative unit having a separate jurisdiction list number in revenue records. A Mauza may consist of one or more villages.

related to fisheries and agriculture, and inefficient management of resources have affected fishers' lives and livelihoods. The impacts of these changes on the fishing community are complex; some changes affect their livelihoods, others create alternative opportunities and significantly contribute to increasing their material wellbeing at the cost of many aspects of their socio-relational wellbeing.

The body of this chapter consists of five sections. Following the wellbeing framework, the first section summarizes the community profile of the study area. According to Coulthard et al. (2015), community profiling sets the stage for research through compiling information about relevant social, cultural, economic, political, and cultural contextual factors. Explicitly following the wellbeing framework, a community profile of Naya Jelapara has been presented in this section. The second section examines the material wellbeing of the fishers. It provides information on household income, changes in the source of income, and household assets and structure which indicate the improvement of material wellbeing. Social and relational wellbeing are analyzed in sections three and four, respectively. The final section examines the roles of children and women in household and fishing context.

4.1 The setting: Manmathpur Union

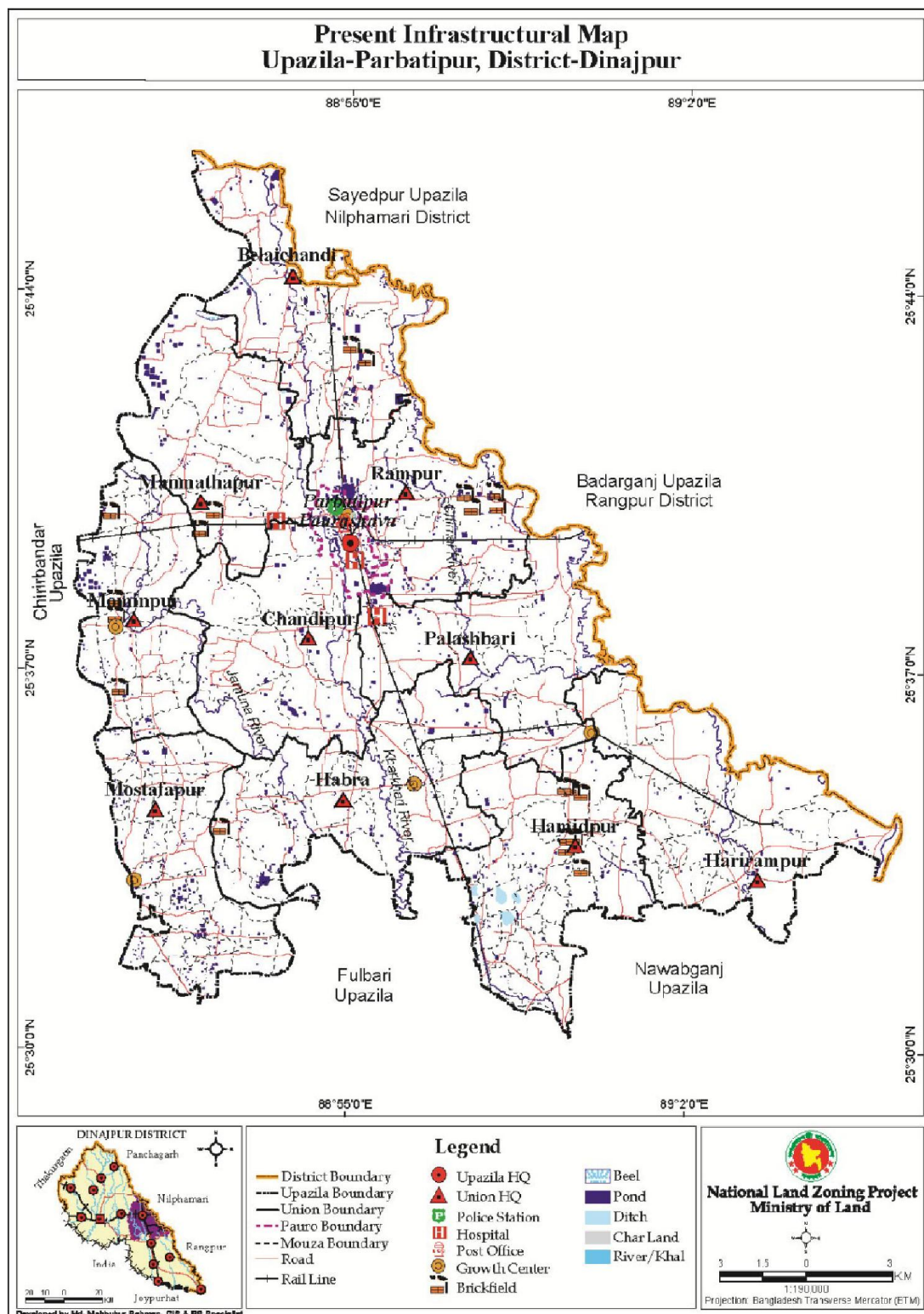
Manmathpur is a union under Parbatipur, a sub-district (Upazila) of Dinajpur which is in the north-western corner of Bangladesh. Manmathpur is around 380 kilometers away from the capital, 32 kilometers from the district headquarters, and around 3 kilometers away from the sub-district headquarters. Parbatipur is the center of rail communication of the northern part of Bangladesh, and came into existence as a Thana in 1800, which was renamed as Upazila in

1983.² It is the second largest Upazila of Dinajpur district in respect of both area and population. Manmathpur union occupies an area of 3.88 sq. km. It is located between 25°10' and 25°47' North and between 88°47' and 89°06' East. It is identified as an agro-fisheries zone in the national land zoning due to the existence of agriculture land as well as waterbodies (MoL, 2015). The physical and chemical characteristics of this union are suitable for both capture and culture fisheries. The union has good numbers of bodies of water which are suitable for capture fisheries, and these wetlands are valuable sources of different indigenous fish species for the locality.

4.1.1 Naya Jelapara: The fishing community

The fishing village Naya Jelapara is a small village situated within the Manmathpur Union. The literal meaning of Naya Jelapara is new fisher's village. Naya Jelapara is my primary study site whose inhabitants mostly depend on the resources situated in the Manmathpur Union. There is another fishing community nearby, and some of them moved to this place in the 1960s and formed a new community, and since then it has been known as Naya Jelapara. The village is 4 kilometers away from the Union office and 7 kilometers away from the sub-district. It is a traditional fishing village inhabited by low caste hereditary Hindu fishers who mainly fish in the inland open water. The community settlement is very congested due to land scarcity and increased population pressure. Almost everyone from this community is directly or indirectly involved in fishing, but involvement with other secondary occupations alongside fishing has increased significantly in last two decades.

²Thana refers to police station



Present Infrastructural Land Use Map of Parbatipur Upazila

Figure 4.2: Study area – Parbatipur, source: MoL, 2015

4.2 Community profiling

4.2.1 Physical and environmental data

The Land in Manmathpur Union is mainly medium-high and low in altitude. General soil color is gray to dark gray. Soil and climate condition of this locality are suitable for growing a wide range of crops. Rice is the dominant crop cultivated throughout the year. Other major crops are wheat, potato, jute, garlic, turmeric, mustard, and vegetables. Out of the total cultivable land, 75% is double cropped, 21% is triple cropped, and 4% is single cropped (MoL, 2015). There are no major forests in the Union, but there are homestead groves called homestead forests. In addition to homestead forests, farmland forestry is currently developing in this area. An increasing number of individual farmers plant trees on their farmland, farmland boundaries, and waste land in exchange for cash. High and medium-high land has been increasingly put to commercial fruit production, especially mango, litchi, banana, and guava.

Dinajpur area is around 37 meters above sea level, and the climate is warm and humid for most of the year. The average temperature is 26 degrees Celsius, reaching a maximum of 38-41 degrees Celsius during the summer. The average annual rainfall is 2540 mm. Nineteen drought periods have been recorded in this part of Bangladesh between 1960 and 1991 (Mbugua, 2011). A gradual decrease in rainfall has been recorded in the last three to four decades. Ground water levels have been declining, and surface water has disappeared from many wetlands. Two decades back these water bodies were full of water all year-round. But now most of them have become shallow and some are disappearing. Due to low rainfall, gradual lowering of underground water, and pumping of water for irrigation, some water bodies are now dry year-round, except during the rainy season.

The physical and chemical characteristics of Manmathpur Union are suitable for different types of fisheries. There are several *beels* (wetlands) in the Union which are the source of open-water capture fisheries for the locality. There are also a number of large government ponds, which are a great source of culture fisheries. Most of the ponds are used for family consumption, but commercial fish farming is increasing significantly. Most of the fish farmers still practice traditional or improved traditional systems in fish farming.

4.2.2 Description of population

The total population of the Manmathpur Union is 32697 of which 16279 are males, and 16418 are females, with an annual growth rate of 1.15% (Population and Housing Census, 2011). Muslims are the majority of the population, at 71.30 percent. This area retains a large Hindu population compared to other parts of the country. Hindus account for 26.53% of total population. Among the rest of the population, Buddhists make up 0.01%, Christians 1.41%, and the remaining 0.75 % of the population are *Adhivasis* (indigenous), who are mostly known as *Santals* (Population and Housing Census, 2011). The literacy rate in the Manmathpur Union is 53.3%, whereas it is 53.9% in Parbatipur. The rate in 1991 was 29.7%. The male literacy rate is 56.5% and the female rate is 51.2%³.

This part of Bangladesh is comparatively poorer than others. According to the 2010 poverty assessment (World Bank, 2013), 22.1% people live in the lower level of poverty, and are referred as extremely poor, and 39.7% live in the upper poverty level, which is referred to as poor. At the country level, the lower poverty level includes 17.6% of the population, having

³Literacy denotes to the ability of writing a letter in any language. Following this criteria 53.9% population aged 7 years and above is literate in Parbatipur.

decreased from 25.1% in 2005, and the upper poverty level is 31.5 which was 40.0 % in 2005 (World Bank, 2013).

4.2.3 Livelihoods

A large portion of the population (72.5%) is younger than 35 years old. Job opportunities for this young workforce in the locality are limited. By profession, the highest numbers of people are engaged in agriculture, which accounts for 24.16% of the total population. The life and livelihoods of this locality are very much linked with agriculture. Most of the rural people are directly or indirectly engaged in agriculture. It is the main source of employment and income of people. Among the farm families, 13.13% are landless, 29.68% are marginal, 40.15 % are small, 15.46 are medium, and 1.58 % are in the large category (MoL, 2015). The number of landless and marginal farm families is increasing as a result of the increasing population. Fisheries are included within agriculture. Business is the second highest profession, which accounts for 4.63% of the population. 34.80 % of people are engaged in their household work, apart from any specific profession. A large number of people, 24.18% of people are unemployed. Other professions of the locality are industrial work (0.28%), service sector (water, electricity and gas) (0.07%), construction worker (0.41%), transportation sector (1.04%), hotel and restaurant (0.13%), and others (8.58%) (Bangladesh National Web Portal, 2015).

4.2.4 Institutions

There are eight government-run primary schools, 17 private primary schools, eight higher secondary schools, 4 madrasa (Higher secondary school following Islamic curriculum), and one college (Grade 11 & 12) in the Manmathpur Union. The nearest government primary school is

within a half kilometer of Naya Jelapara, and the higher secondary school is roughly 2 kilometers away. Almost every village has a government-run primary school and a couple of private primary schools within a kilometer, which significantly contributes to the increase in the number of students. However, the college is situated in the corner of the Union, and it is around 5 kilometers away from the fishing community. Government stipends for female students in the higher secondary schools have had a positive impact in this area, and their participation has significantly increased in the schools.

Health facilities in the Manmathpur Union have improved in last two decades. At present four governments community clinics and one Union health complex are providing health support. The Union health complex is around two kilometers away from Naya Jelapara. There is also a family planning office in the Union and three health staff providing health support in the community. A nationally renowned missionary hospital named LAMB provides health services in the Union. People's access to health services has increased significantly over the years.

The Union Parishad is the main government institute for the development of the area. It provides 20 kinds of services ranging from providing birth and death certificates to rural development. With the support of several government departments and NGOs, the Union Parishad is creating employment opportunities for the poor. It also implements development programs taken on by the central government. Furthermore, it provides free legal aid support to the needy. The Union Parishad office is around 4 kilometers away from Naya Jelapara. Fishers have easy access to the Union Parishad office, and one of the fishers' associations of the Union gets legal support in one of their case related to fishing.

Eight national and local NGOs have been implementing different programs and projects in the area for the last four decades. Earlier, their main program involved giving credit to the

poor without any security, which significantly increased poor people's access to credit. Today, NGOs like the Grameen Bank, BRAC and ASA are implementing education, health, nutrition and female empowerment programs, along with credit programs which have an important positive impact in the community. Health and total sanitation programs of ICDDRDB and LAMB have significantly contributed to improving the maternal and neonatal health, and child health of the area.

There is no bank in the Manmathpur Union, but mobile banking facilities are available in some important points of the union through the assistance of BRAC, a renowned national NGO. Considerable numbers of people of this area live in Dhaka and other cities for their livelihood, sending their money through mobile banking. Mobile banking makes their life easy by removing the barriers to getting banking services. Earlier, they had to go town to get banking services and faced different kinds of barriers to open bank accounts, especially when poor and illiterate. Now it's very easy to open a mobile bank account and send and receive money anytime in the nearest area. Apart from the mobile banking services, eight life insurance companies are active in the area and contribute to the local economy.

Besides government and non-government institutes, there are 73 mosques and 65 mandirs (Hindu temples) in Manmathpur Union. Among the socio-cultural organizations, 17 sports organizations and 2 cultural organizations are operating their activities in the area. There is only one registered occupational organization: the Tajnagar Fishers Organization. It is a registered fishers' association which formed and works for the betterment of fishers, with a current membership of 71 fishers (source: Manmathpur Union Parishad office).

4.2.5. Transportation, water, and sanitation

Significant improvements have been identified in the transportation infrastructure and transportation system of Manmathpur Union in the last two decades. Transport infrastructure of Manmathpur Union consists of kacha (non-metallic) and pucca (metallic) road, and railway. Every village is linked by road, and almost 90% of the population has access to all-weather roads - 30% road of Union became pucca during this time (source: Manmathpur Union Parishad Office). A pucca road links Manmathpur Union with the sub-district and district headquarters. People have access to the railway to go to the sub-district and district; also can go to the capital directly from Manmathpur.

Common vehicles used in this area rickshaws, vans, electric rickshaws, electric vans, electric three wheelers, minibuses, and trucks. The introduction of the electric rickshaw, vans, and three-wheelers made people's live easier and more efficient. Bicycles and motorcycles are two of the most used vehicles in this area. Almost every household has a bicycle, and the wealthy households have a motorcycle.

In Parbatipur Upazila, 96.1% of households drink water from tube-wells, 1.7% from water supplied by Upazila authority, and the remaining 2.2 % of households get their water from other sources (mostly from ponds). Among the households, 37.8% use the sanitary latrine, 30.2% use the non-sanitary latrine, and the remaining 32.0% have no toilet facility. 38.6% of households of the Upazila have electricity (Population and Housing Census, 2011).

4.2.6. Fisheries in Parbatipur

In Parbatipur, fish comes from two sources: inland capture and culture. A large portion of the fish comes from culture fishing, mainly from ponds. A Total of 3132 ponds are in Parbatipur

with an area of 2010.70 acres, among them, 189 are government and 2943 are private. There are also 3487 seasonal wetlands, covering 2990.62 acres and 190 ditches with the volume of 454.48 acres. Moreover, 150 fish nurseries, 2 hatcheries, and 12 large scale fish firms have contributed to the development of culture fisheries (National Web Portal, 2016).

In 2012-2013, total inland fish production (capture and culture) of Dinajpur district was 38,036.20 metric tonnes (DoF, 2014), which had been 45,782 metric tonnes in 2001-2002 (DoF, 2002). A significant reduction happened in capture fishing during this period, especially from floodplains, from 13,010 metric tonnes in 2001-2002 to 6015 metric tonnes in 2012-2013. Surprisingly production from the river increased to 123 metric tonnes from 27 metric tonnes. Culture fisheries (pond and seasonal culture) slightly increased during this period from 32,393 metric tonnes to 34,520 metric tonnes (DoF, 2002; 204). The transition from capture to culture fisheries of the study area started in the 1980s, but rapidly increased in the 1990s. Further information on this transformation is discussed in chapter 5. The major fish species of Dinajpur are major carp, exotic carp, other carp, cat fish, snake head, live fish, prawn, shrimp and other fish⁴. One of the reasons for the decrease of capture fish production is the scarcity of water (Mbugua, 2011) in the area.

⁴ Major Carp – Rui, Catla, Mrigel

Exotic Carp – Silver Carp, Grass Carp, Common Carp, Mirror Carp, Big Head Carp, Black Carp Other Carp – Kalibaus, Bata, Ghania

Cat Fish – Boal, Air, Pangas, Silon, Rita

Snake Head – Shol, Gazar, Taki

Live Fish – Koi, Singhi, Magur

Prawn – Galda and other inland chingri

Other Fish – Includes all other fishes except those mentioned above. (DoF, 2014)

Other Carp – Kalibaus, Bata, Ghania

Cat Fish – Boal, Air, Pangas, Silon, Rita

Snake Head – Shol, Gazar, Taki

Live Fish – Koi, Singhi, Magur

Prawn – Galda and other inland chingri

Other Fish – Includes all other fishes except those mentioned above. (DoF, 2014)

4.2.7. Fisheries resources

Fisheries resources of Manmathpur Union consist of the river, *beels* (perennial waterbody), ponds, seasonal waterbodies, and floodplains.

Rivers: Bangladesh is located in the delta of three big rivers: the Ganges, the Brahmaputra, and the Meghna, which intersect hundreds of other rivers. Like other parts of Bangladesh, Parbatipur is also divided by four small rivers, named *Choto Jamuna*, *Kartoa*, *Telai*, and *Ichamati*, which cover the area of 458.68 acres. Of the four, *Choto Jamuna* flows over the Manmathpur Union and is most important source of capture fisheries of the area. The major river nearby Parbatipur is the Teesta. The Teesta is the fourth most important trans-boundary river in Bangladesh, which shares the boundary between India and Bangladesh. The Teesta is around 100 kilometers away from Parbatipur. The upstream inflow of the Teesta provides key support to fisheries and agricultural production in the Teesta river floodplain in the northwest region of Bangladesh (The Asia Foundation, 2013). Fisheries, especially the capture fisheries and agriculture of Parbatipur largely depend on the Teesta's inflow. Due to climatic changes, siltation, development of barrage in the upstream of the Teesta, and unplanned structural development these rivers become almost dry in the summer and again full with water in the rainy season (The Asia Foundation, 2013; Mbugua, 2011).

Beels (Perennial waterbody): A *beel* is a kind of low-lying waterbody with static water and usually inundated during flooding. *Beels* are another source of open water capture fisheries for the locality. There are a number of *beels* in the Manmathpur Union, some of which are permanent, while others are seasonal. The number of permanent *beels* has declined significantly in the last four decades. Some became seasonal *beels* and some have been completely transformed into croplands. Seasonal *beels* are usually filled with water during monsoon season

and become dry again in the summer. People from all branches of the society catch fish in these *beels*, but some *beels* are controlled by local elite and powerful families, and fishers are excluded from fishing in them. An older fisher named Kandu (78) reported that, “during the Liberations War in 1971 there were eighteen large scale *beels* in this area that were year-round sources of fish for the locality. Later most of them were occupied by the influential and transformed into agricultural land. Now only seven *beels* are left, and those are also significantly downsized and have become seasonal. ”

Floodplains: During the monsoon season, usually lasting from July until October, most of the low-lying lands of the area overflow with water which is one of the important sources of capture fisheries of the locality. Although, the floodplains are usually open to all, sometimes fishers are restricted to fishing and have to share the catch with land owners. The amount of catch in floodplains has decreased in the last two decades, as most of the fish habitat and fish breeding places have been destroyed.

Pond: There are 44 government and many more private ponds in the Manmathpur Union. These ponds are now the main source for the culture fisheries in this area. In the 1970s these government ponds were open to all, but since 1983 these ponds have been leased out to increase revenue collection, which restricts fishers, and general people access to these ponds. Benefits from these ponds mostly go to the lessees who are usually from the non-fisher elite of the area. Changes in laws regarding leasing of fishing resources in 2009 have made an important improvement in disseminating the benefits of ponds among the fishers which declared and confines the leasing of these ponds only to genuine fishers.

4.2.8. Aquatic living resources

Fish: Once this area was rich in fish and other aquatic species. But in last four decades, the amount and species of fish has declined significantly. Most of the fish are native and small in size; large-sized fish are becoming rare. The small-sized fish include *puti* (Swamp barb), *sarputi* (Olive barb), *bata* (Bata), *darkina* (Flying barb), *chela* (Silver rasorbelly minnow), *mola* (Molacarplet), *dhela* (Cotio), *taki* (Spotted snakehead), *chang* (Walking snakehead), *magur* (Indian torrent catfish), *pabda*, *pholi* (Bronze featherback), *shingi* (Stinging catfish), *batashi* (Indian potasi), *tengra* (*Mystus tengara*), *aire*, *chapila* (Toli shad), *kechki* (Ganges river sprat), *koi* (Climbing perch), *bele* (Giant mudskipper), *chingree* (Prawn) etc. The large sized fishes include *shol* (Snakehead murrel), *gazar* (Great snakehead), *pangas*, *boaal* (Wallago), *aire*, and others. In addition to the native fish, there are several exotic fish species in this area. The exotic fish species include pangas, tilapia, silver carp, grass carp, bighead carp, and others. Apart from the fish, there are several kinds of snails and turtles which are consumed by some members of the community.

Aquatic weeds: The most common aquatic weeds are the water hyacinth, or *kachuripana* (Water hyacinth- *Eichhorniacrassipes*), *khudipana* (Duck weed - *Lemna minor*) and *patshola* (*Indica - Vallisneria spiralis*). These weeds are suitable for the aquatic animals when they are small in amount but become harmful when they become abundant (Basaket et al. 2015). *Khudipana* is also one of the favorite foods of fish and ducks. These weeds sometimes cover the wetlands and hinder the movement and growth of fish (Rahman, 1989). These and many other aquatic plants are a source of food and shelter for small fish, aquatic birds, and other animals, including humans.

Several leafy vegetables, such as *Kolmi* (Water spinach - *Ipomeeaquatica*), along with *Malanch* (Alligatorweed - *Alternantheraphiloxerodies*), *Gechu* (Aponogeton – *Aponogeton spp.*), and *Paniphal* (*Trapa spp.*) grow in the waterbodies and on the embankments of the waterbodies. These aquatic plants and weeds are ecologically, and economically important for the ecosystem and its users.

4.2.9. Fishers of the area

In Parbatipur, a man involved in fishing is known as a *jale* or *motshojibi*. Fishers in this area can be broadly divided into three groups: full-time, part-time and occasional. Full-time fishers are those who do fishing year round and identify fishing as their main occupation. Most of the full-time fishers of this area are Hindus, publicly known as *nomoshudras*, a lower caste⁵ of Hindus who are mentioned as “untouchable” in Hindu theology. They have a very low status in the society. Despite the lower status and related challenges, *nomosudras* have been involved in this profession for generations. On the other hand, part-time fishers do fishing mainly during the monsoon to supplement their income. These part-time fishers primarily are poor farmers and agriculture laborers from the locality who are mostly from the Muslim community. The number of part-time fishers has significantly increased in last couple of decades. These part-time fishers have higher status than the full-time Hindu fishers (*nomosudras*). Both the Muslim and Hindu elite of the locality, who are the landowners of most of the floodplains, comprises the third group of fishers, but they never recognize themselves as fishers and they do fishing as a hobby. These occasional fishers do fishing occasionally during the monsoon in the floodplains. To do fishing

⁵ The broadest categorization of castes in Hindu religion is by the four broad *varna* categories of *Brahmin*, *Kashtriya*, *Vaishya* and *Shudra*. *Brahmin* is in the top of the caste hierarchy and *Shudra* in the bottom. *Shudras* are ritually stigmatized as polluted, with the lowest ranked *shudras* seen ‘untouchable’. The contemporary label for these groups in India is *dalit* or scheduled caste. Scheduled caste groups in Bangladesh include fishermen, craftsmen, and deeply stigmatized out castes.

they sometimes restrict other fishers fishing in the floodplain areas they control. These occasional fishers have the highest socio-political status, and Hindu fishers' access to floodplains largely depends on them.

As a Muslim majority area, most of the owner of ponds and ditches are Muslim and are involved in aquaculture, but they have never identified as *motshojibi*, as everyone has another profession and they refer to that as their primary profession, mentioning fishing as a side business. The dilemma is that those who are fishermen over generations have very little access to fishing, as the area and opportunity for capture fisheries has been declining for many years. On the other hand, those who control most of the ponds, ditches, and wetlands and are involved in culture fishing are not willing to refer to themselves as *motshojibi* (fishermen) due to the low social status associated with fishing.

4.2.10. Fishing gears

Uses of fishing gear depend on the depth of the water, fishing strategy, and the expected size of the catch. Different types of fishing gear, such as traps, nets, and hooks, are used in Manmathpur to catch fish. Fishing gear varies by size, shape and operational procedures (WorldFish et.al. 2013). Important fishing gears used in Manmathpur are mentioned below.

For generations, fishers and others from this area have been using several kinds of traps to catch fish. Some are closed, and some are open, and they vary according to size and design. Usually closed traps (also known as box traps) are made of bamboo sticks and thread and are square or rectangular in shape. Once a fish has entered the trap, it cannot get out. Small fish and prawns are caught with box traps. Box traps used in Manmathpur include *Polai* (box trap – Bell shaped trap), *Darki*, *Vorong* (Mochna Chai), *Hanga* (GhuniChai), and *Pasti* (Gui – Conical trap).

Among the open traps, significant types are *Bana* (Fence), *Hanga* (light trap), *Chonga* (Tubular trap), and *Gata* (Ditch).

The hook is another significant type of fishing gear used in this area. Different types of hooks are used to catch different kinds of fish. Several kinds of insects and small animals (such as dragon flies, larvae of bolta, the eggs of red ants, spiders, and different types of small fish) are used on the hook to lure fish. Hooks used in this area include *borshi* (hand line hook), *jelaborshi* (long line), and *nola* (floating hook). Several types of wounding gear are also used in this area to catch fish, which include *khocha* (Spear) and *kakri* (Ring). Fish are also caught by hand. Usually, fish in shallow waters are caught by hand in the mud. Usually between the end of monsoon season and the beginning of summer, when water becomes shallow in the floodplains and *beels*, people fish in groups and by hand.

Several kinds of fishing nets are used in Manmathpur to catch fish. Fishing nets used in the area include *thela jal* (push net), *seine net* (surrounding net), *chatka jal* (lift net), *current jal* (gill net), *phandi jal* (gill net), *suti jal* (gill net), *pak jal* (cast net), *tana jal* (drag net), and *dera jal* (fixed set bag net), among other.

4.3 Local perceptions of wellbeing

The feeling of wellbeing is intertwined with daily activities and experiences of the people. To understand people's perceptions of wellbeing we need to look the use of local terms and their use carefully. In defining wellbeing, the most commonly used terms are "*sukh-shanti*" (happiness - peace), "*khushi / okhushii*" (happy / unhappy), "*valo achi / nai*" (feeling happy / unhappy), and "*ishorer ashirbad a valoi achi*" (by the grace of God we are doing well). Both terms in the phrase '*sukh-shanti*' usually refer to the mental and spiritual state of the people to which it

refers⁶. On the other hand, the phrase, ‘*valo achi /nai*’ represents peoples’ current life condition and covers all aspects of it.

A general tendency among the community members, especially those married and older, is that they judge their wellbeing in terms of their household. Another tendency found among most of fishers (except the rich) is that they define their wellbeing in relation to basic needs such as food intake, income, and housing. One male respondent stated that “*Peta bhat r mathai chat na thakle manus valo thake kivabe?* (If you don’t have food to eat and a house to sleep in then how can you think to live a good life?)”. Besides these subsistence needs, the other important factors of wellbeing regardless the class and gender are respect and reputation (*somman o sunam*) in the community. Another young woman stated that “*Becha thakar jonno amader sobai k ak sathe thakte hoi, tai somman akbar chole gale grame thaka kothin* (We have to live collectively to survive, therefore, if you lose respect then it is difficult to live here).” Comparatively rich fishers, those who are involved with fish culture, highlighted security, status, and credit as important factors for wellbeing. A middle aged fisher who is involved in fish culture and is an active member of the Fishers Association stated that “We always feel a threat from the Muslim fishers and people who live nearby our ponds. We need the security of our lives and our assets.” Another significant difference I found in defining wellbeing in Naya Jelapara is that the older members of the community are deeply influenced by a kind of nostalgia. They are more conscious about their past life and what they have lost. They define their wellbeing

⁶ The term ‘*sukh*’ comes from the Sanskrit word ‘*sukha*’ means happiness or pleasure. In the Rig Veda ‘*sukha*’ is juxtaposed with ‘*dukkha*’ means suffering. In Pali literature, this term is used in a general sense to refer to “wellbeing and happiness” (‘*hitasukha*’) in people’s lives. The term ‘*shanti*’ also comes from the Sanskrit word ‘*sanith*’ means peace or calmness. Both ‘*sukh*’ and ‘*shanti*’ refer to the inners peace of human life.

comparing their current life with their past. Whereas youth are not worried about their past but give preference to their current life.

In Naya Jelapara, people's perception of wellbeing is linked with their socio-cultural and economic lives. Some factors that play an important role in shaping their perceptions of wellbeing are stated below -

Income and wellbeing: There were strong connections between wellbeing and the regular household income required to meet the basic needs of the household. Ability to fulfill household needs have a positive impact on wellbeing. If a household has sufficient foodgrains for year round consumption, it not only increases their food security but also significantly increases their reputation (*sunam*) in the community and beyond. Although the respondents identified many other factors that play a crucial role in wellbeing, the common factor identified by all the respondents is the regular income to fulfill their basic household needs.

Idea of wellbeing is linked to spiritual beliefs: “*Vogoban ar ashirbad na thakle tumi jotoi chesta kora jibone sukh - shanti pabana*” (You cannot be happy without the grace of God, it doesn't matter how much you try). This comment of a 60 year old respondent indicates that their idea of wellbeing is linked with their spiritual beliefs. The general belief is that wellbeing depends on God's will. This tendency is common among the older and married women.

Wellbeing is very relational: Social relations play a crucial role in the construction of wellbeing of fishing households. Fishing households depend on fellow fishers and neighbors for survival. Therefore, any disturbance in their social relations affects their wellbeing. An older fisher stated that “We cannot fish alone; if anyone quarrels with others and is ostracized by the group (*Dolchara*) it became difficult for him to survive. Therefore, I always advise young fishers not to fight with each other but to live like brothers.”

Gendered perceptions of wellbeing: There are significant differences between men and women about what constitutes wellbeing. Women considered their health and that of their household members, the quality of their house, the income of household head, and children's education as the main influences on wellbeing. On the other hand, men recognized regular income, job security, and reputation as the main factors shaping wellbeing. Women in most cases defined wellbeing in terms of their husband's and children's wellbeing. For example, one women respondent expressed low subjective wellbeing despite her household's relatively high level of income because of the difficult situation of her married out daughter. The respondent said that "*Taka poisa hoyeche kintu mone shanti nai*" (We earned good amount of money but I am not happy). She added "Everyone is happy in my family but I am not, I cannot sleep in the night, I always think about my daughter. We don't have good relations with my son in law, and he does not allow my daughter to come to my house and talk with us."

4.4 Material wellbeing

4.4.1. Employment and income:

A gradual increase has been identified in the fisher's monthly income in Manmathpur Union in the last two decades. The increase in fish prices and involvement of fishers and other household members with several alternative income-generating activities, along with fishing, has contributed to the increase in income. As is shown in figure 4.3 the highest monthly income among the surveyed households is above 12000 BDT (60 BDT = 1 CAD), whereas the lowest monthly income is below 4000 BDT. The monthly income of 8 of the surveyed households is between 4000 to 6000 BDT. At most, 12 households earn 6000 to 8000 BDT monthly, 9 of the

rests of the households earn on an average 8000 to 10000 BDT, and 3 households earn 12000 BDT monthly.

In the study area, incomes of the households depend on the active laborers, skills of the members, and their involvement in economically productive demand sectors. The developments of agriculture and aquaculture have increased the income of fishers as labor and wages. The price of agricultural labor increased almost 19 times in the 1980s, whereas there has been an increase of around 19 times in non-agricultural sectors (BBS, 1984 & 2013). Improvements to the transportation system in Parbatipur have led to people's increased movement to towns and adjacent districts for living. From the first half of the 1990s, most of the working people of this area were unemployed during the off-season. At that time they had very few alternative income generating activities and were solely dependent on agriculture and agriculture-related work.

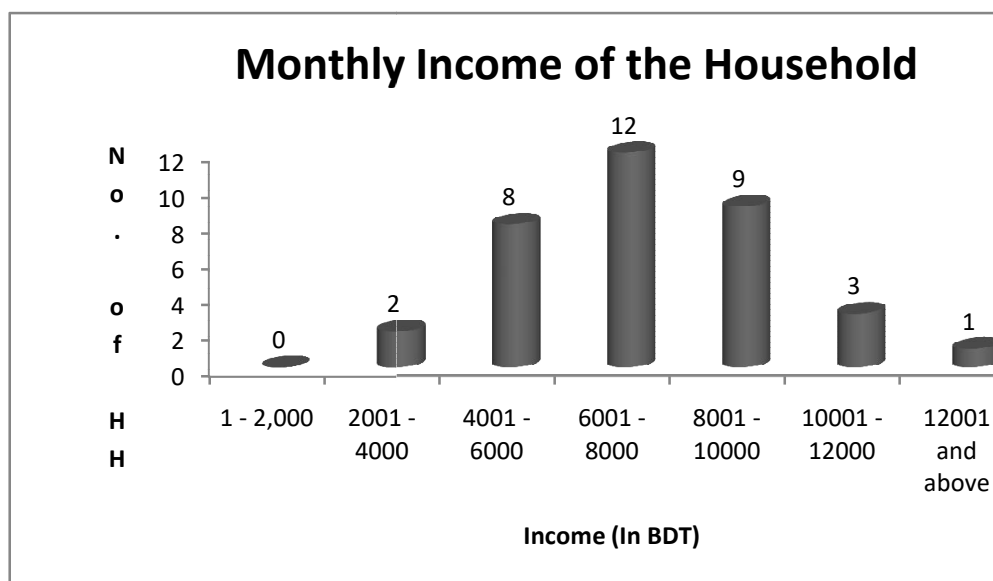


Figure 4.3 Monthly income of fishing households in the study area, 2016-17

Fish prices have risen significantly in the last three decades, especially for native fish. The price of Indian major carp like *rui*, *katla* increased by around 1200% during this period, whereas it has increased by almost 3000% for native catfish like *shing*, *magur*, *ayre* and *boal* (BBS, 1984; Alam et al. 2010). In the 1970s and 1980s prices of native small fish like *kachki*, *chands*, *Mola*, *puti* etc were very low and there was less demand as the source was abundant, whereas it is more than 100 BDT per kilogram now. Native and small sized carp fish make up a significant portion of the harvest of the fishers in this area, which are high in demand and high price. At the same time, aquacultural development has created growing demand on fishers as aquaculture laborers, which has created an alternative source of income for them. These factors have led to a significant increase of fisher's household income.

4.4.2. Household assets

Information on the household assets of fishing households is shown in table 4.1, which indicates their effort to increase household income through diversification. Sixty-six percent of households have at least one cow, and 28% of households have at least one goat, whereas 63% of households have hens and ducks. Among the durable assets, around 92 % of households have a bicycle, and 77% of households have at least one mobile phone. Bicycles and mobile phones are important for their livelihoods. Most of the time, the owners of ponds hire them over mobile phone to catch fish from elsewhere. Those fishers who conduct retail fish business along with fishing check the fish price in wholesale markets before going there. Two households (5.71%) have black and white televisions and 3 households (8.57%) have a motorcycle. These households are comparatively wealthy and do retail fish business and aquaculture. They transport fish to different markets by motorcycle.

Table 4.1: Household assets of the respondents

Name of the asset	No of households have the asset (T=35)
Cow	23
Goat	10
Chicken & ducks	22
TV (Black & White)	2
Bicycle	32
Motorcycle	3
Mobile phone	32

4.4.3 Structure of houses

Table - 4.2 provides information on the structure of houses of the surveyed fishers' households. The village is very congested. There is very limited space between houses and most of the rooms are small in size. The structure of the houses is similar. House walls are made of brick, bamboo, mud, tin, and paddy straw. Among the surveyed households, 17 house walls are made of brick, 6 are of mud, 10 are of bamboo, 1 made of tin, and 1 of paddy straw. All 35 households have an earthen floor, of which 27 of the roofs are made of tin and 8 of paddy straw. Most houses have three rooms (20), and one house has just one room. Among the rest, 13 houses have two rooms, and 1 house has four rooms. Due to limited space in most of the cases, comparatively financially solvent households buy new homestead land to build a new house after marriage.

All those interviewed reported significant changes in house structure during the last two decades. Two decades ago there were no houses made of brick and tin. Most of the houses made of brick were built in the last decade, and every year new houses are built in the community.

These infrastructural changes to this community show the relative increase in economic prosperity of the community in the last twenty or thirty years.

Table 4.2: Structure of houses

Structure of houses			
Items	Wall	Floor	Roof
Brick	17		
Tin	1		27
Earth	6	35	
Bamboo	10		
Straw/ Chan	1		8

4.4.4 Ownership of land by categories

Information on the ownership of land is shown in Table 4.3, which indicates that 97% of the surveyed households have homestead land. The largest homestead land is above 11 decimals⁷. The largest number of households (14 out of 35) has a homestead of 4-5 decimals. Twenty percent of households have fallow land, and one household has agricultural land. But 37% of households (13) hold agricultural land as tenants (contractual).

I noticed that every household has homestead trees. Homestead trees include mostly fruit and timber trees. Mango, litchi, guava, and banana are the major types of homestead fruit trees in the village, whereas *neem* (*Azadirachta indica*) and *mahogany* (*Swietenia macrophylla*) are of the major timber trees in the community. Even on the limited homestead land, 50% of households have vegetable plants like beans, gourds, pumpkin, arum, and different kinds of spinach.

⁷1 acre = 100 decimals

Table 4.3: Ownership of land by categories

Ownership of Land by Categories					
Homestead		Agricultural Land		Fallow Land	
Value (Decimal)	Number of Households	Value (Decimal)	Number of Households	Value (Decimal)	Number of Households
0	1	0		0	
1 to 3	9	1 to 3		1 to 3	
4 to 5	14	4 to 5		4 to 5	1
6 to 10	9	6 to 10		6 to 10	4
11 to 20	2	11 to 20		11 to 20	2
20 and above		20 and above	1	20 and above	

4.5 Subjective wellbeing

4.5.1 Status of education

Information on the educational levels of the fishers, their wives, and their children is shown in figure 4.4. Forty percent of fishers (14 out of 35) are completely illiterate, as are 37% of women. Almost 9% of fishers can sign their name and can read a little. Around 51% of fishers have completed primary level (Grade 5). On the other hand, almost 57% of women have completed primary level. Significant drop-out rates have been identified among fishers and women after completion of the primary level. Only one fisher and one woman among the surveyed households completed secondary (Grade X) level. The education level is higher among the younger fishers compared to the older fishers.

A growing consciousness of education is evident in the community. I found that every child, both boys and girls, is either enrolled in or has completed primary education (up to grade-

5). Figure 4.4 shows that educational levels of children are higher than their parents. Sixty-five percent of children have completed primary level. One boy completed secondary level and 2 other boys and one girl completed the higher secondary level and enrolled in the bachelor program. But still a significant percentage of drop-outs are evident after primary level. Two boys quit school when they were in grade five and nine respectively and joined older members of their household as full-time fishers and fisheries labor. I did not find any male child above 12 years old who was solely studying. All the boys above this age either become regular fishers or are assisting household members in fishing alongside their studies. Boys joined their fathers for fishing and other income generating activities. Female children, on the other hand, help their mothers with household activities. Two out of three girls interviewed left school when they were in grade six and seven, and are now helping their mothers with household tasks. One among them sews cloths at home at the same time as doing house work. The third girl interviewed is continuing her study at the same time helping her mother with household chores.

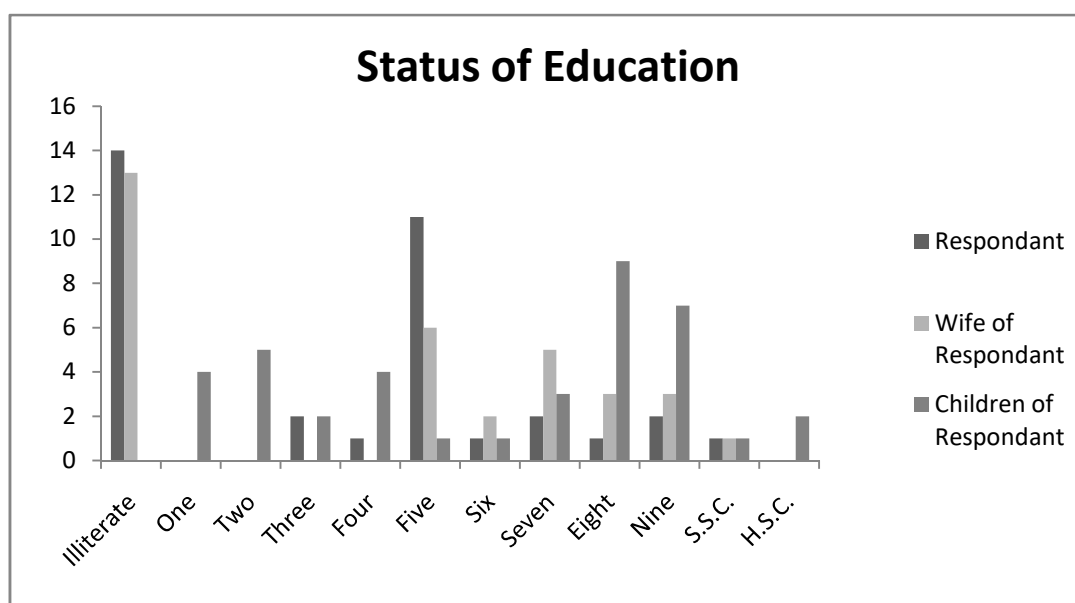


Figure 4.4: Status of education among the households, 2016-17

4.5.2. Health and sanitation

The health and sanitation status of Naya Jelapara has significantly improved in the last two decades. I saw no malnourished children in the community and no neonatal and maternal deaths have been recorded in the community in the last decades. A national program for immunization, vitamin A supplementation, and the operation of a community clinic have had a positive impact on the community. Respondents reported that, in the last decade, almost all births in the community have been attended by skilled health personnel, either in the Union Health Complex or in the missionary hospital, which is around 4 kilometers away from the community. Besides government health programs, BRAC (a leading national NGO) provided a maternal and child health-improvement program in the area, which had a positive impact on the community. Household members are now more conscious about pregnant mothers' and children's health. The community members get free health and family planning services from the health and family planning office of the union, which is around 2 kilometers from the community.

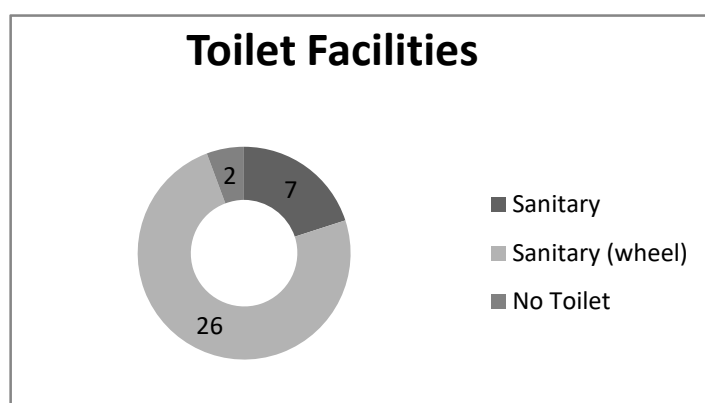


Figure 4.5: Toilet facilities in Naya Jelapara, 2016-17

All the surveyed households use tube-wells as a source of drinking water, and these tube-wells are free of arsenic. Before the 1990s people of this community used a *Kua* (a hole made of

mud or brick) and ponds as the source of drinking water. A gradual improvement has been noticed in use of a latrine. Twenty percent of households in Naya Jelapara use the sanitary latrine, and 74% use the sanitary (wheel) latrine. Six percent of households do not have their own latrine; they use their neighbor's latrine. Poor fishers were given sanitary (wheel) latrines from the Union Parishad under the sanitation project of the Ministry of Local Government, Rural Development and Co-operatives.

4.5.3 Status of food availability

The availability of enough quality food is very important for the wellbeing of the poor. In Naya Jelapara, 6 out of 35 surveyed households are satisfied with the amount and quality of food they have. Nineteen households are “somewhat satisfied”; these families are “satisfied” with the amount of food, but are not “satisfied” enough with the quality of the food. They expect better quality food in their everyday diet. Ten households, on the other hand, are “dissatisfied” with the amount of food they have. Actually, these households struggle to get three meals in a day; they do not even think about the quality. Around 70% of households report that they have a better quality and amount of food now than 20-30 years ago. Four out of the ten households that are still in a shortage of food think that they are better off now than before. In the 1970s and 1980s, despite getting regular good catches, they found it difficult to manage three daily meals, as the price of and demand for fish in this rural area was very low at that time. I found a strong connection between the availability of staple foods and satisfaction. A male respondent, named Monglu (48) who is engaged in agriculture along with fishing commented that “We are happy now. Now we have rice for year-round consumption. If any household has enough rice they never worry about their meal, they know if they even don't earn a single penny, they will at least

have rice and salt as a meal. In our childhood, we seldom had meals twice daily, but now most of us have meals three times a day though the quality and amount of food items vary”

Households with single wage earner and elderly persons are often short of food. These households live hand to mouth, if the single wage earner gets sick, the income of the whole household is totally stopped, and they fall into food shortage. Female respondents stated that, earlier on, wetlands were the source of many aquatic plants like *Shapla* (*Nymphaeanouchalli*), root stock of *Ghechu* (*Aponogeton* sp.), *Fukol grass* (*Euryale ferox*), *Singara* (*Trapa natans*), and leaves of *Kalmi* (*Limnocharisflava*), which were a good source food for the poor and destitute households. But now these aquatic plants are almost extinct due to the transformation of wetlands into agricultural land. Now poor fishing households have to buy almost every necessary household good except for fish. As most of the fishing households are landless, they totally depend on the market for staple foods like rice, wheat, and potatoes. If for any reason they fail to make a profit one day, they fall into food shortage. But those families who have more than one wage earner, they manage the deficit with the income of others.

4.5.4 Level of satisfaction with present situation of small-scale fisheries

None of the respondents of the survey were “satisfied” with the small-scale fisheries of the area. They are very “dissatisfied” with them, as most of the wetlands, which were once the main source of their livelihoods, have been either transformed into agricultural land or occupied by influential people. Once, these wetlands were used as common property, and fishers had easy access to these resources. Due to the lack of proper management and enforcement of laws, these wetlands were gradually captured by the elites as private property and used for agriculture. Thus, fishers lost their use and property rights over these resources. Besides these wetlands, 66

government ponds of Manmathpur Union have been leased to NGOs and individuals since 1983 through the leasing system, which excludes fishers from these resources and denies their use rights.

Due to climate change, low rainfall, and the introduction of agriculture in low lying areas, and abstraction of water from wetlands for irrigation, the fishing season has shrunk to less than 3 months a year. Now fishers mostly are fishing in the floodplains during the monsoon season. Even in the monsoon season fishers sometimes have to share their catch with the land owner in order to fish in the floodplains. Increasing fish prices have attracted poor Muslims to fishing. Over the last two decades, the number of Muslim fishers has significantly increased in this area, which makes the situation worse. Fishing in this area has become more competitive and Hindu fishermen are increasingly facing limits to their fishing. They have almost lost their generational occupation. For survival, they engage in aquaculture, agriculture, fish trading, and working as aquaculture and agriculture laborers.

4.6 Relational wellbeing

Fishers of Naya Jelapara are in relations with several actors within and outside of the community. Relations with these actors are important for their social and economic life. Their relations range from household members to different actors of the wider community and the level of relations are not same; some are stronger than others. Significant changes have been identified in fishers' relations due to the structural changes in the inland small-scale fisheries of the community. As fishers are engaged in several secondary income-generating activities alongside fishing, they have developed relations with many other actors. Relationship development is an important livelihood strategy for fishers. Lack of social and political power encourages them to

develop relations with the local elite and with powerful people in the community, other fishers' associations, and people of the area adjacent to the *beel* in order to get access to resources of the area.

Fishers are not satisfied with all the relations they have. They are happy with some relations and unhappy with others. They are very satisfied with their household members, fellow fishers, relatives, and fishers of other villages. On the contrary, they are very dissatisfied with Muslim fishers, members of Union Parishad and people of the areas adjacent to the *beels*. A gradual decrease in fisheries resources has increased the competition and caused conflict between fishers and others, especially Muslim fishers, who depend on these resources for their livelihood. Increased fish prices and profitability of aquaculture attracts local elites and powerful people to fisheries, which limit fishers' access and use rights to these resources. These changes have made some of their relations worse than before.

Relational landscape of *Naya Jelapara*:

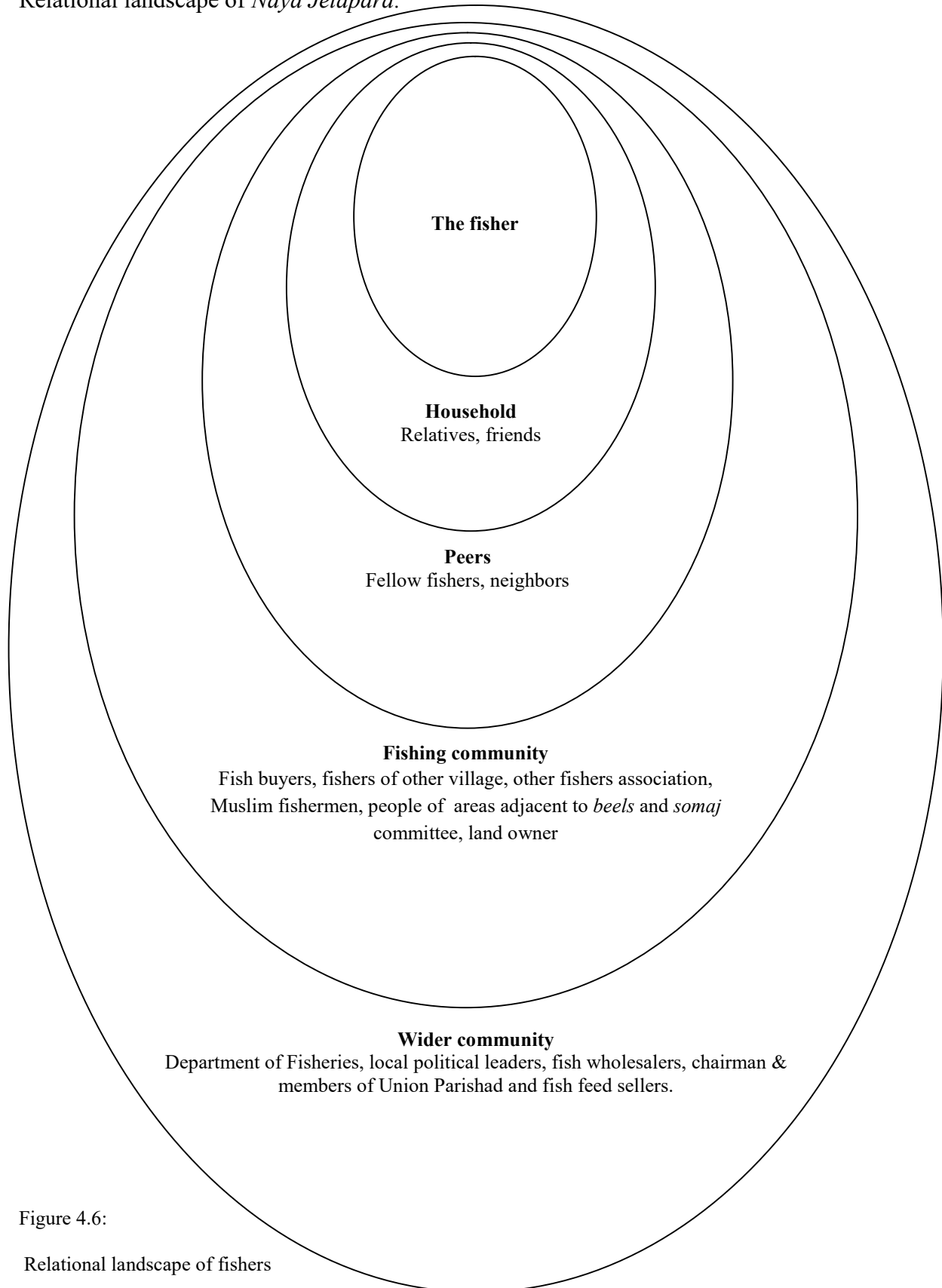


Figure 4.6:

Relational landscape of fishers

Figure 4.7: Fisher's satisfaction level with different actors

Satisfaction level	Actors
Very Satisfied	Fellow fishers, relatives, fellow fishers from other villages
Satisfied	NGOs, fish feed sellers, fish wholesalers, fishers association, and government fisheries officers.
Dissatisfied	Fish buyers, local political leaders, local UP chairman
Very dissatisfied	Muslim fishers, people adjacent to <i>beels</i> people, local UP member

4.7 Roles of women and children in household and fisheries

From dawn to dusk, women in Naya Jelapara perform several activities within and outside of the household. All of the women interviewed reported housekeeping as their primary occupation. Child rearing and cooking food for the household are major primary activities performed by women. Other major activities performed by women are washing clothes, cleaning utensils, cleaning house compounds, feeding poultry & livestock, collecting vegetables from the household garden, collecting fuel for cooking, making beds, and much more. During my four months of fieldwork I did not see any men cook or clean house, but whenever they went outside of the community for fishing then they cooked for themselves. One male respondent informed

that if all the women and girls of the household are away from home for any function or to visit relatives, men will also cook for themselves then. Another male respondent report that “Actually women do not allow men in the kitchen. If I cook in the presence of my wife people will make fun of us, if she is not at home then it’s ok” As most of the time fishers are away from the house, women are the main person for maintaining the household. Although women respondents identified taking care of children as one of their main responsibilities, I found that many fishers and young boys would also take care of children whenever they are at home. In some households where the fishers are regularly away from the house for work, women manage the household economy. Jhorna (42) stated that “Whenever my husband goes for fishing for a week or two he gives me some money for daily household expenditures. In case of any big purchase or important household decision I call him over my cell phone for his decision. He does not mind if I spend more money but I prefer to get his opinion before doing that.” Decisions like selling or buying of assets or marriage of household members are usually made by the man. Another respondent, named Sonali (14) reported that “My elder sister fell in love with a neighboring boy and they got married without consulting her father. Therefore, her father did not accept their marriage and does not allow them in their house even after three years of the marriage.” Table 4.4 shows the daily household activities performed by women and men that were identified by women and men respondents through the focus group discussions.

Most fisher households in this area live on daily or weekly income. Therefore, food management is a crucial activity for fishing households, and women of the household are responsible for this job. Usually men or boys do the shopping while women and girls do the cooking and distribution of food. Whatever amount of food they have, fisherwomen plan and manage it. They plant vegetables in their yard and nearby, and collect aquatic plants which

provide a significant portion of family food. They also manage food from home-based poultry, and sometimes it becomes a source of income. Fisherwomen try to save some money from fishermen's incomes as well as her income which are important in moments of crisis. A female respondent, Momota (45), commented that "I gave my husband around eight thousand BDT from my savings when he took lease of a pond, For the last two years, I have been saving money from household money, by selling chicken and eggs." Fisherwomen's roles vary depending on the geographical, social, cultural, and political context. But in general, fisherwomen play a crucial role in family and food management, child rearing, housekeeping, as well as supplying the family income through participating in several income-generating activities.

Table 4.4: Daily household activities played by women and men

Daily activities of household members		
Time	Women	Men
Morning	Perform daily religious rituals, washing utensils, cleaning house compounds, releasing poultry and livestock, preparing breakfast, feeding the younger child, collecting vegetables from the homestead for food, taking out the trash.	Releasing livestock and feeding them.
Afternoon	Feeding poultry & livestock, collecting grass for livestock, cooking, sewing clothes, bathing of younger children, preparing lunch, crop preservation, fuel collection within house, homestead cultivation (vegetables & spices), laundry, and clean bathrooms.	Fishing, agricultural work (seedling of paddy, taking care of seedling, irrigation & cutting of crops) in the season, selling produced crops, selling livestock, selling poultry and its products, house making, and repairing as needed.
Night	Preparing dinner, feeding younger children, dinner cleanup, and making beds.	Shopping for the household, and selling fish.

Whatever amount of food they have, fisherwomen plan and manage it. They plant vegetables in their yard and nearby, and collect aquatic plants which provide a significant portion of family food. They also manage food from home-based poultry, and sometimes it becomes a source of income. Fisherwomen try to save some money from fishermen's incomes as well as her income which are important in moments of crisis.

Table 4.5: Roles of men and women in fishing

Time	Women	Men
Pre-fishing	Knitting net, performing religious rituals at home or in the community level, and preparing meal for fishers.	Knitting net, performing religious rituals before starting fishing, checking fishing gear and other necessary stuff before leaving the house.
During fishing period	Occasionally catching fish during monsoon, assisting male household members to set net and collect fish	Setting net, floating hook, etc. collecting fish from longline and hook for handling, and preserving live fish,
Post fishing	Sorting and grading. Cleaning of fishing net and fish selling items.	Sorting and grading, bleeding, gutting and washing, and transportation and of fish.

Children are an important part of fishing household economy and livelihood strategy. Children in the fishing community take part in daily household activities from an early stage of life. Some children simultaneously continue their studies while helping with household activities. Children of comparatively needier households drop out of school early and engage full-time in household activities. Distinctions have been observed between boys' and girls' work in fishing communities. Boys usually go with the fishermen to assist them with fishing. Boys' involvement in fishing is important because it reduces the fishing costs and ensures the learning of fishing skills and intergenerational engagement with fishing. On the other hand, female children usually assist fisherwomen in household work, especially housekeeping and child rearing. If the

fisherwomen are engaged in part time work, then the girls' roles become more vital. A girl respondent, Sraboni (15) stated that "I quit school when I was in grade six to do the household chores. My father is a fisher and aquacultural laborer and my mother is a maid. Earlier my older sister did all the household chores but she got married two years ago, so I had to quit school to manage the household and take care of my younger sisters as my parents were busy with their work."

4.8 Conclusion

The analysis of material wellbeing of fishers in Naya Jelapara presents a complex scenario. In the last three decades, a regular improvement has been reported in the material wellbeing of fishers in Naya Jelapara. Fishers' involvement with alternative occupations and income from them has considerably increased. On the other hand, access to fishing resources and income from fishing has been significantly reduced during this period. Significant improvements have been identified in the fishers' household incomes, the structure of houses, and household assets. This improvement in the material wellbeing of fishers of Naya Jelapara contradicts the idea that fishers are 'the poorest of the poor' (as per Béné, 2003), although the level of improvement is not the same for all. Improvement has also been noticed in some indicators of social wellbeing like overall food availability, education, health, and access to credit. At the same time, fishers have almost lost their generational occupation. Many of their rituals related to fishing are not performed today, as the access to fishing and the fishing period have shrunk significantly. These changes have affected the relational wellbeing of fishers. New relations have developed, while some old relations have become less important. A gradual decrease in fisheries resources and an increase in users have created more conflicts in the fisheries sector. Fishers have become more

vulnerable as their new competitors are socially, economically, and politically more powerful than them. Although fishers miss their culture and past relations, they highlight their material improvement and express their happiness when comparing their life today as compared to three decades ago. These improvements in life for fishers of Naya Jelapara are linked with the broader national development policy since 1990, under democratic rule. During this period, remarkable developments have been achieved in agriculture, aquaculture, transportation, and rural development, which have created more opportunities in rural areas. But the level of improvement is not same for all, although fishers benefited from this development, people from other groups like agriculture, aquaculture, elite landowners, Muslims, and upper caste Hindus benefited the most and have achieved greater improvements.

Bangladesh has made outstanding progress in social development (such as education, health, sanitation, and fertility) and met several MDG targets before the timeline despite its lower national income (UNDP, 2011). It has particularly attained impressive progress in female schooling, fertility decline, infant mortality and child immunization. Improvements in the health status have been noticed in the study area, especially on maternal and child health. Bangladesh also made commendable achievements in literacy and primary (Grade 1-V) and secondary education (Grade VI-X), most notably in school enrollment and closing the gender gap. Although in Naya Jelapara, enrollment in primary education is close to the national rate, but a significant drop-out rate, especially of female children was reported at the higher secondary level. The gender gap is very high in secondary education compare to national level, even after the presence of ‘Upobritti,’⁸ a stipend program for female students. One of the most important reasons why this drop-out rate is increasing is that children are an important part of the

⁸Upobritti is a stipend program for girl students, enrolled in secondary level (Grade VI-X) to increase interest of students and parents in education.

household economy and are important in the struggle for livelihoods (Begum et al. 2012). Women and children play significant roles in the household economy, and daily household and fishing activities if we consider the pre - and post-fishing activities, but their role is either underestimated or not acknowledged in the community, as well as in fisheries management. Female participation in household resource management and fishing is very limited. They cannot even make decisions about those issues that are directly involved with them and impact their lives. Therefore, recognition of gender dynamics is also important for the wellbeing of women and the equal distribution of the benefits of resources. The integration and understanding of gender dynamics in fisheries resource management could ensure a better understanding of local dynamics, which could then contribute to sustainable use and development of fisheries resources and equal distribution of the benefits of resources among all people dependent on those resources.

Chapter Five: Structural changes in the small-scale fisheries in Parbatipur

5.0 Introduction

One of the key objectives of this study is to identify the structural changes that have taken place in the small-scale fisheries in Parbatipur. This chapter addresses this objective, and recognizes multiple structural changes that have had significant impacts on the small-scale fisheries of the locality. Over the last five decades, the fisheries sector in Parbatipur has gone through massive and multidimensional changes, ranging from infrastructural changes to changes in governance and management. The agricultural policy of the newly independent government in the 1970s was the beginning of the changes. Promotion of a ‘green revolution’ by the state immediate after the independence to attain foodgrain sufficiency has greatly affected capture fisheries. In the study area, almost all the inland open water resources have been transformed into agricultural land for crop production, especially rice which destroys fish habitats. Moreover, several infrastructural development projects like water canal and irrigation channel have been implemented to support rice production which greatly affects inland openwater fisheries, destroys fish migratory route and fish breeding habitat. Furthermore, excess uses of chemical fertilizers and pesticides in crop production left a negative impact on fisheries. These changes have greatly affected the ecosystem of the locality, gradual loss of fish habitat, and fish breeding place, resulting in a significant reduction in capture fisheries and the loss of several indigenous fish.

To increase fish production, the Department of Fisheries has promoted aquaculture in this area and transforms the common fisheries resources to privately-owned property through a leasing system which denies the user rights of genuine fishers and denies them access to these resources, resulting in an increase in the vulnerability of fishers. An improvement has been identified in the laws of leasing of fisheries resources 2009 which confined the leasing of

fisheries resources to genuine fishers' associations. Even after this improvement, only a few fishers' associations were able to get a lease. Most of the fishers have been unable to form an association and collect enough money for the lease. Still, most of the leases are non-fishers due to the lack of monitoring and poor enforcement of the law.

5.1 Structural changes in inland fisheries in the study area

This chapter exclusively addresses the structural changes of the small-scale fisheries in Parbatipur. To recognize the changes and their impacts in a systematic way, the changes are broadly divided into five categories. The first category discusses the changes associated with agriculture. The second category deals with the changes associated with the eco-system. Changes in the fishing system and practices comprise the third category, and the fourth category discusses infrastructural changes. The final category identifies the changes in the governance and management in the fisheries sector since 1971. All these changes have directly or indirectly affected the capture fisheries of the study area. The subsequent sections of this chapter discuss details about these changes. Impacts of these changes over fisheries and fishing communities are discussed in chapter six.

Table 5.1 briefly presents the structural changes that have taken place in the small-scale fisheries in Parbatipur and their effects. These are discussed further in the subsequent sections.

Table 5.1: Structural changes in inland fisheries in Bangladesh

Changes	Effects	
	Negative	Positive
Promotion of ‘Green Revolution.’ <ul style="list-style-type: none"> • Development of several irrigation projects • Use of High Yield Varieties (HYV) • Increase of chemical fertilizer and pesticides • Withdrawal of water from rivers and canals 	<ul style="list-style-type: none"> • Reduce the area of inland capture fisheries. • Decline in open water fish production • Loss of fish species. • Reduce living space for the residual parent stocks of fish. • Increase competition and conflicts in fishing 	<ul style="list-style-type: none"> • Significant increase in rice production • Achieved foodgrain sufficiency • Increase demand and price of agricultural labor. • Boost rural economy through business related with agriculture
Changes in eco-system <ul style="list-style-type: none"> • Transformation of fish habitat • Destruction of fish breeding place • Scarcity of water 	<ul style="list-style-type: none"> • Extinction of several fish species • Decline in fish production • Drying up of water bodies during dry season 	<ul style="list-style-type: none"> • Increase intensity and production of food-grain
Changes in fishing <ul style="list-style-type: none"> • Increase of harmful fishing practices • Shorten of fishing period 	<ul style="list-style-type: none"> • Growing number of endangered aquatic species • Fishers growing involvement with other occupation • 	
Infrastructural development <ul style="list-style-type: none"> • Development of irrigation canal and drainage • Unplanned road development • Growing homestead expansion 	<ul style="list-style-type: none"> • Disrupts the natural flow of rivers. • Inhibit migration and movement of fish and prawn to their feeding or breeding grounds. • Reduce fish productivity and species diversity. 	<ul style="list-style-type: none"> • Growing irrigation support for crops production. • Easy communication which boosted rural economy
Governance of fisheries <ul style="list-style-type: none"> • Promotion of aquaculture to meet local and national demand • Introduction of leasing system • Hierarchical and complex management system 	<ul style="list-style-type: none"> • Excludes fishers from fishing and gives control over resources to a non-fisher elite group. • Lack of participation of fishers in decision-making process • Ineffective 	<ul style="list-style-type: none"> • The remarkable increase in fish production. • Increase demand and price of aquaculture labor. •

Ref: Ahmad and Reazuddin, 1986; Ali, 1997, 2000; Lewis, 1996; Naher, 1997.

5.2 Promotion of the “Green Revolution”

Immediately after gaining independence, Bangladesh experienced a devastating famine in 1974, which brought untold miseries to millions and resulted in the deaths of many (Sen, 1981). The new government of Bangladesh took the responsibility to provide adequate food for the already large - and still growing - population. The attainment of foodgrain sufficiency was important for Bangladesh and had several implications for the newly independent country. First, it went hand in hand with the development of national development strategies based on agriculture. Second, it gave a signal to the internal arena of progress in the agriculture sector whose future development had been seen as hopeless (Wennergren and Whitaker, 1986). In this situation, the green revolution was promoted by the government as a way of attaining food sovereignty. Though it started in the 1960s in Bangladesh, it intensified in the latter half of 1980s in Dinajpur district, as well as in Parbatipur sub-district. Since the promotion of the green revolution, the largest increase ever in harvest area and production of rice and wheat occurred in Dinajpur, Noakhali, Rangpur, Comilla and Jessore districts (Hukeedt. 1993). Now Dinajpur is recognized one of the most productive areas of staple foods in Bangladesh. In the last three decades, Dinajpur district has achieved foodgrain sufficiency from chronic deficit and emerged as one of the houses of foodgrain production in Bangladesh (Bhuiya and Mohiuddin, 2013). Though foodgrain sufficiency was achieved in the study area, especially in rice through the green revolution, it greatly affected the inland capture fisheries, water, and ecology of this area.

Land scarcity and government initiatives have brought almost all the available land in this area under cultivation. Of these lands, a significant portion was lowlands which were the source of capture fisheries. The green revolution brought structural changes in food production, especially in rice. Before the 1980s, two types of rice in particular were cultivated in this area:

Aus and Aman. Aus is the pre-monsoon upland rice. It is planted throughout March and April, after the pre-monsoon shower, and is harvested between July and August. Aman, on the other hand, is the monsoon season rainfed rice. Aman is planted in June and July and harvested from November through December. Introduction and expansion of the high yielding varieties (HYV) expand the third kind of rice growing seasons known as Boro. Boro is dry season irrigated rice which is famous for high production and water input. Boro is planted from December to January and harvested between April and June. Because of its high level of water input, the low-lying land is suitable for Boro production. In Parbatipur sub-district, Boro cultivation increased to almost 49 times that of 1980-81 in last three decades (BBS, 1983; 2013). An older fisher who is now involved in agriculture commented that “two-thirds of the total rice production of the locality comes from the Boro. We prefer Boro because of its higher rate of production.” My personal experience also supports the statistics. During my fieldwork, I found almost all the land of the locality except the higher areas used for Boro cultivation. Almost all the low-lying lands, beels, and ditches of the study area have been brought under Boro cultivation, which had previously been the main source of year round capture fisheries (see table 5.2). Since the 1990s, low-lying lands, and even the beels, have been often drained to plant high yielding Boro rice. Rice sufficiency of this area is achieved at the cost of inland capture fisheries of the locality, which was the main source of food and livelihood for fishers and the poor and destitute of the area.

Table 5.2: Area and production of rice crops in Parbatipur Upazila						
Year	Aus		Aman		Boro	
	Area (Acre)	Production (Metric tonnes)	Area (Acre)	Production (Metric tonnes)	Area (Acre)	Production (Metric tonnes)
1980-81	18319	7350	79500	-	1305	1397
2010-11	-	-	63100	100794	64345	202043
Source: BBS, 1983; 2013						

The agricultural development of the study area, especially rice production, has immensely affected the capture fisheries. This is consistent with the trends at the national level, where areas of capture fisheries have continuously decreased with the development of rice production. The findings of the Master Plan Organization (1987 in Ali 1997), for example, identify that over 0.81 million hectares of floodplain have been permanently removed from fish production and another 2.0 million hectares of floodplain fish habitat is under the threat of removal from fisheries over next two decades. Open water fisheries production of this area has been reduced and is being reduced every year, as more and more open water fish production areas are removed or altered for foodgrain production (Ali, 2000).

5.2.1 Irrigation

Crop intensity in Parbatipur has significantly increased over last three decades. The proportion of double-cropped has increased to more than two times than that of 1979-80, from 30227 acres to 60900 acres, whereas triple-cropped increased from 5715 acres to 8266 acres. Increased crop intensity drastically raises the demand for irrigation. Furthermore, expansion of Boro rice (dry season rice) cultivation and the High Yielding Varieties (HYV) rice made the situation worse. Boro rice requires around 16500 m³/ha, which is around three times more than the rainfed rice

(Aus and Aman) which usually requires 5500 m³/ha (Facon, 2000). As High Yielding Varieties are irrigation intensive, the government has promoted deep tube wells (DTW) and low lift pumps (LLP) through subsidization to increase rice production (Shankar and Hall) since the 1980s. This subsidization created an expansion of small-scale irrigation boom in the 1990s that has continued to the present, which has immensely affected the capture fisheries of this area. Beel water became the main source of irrigation to cultivated lands adjoining beels. In the 1970s and 80s, people of this area used swing baskets for irrigation from beels and khals (canals), which can raise a small amount of water at a time. But the introduction and uses of low lift pumps (LLP) and shallow tube wells (STW) made possible the higher discharge of water for irrigation, and draws water from beels until it dries out. Dry season water level maintenance is very important for fisherproduction and productivity. This is the season when the fish spawn and provide recruitment for next year's stock (Shankal and Halls). Most of the fish mortality occurs during this season. The cheap and transportable characteristics of LLP and STW made them very popular among the farmers which emerged as the biggest threat to capture fisheries. This situation is well noted by a responded, named Krishno, "Shallow tube-well is our biggest enemy, it takes away our livelihoods from us."

Table 5.3: Number of deep tube wells and low lift pump in Parbatipur (Area in acres)

Time	Deep tube-wells		Low lift pumps	
	Number	Area coverage	Number	Area coverage
1980-81	652	40762	317	12790
2010-11	109		9457	40145

Source: BBS, 1983; 2013

5.2.2 Pollution

Chemical fertilizers and pesticides have become highly important with the introduction and expansion of High Yielding Varieties (HYV) in agriculture. In Bangladesh, the use of chemical fertilizers and pesticides increase about 150-300 percent compared to the 1950s (Rahman and Debnath, 2015; see table 5.4). In Parbatipur, so as in Dinajpur district, agrochemical use sharply rose after the 1980s, especially with the expansion of Boro crop (BBS, 1983; 2013). A large portion of the farmers in this area are marginal and medium types of land owner who try to maximize their crop production through the acute use of agrochemicals without consideration of the long-term effects of doing so. Their indiscriminate use of chemical fertilizers and pesticides has emerged as a great threat to inland fisheries, soil fertility, and human health.

Agrochemicals are one of the major causes of damage to inland fisheries resources in Bangladesh (Karim and Ahsan, 1989). In the study area, pesticides and fertilizers are the most common waterbody pollutants (MoL, 2015). Most of the fisheries resources of this area, such as beels, canals, and ditches, are within the agricultural land. Therefore, the agrochemicals are easily washed away with the resources through the irrigation channel. Contamination of these resources presents a great threat to fish habitat, fish flesh, and fish food (Bhouyain, 1995). Excessive use of agrochemicals kills the inland openwater fish, especially fish fry, resulting in a decline in fish species and fish production (BCAS and IIED, 2004). Water pollution through agrochemicals has been identified as one of the main reasons for the decline in fish species and inland fish production in this area, which is familiar with the findings of Ali (1994).

Table 5.4: Fertilizers and pesticides consumption in Bangladesh and Dinajpur district

Trends of fertilizers and pesticides consumptions in Bangladesh (in metric tonnes)		
Year	Chemical fertilizer consumption	Pesticides consumptions
1978-79		3336.00
1988-89	2043176	5050.76
1996-97	3036563	11367.20
2007-8	3064263	48690.19
2010-11	3645600	44423.43

Use of chemical fertilizers in Dinajpur district (in metric tonnes)						
Year	UREA	TSP	MP	DAP	Others	Total
1980-81	18620	12810	-	4792	2064	38286
2010-11	114908	35741	29291	13072	10996	204008

Source: BBS, 1978-2013

5.3 Changes in ecosystem

5.3.1 Loss of fish habitat and fish breeding place

“*Chokher samne sob shes hoa gelo, keu kichu korlo na.* (Everything has been destroyed in front of us, no one did anything to save it).” This comment of an older fisher indicates the long-term changes in the small-scale fisheries of the locality. Beels, khals (ditches), and rivers were the main sources of open water capture fisheries in Manmathpur Union. There were seven large-scale beels and two khals in this area. Those were government property and provided open access to all, and were a source of fish year-round, until the mid 1990s. These beels and khals gradually became occupied by the influential and were transformed into agricultural land since the 1980s, but dramatically increased in the 1990s. Most of these resources became private

property and denied the fishers' and other poor people use rights. The Choto Jamuna river, which flows through the Union, has also lost its natural flow of water due to the embankments made by the influential local leaders in several parts of it for fishing. Most of the parts of the river also dry out during the dry season due to irrigation. Now the main source of open-water capture fisheries in this area is the floodplains during the peak flood period during the monsoon season.

Table 5.5: Open waterbodies in the Manmathpur Union and their present situations

Type of waterbody	Name of the water bodies	Present situation of the water bodies
<i>Beel</i>	<i>Debidoba Beel</i>	Almost half of the beels occupied by the influential and became private property, rice cultivated in the occupied portion in the dry season. Rest half became almost dry in the dry season; fishers only get access to fishing during monsoon.
	<i>Dolbari Beel</i>	The size of the beel reduced almost two third and occupied by the beel adjacent Muslim community and managed by the local Mosque Management Committee. Fishing is restricted in the dry season; fishers only get access to fishing in the monsoon with the permission of Mosque Management Committee.
	<i>Vorotdah Beel</i>	Almost whole beel transformed into agricultural land and became private property. Only a small portion of beel becomes live in the monsoon.
	<i>Pachaton Beel</i>	The beel became private property and transformed into agriculture land.
	<i>Bani Pukur</i>	The size of the beel became almost half and dried out in the dry season due to irrigation.
	<i>Chagolpati Beel</i>	Has been totally transformed into agriculture land privately owned.
	<i>Shakoa Beel</i>	The area has been drastically reduced and became one-third of its previous size. Dried out in the dry season.
<i>Khal</i>	<i>Shoirakhol</i>	No sign of canal, totally transformed into agriculture land. A little amount of fish is caught only in the monsoon.
	<i>Simuliakhali</i>	Greatly reduced the size of the canal. Fish are caught only in monsoon.
<i>River</i>	<i>Choto Jamuna river</i>	Maximum portion of the river dried out during the dry season. At the beginning of the winter when the water level going down the river divided into many parts with the net by the influential of the adjacent river area, and fishing are restricted in those areas.

Source: FGD and interview of fishers and participant observation.

5.3.2 Reduction in amount of fishes

A significant decline in the amount of open water fish has been reported by the fishermen. According to the Department of Fisheries, Parbatipur office, the rate of decline is higher than other parts of the country, as the scarcity of water in this area has become higher than the others'. Besides during the monsoon, according to fishermen, the number of catches drastically reduced in the last fifteen years. In the 1970s and 1980s, on average 7-8 kilograms of fish were caught by each fisherman each day year-round, and the amount increased during the monsoon. But now, averages of 1-2 kilograms of fish are caught in the peak flood season, and hardly 0 - 0.5 kilogram in other times of the year. The changes are well captured in the voice of a sixty years old fisherman, named Binoy (60), "In my young age we need not think about catches, we rotationally went to different beels and khals and came with lots of catches within half of a day. Sometimes when we caught a lot, we left the fishes in the beels again as there was not that much demand for fish that time. But we gradually lost fishes as the IRRI (Boro rice) came. Now we are crying for fish. It becomes a story now that I told my grandson everyday when we go fishing".

Another important change is the loss of large fish. 80% of the catches from areas that are flooded in the monsoon are small indigenous and carp fish. Fishers have reported that now they hardly catch a fish weighing one kilogram or more, but it was very usual to catch a fish weighing one to two kilograms two decades ago. Due to harmful fishing practices such as complete withdrawal of water from water bodies, poisoning, and overfishing, fish rarely get time to attain a larger size.

5.3.3 Loss of several indigenous fishes

The fish biodiversity of this locality faced a gradual decline in last three decades. Many indigenous fish species have become endangered and vulnerable due to degradation and loss of

fish habitat, coupled with the lack of proper management, abstraction of water during dry season, use of harmful fishing gears and system (fishing by poisoning and dewatering), and pollution. Breeding and feeding migrations of fishes has been greatly hampered due to unplanned infrastructural development. Furthermore, introduction and expansion of exotic fishes through aquaculture worsened the situation, as most of the exotic fishes eat small indigenous species (Hossain, 2014). The number of indigenous fish species has gradually decreased over the last three decades, as exotic fishes occupy their niches. A government official of the Department of Fisheries expressed his anxiety by stating that “It is likely that the number of vulnerable and endangered fish species is high in this area due to the continuous destruction of water bodies. The main concern is the number of vulnerable fish species that has been continuously increasing every decade”. A list of endangered, vulnerable, and available fish species of the locality has been developed through a focus group discussion with fishers and is presented below.⁹

Table 5.6: Fishes and their status in the Manmathpur Union

Local Name	Native / Exotic	Scientific Name	Status
Tengra	Native	<i>Mystusbleekeri</i>	Available
Taki	Native	<i>Channapunctatus</i>	Available
Puti	Native	<i>Puntius sp</i>	Available
Darkina	Native	<i>Esomusdanricus</i>	Available
Chingri	Native		Available
Nilotica	Introduced	<i>Oreochromisniloticus</i>	
Common carp	Introduced	<i>Cyprinuscarpiocarpio</i>	
Telapia	Introduced	<i>Oreochromismossambicus</i>	Available
Minor carp	Native	<i>Cyprinuscarpio</i>	Available
Silver carp	Introduced	<i>Hypophthalmichthysmolitrix</i>	Available
Katla	Native	<i>Catlacatla</i>	Available
Thai Pangas	Introduced	<i>Pangasiuspangasius</i>	Available
Gras carp	Introduced	<i>Ctenopharyngodonidela</i>	Available
Bata	Native	<i>Labeobata</i>	Available
Brigad			Available
Ruhi	Native	<i>Labeorohita</i>	Available

⁹Endangered: Facing a very high risk of extinction in the wild

Vulnerable: Facing a risk of extinction in the wild

Available: Available in each season though the amount of fishes greatly decreased

Mirka			Available
Koi	Native	<i>Anabustudinius</i>	Available
Gazar	Native	<i>Channamarulius</i>	Vulnerable
Dhedo	Native		Vulnerable
Shorputi	Native	<i>Puntius sarana</i>	
Magur	Native	<i>Clariasbatrachus</i>	Vulnerable
Baim	Native		Vulnerable
Shing	Native	<i>Heteropneustesfossilis</i>	Vulnerable
Kursha	Native	<i>Sinilabeodero</i>	Vulnerable
Balachata	Native	<i>Acanthocobitisbotia</i>	Vulnerable
Air	Native		Vulnerable
Kakila	Native	<i>Xenentodoncancila</i>	Vulnerable
Khoilsha	Native	<i>Colisafasciatus</i>	Vulnerable
Mola	Native	<i>Amblypharyngodormola</i>	Vulnerable
Gochi	Native		Vulnerable
Cheng	Native	<i>Channaorientalis</i>	Vulnerable
Kechhki	Native	<i>Coricasoborna</i>	Vulnerable
Mrigol	Native	<i>Cirrhinuscirrhus</i>	
Baila	Native	<i>Awaousguamensis</i>	Endangered
Foli	Native	<i>Notopterusnotopterus</i>	Vulnerable
Cheli	Native	<i>Chela cachinus</i>	Endangered
DeshiShoil	Native	<i>Channastriata</i>	Endangered
Pabda	Native	<i>Ompokbimaculatus</i>	Endangered
Chapila	Native	<i>Grudusiachapra</i>	Endangered
Roina	Native	<i>NundusNundus</i>	Endangered
Boal	Native	<i>Wallago attu</i>	Endangered
Chital	Native	<i>Notopteruschitala</i>	Endangered
Batasi	Native	<i>Pseudeutropiusatherinodes</i>	Endangered
Baim	Native	<i>Macrognathusaculeatus</i>	Endangered
Golsha	Native	<i>Mystuscavasius</i>	Endangered
Kuicha	Native	<i>Pisodonophiscancrivorus</i>	Endangered
Phasa	Native	<i>Setipinnaphasa</i>	
Baghair	Native	<i>Bagariusbagarius</i>	
Kalibaus	Native	<i>Labeocalbasu</i>	Endangered

5.3.4 Scarcity of water

One of the biggest challenges of open water capture fisheries in Parbatipur is the growing scarcity of water. Increasing demand and abstraction of water for irrigation from both the ground and the surface makes the situation worse every year. Surface water has disappeared from beels, khals and even from the river over the last three decades. The ground water level continued to go down. The average underground water level in Parbatipur was 5.87m (19.25 ft) in 2010

(Mbugua, 2011) whereas it was 2.42 m (7.95 ft) in 1982 (BBS, 1983). The underground water level in Bangladesh goes down by 5m annually. Although it recharged again in other parts, in the northern part of Bangladesh, it does not recharge well due to inadequate rainfall, low water flow in the small and major rivers of the area, and geographical features (Mbugua, 2011). The nearest major river is the Teesta, the fourth major trans-boundary river between India and Bangladesh. The upstream inflow of Teesta is the major source of water in this region and provides key support to fisheries and agricultural production. In 1975, India developed the Gazoldoba Barrage about 65 km upstream of the Bangladesh border. Bangladesh also developed another Barrage in 1990, named Teesta Barrage, for irrigation in the northwest part of Bangladesh. The Gazoldoba Barrage greatly disrupted the natural flow of the river; the water flow is getting down day by day. The water flow is reduced significantly during the dry season. Most of the rivers in northwest Bangladesh, including Parbatipur, become dry in the dry season, as a result of the reduction of Teesta's inflow. It caused major environmental changes in the area and reduced the area and production of inland capture fisheries. In the 1970s and 80s, the rivers, beels, and canals were the main sources of capture fisheries in this area, but now they are found almost dry year-round, except during the rainy season. Most of the waterbodies of this area now dry up completely dried up from December to May, but it is important to maintain the dry season water level for the reproduction and productivity of the fishery (Halls et al. 2001).

Table 5.7: Water flow during dry season in the Teesta Barrage Project area

Year	Water flow (In Cusec)
1980	4494
1990	4732
2000	1033
2010	545
Source: The Daily Janakantha 10.27.2011 in Mbugua (2011)	

Figure 5.1: Socio-economic and ecological changes in Naya Jelapara since the 1970s

Times	1970s	1980s	1990s	2000s	2010s
Crops (Rice)	↓	↑	↑	↑	↑
Food sufficiency	↓	→	↑	→	↑
Fruits	→	→	→	↑	↑
Livestock	→	→	→	→	↑
Poultry	→	→	→	↑	↑
Capture fisheries	→	→	↓	↓	↓
Culture fisheries	→	→	↑	↑	↑
Native fishes	→	→	↓	↓	↓
Alien/Exotic fishes			↑	↑	↑
Aquatic plants	→	→	↓	↓	↓
Economic status of fishers	→	→	↓	↑	↑

Average: → Increase: ↑ Decrease: ↓

5.4 Changes in attitudes

“We were like brothers, we fished, lived together, we were together in our days of sorrow and happiness (*sukhe - dukhe*). But the new generation has become selfish; they do not have time to think of others.” This comment of a senior fisher indicates the changes in fishers’ attitudes. Growing competition in fishing and increasing involvement with other occupations for livelihoods has brought changes in the attitudes of fishers. Earlier fishermen of Naya Jelapara caught fish in a large group all year-round. Now they catch fish separately or in a small group,

hardly fishing in a large group as the fishing resources have been greatly reduced. This change in fishing practices has brought changes in their mindset and attitudes. Fishers have become more self-centered than the previous generation. Now fishermen individually try to build tactical relations with the influential members of the locality to attain greater access to the resources. This tendency creates distrust among fishers. Another division has been noticed among the fishers; there are those fishers who are the registered members of fishers' association and got a lease for the government ponds, and there are those fishers who do not get the lease. Fishers who do not get the lease express their disappointment and distress towards the fishermen who got the lease. They thought that the fishermen who got the lease did not think about the community, and only think about themselves, and that they should help the poor fishers to get the lease together as they are a community.

Many fishers of Naya Jelapara have now lived in cities for a long time. Their participation in other occupation and culture has brought changes to the culture of the fishing community. Men and women of the new generation do not want to follow their communal norms, values, and rules. Therefore, the Samaj Committee, which is formed with the senior persons of the community to guide them in every aspect of life, has become less important. Previously, the committee members were very respected by the community and everyone followed their advice. But the respect is reduced now as individuality, disappointment, and mistrust among fishers has increased. Now the community members very often oppose the decisions of the committee and deny it if it goes against them.

5.5 Infrastructural development

External issues like development interventions and water management projects have been identified as a great source of aquatic resource depletion in Bangladesh (Lewis, 1996; Ali, 1997; Ali, 2000; Ahmad & Reazuddin: 1986). My study area is situated under the Teesta Barrage Project (TBP) coverage, one of the largest irrigation projects of Bangladesh, comprised of a 615m barrage, 708km of irrigation canal networks, 380km of drainage channels and an 80km flood embankment. Irrigation canals and drainage crisscross the study area, in some places divided the waterbodies and are restricted by the natural flow of water throughout the floodplains. The density of the population in Parbatipur increased to 823 per square kilometer in 2015, having been 381 in 1974 (National Web Portal, 2015). A substantial amount of lowlands adjacent to village have been transformed to homesteads to meet the growing housing demand. Furthermore, the length of road (both metallic and non-metallic) in Parbatipur has doubled in the last three decades from 346 km in 1982 to 787 km in 2015 (BBS, 1983; National Web Portal, 2015). Many portions of these roads go over waterbodies and low-lying land; even the water passing channel was not considered during the development of the roads to reduce the cost. The planning, design, and implementation of these water development projects, roads, and other infrastructure development never took into account the impact of these projects on fish, prawns, and other aquatic living resources (Ali, 1997).

Alteration of aquatic habitats not only reduces the fish production of that locality permanently, but also adversely affects the fish production in other components of the system elsewhere. According to Master Plan Organization (MPO, 1985), the removal of flooding water from one hectare of floodplain would produce the disappearance of 37 kg of fish every year. MPO reports (MPO, 1986, 1987a, b in Ali, 1997) presented the adverse impacts of water

resource development projects. Flood control embankments, irrigation canals, and drainage prevent lateral migration and movement of fish and prawns, resulting in the loss of many species.

5.6 Governance and management of fisheries in Parbatipur

The governance and management of inland fisheries in Bangladesh has gone through a long process of changes, but property rights have been used as the main management tool at all times, benefitting some groups and depriving others. From the colonial period until 1986, the property rights were the main mechanism for inland fisheries management in Bangladesh. Through the Permanent Settlement Act of 1793, the British colonial rulers introduced *Zamindari* system which gave *Zamindars* the legal authority over natural resources against the regular payment of rent. At the same time, it restricted the general public's rights and access to resources (Khan, 2012). The *Zamindari* system was replaced by East Bengal State Acquisition and Tenancy Act in 1950, and all common natural resources were brought under the control of the state and people received access to resources. Immediately after the independence of Bangladesh, all common fisheries resources were brought under the authority of the Ministry of Land and a revenue-oriented state policy was introduced for natural resource management through a leasing system by which resources were allocated to the highest bidder for a fixed period.

Since 1971, a remarkable improvement has been identified in fisheries policies, laws, and acts which address the rights of genuine fishers, push for greater participation by fishers in aquaculture, and emphasize the conservation of ecology. But the implementation of these policies, laws, and acts is frustrating. In reality, fishers are continuously losing their fishing rights - especially in the inland open water fisheries and their participation in aquaculture is restricted by the high amount of leasing fees, the ineffectiveness of laws and policies, undue

transactions during the leasing process, political pressure, and the illegal demands of the ruling party (Toufique, 1997; Khan et al. 1994). Although the latest fisheries policy put more emphasis on conserving ecology and biodiversity, it failed to achieve its objectives. Rather the waterbodies increasingly degraded due to the high target of production, lack of an effective monitoring system, and execution of laws.

Table 5.8: Major changes in inland open water fisheries governance in Bangladesh

Policy, Laws, and Acts	Changes	Effects
The East Bengal Acquisition and Tenancy Act, 1950	Before independence, under this Act, all <i>jalmohals</i> (wetlands) were brought under the authority of the government through the abolition of the <i>Zamindari</i> system. After independence, all the <i>jalmohals</i> (wetlands) were handed over to the Ministry of Land (MoL), and it introduced a leasing system through the highest bidding for revenue collection.	<ul style="list-style-type: none"> • Introduction of leasing system • Leased <i>jalmohals</i> (wetlands) captured by non-fishers • Restricted access to leased-out waterbodies • Denial of fishing rights to fishers • Lots of <i>jalmohals</i> (wetlands) were remain out of lease
Allocation of functions to the Ministry of Fisheries and Livestock, 1975	Functions of the Ministry of Fisheries and Livestock were defined for the first time. Functions included: development of a national fisheries policy, development of the sector, research on fisheries, etc.	<ul style="list-style-type: none"> • Creation of a separate and specific Ministry for Fisheries • <i>jalmohals</i> (wetlands) were still under the authority of MoL
Restricted Leasing System	In 1980, the management of <i>jalmohals</i> (wetlands) was transferred to the Ministry of Fisheries and Animal Resources (MoFAR) until 1983. MoFAR follow two systems of leasing: a) restricted leasing among the registered fishers' cooperative society, b) direct negotiations with individuals or organizations	<ul style="list-style-type: none"> • More structured leasing system to increase revenue • Fishers' participation in leasing system
Protection and Conservation (Amendment) Ordinance 1982	A new and inclusive definition is given through the amendment. The new definition of fish includes all cartilaginous, bony fish, prawn, shrimp, amphibians, tortoise, turtles, crustacean animals, mollucs, and frogs.	<ul style="list-style-type: none"> • An inclusive definition of fish
The Local Government Ordinance, 1983	Management of the <i>jalmohals</i> (wetlands) transferred to local government, size less than 0.81 ha, transferred to Union Parishad (the lowest unit of local government), and 1.21 to 8.10 ha to Upazila Parishad (sub-district council)	<ul style="list-style-type: none"> • The lease of the <i>jalmohals</i> (wetlands) mainly went to the powerful local elite. • Degradation of water resources as the lessees trying to maximize the profit • Improvement in revenue through lease fee collection via Union Parishad and Upazila Parishad
The New	Sharing of ownership and management of	<ul style="list-style-type: none"> • Transfer of around 300 water bodies to

Fisheries Management Policy, 1986	jalmohals between the Department of Fisheries (DOF) and the Ministry of Land (MoL).	the Department of Fisheries (DOF). <ul style="list-style-type: none">• Increase of lease fee
National Fisheries Policy, 1998	Put emphasis on fisheries production, creating self-employment through fish culture, and earn foreign currency by exporting fish and fisheries products.	<ul style="list-style-type: none">• Expansion of aquaculture and intensification of resource abstraction• Degradation of fisheries resources• Increase in the proportion of non-fisher elite in aquaculture
The <i>Jalmohals</i> Management Policy, 2005	Decentralization of the authority of wetland resource management. Involvement of diverse institutions in wetland resource management increased. Greater roles of Union Parishad, Upazila Parishad, District and sub-district administration, the Ministry of Youth and Sports.	<ul style="list-style-type: none">• Continuation of degradation of resources.• Political activist and elite participation increased through the leasing to youth club
The <i>Jalmohals</i> (Wetlands) Management Policy, 2009	Greater emphasize to ensure the leasing of wetlands to genuine Fishers Cooperative Society. Participation of fishers in the District and Sub-district Jalmohal Management Committee.	<ul style="list-style-type: none">• Due to the lack of monitoring non-fisher and elite persons registered as Fishers Cooperative Society (FCS) and got a lease.• Resource-rich wetlands are captured by these non-fishers FCS through the highest bidding.

Parbatipur Fisheries Office (the sub-district office of the Department of Fisheries) is the main responsible institute for the management and development of fisheries in this area. The sub-district fisheries office mainly implements the program taken by the central office. The sub-district office does not have the workforce or economic support to implement area specific program for the development of open water fisheries. The fisheries office is playing a remarkable positive role in the development of aquaculture in this area following the national plan program. But it does not have any program for the development of open water fisheries except occasionally putting fingerlings in some selected beels. Furthermore, it has failed to protect the available open water bodies due to their lack of willingness and limited workforce, lack of support from the law enforcement department in the execution of laws, and lack of coordination among the related departments.

The Upazila Jalmohal Management Committee, which is headed by the Upazila Nirbahi Officer (UNO) and Assistant Commissioner (Land) as Secretary- is solely responsible for leasing out of the waterbodies up to 20 acres, management, and the monitoring of water bodies in its area. The Upazila Fisheries Officer (UFO) (sub-district fisheries officer) is a member of this committee, along with other government officials¹⁰, respective Union Chairmen, two members of the fisheries association, and a member of civil society, agricultural organization, as well as women selected by UNO. Moreover, respective Members of Parliament (MP) and Upazila Chairman play the role of advisors to the Committee. The Upazila Fisheries Officer has a minor position in the committee due to its hierarchical structure, and most of the time the officer cannot play active and positive role in the leasing of the water bodies to genuine fishers due to the undue demand of the public representative and political pressure of the ruling party. In this study area, only 10 out of 43 government ponds were leased out to genuine fishers' associations and the rest are leased out to different organizations which are mainly controlled by the local elite and members of the ruling political party.

Table 5.9: Changes of fishing rights over government pond in the Manmathpur Union

Fishing rights	Time	Participation of fishers
Government of Bangladesh	Since Pakistan period until the middle of the 1970s	All government ponds were open to all
Fisheries project under Department of Fishery	Since the middle of the 1970s to 1988	Under the management and supervision of the sub-district Department of Fisheries (DoF), fisher's culture fished at a limited level in only the good quality ponds. The production was shared between the fishers and the DoF; fishers got one-fourth of the production. Besides those good quality ponds, the rest were open to all.
Leasing to Grameen Motsho O Pashusampad Foundation	From 1988 to 2009	15 out of 43 ponds were leased to GMPF for aquaculture and these were the best quality ponds of the area. Only

¹⁰Other government officials in the Upazila Jalmohal Management Committee are, Upazila Cooperative Officer, Upazila Agriculture Officer, Upazila Cooperative Officer, Officer in Charge of respective Thana, Upazila Youth Development Officer and Upazila Women Affairs Officer.

(GMPF)		fishers to ponds adjacent area, who were members of GMPF committee, got the rights to fish and to a portion of fishing.
Leasing to the Fisher's association and other cooperatives	From 2009 to the present date	For the first time, 5 fisher's associations of the Union got a lease of 10 ponds. The rest of the ponds were leased to youthclubs, freedom fighter organizations, government housing projects, and individuals.

Source: Field findings from fishers and both govt. and non-govt. officials

5.7 Promotion of aquaculture

A structural transformation from open water capture to ponds based culture fisheries has been identified in Parbatipur Upazila. The area and production of open water capture fisheries have been significantly reduced in the last four decades, especially in the 1980s and 1990s. Against this trend, area and production of culture fisheries - more specifically ponds based aquaculture - significantly increased in the last three decades, especially in the 1990s and 2000s. Today, Parbatipur Upazila has a total wetland area of 1265.98 hectares, of which the areas of culture and capture fisheries is 1019.96 hectares and 246.02 hectares respectively (MoL, 2015). Fish production increased by 40.19% in the last 10 years, from 3082.92 MT in 2003-2004 to 4322.04 MT in 2012-2013 (MoL, 2015). A significant portion of this production comes from the culture fisheries. The average fish production in Parbatipur Upazila is 300 kg/ha in capture fisheries, whereas it is 4240 kg/ha in pond aquaculture.

Parbatipur Central Fish Hatchery currently plays a vital role in the expansion of culture fisheries in Parbatipur as well as the whole northwest region. To increase the fisheries' production in the northwest region to meet local and national demand, Parbatipur Central Fish Hatchery implemented the Northwest Fisheries Extension Project¹¹ (NFEP), which was started in 1987 and ended in 2007, to expand fish culture in this region and increase fish production. Under

¹¹The NFEP was a collaborative project of the British Department For International Development (DFID), Overseas Development Administration (ODA) and the Department of Fisheries (DoF) of the Government of Bangladesh.

this project, people were motivated and convinced that fish culture is an important cash crop and has the potential to improve earnings more than other cash crops. Fish farmers of the northwest region were given training on fish farming, and fish fingerlings were provided by the Parbatipur Central Fish Hatchery under this project. The highest percentage (45%) of fish farmers in this area started fish farming, especially carp, during 1996-2000 and 37.5% started after 2000, whereas it was 0% before 1990 (Islam and Haque, 2010). The average fish production of farmers increased from 408.55 kg/ha to 2224.07 kg/ha, before and after the NFEP project. Within a decade of the project starting, it achieved remarkable success, as it proved more profitable and cheap than other crop production. This shift was a great success regarding production, but it excluded small-scale fishers from fishing and was increasingly dominated by non-fishers. With the rise of aquaculture, the introduction of new technology, capital investment, and the privatization of common property in the name of lease-based fishing in Bangladesh, they have largely become controlled by non-fishers (Ahmed et al. 1998; Thomson & Hossain 1998; Toufique 1997).

5.8 Conclusion

The growing population and increased demand for food has raised pressure on land and the intensity of crop production, which led to the over exploitation of resources. Common property resources are exploited and destroyed, mostly due to the absence of effective resource management system and execution of laws. In the last three decades, open water fisheries resources (*beels*, *khals*) in Naya Jelapara were alarmingly reduced and transformed into agriculture land, which was indirectly supported by the government in the name of the green revolution. This alteration of common property resources takes them away from fishers and poor

people and gives them to the influential. Although the transformation of *beels* and *khals* into agricultural land significantly contributed to foodgrain sufficiency for the locality, it undermined the importance of those resources to the people who relied on them. The direct benefits of this change go to the influential that got the property rights to these resources but create some indirect benefits for the poor and fishers through increasing demand for agricultural labor. This indirect benefit is minor to fishers compared to their previous life when they had the use rights to fishing all year-round. Destruction and transformation of fisheries resources led to a process of loss of fishing and related professions in Naya Jelapara and forced them to get involved with other available occupations, as the fishing period had become significantly shorter. Significant open water biodiversity loss, due to the reduction of fish habitat, an increase harmful fishing practices, and fisheries resource-destructive infrastructure development, brought changes in people's diet, especially fishers and other poor people.

The fisheries policies and programs in Bangladesh are biased towards promoting culture fisheries to increase production, which is very much evident in Parbatipur Upazila. As a part of the national policy, the rapid expansion of aquaculture reported in Parbatipur Upazila in the last two decades led to a structural transition in the fisheries sector in the Manmathpur Union, from open water capture to pond-based culture fisheries. The high level of landlessness, shortage of capital, lack of socio-political power, corrupt leasing system, and illegal interference by the ruling political party has restricted fishers in getting the full benefits of aquaculture development. Like agriculture, fishers indirectly benefited from the development of aquaculture in the form of aquaculture labor, but the direct benefits go to the non-fisher elite group.

Involvement of diverse institutions in fisheries resource management in Parbatipur Upazila makes it complex and challenging, and sometimes becomes a constraint on the

development of the sector rather than a support for it. Lack of coordination among the Ministries and Departments related to fisheries and their conflicts of interest, and absence of government endorsement make inland fisheries management - especially open water fisheries - more challenging. Until today, property rights have been the main mechanism for fisheries management in Parbatipur, and property rights are defined by the leasing system. Though the last Jalmohal (Wetland) Leasing Policy (2009) clearly defined the leasing of Jalmohal to genuine fishers' associations, it failed to address the heterogeneity of fishers. Therefore, very few fishers directly benefited from it. The highest bidding system restricted most of the fishers from the leasing system. Besides the highest bid, political power and illegal transactions (like bribes) play a vital role in the auction process, which favors the elite and excludes the poor from the system. The high leasing fees and management costs, the inability to maintain control over the resources, and uncertainty surrounding profit prevent fishers from taking part in the leasing system, which has allowed the elite to take control over fisheries resources in the name of a fake cooperative society or through sub-leasing.

Chapter six: Impacts of and responses to the structural changes

6.0 Introduction

This chapter addresses two objectives of the study: first, the impacts of the structural changes over fisheries and fishing community, second, the ways fishers responded to these changes. Structural changes in the small-scale fisheries in Parbatipur have left an adverse impact on fisheries and fishers, although the impact varied with economic status, gender, religion, age and political identity. The fishing period has been significantly shortened over the years, which has led to changes in the fishers' livelihoods. Women of fishing families have lost the occupation as adjacent fishing resources are destroyed and transformed into cropland. Children have gradually lost their willingness to become involved with capture fisheries like their parents and grandparents had been, as there is no security of income year-round. Although most of these structural changes have reduced the total area and number of capture fisheries, they have also created many other alternative opportunities for fishers. Fishers' involvement with agriculture is growing, which has improved the status of their food availability. Involvement with many secondary occupations has increased, ensuring their regular income. Though the benefit of the development of aquaculture mostly goes to the non-fisher elite, but it simultaneously creates a demand for aquaculture labor, which has become one of the main sources of income of fishers.

Fishers have responded to these changes in multiple ways, such as by diversifying their livelihood and income, migrating, sharecropping, borrowing and lending money, and drawing on the various forms of social and kin relationships. The development of agriculture, aquaculture, and communication in the area has created many employment opportunities and a growing number of fishing households are using these sectors as a source of income, along with fishing. Most of the households are involved with two or three occupations at a time to tackle the effects

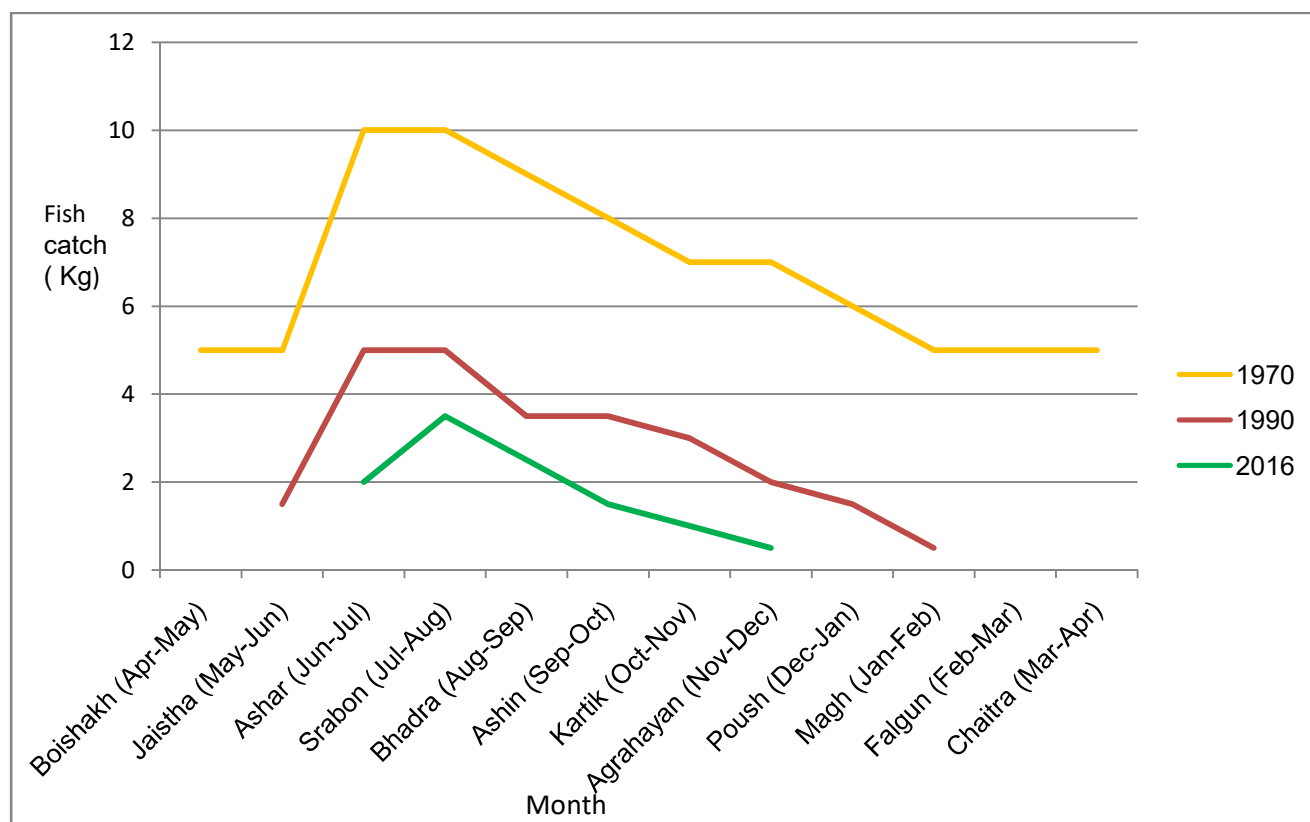
of these changes and to maintain the household income. Previously, fishing was the main occupation of each of the household members, but now household members are involved with diversified occupations to continue the normal flow of household income, if one failed, then other members help the household to help out of the problem. Strategies pursued by fishers minimize the shock and insecurity brought by those changes and provide flexibility between sources of income, increasing fishers' abilities to achieve basic household subsistence needs. Moreover, they also support the improvement of livelihood and many areas of life through the investment of surpluses in a variety of other activities.

6.1 Impacts of the structural changes in fisheries and fishers

6.1.1 Shortening of the fishing period

Over time, the fishing period has been shortened in the locality. Now the openwater fishing period is concentrated during the monsoon, mainly in the peak flood period (August – mid-October). The fishing season starts in July, with the start of rainfall and the rising of water levels in the beels, khals, and river. The floodplains become the common fishing ground once the flood water flows over the agriculture land. The season starts then and come to end in around mid-October when the water begins to drain off into the lower lying area slowly. The fishing becomes restricted in the floodplains, as the borders of the individual lands become visible. Catches gradually decrease after October as the water becomes increasingly shallow, and finally comes to an end around mid-November with the start of irrigation.

Figure 6.1: Changes in fishing calendar in Naya Jelapara by period and Bengali month



6.1.2 Harmful fishing effort and overfishing

As the number and area of fisheries resources have been reduced significantly over the last couple of decades, pressure has increased on the rest of the resources. The catch from per-unit attempts has greatly decreased, resulting in an increase in harmful fishing practices like poisoning and dewatering from water bodies to catch more fish, which is destroying the fish ecology and may eventually contribute to the extinction of fishes. At the end of the monsoon, fishes of floodplains gather in the deepest part of the water bodies, as the monsoon water gradually goes down to the lower part of the waterbodies. The owner of the waterbodies, and sometimes the whole community, begins dewatering the water bodies to catch all the fish at once, which greatly affects the aquatic species. Besides the catch of fish, it kills the immature

fish (ova, larvae), breeding fish, and other aquatic species threatening the production for next season. Another destructive fishing practice is the poisoning of the waterbodies to catch fish. It mainly happens in the leased or privately- owned water bodies, but it sometimes happens in the beels too. When the lease comes to an end, the lessee poison in the water body to catch all of the fish to maximize the profits. Poison is also put in the water bodies to kill the harmful fishes before the fingerlings are put in the water bodies for culture. This poison kills not only the fish, but also the natural ecology of the waterbodies and the fish food web. Indigenous fish of the area are mostly affected by these practices, as no unaffected fish habitat is left for them in the beels, rivers, or the ponds. Apart from poisoning and dewatering, the use of extra fine nets, catching of brood fish and mother fish in the monsoon is very common. This destructive and illegal practice is increasing due to a growing demand for indigenous fishes, lack of monitoring, and inappropriate management.

6.1.3 Changes in fishing livelihood

Great changes have been reported in the livelihood of fishers in Naya Jelapara in the last two decades. Most of the fishers in Naya Jelapara who have been doing fishing for generations have now become part-time fishers, as the fishing period has become shortened significantly and the number and area of waterbodies has been reduced drastically. Beyond the fishing period (during monsoon), they are involved with other occupations for a living. But still, they give the highest preference to fishing and do not miss any opportunity to fish. Besides the generational¹² fishers, the number of part-time fishers in this area has increased considerably over the last two decades. These part-time fishers are mostly from the Muslim community, and by profession are mainly

¹²Fishers in Naya Jelapara are doing fishing for generations not only for money but also for their love and passion to this occupation, and intend to carry the culture of their fore parents. They expect their coming generations will also carry this culture for generations.

farmer and agricultural laborers. After planting Aman paddies at the beginning of the monsoon in July, people have less agricultural work before the harvest of Aman in October-November. During this period, poor farmers involve them in fishing to supplement their income from agriculture and for family consumption. Over the last one decade and a half, the number of this kind of fishers alarmingly increased and emerged as a threat to generational fishers. Generational fishers are increasingly facing tough competition in the peak period of fishing. Sometimes they lose their use rights to Muslim fishers, as they possess more social and political power than generational Hindu fishers. Besides generational and part-time fishers, there are some occasional fishers in this area who are distinct from part-time fishers because they only work for 2-3 days a week in fishing during the monsoon, while part-time fishers work full time during this period. The occasional fishers are also mostly Muslim and they are mainly the floodplains' land-owners. When the floodplain water level goes down and the land boundary becomes visible, they close the land with mud or nets and restrict other from fishing. Finally, they dry the land and catch fish. This kind of fishing denies the use rights of fishers and shortens the fishing period of genuine fishers, making their livelihood more vulnerable. The vulnerability is depicted in the voice of a fisherman named Bimol (62),

Now fishing is not our but the Muslims, they took away the waterbodies from us, now they take away our profession. If we raise your voice, we are kicked out from the floodplains and water bodies. Many of us and our women and children are threaten and beaten by them for fishing. To catch fish now, we have to liaison with them and sometimes share the catch. Otherwise, it is difficult to catch fish in this area.

One of the most surprising findings of this study is the increase in registered fishers. The number of registered fishers has increased to around 57% in the 2010-11 fiscal years, compared to 2009-10 (BBS, 2013). The fishermen report that now the number is 3 to 4 times higher than that of 2010. In the study area, middle class and elite people, both from the Muslim and Hindu

communities registered themselves as fishers. Surprisingly, among them few are Brahmin Hindu, who have the highest position in the caste system and thought of the fishers as untouchable. It is surprising because, due to the low social status, no one wants to identify as a fisher, even though they are doing part time fishing. They usually mention it as their hobby or a part-time activity. The reasons for this change, as reported by the fishers, are the recent changes in the national waterbodies leasing laws, which came into effect in 2009. According to this law, only associations of genuine fishers can take part in the lease bidding process and will get the lease. To get the lease to any of the government pond in this area for aquaculture, significant numbers of people registered them as fishers, though fishing was, and still, not their main profession. They take the help of undue transactions and use political power to get them registered.

6.1.4 Increase of competition and conflicts

Conflicts over the use and management of fisheries resources have increased in the study area over the last couple of decades. It has been found that the absence of effective management, the influx of new fishers, access and control over fisheries resources, and politics are the main sources of conflict. The effects of these conflicts are more profound on fishers than on others as they rely on fishing as their main source of food and income. Fishers in Naya Jelapara are not only facing competition from the generational fishers, but mostly from the part-time and seasonal fishers. During the monsoon, the peak period of fishing, all fishers (i.e. full-time, part-time, and seasonal) catch fish in the same ground, which sometimes leads to conflict. Due to the absence of formal or informal conflicts-management systems, low caste Hindu fishers always forced to leave their use rights, as their competitors are socially, economically, and politically more powerful (see case one). Therefore, the low caste Hindu fishers try to avoid the confrontation

with Muslim fishers and landowners rather they always try to develop tactical engagement with Muslim fishers and landowners, especially with the elite to get benefit from the arising opportunities. Despite these tactical engagements sometimes they cannot avoid conflicts due to the absence of effective conflict management system. Due to the poor execution of laws and support from the fisheries department, generational Hindu fishers are facing conflicts in the leased pond also (see case two). These incidents of conflict indicate the lack of an effective management system and highlight the importance of the execution of laws and better management practices for a sustainable and pro-poor inland fishery.

Case One

Sree Ranjit (37) is a low-caste Hindu fisherman. His family consists of four members: him, his wife, and their two daughters. He started fishing when he was around eight years old with his father. Now he works as an aquaculture laborer, along with a fisher. During the monsoon, his wife assists him in catching fish. But they have been facing severe difficulties in fishing in the floodplains over the last 7-8 years. In 2010, Ranjit and his wife were attacked by the Muslim seasonal fishermen while fishing in the floodplains. Muslim fishers opposed Ranjit setting his net in the floodplains, but Ranjit set his net when they went away for the day. The next day, when Muslim fishers noticed that Ranjit had set his net even after their protest, they took away his net along with the catches. Ranjit and his wife tried to stop them, but they were physically harassed and threatened that if they tried to catch fish in the area again, they would lose their life. Ranjit's wife became scared and sought the help of his fellow fishers to solve the issue. After the incident, the senior fishermen of the community met the Muslim fishermen and begged their pardon, requesting that the net be returned. They again threatened to stop them from fishing in the area and refused to give back the net as punishment.

Case Two

In 2011, Naya Jelapara Fisher's Cooperative Society participated in the bidding for government ponds for aquaculture and got a lease for two ponds for the next three years. Before the lease, these ponds were managed by the Grameen Motsho O Pashusampad Foundation (GMPF) until 2009. After that, the local influential people possessed those ponds until the lease. Among the influential some were the relatives of the Chairman of Union Parishad. The fishers' association got the lease in April 2011, but they could not establish their rights until November 2011. Local people, who were enjoying the use rights, stopped them from using the ponds. The fishers' association continuously seeks help from the local fisheries office and administration but has failed to get any. Later, the fisher made liaison with some other influential people to get the use rights, and through their support, they were finally able to get the rights in November 2011. But the influential people that had previously used those ponds were very unhappy and threatened to take revenge. In June 2012, at the time of harvest when fishers catch fish and prepare them to sell, those influential people came and took away all the catches along with their nets and bicycles, and burned the fishers' room and watch tower. Fishers were severely beaten as they tried to protest. Almost all the men, women, and children from the fishing community came to the ponds in support of fishers just immediately after hearing the incidents. They got into a clash with the influential and ponds adjacent peoples. Many of them got injured, failed to get the fish back, and lost the use rights again. The next day, the fishers went to the local police station to file a lawsuit, but police refused to file. The influential were also the members of the ruling party, and they have strong relations with police. They did not get any support from the Union Parishad. Three months after the incident, the fishers' association along with four other fishers' associations of the Union, blocked the vehicle of the respective Member of Parliament and insisted that he hear them out. After hearing all about the incident, the Member of Parliament ordered the police station to file their lawsuit and take necessary action to establish fishers' right in their leased ponds. Just after the order of the Member

of Parliament to the police station, the fishers filed lawsuit and got back their use rights. But they did not get their nets and other assets back yet, and the case is still going on. In between these incidents, the leasing period almost ended, and they could not make any profit rather they lost their investment. In 2014, they again made a bid for those two ponds and again got the lease for the next three years. Though they are using those ponds now, they are continuously threatened by those influential to withdraw the case.

6.1.5 Impacts on women and children

Women in Naya Jelapara once were actively engaged in fish harvesting in the adjacent village areas. Women are gradually excluded from fish harvesting as the adjacent village wetlands disappeared. Although Hindu women enjoy the comparatively more social freedom and higher mobility than Muslim women, the social norms and regulations still don't allow them to go far away to catch fish. Now they occasionally harvest fish in the nearest floodplains during the monsoon. But still, they play significant roles in the pre- and post-fishing periods. Women significantly contribute to pre-fishing activities like the construction of fishing gear, preparation of fishing, and so on. They also contribute to post-harvesting activities like fish sorting and handling, net mending, equipment cleaning, and myriad complementary activities (Matthews et al. 2012). Fish vending in this area is different from the coastal area (Deb et al. 2014). Here, it is totally a man's sphere. Rarely any women participate in fish vending. In Naya Jelapara, fish harvesting is now almost a man's sphere. Despite the women's important involvement in fisheries activities, women's invaluable contribution is rarely recognized in the community and the fisheries development programs.

Children and young generations of the fishing community don't want to get involved in fishing due to the insecurity of income. 70% of respondent fishers don't want their children to take fishing as a future occupation, whereas only 30% fishers reported that they would be happy if their children took fishing as an occupation and continue the culture. Although the reasons behind not taking fishing as a future occupation are diverse, the most important reasons are economic. Young generations of the community don't want to live in uncertainty like their parents and grandparents; they want income security in life. They are happy with a minimal but regular income, which is very difficult in fishing today. Swapon (17) is doing several seasonal jobs like working in the fish fingerlings business, aquaculture labor, and pulling a rickshaw, along with fishing reflects the view of most of the children of the fishing community, stated, "We see poverty and insecurity since our childhood, and our parents were struggling to feed us. In those days, there were not much alternative income sources for fishers, but now we have many alternatives, and many of us doing well in such occupations. Like our parents we also love fishing but how long we can be involved in such occupation which is continuously decreasing and in which there is no income security. Therefore, like other boys of my community, I am saving money for my future occupation. I have a plan to buy an electric three wheeler whenever I able to save enough money I will switch to that occupation."

6.2 Responses to the changes

6.2.1 Occupational diversification

Diversification of occupation is the most important strategy of the fishermen to effectively tackle the effects of the structural changes of the fisheries sector. Members of each household in Naya Jelapara are engaged in more than one occupation to ensure year-round income. Besides fishing,

other important occupations are those in agriculture, aquaculture, fish trading, small business, the aquaculture and agriculture business, and rickshaw and van pulling. Eleven households are engaged in maximum of four different occupations, whereas six households are involved with three occupations and eighteen with two. Involvement in different kinds of occupations depends on the number of people in the active labor force of the households. Households with three or more active male laborers are involved with the maximum number of occupations. On the other hand, a household with a single active male is involved with minimum of one occupation, along with fishing. Although in Naya Jelapara, the fishing period has been significantly shortening and fishers are engaged in several other occupations for a living, they still consider fishing as their primary occupation.

The strategy behind this diversification of occupations is that each member of the household is primarily responsible for a specific job, though they always help each other. These divisions of labor help them to manage several jobs at a time effectively. Diversifications of occupations increase the fishers' capability to cope with the changing situations. Now they are not solely dependent on any specific occupations, rather their involvements with multiple occupations to increase their economic security and capability of managing economic uncertainty. If any source of income stops, then they manage it through the alternative occupations.

Table 6.1: Occupations of fishing households in Naya Jelapara

Occupation	Number of Households (Total- 35)
Fishing + Fish Culture	1
Fishing + Fish Business	6
Fishing + Construction Worker	4
Fishing + Agriculture Labor	1
Fishing + Aquaculture Labor	1
Fishing + Fish Fingerlings Business	1
Fishing + Dry Fish Business	1
Fishing + Aquaculture Labor + Agriculture	6
Fishing + Fish Culture + Agriculture + Aquaculture Labor	7
Fishing + Fish Culture + Agriculture + Fish Business	4
Fishing + Electric Auto Driver	3

6.2.1.1 Engagement with aquaculture

Aquaculture emerged as most expected occupation among the fishers in Naya Jelapara. Aquaculture is a proven profitable business in this locality, and it is still occupied by a non-fisher elite group. Fishers believe that they can do better in aquaculture as they have vast knowledge and experience with fish and fisheries. Extreme landlessness and a shortage of capital is the main barrier to aquaculture. To participate in the local aquaculture sector, fishers formed the Naya Jelapara Fishers Cooperative Society and participated in the leasing of a government pond. In the beginning, there were 24 households in the association, but gradually the number decreased as they failed to manage money for their share. Some households left the association during the conflicts with the local elite over the leased ponds. They were very scared and left the association to save their life and money. Currently, eleven households are doing aquaculture under the Associations.

The fishers' association could not make enough profit during the first phase of leasing (2011-2014) due to the conflicts. But in the second phase (2014 -2017), they made around 350000 BDT in profits until June 2016 and are expecting 300000 BDT more for rest of the time. Besides the association, some fishers take a lease on private ponds for certain times, usually one to three years for aquaculture. Young fishers are more interested in aquaculture than the seniors. Young fishers are more ambitious, and they believe that aquaculture is a good way to achieve solvency in life. The attitudes of the young fishermen are well captured by the voice of Shamol (23), a young, educated fisherman, "We almost lost our rights to fishing in open water, the Muslim fishers badly treat us, and often physically harassed. Aquaculture comes as a new hope for us. As per new wetlands leasing law, our rights are first over these resources. It is very profitable, and we already got the results. Now we only expecting the security of our life and assets, if we get it then our fate will be changed."

6.2.1.2 Engagement with agriculture

Fishers' engagement with agriculture has gradually increased since the mid-1990s as an alternative source of income and managed food for consumption. In Naya Jelapara, fishers do not have their agricultural land; most of the fishers sharecrop with the local elite. Two types of arrangements are present in sharecropping. In one arrangement, the sharecropper and the landowner equally share the cost of production and receive an equal share of the crop. In the second arrangement, the landowner does not share any cost and receives a fixed amount of crop instead. Usually it is 12 mounds in the *Boro* season and 8-10 mounds in the *Aman* season. The second type of arrangement is more popular among both the sharecroppers and the landowners. Today, some fishers who have savings prefer to provide a mortgage on land for crop production

instead of sharecropping. In this system, the landowner mortgages their land in exchange for the certain amount of money and the mortgage taker enjoy the user rights of the land until the mortgage money is returned. The average rate of mortgage of per *Bigha* (60 Decimals) crop land is around 60,000 to 80,000 BDT. The mortgage period is set by both the landowners and the mortgage taker. Nirat (52), one of my respondents said that “I took a mortgage on one *bigha* of land for 55,000 BDT. I have been using the land for the last two seasons and will use the land until he pays back the mortgage money.” In this community, 13 households (out of 35) are engaged in agriculture through sharecropping and mortgage of crop land. The primary goal of fishers’ involvement with agriculture is to produce food for household consumption and reduce their dependency on the market for staple food. But increasing numbers of fishing households produce crops for market. Fisher’s involvement with agriculture has contributed in the foodgrain sufficiency of fishers’ households in last two decades.

The fishing community is surrounded by the Muslim community, and the land owners are mostly Muslim. To get land for sharecrop fishers, especially the poor try to build a kind of patron-client relationship with the Muslim land owners. To maintain the relationships they sometimes give fishes to the land owners as a gift, and in their leisure time, they help the land owner doing his works. Fishers are not forced to do these works, but they willingly do those works to get the land like many other also expecting the same land. Due to the economic insecurity along with low social status poor fishers always feel insecure, and this relationship supports them as a kind of social security in their insecure life. But comparatively wealthier fishers prefer taking a mortgage of land than sharecropping and they do not feel the need of having such kind of relationships with anyone.

6.2.1.3 Wage labor in aquaculture and agriculture

Expansion and development of aquaculture and agriculture significantly increases the demand for labor. On the other hand, fishers become unemployed in the dry seasons due to the shortening of the fishing period. *Boro* rice (dry season rice) cultivation creates alternative income opportunities for the fishers in their unemployed days. Poor fishermen and the women and children of their households become agricultural laborers during this period. They again go back to fishing at the start of the rainy season. Each male laborer earns 200-300 BDT each day, whereas it is 100-150 BDT for female laborers, and 80-120 BDT for the young children. Although the price of labor is not enough for a single-earner household for a living, it is still recognized as a good alternative source of income during the lean season, as they have very few alternative option of income.

The demand for fishers as aquaculture laborers has considerably increased with the development of aquaculture in the last two decades. They mainly catch fish for the pond owners within and outside of Manmathpur Union. Fishers formed a small group of 5 -7 persons and caught fish on a contract basis. For each attempt at catching fish, they charge 500 BDT for a small pond and 700 - 900 BDT for a large pond. On average, they catch fish in 2-3 ponds each day, and usually attempt one time for each pond but sometimes do more on demand for the pond owner. Sometimes they get a share of small miscellaneous fishes alongside the contract money, which is also a good source of income. For this job, fishers must have their net and bicycle to reach the pond area on time. Therefore, they collectively buy fishing net and those fishers who do not pay their share of the net cost get less of the share of the income, which is mutually determined by the group members. Although the number of part-time and seasonal fishers has

increased, they do not do this kind of work. Therefore, fishers are expecting that demand of fishers as aquaculture laborers will increase in coming years as the sector still expanding.

6.2.1.4 Fish trading

The continuous efforts to increase household income have led to a diversification of their activities associated with fishing. In Naya Jelapara, 10 households (out of 35) became engaged with fish trading alongside their other income sources. Most of them buy fish from the wholesale fish market and sell them in the local village market. Those fishers who both culture fish and do fish trading sell a portion of their culture fishes in the local retail market and sell the rest of their fishes to the wholesale market, as the local demand is limited. Selling their cultured fishes is more profitable than selling in the wholesale market. But during the monsoon, all fish traders become full-time fishers; they catch fish in the daytime and sell them in the local market in the evening. The monsoon is the most profitable season for fish traders, as they sell their catches. Fish trading proved more profitable and less risky for fishers and attracts more and more fishers. But the increasing numbers of fish traders has simultaneously increased the competition among them and has made it riskier for profit.

Case Three

Dhan Babu (46) and Rup Babu (40) are two brothers who are now doing retail fish trading along with fishing. Both left school at an early age, just after completing grade four and five respectively, they joined their father in fishing. But their father died when they were young, and they became the main earners of the family's income. At young age, they successfully maintained their family, but the gradual decrease in fish habitat since the mid 1990s has made it difficult for them to maintain their family. The

opportunity for fishing and year-round income decrease over the time with the gradual shortens of the fishing period. They have tried to get involved with other occupations for regular income. In 2001, both went to Dhaka, the capital city of Bangladesh, to work as construction workers. The job was very hard for them and they knew nothing about it as they did not do anything except fishing. It was also difficult for them to live away from their family and to adjust to city life. Finally, they came back home after around three years and started retail fish trading with their little savings. In the beginning, they bought fish from the nearest wholesale market in Saidpur and Parbatipur and sold them in the village market. They did not have enough capital, and therefore, mainly bought the exotic carp fishes, as they are low in price. Later they started buying fish from Rangpur, the divisional wholesale fish market around 55 kilometers away from the community, where fish are comparatively cheaper than those of Saidpur and Parbatipur and they managed to make more profit. Rotationally one of the brothers goes to Rangpur in the very early morning to buy fish, and the other one sells those fish in the evening in the village market. The one of them who stays at home tries to catch fish in the adjacent areas which they sell in the evening. They make a profit of 400-500 BDT each day, which significantly increases during the monsoon. During the monsoon, they do not buy fish from wholesale market, but rather both catch fish in the floodplains and in beels and sell them in the village market. As they do not need to buy fish during the monsoon, their daily profit increases to 1000-1500 BDT. Another reason is that a major portion of their catches are native small fishes which are high in demand and price. Therefore, they eagerly wait for this season, as it is the prime

time of their incomes as well as the fact that they get the chance to do fishing, which they still consider their primary occupation and their identity.

6.2.1.5 Involvement with small business

Non-farm small business emerged as another key livelihood pathway during the fishing off-season. Fishers in Naya Jelapara became involved with several non-farm small businesses, such as dry fish business, small shop within and outside of the community, fish fingerlings business, selling of handmade fishing net, among others. These non-farm activities minimize fisher's dependency on fishing and agriculture, and help them to achieve basic household subsistence needs during the crisis period. These non-farm activities are still a sphere of male fishers; women have very little opportunity to get involved with these kinds of income generating activities. The absence of women-oriented, non-farm income generating activities makes them more vulnerable during the crisis period.

Case Four

Santu Das (68) lives with his wife (55). Both are sick and cannot do any hard work, and they do not have any children who will feed them. For survival, Santu Das started a mobile dry fish business at the beginning of 2000. He buys the dry fish from Saidpur dry fish market, a wholesale market around 11 kilometers away from the fishing community. He was the first person in his community to start a dry fish business. In the day time, he walks through villages with a basket of dry fish on his head to sell them, and in the evening, he also sells them in the local market. His reason for choosing this pathway is that it is a year-round business and you can do it on your available time. During fishing seasons, he can catch fish along with this regular business. He believes

that it is not that hard, as he can take a rest whenever he wants. He makes a profit of 100-120 Taka daily, which he thinks is good for a two-member household. Following in his path, two other fishers of his community started a dry fish business, which increases competition as the market is small.

6.2.2 Outmigration

Migration is recognized one of the important livelihood and survival strategies in Naya Jelapara. Several push and pull factors work behind this migration; poverty and the insecurity of year-round income are the main push factors in the fishing community, and security of income and better life are recognized as the main pull factors. Members of eight households (out of 35) live outside of the village for a living. The main destinations of migration are Dhaka, Comilla and Dinajpur city. They work there as construction workers, rickshaw pullers, aquaculture laborers, and garments workers. The number of migrating members is increasing, as the already migratory persons are pulling others to go there, primarily due to the financial insecurity in the community. The success of a migrant depends on his skills and ability to work. The construction worker and aquaculture laborer daily earn an average of 300-400 BDT, whereas the rickshaw puller earns 500-600 BDT. They send their monthly savings (average 2000-4000 BDT) to their households. Two households have reported that their household members do not send money; they are saving there and when they have a handsome amount of money, they will come back home and do something here. One of the respondents came back home after four years with around 80000 BDT and bought an electric rickshaw and lives with family now. Most of these migratory persons come back home during the monsoon and begin fishing with other family members. From an economic perspective, income through fishing during the monsoon is more

profitable than those occupations. Furthermore, they get the opportunity to live with their family. They have also informed me of their affection for fishing and insist that never want to leave their family if they have year-round fishing opportunity. It is noticed that this affection for fishing varies between different age groups; comparatively younger persons of the fishing community feel less affection for fishing, rather they prefer other jobs that give income security.

6.2.3 Roles of women and children

Women in the fisheries community play significant roles in the household economy. They are directly or indirectly involved in income and non-income generating activities. Women of 24 out of 35 surveyed households are housewives, who play the main role in housekeeping and child-rearing. Women of 6 of the surveyed households work as housemaids within and outside of the village. 2 women work as agricultural laborers, whereas 1 works as a non-agricultural day laborer. Another 2 women are trained in sewing and sew clothes in the home.

Women in this area are paid low, though they play same roles as men. The highest monthly income of women reported in this survey is between 1500–2000 BDT, whereas the lowest income is below 500 BDT. For men, the highest monthly income is between 6000-8000 BDT, whereas the lowest income is between 3000-4000 BDT. A maximum of 5 women earn within the range of 1001 – 1500 BDT, and the other 3 earn between 501 and 1000 BDT. Women are increasingly involved with household-based income-generating activities like livestock rearing, poultry farming, and vegetable plantation, as their opportunity for fishing has been reduced greatly. These kinds of activities not only provide added income but also fulfill household needs. Women's roles are rarely recognized within households and communities even for their significant contributions to the household economy.

6.2.4 Livestock rearing

A gradual decline in the income from fishing has forced the fishers to look for alternative sources of income. Livestock rearing came out as a significant alternative source of income. Growing demand and price of livestock at the local and national levels encourages fishers to get involved in the rearing of livestock. As a bordered district, an important portion of demand for meat was earlier fulfilled by importing cows from India, but the banning of cow exporting by India over the last decade has significantly increased meat prices. The respondents reported that cow and goat became their main assets to meet sudden family needs, along with investment for aquaculture and other businesses. Hen and duck both are used for household consumption and sale in the market. In the local market, cows are sold at between 20000- 25000 BDT, cattle at between 5000-10000 BDT, chickens at between 150-200 BDT, and ducks at between 200-300 BDT each. Because of the regular supply of fish, fishers' households usually sell duck and hen, as well as their eggs to contribute to the household income.

Almost every household in Naya Jelapara, across the various level of income, keeps livestock. Livestock contributes to the household livelihoods through a variety of direct and indirect pathways. Livestock is a great source of cash income for fishing households through the sale of animals and /or the sale and consumption of milk, eggs, and other animal products. In the absence of formal insurance markets, livestock works as a form of savings and insurance for fishers. Livestock provides immediate cash to deal with the significant and unexpected expenditure of households.

Women are mainly responsible for the rearing of livestock, as fishers are away from household most of the time. Through the production of livestock, women emerged as one of the main providers of capital for fishing households' investment in aquaculture, agriculture, and

business. But this livelihood strategy faces several constraints, of which the main constraint is the scarcity of land. Most of the fishing households do not have enough room to keep more livestock. Therefore, they keep small ruminants, although they wish to keep more and larger ruminants.

6.2.5 Uses of credit

Credit from the local and national NGOs was the immediate survival strategy of most of the fishing households in the phase of decline of fisheries of the area. A shortage of food was very common in these fishing households a decade ago due to the irregular income. Credit was the main source for fishing households to use to tackle these crises. Most of the fishing households used a portion of the credit for food in the time of crisis and invested the rest of the money in alternative income sources. Findings show that 33 out of 35 fishing households took credit from microfinance institutions. The highest amount of credit taken by any fisher's households is above BDT 30000, and the lowest is BDT 5000. A maximum 13 households took credit within BDT 15000 to 20000.

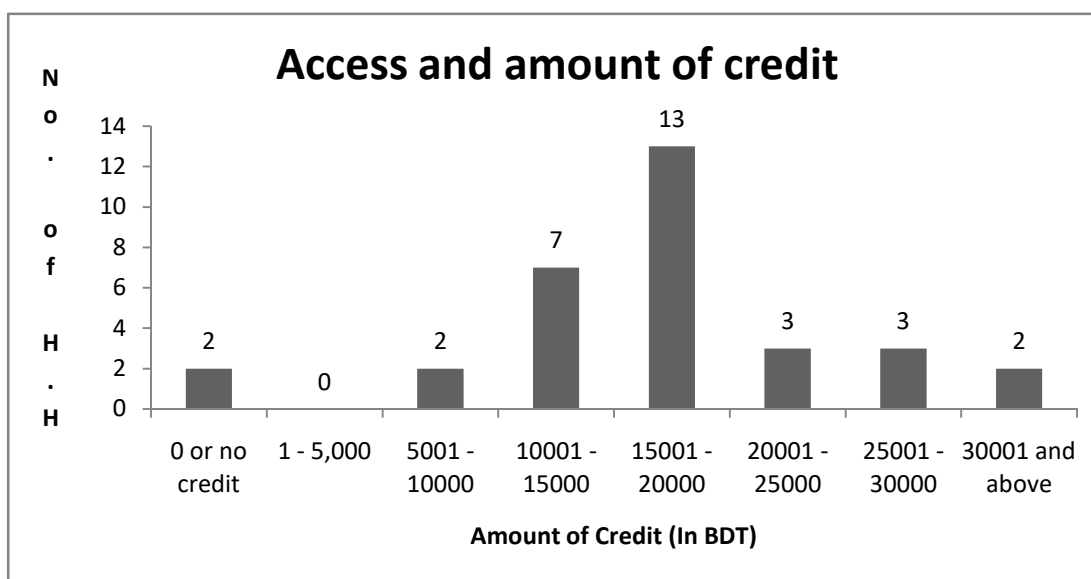


Figure 6.2: Access and amount of credit

There is no branch of the bank in the Union. The nearest branch is around 7 kilometers away from Naya Jelapara. No one in Naya Jelapara has a bank account, but almost every household is engaged with NGOs. Reasons of unbanked are various, including the requirement of different documents to open an account, the high minimum balance of the account, and the distance from the community. On the other hand, some have become members and are getting credit from microfinance institutions which are very convenient. Usually, the women of the households are the members of the NGOs and credits are taken against their membership. But the limitation is that the amounts of credit given by microfinance institutions are small and high in interest. For aquaculture and business, fishers are in need of higher amount of credit which they do not get from these microfinance institutions.

6.2.6 Kin and social network

Kin and social networks play a crucial role in the livelihoods of the rural poor. In the study area, kin and social networks were recognized as an important way of tackling the adverse impacts of the changes mention above. The exchange of food and cash among the kin and neighbors is very common here, which plays an important role in household subsistence, particularly during the crisis period. It is found that whenever fishers in need they seek support first from the kin and neighbors. Borrowing money, food, and other kinds of household needs from neighbors and kin is very usual in the community. Santu Das (68), reveals the importance of kin and social networks through his life experience – “We are two in my family, my wife and I. I have a mobile shop of dry fish and I am the single earner of the family. But at the beginning of this year I got seriously sick and was hospitalized for around a month. We did not have food to eat and money to buy the medicine. My relatives and neighbors stood by us; my neighbors gave us food and

relatives gave money for medication. We are very grateful to them; without their help it would have been very difficult to survive.” Besides the formal credit system, kin are the main source of credit during the crisis period. They first go to the kin and / or neighbors for credit and if that fails, only then do they go to the microcredit institutions for credit. Sometimes they need to pay interest on the credit and sometimes not, depending on the relationships with the kin and period of the credit. Sometimes fishers share the profit of the production if they invest the credit in farm or non-farm business. There are no specific rules for interest; rather it varies case by case.

6.3 Conclusion

These structural changes greatly affect the small-scale fisheries in Parbatipur, ranging from the extinction of several indigenous fish species to the loss of fishing as an occupation. The inland open water fisheries are now entirely dependent on floodplains during the monsoon, where Hindu fishers are increasingly facing tough competitions from part-time and seasonal Muslim fishers. Women are excluded from fishing due to these changes, and the young generations of fishing households have become very frustrated about fishing. They prefer other occupations than fishing which ensures income security. These changes have led the fishers to lose their occupations and identity as generational fishers.

Fishing households in Naya Jelapara have creatively responded to these changes for survival and have found multiple ways to reduce the shocks, insecurity, and negative impact of these changes, and instead increase income and wellbeing. The diversifications of livelihood have been identified as the main strategy of fishers' households in response to the structural changes in the fisheries sector. Although every household has one primary occupation, each member of the household engages in some other occupations and the income of each member

collectively makes up the household income. These diversified occupations do not constrain each other, but rather complement each other. A growing tendency among fishers is to invest their savings from labor, remittance, or livestock on agriculture, aquaculture, or non-farm business. Although migration of household members reduces the household's active labor force, their sending of remittances reduces the household's economic uncertainty, offsets income shocks, protects the household's assets, and enhances the potential for farming. Profits from farming—both agriculture and aquaculture, are invested and reinvested in non-farm business and farming. Alternatively, savings of non-farm business is invested in farming. Each pathway contributes to the development of others and collectively increases the fishers' coping capacity during these changes and contributes to the overall development of fishers' households.

The primary motivation of this kind of diversification is to reduce the risk and uncertainty and to cope with the changing situation. It not only enhances the fishers' capability to respond to the decline in resources and income, but also enables them to accumulate capital for future investments. However, the success of the diversification of livelihoods is not same for all, rather it varies depending on the primary assets and active labor force of the households, as well as on their skills.

Chapter Seven: Discussion, Recommendations, and Conclusion

7.0 Discussion:

The findings of this study show that the agriculture and fisheries sectors in Parbatipur have gone through massive structural changes, ranging from infrastructural changes to changes in governance. The state has played a notable role in this transformation through policies and programs to increase production and revenue that increase capitalist tendencies and inequalities among the fishers, leading to changes in class structure and deepening dependencies on the market. The effects of these changes are multidimensional and are experienced very differently by different people based on their class, gender, age, religion, and socio-political status. Similarly, responses to these changes have been diverse. Households' strategies and responses are shaped by their incomes and assets, socio-political status, gender, age and household demography. Many actors have experienced remarkable economic success through the direct benefits of these changes and others have been excluded, which indicates the inequality of power relations among the actors in the fisheries sector. The political economy of agrarian transition and governance provides insight to identify these changes in the fisheries sector, the agents of these changes and their power relations, and those who have gained and lost from these changes. The wellbeing framework further enriches this understanding through the three-dimensional wellbeing analyses of the impacts of these changes, the subjective experience of users, and the comprehensive identification of the contributions of the sector.

Conversion of inland open water fishing grounds to paddy land is identified as one of the major changes that have taken place in the small-scale fisheries in Parbatipur over the last four decades. The Green Revolution, promoted by the state to achieve foodgrain sufficiency, has led to this conversion and privatization of common property resources. Almost all the open water

fishing grounds, which had previously been used as common property resources, have been privatized and converted to paddy lands. The growing intensification of agriculture, unplanned infrastructural development like irrigation drainage and canals to support agriculture, abstraction of water from the fishing ground for irrigation, and the complete drying-out of the fishing grounds over the summer has destroyed almost all the open water fish habitat in the area. Furthermore, the excessive use of chemical fertilizers and pesticides to increase crop production has adversely affected inland fisheries, resulting in the reduction of wild fish biodiversity and biomass, as well as the exclusion of genuine fishers from access to these resources.

There has been a gradual decline identified in the catches from inland open waterbodies over the years. Native fish species have been significantly affected due to these changes, resulting in the extinction of some species and the endangering of many others. Large-sized indigenous carp have almost disappeared, despite being very common two decades earlier. The decrease in inland open water fish production and the growing demand for fish due to the increase in population has led to the gradual rise in fish prices. Aquaculture was promoted in this area by the Department of Fisheries (DoF) at the beginning of the 1990s to meet growing demand. The promotion of aquaculture by the state through policies and programs led to structural transformation in the small-scale fisheries in Parbatipur from inland open water capture fisheries to culture fisheries. Common property fishing grounds were converted to private fishing grounds through leasing to promote aquaculture and increase revenue. Until today, leasing remains the primary mechanism for managing the fisheries of this locality, which excludes the genuine fishers' access to them and replaces genuine fishers with a non-fisher elite group. A significant improvement was identified in the leasing system with the introduction of new Jalmohal (wetland) Management Policy in 2009, which allowed the leasing of wetlands to

genuine fishers' associations exclusively. This change in policy has increased genuine fishers' participation in aquaculture. Genuine fishers were previously excluded from the open water fisheries due to several structural changes. But fishers' involvement in aquaculture is still very limited due to extreme landlessness and a shortage of capital and lower socio-political status in society. This evidence emphasizes that the governance of natural resources like fisheries is political in character and that actors related to it, both directly and indirectly, hold different types and amount of capital and power. This political characteristic of fisheries governance highlights the power relations and capital of the actors, as well as the subjective experiences of the direct users in this politicized environment. These considerations are particularly important if a goal of fisheries development is to be pro-fisher and pro-sustainability.

The potential for aquaculture to generate greater profit than agriculture has been increasingly pursued by powerful elites to seek control over government ponds through abuse of their economic and political power. The study shows an increase in a number of part-time and seasonal fishers contrary to the gradual decline of open water fisheries, resulting in further competition and conflict over access to fisheries. Although most of these fishers are landless farmers and day-laborers from the Muslim community, surprisingly an increasing number of rural elites, both from the Muslim and Hindu communities have enrolled themselves as registered fishers in recent decades, despite the low social status of fishers in the society. The reason for being registered as fishers is the recent change in the wetlands management policy, which declared leasing of wetlands only to associations of genuine fishers. As a result of the absence of effective monitoring systems, increasing numbers of rural elites enrolled themselves as fishers to get the lease of wetlands. Thus, the advantages of the development of aquaculture

were mostly captured by the elites due to the poor execution of existing laws and the absence of proper monitoring systems.

The transition of fisheries and agriculture has important subjective and relational dimensions along with material ones. The wellbeing framework allows for a comprehensive understanding of the multidimensional impacts of this transition and the diversity and complexity of the fisheries sector. Data show that the impact of the structural changes in the fisheries sector of the study area were very complex and varied depending on the status of the actors. Although these changes affect open water fisheries and some areas of the fishers' wellbeing, they also created alternative opportunities for others and contributed to the improvement of their wellbeing. It is the fishers and the poor of the locality who are most directly affected by these structural changes. The conversion of common fishing grounds into private croplands excludes fishers and other poor people from those fishing areas, despite them previously been the main source of livelihood for fishers and an additional source of income and food for the poor people of the locality. Dependence upon common property resources is higher among poor people than others due to their limited resources. Therefore, the decline and/or transformation of common fishing grounds has greater implications for the welfare of fishers than others.

The effects of these changes are also varying based on religion, gender, age, and class. Although every fisher of this locality is affected by these changes, it is the generational Hindu fishers who are affected the most. Muslim, part-time, and seasonal fishers, have greater access to the rest of the fishing grounds and floodplains than Hindu fishers due to their comparatively higher social power and being part of the Muslim majority community. Hindu fishers face greater constraints in getting access to resources. On the other hand, within the Hindu fishing community, the most affected section is women, who are almost entirely excluded from the

fishing due to the destruction of the fishing grounds adjacent to their village. Although Hindu women have greater mobility and freedom than Muslim women, their family and community do not allow them to go far away for fishing. This restriction has been further justified by the increasing conflicts in the fishery in the last two decades that threaten women's security. The young generation of the Hindu fishing community does not want to get involved with their ancestral occupation anymore considering the decline of the fishing grounds, increasing conflict, and insecurity of income. Rather they prefer aquaculture, agriculture, and non-farm employment which ensures income security and safety. Comparatively wealthy fishers have more successfully adapted to these changes and have become involved in aquaculture and agriculture to get the direct benefits of the changes. In contrast, poor fishers, who are the majority of the population, have failed to get the direct benefits from changes in fishing and aquaculture.

Consumption of wild fishes has gradually decreased across all social strata, but mostly among the poor due to the decline in production and increase in price of the wild varieties. The decline of common fishing grounds and wild fish has increased poor households' dependence on the market and on culture fish. Previously, all of the consumption of fish by poor households came from open water fisheries, but now they are almost entirely dependent upon the market and consume cheap culture fish. Even fishers depend on market and culture fish during the non-fishing season. Increasing dependency on market and culture fish have significant implications for the wellbeing of fishers. The decline of common property resources and a decrease in the consumption of wild fishes- which are highly enriched with essential micronutrients and were the primary source of animal protein of poor households have significant implications for their subjective wellbeing. Recent study (Bogard et al. 2017) support this position, the study shows that despite the increase of total fish consumption in Bangladesh significant decrease found in

iron and calcium intakes from fish as the consumption of non-farmed wild species declined by 33%.

Conversion of fishing ground into paddy lands has significantly increased rice production and helped Parbatipur Sub-District to attain foodgrain sufficiency. But the benefits of the development and expansion of agriculture have been mostly captured by the rural elite who own the majority of the land. Although fishers and the other poor of the locality gained from the indirect benefits (e.g. increase in demand and price of labor) of the agricultural development, they were excluded from the direct benefits due to their landlessness. A gradual increase has been identified in fishers' participation in agriculture over the last around two decades through leasing and sharecropping for subsistence and/or market. Improvements in material and social wellbeing have been identified among the fishing households involved with agriculture. Self-sufficiency in food-grains is viewed as an indicator of family status in rural Bangladesh. Therefore, involvement with agriculture and an increase in foodgrain sufficiency has contributed to the improvement of their social status and personal satisfaction. Furthermore, the development of agriculture and aquaculture, and the enhancement of infrastructure has enriched the rural economy and created alternative employment opportunities for fishers and other poor people, which have positive implications for many areas of their wellbeing.

The structural changes in the small-scale fisheries sector have also led to a change in class in the fishing community. Fishing households involved in aquaculture and agriculture have become successful and generate a surplus, which they further reinvest in aquaculture and agriculture. The surplus is also invested in non-farm activities to diversify their income source and to reduce insecurity. The primary purpose of their production is the market, not subsistence. The market orientations of the production system, and the reinvestment of surplus to generate

further surplus has led to the emergence of a new capitalist fisher population in the fishing community. Though these fishing households carry many aspects of a capitalist production system, they still mostly depend on the household labor force and sometimes on their kin for production. On the other hand, members of fishing families unable to participate in aquaculture and agriculture became laborers in agriculture and aquaculture.

Diversification of livelihood has been recognized as the top strategy, followed by outmigration and kin support, to respond the structural changes that have taken place in the small-scale fisheries of the locality. Aquaculture, agriculture, fish business, livestock rearing, and wage labor emerged as the major areas of livelihood which increase fishers' income security and reduce their vulnerability and shock to the results of these changes. In these changing situations, greater roles of women and children have been identified within the households, especially those that are involved in agriculture, aquaculture, and livestock rearing. Although the fishing households are not equally successful to responding to the changes even after that, the overall wellbeing of most of the fishers has improved as a result of the improvement in the economy of the locality, and the policy and program supports of the government, especially in the fields of education and health. Households with a more active labor force and greater resources are more successful in tackling the negative effects of structural changes and gain more benefits from these changes.

Inland fisheries management in Bangladesh is very complex and political in nature. Several ministries and departments are directly and indirectly involved with it. Power relations of the Department of Fisheries with other department and ministries significantly affect the fisheries sector. It is evident that the Department of Fisheries holds less power and a lower political standing than other departments and ministries, both at the local and national level. Data show

that open water fishing in the study area has mainly been affected by the external (conversion of water bodies into paddy lands, irrigation, pollution and so on) factors. It indicates the importance of recognizing the power relations between the actors who are either directly or indirectly involved in the governance of the sector. Power differences among several departments and ministries have emphasize the need for a comprehensive plan of action for the development of the fisheries sector developed in an inclusive dialogue with all other related ministries and needed to consider the guidelines in developing in any policies or programs, directly and indirectly related to fisheries. On the other hand, one possible way to manage the internal factor in the degradation (i.e. overfishing, growing competition, and conflicts) of open water fisheries is the greater participation of the users in the resource management system. It is evident that even despite some limitations, several ongoing community management projects of the Department of Fisheries proved successful in improving the fisheries in a sustainable way. A context-specific community-managed fishery is a possible way to the sustainable development of the sector. However, one needs to be cautious in forming the nature of the community management system. Failure in identifying the socio-political and ecological context in developing the community-managed system will lead to failure of the system.

Fisheries governance in Bangladesh has also failed to allocate the benefits of fisheries development equally. In the governance and management of inland fisheries Bangladesh, the state is deeply influenced by the elite. The relative autonomy of the state suggested by Poulantzas (1968, 188; 1978, 127) is clearly absent here. Leasing of common pool waterbodies and the promotion of private pond based aquaculture instead of capture fisheries by state authorities are clear examples of influence by the elite. Failing to recognize the heterogeneity within the fishers is another limitation of the fisheries governance resulting in an unequal

distribution of benefits. For example, poor fishers have been excluded from the benefits of leasing wetlands even after the remarkable improvement in the latest Wetlands (*Jalmahol*) Leasing Policy, as it failed to address this heterogeneity among fishers. Due to the highest bidding system, poor fishers have been excluded and comparatively wealthy fishers have benefited the most, resulting in an increase in class division among fishers. Therefore, fisheries policies and laws must explore and consider the heterogeneity within fisheries to equally distribute benefits. Furthermore, reasons for the decline and constraints on the improvements of open water fisheries are every context-specific. Therefore, policy and program support for the development of the fishing sector needs to be context specific.

This study is not free of limitations; the main limitation is the small number of informants, which reflects the short time frame of the study. Taking into consideration the timeline and objectives of the study, I kept my study confined to a single fishing community and entirely focused on the generational Hindu fishers which limits my ability to compare my data with other fields. Moreover, the study does not cover the opinions of Muslim, part-time, and seasonal fishers. But at the time of my data analysis, I realized that Muslim fishers are inextricably linked with Hindu fishers and roles of Muslim fishers have a significant impact on the wellbeing of Hindu fishers. Therefore, the absence of the views of Muslim fishers regarding the changes is another limitation of this study. The findings of this study are context specific. Therefore, any generalization of these results may lead in the wrong direction. Hence, I ask the reader to consider the context in reading or using the findings of the study.

7.1 Policy recommendations

One of the objectives of this study is to propose policy recommendations for small-scale fisheries. Specific question asked to fishers, women, children and GO-NGO officials regarding possible policy recommendation to tackle the structural changes that have taken place in the small-scale fisheries of the locality and improve the fisheries sector in a sustainable way. Major recommendations are mention below:

Recommendation 1: Restoration of water resources and physical demarcation of them, especially those are common property.

State should take proper initiatives to restore the lost water resources and physically demarcate them to protect them in future. Moreover, use rights of these resources and the extent of use need to be specified to ensure sustainable use of them.

Recommendation 2: Ensure tenure and use rights of generational fishers with special attention to rights of women.

Proper initiatives are needed to ensure context-specific tenure and use rights of generational fishers who primarily depend on open water capture fisheries for livelihood. Women should have equal rights to fishery resources and appropriate efforts should be made to protect those rights.

Recommendation 3: Recognition of the importance and contributions of small-scale fisheries and respect for the occupation and fishers.

Despite its significant contributions to food security, livelihoods, and the rural and national economy, fishing is considered as an inferior occupation and fishers have low social status. Efforts should be made to recognize fishers' remarkable roles and respect for the occupations

and fishers' culture. Policy making must move beyond monetary value and considered the social, relational and ecological values of small-scale fisheries.

Recommendation 4: Ensure greater participation of fishers in decision making and in the management of water resources.

Participation of genuine fishers, with special attention to women, in decision-making and management of water resources should be increased and strengthened. State should provide support to increase fishers' capacity for a meaningful participation and to make them realize their responsibility for sustainable management of the resources.

Recommendation 5: Complete stop to destructive fishing practices.

Destructive fishing practices like poisoning, complete dewatering of water resources and use of illegal fishing net must be stopped completely. Efforts should be made to identify destructive fishing practices and implement the laws to stop them. Awareness programs are needed to increase public awareness about the long term effects of these practices and fishers should be held accountable for the sustainability of the resources.

Recommendation 6: Ensure leasing of wetlands to genuine fishers.

State should take initiatives to implement the new wetland leasing act and remove all kinds of barriers to getting leases by the genuine fishers. Class divisions and heterogeneity among fishers should be recognized, and institutional and financial support should be provided to actual fishers so that they can access to lease system.

Recommendation 7: Improved coordination among the ministries and departments related to fisheries.

Lack of coordination among the ministries and departments, both at national and local level, is identified as one of the main reasons for the degradation of open water fisheries resources. The State should recognize areas of coordination at all levels and should take initiatives to improve it. Moreover, in case of any proposed infrastructure development, impact studies should be undertaken to assess their impact on small-scale fisheries prior to such projects getting approval.

Recommendation 8: Initiatives to develop capture fisheries.

As is illustrated in chapter 6, my research confirms the findings of earlier studies (Lewis, 1997; Thomson et al. 2002; Toufique and Belton, 2014) that show that capture fisheries are a primary source of diet and livelihood for the rural poor, and create more values and benefits than aquaculture. It can play greater roles in poverty reduction and food and nutrition security. Despite its remarkable contribution the sector is still undervalued by policy makers. The State should take specific initiatives for the sustainable development of capture fisheries.

Recommendation 9: Special support for the fishers to tackle the structural changes.

Fishers are the most vulnerable social group in Parbatipur due to the structural changes affecting small-scale fisheries. Context-specific vulnerability needs to be identified and support needs to be given that keep the heterogeneity of fishers in mind. Financial and institutional support should be given to fishers with special attention to women to diversify the livelihoods as a long term strategy to tackle the effects of structural changes.

7.2 Contributions of the study

Based on the observation arising from the examination of the structural changes in the small-scale fisheries in Parbatipur, this thesis proposes a conceptual framework that brings together

political economy approaches to agrarian transition and social wellbeing for the critical study of fisheries transition. These approaches make a significant contribution to the critical inquiry into the nature and direction of fisheries transitions, as well as inform fisheries governance.

Key substantive, conceptual and applied insights from this approach in this thesis are as follows:

- A) The state initiated Green Revolution in agriculture and fisheries have driven fisheries transition towards an economy which is increasingly capitalist in nature, as is indicated by the following:
 - a. Increasing commodification of production
 - b. In Naya Jelapara, an emerging class differentiation is evident among generational fishers who primarily produce for the market.
 - c. Class difference identified between generational fishers (low caste Hindu fishers) and non-generational fishers (mostly Muslim and do fishing part-time). Most of the part-time Muslim fishers (whose main professions are day labor and agriculture labor) involved in capture fisheries hold same class status as the generational Hindu fishers but the former have higher social, religious and political power and status. In aquaculture, on the other hand, Muslim fishers comprised the majority of the producer who produces fish completely for the market and holds higher class as well as social and political status than the generational Hindu fishers.
- B) The increasingly capitalist orientation of the agrarian production system has socio-relational and ecological implications. The Green Revolution increases production and accumulation of wealth in the rural area but, simultaneously increases ecological degradation, conflicts, and social tensions.

C) Point A has to be qualified by the many ways in which the rural economy of Parbatipur is shaped by particular local social, cultural and political features, as the following points demonstrate:

- a. The findings of the study show the complexity of class. There are clear divisions in the study area, but they are complicated by other intersecting social differences of religion, caste, and gender. Structural changes have been channeled through, and shaped, this social heterogeneity and local politics. Even after the inclusion in a capitalist production system, fishing households still follow as a household based organization of production. This indicates the simultaneous presence of two different kinds of production systems, which points out the complexity of production systems in developing countries. Social differentiation engendered by the Green Revolution in agriculture and fisheries also has gendered implications: evidence from Naya Jelapara shows that women have been almost entirely excluded from open-water fisheries with the almost complete destruction of open-water resources. To compensate, women's participation in agriculture as laborers has increased.
- b. Resistance and conflict between classes identified in the study area are not in the form of conventional 'class struggle', but mostly in the form of tactical engagements as opportunities arise and / or community-level collective action (see chapter 6 for details). These multidimensional social divisions mean that oppression is not exclusively experienced as class exploitation. There is a high possibility of missing these forms of resistance and political action by fishers if we look for struggle in conventional forms. As is evident from the case of Naya

Jelapara Fishers Cooperative Association (see chapter 6; case-two for details), these kinds of resistance are most of the times overlooked by the researchers and policy makers until the protest is organized on a large scale.

- c. In a developing country like Bangladesh, nation state and state authorities, and international development institutions play an important role in the agrarian transition and emerging social differentiations through mainly the system of property rights (see chapter 5 for details). The findings of this thesis show how the economic and social power of the state is reinforced through the system of property rights. Moreover, changes in property rights in agrarian transition are politically contested; therefore, critical inquiry into the agrarian (and fisheries) transition requires consistent interrogation of the power relations of its relevant actors with specific attention to the nation state and state authorities.
- d. The changes in agriculture and fisheries are experienced differently. Fishers in Parbatipur are highly heterogeneous and characterized by important economic and social differentiation. Differences are taking place not only in assets but also in social status, values, and aspirations. Recognition of this heterogeneity in policy is critical for the sustainable development of the sector. Therefore, governance of fisheries should go beyond a single dimension approach (material) and should take into account the non-material dimensions, subjective experiences of users and social relations for a better understanding of fisheries and in developing appropriate policies. The social wellbeing approach has the potential to overcome these limitations. Wellbeing provides a multidimensional and broader conception of a social benefit than the narrow single-objective view of current dominant

fisheries framework. It is an analytical lens which can help draw policy attention to the non-material benefits of fisheries and added value to our understanding of socio-relational and economic dynamics in fishing communities.

- e. Class composition and differentiation, the social relations and dynamics of production, roles of state and state authorities, and use of state law and power by different classes and groups are vital in the analysis of fisheries transition. The political economy view of agrarian transition and governance has the potential to recognize class composition and differentiation, and power relations among actors in fisheries transitions. The social wellbeing framework, on the other hand, has potential to recognize other social differentiations, motivations, and aspirations of actors, and their subjective experiences of the transition. It addresses not only the material aspects of the transition but also the non-material. The social wellbeing and the political economy approaches view agrarian transition and governance as complementing each other and collectively providing a comprehensive and in-depth understanding of fisheries transition and its multidimensional impact for policy makers.

7.3 Conclusion

Inland capture fisheries are a significant source of livelihood and food for rural poor people in Bangladesh and provide a social safety net during crises. This sector gets little attention from policy-makers relative to its contributions and significance. The contributions of open water fisheries to food and nutrition, rural and national economy, poverty reduction, employment

generation, and its significant roles in the social and cultural lives of people related to it need to be recognized comprehensively.

Today, the governance of fisheries in Bangladesh is still mainly guided by two primary priorities: revenue and production. This revenue and production-centric governance has promoted aquaculture as a way to develop fisheries and has overlooked the importance of capture fisheries for a long time. Moreover, issues like ecology, the wellbeing of fishers, and the rural poor get little attention in the fisheries governance. But it is evident that, for a sustainable fishery, the governance must address the ecology, the wishes of people related to fishing, and its roles in their socio-cultural lives.

The development of aquaculture has contributed a lot to an increase of fish production, along with food and nutrition. But fishers have reported that improvements in capture fisheries create more direct benefits to fishers and other poor people, than aquaculture. Sustainable capture fisheries, along with aquaculture, will be more beneficial for the overall development of the fishing sector and the wellbeing of fishers. Therefore, we need pro-poor and ecology-friendly fisheries governance which will develop the sectors of both capture and culture fisheries in a sustainable way, and will ensure the equal distribution of the benefits from the improvements in the wellbeing of people related to it. Integration of wellbeing with the political economy of agrarian transitions and governance can substantially contribute to achieving this goal through recognizing the multidimensional contributions of the sector beyond the narrow materialistic view, identifying the actors, their interests and priority, and power relations and subjective experiences of the users.

References

Ahmad, A. U. and Reazuddin M.

1986 Industrial pollution of water systems in Bangladesh. Paper presented at the workshop on the environmental aspects of surface water systems of Bangladesh organized by the Bangladesh Centre for Advanced Studies (BCAS) and Bangladesh Academy for Rural Development (BARD). Comilla, 18-22 July 1986, Bangladesh. pp.6

Ahmed, I., Bland S. J. R., Price, C. R. and Kershaw, R.

1998 Open water stocking in Bangladesh: Experience from third fisheries project. In T. Petr (Ed.), *Inland fishery enhancements*. FAO Fisheries Technical Paper 374. Rome: Food and Agriculture Organization and UK Department for International Development. Pp 337-350.

Alam, M. J., Yasmin, R., Rahman A., Nahar, N., Pinky, N. I., Hasan, M.

2010 A study on Fish Marketing System in Swarighat, Dhaka, Bangladesh. *Nature and Science*, 8 (12), pp: 96-103.

Ali, M.Y.

2000 Openwater Fisheries and Environmental Changes, In Rahman, A.A., Huq, S. and Conway, G.R. (Ed,) *Environmental Aspects of Surface Water Systems of Bangladesh*. Dhaka: The University Press Limited; pp. 145-164.

Ali, M. Y

1997 Fish, Water and People: Reflections on Inland Openwater Fisheries Resources of Bangladesh. Dhaka: The University Press Limited.

Ali, M. Y.

1995 Final Report of Second Lease Holder Study. Third Fisheries Project, Dhaka: Bangladesh Centre for Advanced Studies.

Allison, E.

2011 Aquaculture, fisheries, poverty and food security. Working Paper 2011-65, Penang: The WorldFish Center.

Bangladesh Bureau of Statistics (BBS)

2013 Dinajpur District Statistics 2011. Bangladesh Bureau of Statistics, Statistics and Informatics Division (SID), Dhaka: Ministry of Planning, Government of the People's Republic of Bangladesh.

Bangladesh Bureau of Statistics (BBS)

2011 Population and Housing Census. Bangladesh Bureau of Statistics, Statistics and Informatics Division (SID), Dhaka: Ministry of Planning, Government of the People's Republic of Bangladesh.

Bangladesh Bureau of Statistics (BBS)

1984 Dinajpur District Statistics 1983. Bangladesh Bureau of Statistics, Statistics and Informatics Division (SID), Dhaka: Ministry of Planning, Government of the People's Republic of Bangladesh.

Bangladesh Centre for Advanced Studies (BCAS) and the International Institute for Environment and Development (IIED)

2004 The use of sluice gates for stock enhancement and diversification of livelihoods, Dhaka: Bangladesh.

Bangladesh National Web Portal

2015 Bangladesh National Web Portal, [www. Bangladesh.gov.bd](http://www.Bangladesh.gov.bd)

Basak, S. K., Ali, M. M., Islam, M. S., Shaha, P. R.

2015 Aquatic weeds of Haor area in Kishoregonj district, Bangladesh: Availability, Threats and Management approaches. *International Journal of Fisheries and Aquatic Studies*, 2 (6), pp: 151-156

Beebe, J.

1995 Basic concepts and techniques of rapid appraisal. *Hum Org* 54(1):42-51.

Begum, L., Islam, A. and Smyth, R.

2012 Girls' Education, Stipend Programs and the Effect on Younger Siblings' Education. Department of Economics, Kuala Lumpur: Monash University.

Belton, B., Nasib, A. and Khondker, M.E.J.

2014 Aquaculture, employment, poverty, food security and wellbeing in Bangladesh: A comparative study. CGIAR Research Program on Aquatic Agricultural Systems, Program Report: AAS-2014-39, Penang: Malaysia.

Belton, B. and Thilsted, S. H.

2014 Fisheries in Transition: Food and nutrition security implications for the global South. *Global Food Security*, 3 (1), pp. 59-66.

Belton, B., Haque, M. M. and Little, D. C.

2012 Does size matter? Reassessing the relationship between aquaculture and poverty in Bangladesh, *Journal of Development Studies*, 48 (7): 904-922.

Béné, C. and Neiland, A. E.

2006 From Participation to Governance: A critical review of the concepts of governance, co-management and participation, and their implementation in small-scale inland fisheries in developing countries. WorldFish Centre, Penang: Malaysia and the CGIAR Challenge Program on Water and Food, Colombo: Sri Lanka.

Berkes, F.

1999 Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Philadelphia: Tylor and Francis.

Bernstein, H.

1982 Notes on capital and peasantry. In John Harriss (Ed) *Rural Development: Theories of peasant economy and agrarian change*. London: Hutchinson University Library. pp. 160-177.

Bhouyain, A. M.

1995 Toxic Effect of Pesticides (Nogos and Dimercon) and Heavy Metal (Mercury and Copper) on Some Freshwater Organisms, Unpublished PhD thesis, Department of Zoology, University of Rajshahi, Bangladesh.

Bhuiya, M. M. R. and Hossain, M.

2013 Agricultural Regionalization of Bangladesh Based on Productivity and Analysis of Spatial Dependencies of for Productivity Between the Districts of Bangladesh. *Journal of Bangladesh Institute of Planners*, Vol. 6, pp. 181-189.

Bogard, J. R., Farook, S., Marks, G. C., Waid, J., Belton, B., Ali, M., Toufique, K., Mamun, A. and Thilsted, S. H.

2017 Higher fish but lower micronutrient intakes: Temporal changes in fish consumption from capture fisheries and aquaculture in Bangladesh. PLoS ONE 12(4): e0175098.
<https://doi.org/10.1371/journal.pone.0175098>.

Bourdieu P.

1984 Distinction Cambridge Mass: Harvard University Press.

Britton, E. and Coulthard, S.

2012 Assessing the social wellbeing of Northern Ireland's fishing society using a three-dimensional approach. *Marine Policy*. Vol. 37, pp. 28-36.

Bush, S. R. and Marschke, M. J.

2014 Making social sense of aquaculture transitions. *Ecology and Society*, Vol. 19 (3): 50.

Chambers, R.

2004 Ideas for development: reflecting forwards. IDS Working Paper 238.

Chuenpagdee, R. and Jentoft, S.

2009 Governability Assessment for Fisheries and Coastal Systems: A Reality Check. *Human Ecology*, Vol. 37 (1), pp. 109-120.

Coulthard, S., Sandaruwan, L., Paranamana, R. N., Manimohan, M., Amarasinghe, O., Koralgama, D., Britton, E., Bene, C., McGregor, J.A., Pouw, N. Abunge, C. Mbatha, P., Ramachandran, R., Ramachandran, P. and Daw, T.

2015 Exploring wellbeing in fishing communities (South Asia), Methods handbook, online open access publication available at <https://www.researchgate.net/profile/SarahCoulthard>

Coulthard, S., Johnson, D. and McGregor, J. A.

2011 Poverty, sustainability and human wellbeing: social wellbeing approach to the global fisheries crisis. *Global Environmental Change*. Vol. 21 (2), pp. 453-463.

Da Corta, L.

1992 Neo-populist and Marxist Methods for studying change in agrarian structures: Case for methodological pluralism. A paper submitted for development studies association Grain group workshop of field methods.

Das, R. J.

1996 State Theories: A Critical Analysis, *Science & Society*, Vol. 60, No. 1, pp.27-57

Deacon, R. T.

2010 Pathways to fishery reform: Accounting for political economy. In Donald R. Leal (Ed) *The Political Economy of Natural Resource Use, Lessons For Fisheries Reform*. The World Bank, Washington.

Deb, A.K., Haque, C. E. and Thompson, S.

2014 ‘Man can’t give birth, woman can’t fish’: gender dynamics in the small-scale fisheries of Bangladesh. *Gender, Place and Culture: A Journal of Feminist Geography*. DOI: 10.1080/0966369X.2013.855626

Department of Fisheries (DoF)

2014 Fisheries Statistical Yearbook of Bangladesh: 2012-2013, Fisheries Resources Survey System, Bangladesh Ministry of Fisheries and Livestock. Dhaka: Department of Fisheries.

Department of Fisheries (DoF)

2011 Fisheries Statistical Yearbook of Bangladesh: 2010-2011, Fisheries Resources Survey System, Bangladesh Ministry of Fisheries and Livestock. Dhaka: Department of Fisheries.

Department of Fisheries (DoF)

2010 Fisheries Statistical Yearbook of Bangladesh: 2009-2010, Fisheries Resources Survey System, Bangladesh Ministry of Fisheries and Livestock. Dhaka: Department of Fisheries.

Department of Fisheries (DoF)

2002 Fisheries Statistical Yearbook of Bangladesh: 2001-2002, Fisheries Resources Survey System, Bangladesh Ministry of Fisheries and Livestock. Dhaka: Department of Fisheries.

Djurfeldt, G.

1982 Classical discussions of capital and peasantry: a critique. In John Harriss (Ed) *Rural Development: Theories of peasant economy and agrarian change*. London: Hutchinson University Library. pp. 139-159.

Elizabeth, M., Bechtel, J., Britton, E., Morrison, K. and McClennen, C.

2012 A Gender Perspective on Securing Livelihoods and Nutrition in Fish-dependant Coastal Communities. Report to the Rockefeller Foundation from Wildlife Conservation Society, Bronx, NY.

Facon, T.

2000 Water Management in Rice in Asia: Some Issues For the Future. In Papademetrou, M. K., Dent, F. J. and Herath, E. M. (Ed.) *Bridging the Rice Yield Gap in the Asia-Pacific*

Region. Food and Agricultural Organization of the United Nations, Regional Office for Asia and the Pacific, Bangkok: Thailand.

Finnis, E.

2009 “Now it is an Easy Life”: Women’s Accounts of Cassava, Millets, and Labor in South India. *Culture and Agriculture*, Vol. 31 (2), pp: 88-94.

Food and Agriculture Organization of the United Nations (FAO)

2014 The State of World Fisheries and Aquaculture, Opportunities and challenges. Rome: Food and Agriculture Organization of the United Nations (FAO).

Gain, A.K. and Giupponi C.

2014 Impact of the Farakka Dam on Thresholds of the Hydrologic Flow Regime in the Lower Ganges River Basin (Bangladesh). *Water*, Vol. 6, pp: 2501-2518.

General Economics Divisions (GED)

2015 Millennium Development Goals, Bangladesh Progress Report 2015. General Economics Divisions (GED), Dhaka: Bangladesh Planning Commission.

Giddens, A.

1984 The Constitution of Society: Outline of the Theory of Structuration. Berkeley and Los Angeles: University of California Press.

Giddens, A.

1976 New Rules of Sociological Method: A Positive Critique of Interpretive Sociologies. London: Hutchinson.

Government of Canada

2014 Tri-Council Policy Statement, Ethical Conduct for Research Involving Humans. Ottawa: Secretariat on Responsible Conduct Research.

Halls, A. S., Kirkwood, G. P. and Payne, A. I.

2001 A dynamic pool model for floodplain-river fisheries, *Ecology and Hydrobiology*, Vol. (1), pp. 323-339

Harriss, John (Ed)

1982 Rural Development: Theories of peasant economy and agrarian change. pp. 15-34. London: Hutchinson University Library

Harriss-White, B., Mishra, D. K. and Upadhyay, V.

2009 Institutional Diversity and Capitalist Transition: The Political Economy of Agrarian Change in Arunachal Pradesh, India. *Journal of Agrarian Change*, Vol. 9 (4), pp. 512-547.

Hart, G.

1989 Agrarian Change in the Context of State Patronage. In Hart, G., Turton, A. and White, B. (Ed) *Agrarian Transformations: Local Processes and the State in Southeast Asia*. Berkeley: University of California Press. pp. 31-49.

Herrendorf, B; Richard R. and Akos V.

2013 Growth and Structural Transformation, NBER Working Paper Series, Working Paper 18996, National Bureau of Economic Research, Cambridge.

Hossain, M. A. R.

2014 Habitat and fish diversity: Bangladesh perspective. In Wahab, M. A., Shah, M. S., Hossain, M. A. R., Barman, B. K. and Hoq, M. E. (Ed), *Advances in Fisheries Research in Bangladesh*. Bangladesh Research Council, Dhaka: Bangladesh Fisheries Research Forum. pp. 1-26.

Huke, E., Huke, R. and Woodhead, T.

1993 Rice-Wheat Atlas of Bangladesh, International Rice Research Institute (IRRI), International Maize and Wheat Improvement Center (CIMMYT) and Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh.

Islam, M. R. and Haque, M. R.

2010 Impacts of Northwest Fisheries Extension Project (NFEP) on pond fish farming in improving livelihood approach. *Journal of Bangladesh Agricultural University*, Vol. 8 (2), pp. 305-311.

Jentoft, S.

2007 In the Power of Power: The Understated Aspect of Fisheries and Coastal Management. *Human Organization*, Vol. 66, No. 4, pp: 426-437.

Jentoft, S.

2004 Institutions in fisheries: what they are, what they do, and how they change. *Marine Policy* Vol.28, pp:137-149

Jentoft, S. and Chuenpagdee, R.

2009 Fisheries and coastal governance as wicked problem, *Marine Policy*, Vol. 33, pp. 553-560.

Jentoft, S., Kooiman, J. and Chuenpagdee, R.

2005 National Institutions. In Kooiman, J., Bavinck, M., Jentoft, S. and Pullin, R. (Ed). *Fish for Life: Interactive Governance for Fisheries*, Centre for Maritime Research. Amsterdam: Amsterdam University Press.

Johnson, D.S.

In press Johnson, D.S., Acott, T., Stacey, N., and Urquhart, J (Eds.) Social wellbeing and the values of small-scale fisheries. Dordrecht: Springer.

Khan, S. M. M. H.

2012 Participatory wetland resource governance in Bangladesh: An analysis of community based experiments in *HakalukiHaor*. Doctoral thesis submitted to the Faculty of graduate Studies of The University of Manitoba.

Karim, M. and Ahsan, A.K.M.

1989 Policy Recommendations for Fisheries Development in Bangladesh, Draft Report for the Ministry of Fisheries and Livestock, Dhaka: Government of the People's Republic of Bangladesh.

Kooiman, J. and Bavinck, M.

2005 Theorizing Governability: The Interactive Governance Perspective. In Bavinck, M., Chuenpagdee, R., Jentoft, S. and Kooiman J. (Eds) *Governability of Fisheries and Aquaculture: Theory and Application*. New York: Springer.

Lenin, V. I.

1899 The differentiation of the peasantry. In John Harriss (Ed) *Rural Development: Theories of peasant economy and agrarian change*. London: Hutchinson University Library. pp. 130-138.

Lewis, D. J., Wood, G D. and Gregory, R.

1996 Trading the silver seed, Local knowledge and Market Moralities in Aquaculture Development. Dhaka: The University Press Limited.

Maghimbi, S., Lokina, R. B. and Senga, M. A.

2011 The Agrarian Question in Tanzania? A State of the Art Paper. *Current African Issues*, Vol. (45), Nordiska Afrika Institute, Uppsala in cooperation with The University of Dar Es Salaam.

Mbugua, A.

2011 Research Report on Water Scarcity in Northern Bangladesh. VSO and GBK, Parbatipur, Dinajpur.

McGregor, A.

2009 Human Wellbeing in Fishing Communities. Paper prepared for ESPA Workshop 1, organized by Institute for Ocean Management, Chennai, India.

McGregor, J. A., McKay, A. and Velazco, J.

2007 Needs and resources in the investigation of wellbeing in developing countries: illustrative evidence from Bangladesh and Peru, *Journal of Economic Methodology*, Vol.14 (1), pp. 107-131

Miliband, R.

1977 *Marxism and Politics*, Oxford, England: Oxford University Press.

Ministry of Land (MoL)

2015 National Land Zoning Report: Parbatipur Upazila, District: Dinajpur. Dhaka: Ministry of Land, Government of the People's Republic of Bangladesh.

Mikkelsen, B.

1995 *Methods for Development Work and Research, A Guide for Practitioners*. New Delhi: Sage Publications.

Moeran, B.

1992 The Cultural Construction of Value, 'Subsistence', 'Commercial' and Other Terms in the Debate about Whaling. *Maritime Studies* (MAST), Vol. 5 (2).

Muhammad, A

2017 "State" In The Era of Globalization and People's Struggle, The Daily Banik Barta, Dhaka, Bangladesh.

Naher, F.

1997 Green Revolution in Bangladesh: Production Stability and Food Self-Sufficiency. *Economic and Political Weekly*, Vol. 32, No. 26, pp: A84-A89.

Nieuwenhuys, O.

1994 Children's Lifeworlds, gender, welfare and labour in the developing world. London: Routledge.

Njaya, F., Donda, S. and Béné, C.

2012 Analysis of Power in Fisheries Co-Management: Experiences from Malawi. *Society and Natural Resources*, Vol. (25), pp. 652-666.

Pakulski, J.

2007 Anti-class analysis: social inequality and post-modern trends.

<https://www.ssc.wisc.edu/~wright/Found-c6.PDF>

Pascual-Fernández, J. J., Jentoft, S., Kooiman, J. and Trinidad, A.

2005 Institutional Linkages. In Kooiman, J., Bavinck, M., Jentoft, S. and Pullin, R (Ed). *Fish for Life: Interactive Governance for Fisheries*, Centre for Maritime Research. Amsterdam: Amsterdam University Press.

Planning Commission

1973 The First Five Year Plan 1973-78, Planning Commission, Government of The People's Republic of Bangladesh, Dacca, Bangladesh.

Pomeroy, R. S.

1987 The role of women and children in small scale fishing households: a case study in Matalom, Leyte, Philippines. *Philippine Quarterly of Culture and Society*, Vol. 15 (4), pp. 353-360.

Pomeroy, R. S. and F. Berkes

1997 Two to tango: the role of government in fisheries co-management." *Marine Policy*, V. 21(5): 465-480.

Plumptre, T. and Graham, J.

1999 Governance and Good Governance: International and Aboriginal Perspectives. Institute on Governance.

Poulantzas, N.

1978 State, Power, Socialism. London: New Left Books.

Poulantzas, N.

1968 Political Power and Social Classes. London: New Left Books.

Pyakuryal, K.

2001 Weberian Model of Social Stratification – A Viewpoint. *Occasional Papers in Sociology and Anthropology*, Vol. 7, pp. 14-25.

Rahman, K. M. A. and Debnath, S. C.

2015 Agrochemical use, environmental and health hazards in Bangladesh, *International Research Journal of Interdisciplinary & Multidisciplinary Studies (IRJIMS)*, Vol. I (VI), pp: 75-79

Ramamurthy, P.

2010 Why Are Men Doing Floral Sex Work? Gender, Cultural Reproduction, and the Feminization of Agriculture. *Signs*, Vol. 35 (2), pp. 397-424.

Razavi, S.

2009 Engendering the political economy of agrarian change. *The Journal of Peasant Studies*, Vol. 36 (1), pp. 197-226.

Rogers, P., Lydon P., Seckler, D. and Pitman, G.T. K.

1994 Water and development in Bangladesh: a retrospective on the Flood Action Plan. Arlington, Virginia: Irrigation Support Project for Asia and the Near East.

Shankar, B. and Halls, A.

2005 The effects of surface water abstraction for rice irrigation on floodplains fish production in Bangladesh. *International Journal of Water*, Vol. 3 (1), pp: 61-83

Schettkat, R and Yocarini, L.

2006 The Shift to Services Employment: A Review of the Literature, Structural Change and Economic Dynamics, Vol. 17 (2), pp. 127-147.

Sen, A.

1981 Poverty and famines: an essay on entitlement and deprivation. Oxford: Clarendon Press.

Sewell, W. H.

1992 A Theory of Structure: Duality, Agency, and Transformation, *The American Journal of Sociology*, Vol. 98, No. 1, pp. 1-29.

Simmel, G.

1990 The Philosophy of Money. New York: Routledge.

Sultana, P.

2012 Implications of floodplain aquaculture enclosure, *Journal of Environmental Planning and Management*, Vol. 55 (9), pp. 1159-1174.

Sultana, P. and Thomson, P.

2008 Gender and Local Floodplain Management Institutions: A Case Study from Bangladesh. *Journal of International Development*, Vol. 20, pp. 53-68

Sultana, P., Thomson, P. and Ahmed, M.

2003 Final Technical Report, Understanding Livelihoods Dependent on Inland Fisheries in Bangladesh and Southeast Asia, WorldFish Center.

Thapa, S.

2005 Conceptual Framework to Study Peasant Society and Economy. Research paper submitted under the 'Korea Foundation Field Research Fellowship' from May to November 2005 under the theme Peasant Radicalism.

Thomson, P., Roos, N., Sultana, P., and Thilsted, S. H.

2002 Changing significance of inland fisheries for livelihoods and nutrition in Bangladesh, *Journal of Crop Production*, Vol. 6, pp. 231-49.

Thomson, P. and Hossain, M. M.

1998 Social and distributional issues in open water fisheries management in Bangladesh, In Tomi Petr (Ed.). *Inland fishery enhancements*. FAO Fisheries Technical Paper 374. Rome: Food and Agriculture Organization and UK Department for International Development. pp. 351-370.

Toufique, K. A.

1998 Institutions and Externalities in the Inland Fisheries of Bangladesh. *Land Economics*. Vol. 74 (3), pp. 409-421.

Toufique, K. A.

1997 Some Observations on Power and Property Rights in Inland Fisheries of Bangladesh. *World Development*, Vol 25(3), pp. 1-11.

Toufique, K.A. and Belton. B.

2014 Is Aquaculture Pro-Poor? Empirical Evidence of Impacts on Fish Consumption in Bangladesh, *World Development*, Vol. (64), pp. 609-620

Toufique, K. A and R. Gregory

2008 Common waters and private lands: Distributional impacts of floodplain aquaculture in Bangladesh, *Food Policy*, Vol. (33), pp. 587-594.

United Nations Development Programme (UNDP)

1997 Governance for sustainable human development, UNDP policy document, New York.

Venkateswarlu, D.

1997 Changing agrarian structure and relations, study of a village in Guntur District 1950-1991. A thesis submitted for degree of Doctor of Philosophy, Department of Political Science, School of Social Science, Hyderabad: University of Hyderabad.

Wennergren, E. B. and Whitaker, M. D.

1986 Foodgrain Sufficiency in Bangladesh: A Reappraisal and Policy Implications. The *Journal of Developing Areas*, Vol. 21, (1), pp. 1-14

Weerantunge, N., Béné, C., Siriwardane, R., Charles, A., Johnson, D., Allison, E. H., Nayak, P. K. and Badjeck, M. C.

2014 Small-scale fisheries through the wellbeing lens. *Fish and Fisheries*, No. 15, pp: 255-279
Weerantunge, N., Snyder, K. A. and Sze, C. P.

2010 Gleaner, fisher, trader, and processor: understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries*, Vol. 11(4), pp. 405-420.

White, S. C.

2010 Analyzing wellbeing: a framework for development practice. *Development in Practice*, Vol. 20 (2).

White, Sarah C.

2009 Bringing Wellbeing into Development Practice, Wellbeing in Developing Countries Research Group (WeD) Working Paper 09/05, Bath: University of Bath.

World Bank

2013 Poverty Assessment: Assessing a Decade of Progress in Reducing Poverty, 2000-2010, Bangladesh Development Series, Paper No. 31, The World Bank Office, Dhaka, Bangladesh.

World Bank

1993 Governance, Washington: World Bank.

WorldFish

2013 Fishing Gears Diversity in Sunamganj, Haor region within CBRMP's working area. Community Based Resource Management Project, Dhaka: Local Government engineering Department and WorldFish.

Wright, E. O

2003 Social Class. In *Encyclopedia of Social Theory*, edited by George Ritzer, Sage Publications.

Appendix - I

Appendix I : List of lessee of government ponds in the study area (Manmathpur Union)

Serial	Name of pond	Size of pond (In acre)	Lease	
			Time	Name of lease
1	Andhua Pukur	5.76	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2009-2016	Andhua Housing Project
2	Majer Pukur	3.60	1997-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>DeaulFihser's Cooperative Society¹³</i>
3	Pokabari Damua	4.23	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Deaul Fisher's Cooperative Society</i>
4	Garudanga	4.48	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2009-2016	<i>DeaulFihser's Cooperative Society</i>
5	Hatiram	4.51	2009-2016	Hatiram Housing Project
6	Mukhdhoa	4.78	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Khorakhai Daspara Fisher's Cooperative Society</i>
7	Boro Autal	4.00	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2013	<i>Tajnagar Jalkor Fisher's Cooperative Society</i>
			2013-2016	Manmathpur Freedom Fighter Cooperative Society
8	Boro Chunial	5.37	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Tajnagar Nayajela para Fisher's Cooperative Society</i>
9	Choto Chunial	4.79	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>TajnagarJalkor Fisher's Cooperative Society</i>
10	Pancho Roton	6.50	2002-2004	Prannagar VDP Cooperative Society
11	Kashi Pukur	4.48	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
12	Khunia Pukur	4.03	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Khorakhai Daspara Fisher's Cooperative Society</i>

¹³ Name of lease in italic form are the genuine fisher's association

13	Bashihar	5.01	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Khorakhai Jelapara Fisher's Cooperative Society</i>
14	Hari Pukur	3.38	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2016	<i>Tajnagar Nayajela Para Fihser's Cooperative Society</i>
15	Dalua	0.29	2014-2016	Hossenpur CPIG Fisher's Cooperative Society
16	Choto Damua	0.40	2014-2016	Mr. Saiful Islam
17	Damua	1.09	2005-2013	Barinda Multipurpose Project
			2014-2016	Dokhin Majhapara Cooperative Society
18	Son aPukur	0.38		Open access
19	Mali Pukur	0.18		Filled with sand
20	Dhantola	1.03	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2012-2014	Mr. Jashim Pramanik
21	Jogi Pukur	2.45	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2012-2014	Mr. Mofazzal
22	Dakua	1.54	2005-2013	Barinda Multipurpose Project
			2013-2016	Dokhin Para Cooperative Society
23	Choto Autal	2.38	2000-2009	Grameen Motsho O Pashusampad Foundation (GMPF)
			2011-2013	<i>Khorakhai Jelapara Fisher's Cooperative Society</i>
			2014-2016	Manmathpur CPIG Cooperative Society
24	Damua II	1.20	2002-2009	Manab Sompot Unnayan o Gobashona Songstha
			2012-16	Mr. Rabiul Islam
25	Choto Damua II	1.12	2002-2011	Local Youth Club
			2007-2009	Barinda Multipurpose Project
			2012-2014	Manab Sompot Unnayan o Gobashona Songstha
26.	Modonkuri	0.23		Open access
27	Unnamed	0.47		Open access
28	Unnamed	0.41		Open access
29	Bogahaga	0.94	2003-2007	Local Youth Club
30	Charaya	1.59	2002-2003	Local Youth Club
			2013-2016	Daglagonj Rikshaw-Van Puller Cooperative Society
31	Nolkata	0.51		Open access
32	Unnamed	0.14		Open access
33	Rangamati	1.59	2002-2004	Local Youth Club
			2005-2009	Barinda Multipurpose Project
			2012-2016	Sharna Komol Cooperative Society

34	Unnamed	0.56	2013-2016	Mr. Rahmat and Gang
35	Unnamed	0.87		Open access
36	Vorardaho	2.62		Disputed
37	Varveri	1.08	2013-2016	Bolrampur Baishapara Youth Development Cooperative Society
39	Surdaho	2.36		Open access
40	Unnamed	0.60	2008-2016	Barinda Multipurpose Project
41	Unnamed	0.68		Open access
42	Unnamed	1.74	2002-2014	Sharna Komol Youth Development Society
43	Dogri	0.49	2002-2006	Sharna Komol Youth Development Society
			2008-2010	Barinda Multipurpose Project
			2014-2016	Tajnagar Mosque Management Committee

Source: Register VI, Manmathpur Union Parishad Land Office, Parbatipur, Dinajpur

Appendix II: Questionnaire for Household survey

1. General information of respondent:

Name of the respondent: Age: Occupation:
Level of education: Gender: Income:
Nature of HH: (Single/Joint) Source of income:
Total number of member of HH: Religion: Caste:

2. Household organization:

Name	Relation with respondent	Age	Gender	Level of education	Main occupation	Other occupation	Income

3. Assets of the respondent's household:

- Amount of land owned by the HH:
- Nature / Condition of the house:
- Total number of room:
- Source of drinking water:
- Sanitation status:
- Other relevant assets of the HH: Cow (), Goat (), Chickens & Ducks (), TV (Black & white / Color), Cycle / Motorcycle, Others
- Member of any NGO / Association : Yes /No, If yes, Name:
- Do you deposit money in any NGO / Bank: If yes, Amount of deposit:
- Do you have access to credit: If yes, Amount of credit:

4. Fishing Assets:

- Boat and gear access: (ownership, shared, rented)
- Type and amount of fishing gears:

5. Roles of women and children:

- What daily activities women do in the HH?
- What roles women play in fishing?

- c) What roles children play in your HH?
- d) Do women and children of your HH involved with any income generating activities?

6. Importance of fisheries:

- a) What importance fisheries carry in your life?
- b) What roles fisheries play in your household and community?
- c) Do you observe any rituals related to fisheries?

7. Structural changes in the fisheries and its impacts:

- a) What are the key changes / trends / particular events that have occurred in fisheries over the last four decades?
- b) Do you feel that these changes affect your life? If so, then, how it affect your life?
- c) Do you feel that life is getting better or worse (regard to these changes)? Why?

8. Responses towards these structural changes:

- a) How do you response towards these changes?
- b) What roles your family members play towards these changes?
- c) Do you think you effectively manage the effects of these changes? Why?

9. Governance of fisheries:

- a) Do you have any communication with the fisheries department of Parbatipur?
- b) What are the barriers to fishing in Parbatipur?
- c) What initiatives should take to remove these difficulties?
- d) What roles you expect from fishing department?

Appendix III: Images from the study area



Conversion of wetlands into paddy land



Conversion of wetlands into paddy land



Irrigation canal goes through wetlands



Irrigation canal goes through wetlands



River becomes narrow and shallow



River occupied by the influential during the summer season



Fishing in the wetland



Fishing in the wetland



Fishing in the floodplain



Fishing in the floodplain by the children



Fishers work as aquaculture labor



Young fishermen are knitting the fishing net



Sorting of fish for sale



Fish market at local sub-district

