

Project Completion Report

Environment and Community Conflict Management: Exploring the Scope of Community Engagement as an Efficient Measure to Localized Common Pool Resource (CPR) Management

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ABSTRACT

Effective management of common pool resources (CPRs) is essential to safeguard natural resources and biodiversity. This study in Bangladesh addresses the critical issue of mismanagement of Common Pool Resources (CPRs), emphasizing the environmental degradation, resource depletion, and conflicts arising from such practices. With a focus on assessing the current state of CPR extraction and exploring community participation as a solution, the research aims to empower local communities for more sustainable and equitable resource management. The study employs a case study approach using Participatory Rural Appraisal (PRA) methodology to assess and understand the current state of common pool resource extraction in the Haldi Beel area. Various participatory tools such as social and resource mapping, transect walks, mobility mapping, dream mapping, and SWOT analysis are utilized to collect data and engage the community in the resource management process. The study explores conflicts arising from resource extraction in the Haldi-Beel community, employing resource mapping and historical analysis to understand contradictions among community members. It highlights the ecological significance of Haldi Beel, emphasizing its rich biodiversity and the challenges faced in managing common pool resources, particularly concerning land, water, and fisheries. The study unveils conflicts between farmers and fishermen, intricacies of land acquisition, wetland management evolution, and the implications of excessive exploitation of natural resources, leading to resource degradation and biodiversity loss in Haldi Beel. The degradation of common pool resources in Haldi Beel is attributed to factors such as corruption in land acquisition, indiscriminate killing of birds, breeding fish using current nets, over-extraction of fish, and a lack of employment opportunities. To address these challenges, community engagement, negotiation, localized resource management, and the proper implementation of regulations are recommended. The policy recommendations include the need for environmental governance, participatory governance, and the establishment of time durations for resource use agreements to minimize conflicts and promote sustainable resource management. Improper land acquisition and overfishing in the wetland of Haldi-Beel are contributing to a tragedy of the commons, necessitating effective conflict management and rule adjustments based on community expectations. The study underscores the importance of managing resource consumption to alleviate the pressure on future generations and highlights the significance of

addressing overexploitation for sustainable development in developing countries. Positioned as a baseline study, it lays the groundwork for future endeavors in conflict management within the context of common pool resource degradation.

Keywords: Common Pool Resources (CPR), Participatory Rural Appraisal (PRA), SWOT analysis.

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Glossary of Terminology

Beel: Lake-like depressions retaining water permanently or for the greater part of the year.

Khals: Drainage channels connecting beels to adjacent rivers.

Benami: Land property purchased and recorded in the name person who is not the true owner.

Julmohal: A designated fishing ground. A water estate.

Nirbahi: Upazila executive officer.

Tebhaga: Share crop system where one-third of proceeds goes to the land owner and two-thirds to the cultivator to cover labor and material inputs.

Settlement: Major survey and establishment of land ownership

Pucca structures: Structures built with permanent plinth and wall material such as burnt bricks, stones (packed with lime or cement), cement concrete, etc, and roof material such as RCC(reinforced cement concrete), iron, or other metal sheets.

Semi-Puccu structures: They consist of a plinth made of permanent materials such as burnt bricks, stones(packed with lime or cement), walls, and roofs made up of tin or other metal sheets.

Katcha structures: Katcha structures are those with temporary plinths made up of bamboo, wood, or other durable materials, and walls and/or roofs are made of materials similar to “Semi-Pucca” buildings.

CHAPTER 1

INTRODUCTION

The introduction serves as the opening section that provides readers with an overview of the research topic, its context, and the study's objectives. The introduction is crucial because it sets the stage for the entire study and helps to understand the significance and relevance of the research.

1.1 Background of the study:

The environment serves as a critical life support system, yet the Earth's reservoir of ecological resources is finite. The relentless pursuit of growth and comfort by humans is pushing the environment to its limits. In developing nations such as Bangladesh, green spaces have become scarce due to rapid urbanization and the disappearance of wetlands, exacerbating environmental issues and increasing vulnerability to urban flooding and natural disasters.

Bangladesh is identified as the most vulnerable country to extreme climate events by the Global Climate Risk Index (GCRI) 2021 and the Sixth IPCC Assessment Report (AR6-2023). The Global Goals and New Urban Agenda present a significant challenge for developing nations to create inclusive, safe, and resilient human settlements.

The extravagant use and open access to common pool resources contribute to their depletion, creating a tragedy of the commons. G. Hardin's "Tragedy of the Commons" argues that shared resources inevitably lead to their destruction. This phenomenon is mirrored in environmental degradation issues, highlighting the interconnection between the economy and the environment.

In Bangladesh, scarce environmental resources face degradation due to individual greed and inadequate regulatory measures. Despite global research on this issue, a substantial research gap exists, particularly concerning Bangladesh. Rigorous, localized field investigations are essential to understand how a combination of policy measures can effectively manage common pool resources in this context.

The management of common pool resources often leads to disputes and conflicts of interest among different groups, emphasizing the urgent need for dispute resolution measures in environmental preservation, particularly in countries like Bangladesh.

1.2 Objectives of the study:

- ✓ To identify the existing condition of extracting common pool resources and the tragedy of common issues related to it in the study area.
- ✓ To investigate the scope of community participation as a solution for common pool resource management in the study area.

1.3 Justification of the Study:

- ✓ Common Pool Resources (CPRs) are integral to the well-being of many communities and the environment. Mismanagement of these resources leads to environmental degradation, resource depletion, and conflicts among stakeholders. This study seeks to address these pressing environmental and social concerns.
- ✓ Empowering local communities to manage their resources can lead to more sustainable and equitable outcomes.
- ✓ the study's findings may have a positive impact on the well-being and quality of life for communities that rely on CPRs.

1.4 Expected Outcome

- Increased awareness within the local community about the importance of sustainable Common Pool Resource (CPR) management and the consequences of overuse or mismanagement.
- Reduced conflicts and disputes among stakeholders related to CPR access and use, leading to a more harmonious community.
- Increased community engagement and empowerment in decision-making processes related to CPR management and resource access.
- Potential social and economic benefits for the community, including improved livelihoods, increased income, and reduced vulnerability.

CHAPTER 2

METHODOLOGY

In this chapter, the study employs a case study approach, specifically using the Participatory Rural Appraisal (PRA) method. Here's a breakdown and further clarification of the mentioned methodology:

The study process has been explained in this chapter. The case study approach using the participatory rural assessment method is the methodology used for this investigation. Because PRA (Participatory Rural Appraisal) is a yieldable, reasonably priced, and time-saving set of approaches and methods used to enable workers to access and analyze information in terms of previous, current, and future situations to understand the rural masses and the conditions that exist in rural areas, several participatory rural appraisal tools have been used to collect databases. To construct realistic development practitioners and accomplish the intended goals within a set timeframe, community engagement is a crucial tool of PRA. It provides a comprehensive and wide-ranging understanding of problems, potentials, resources, and solutions (Chambers, 1992). The literature on natural resources and communally owned property for resource economics and resource planning provides numerous instances of how community engagement is currently becoming a key strategy in rural development (Scoones and McCracken, 1989). Participatory procedures locally open up the prospect of establishing connections between sustainable livelihoods, awareness webs, consciousness schemes, and development techniques (Gupta, 1997).



Figure 1: Social and Resource map preparation with community participation

(Source: Field Survey, 2023)

Participation in the community can influence how the poor are affected by land policy, structural adjustment, and other policies. We have employed participatory rural assessment to determine the current resource management that involves community involvement. Considering that community involvement can aid in providing a realistic example of the state of affairs. It aids in our discovery of every component that now influences the process of managing the resources in the common pool.

Table 1: List of PRA tools to be applied in the Study Area

Issue(s) Purposes	Tools Used
Assessment of community (physical/natural) assets.	Social and Resource Mapping
Exploration of local resources and development conditions and observation of physical, natural, and capital assets.	Transect walk
Exploration of mobility pattern of the community.	Mobility map
Exploration of aspiration of community people.	Dream map

Exploration of degradation of resources and conflict.	Cause effect diagram
Exploration of resources and how they extract and degrade the resource and their conflict of extraction.	Focus Group Discussion
Gaining in-depth `knowledge of specific issues, structures, and organizations.	Key-Information Discussion
Income Generation present, future and trend and constraints.	Seasonal diagram
Strategies to reduce the degradation of resources.	SWOT analysis

Source: Secondary data

The implementation of participatory rural assessment instruments for our specific aims is shown in this table. We have mapped resources and social networks to evaluate the assets inside the community. We conducted a transect walk to investigate the state of land resource development and to observe physical, natural, and capital assets. The management problem is the focus of our investigation. We have conducted a mobility mapping tool to identify the sources from which we can obtain information on the land management process of the research area.

Community expectations should be given first attention while managing resources from the common pool. As a result, we carried out dream mapping, which enabled us to better understand the aspirations of the community members regarding how they would like to address resource management issues. The various organizations' roles are crucial in resolving management issues. Participatory research methodologies, particularly participatory rural appraisal, were employed to conduct the study, which comprised focus group talks and key informant interviews. The seasonal diagram can be used to determine the likelihood of conflicts. Finally, we have tried to use the SWOT analysis to determine the best ways to slow down the deterioration of resources. Several semi-structured questions were created to force the necessary conversation and elicit the necessary data from the group discussion. As a guide, secondary databases were employed. Their information has been verified through the use of secondary data. The secondary databases were

located in several administrative offices, including local agencies and the union parishad, AC land office, and BMO.



Figure 2: Focus Group Discussion (Source: Field Sarvey, 2023)

The focus group discussion is desperately needed in PRA. Someone has been chosen as an expert who knows several ideologies, including those related to markets and prices, politics and conflict, and various values and customs. Data on watersheds, soil and water conservation, agroforestry, fisheries and aquaculture, biodiversity, management of wildlife reserves, planning and implementation of integrated pest control, and village resource management To understand resource extraction and conflict surrounding it, as well as to provide policy to control the management system, this study focused on crops and animal husbandry, including farmer participatory research, farming systems research, and problem identification by farmers in irrigation and marketing.

In our study field, several technologies have been employed for data extraction. Various mapping techniques such as social and resource mapping, Venn diagram, transect mapping, seasonal diagram, mobility mapping, and dream map were employed to comprehend the connections between residents and shared resources. The approach has been used to determine

the current state and tragedy of common resource extraction in Haldi Beel. The common pool resources of that beel and their deterioration were identified by social and resource mapping, which was also utilized to evaluate the economic standing of the Haldi beel community that extracts resources. Studies examining people's reliance on shared resources frequently include seasonal calendars and mapping of natural resources. Researchers studying farming systems have found value in using bio-resource flow diagrams. By recognizing the connections between the farm's crop, animal, and tree components as well as between private and common/government property, they also facilitated problem-solving discussions and sparked ideas from farmers for potential solutions. (Pound, 2000). With the use of a transect walk, local resources, physical and natural assets, and their development pattern were explored. To understand the seasonal variations in terms of migration, cropping patterns, and income production, seasonal diagrams were employed.

A mobility map was utilized to identify the important difficulties in day-to-day activities, such as disputes and issues with land management and livelihood. The instruments were used to gather data regarding land-based CPRs' contribution. In the survey analysis, a few sequences were adhered to, including mobility pattern, distance, trip purpose, frequency, and gender of the trip maker. We attempted to conduct a key informant survey after a group discussion. We conducted case studies that included information about the history and profile of the household, crisis management techniques, and conflict resolution techniques.

The study's topic has been chosen with the aid of secondary data sources. The study's goal and aim were taken into consideration when choosing the study region. The study's characteristics and those of Haldi Beel are identical. With the aid of a literature review, a conceptual framework and coordination schema were then created. Sources both primary and secondary were used to gather the data. Ultimately, the data were interpreted to provide recommendations.

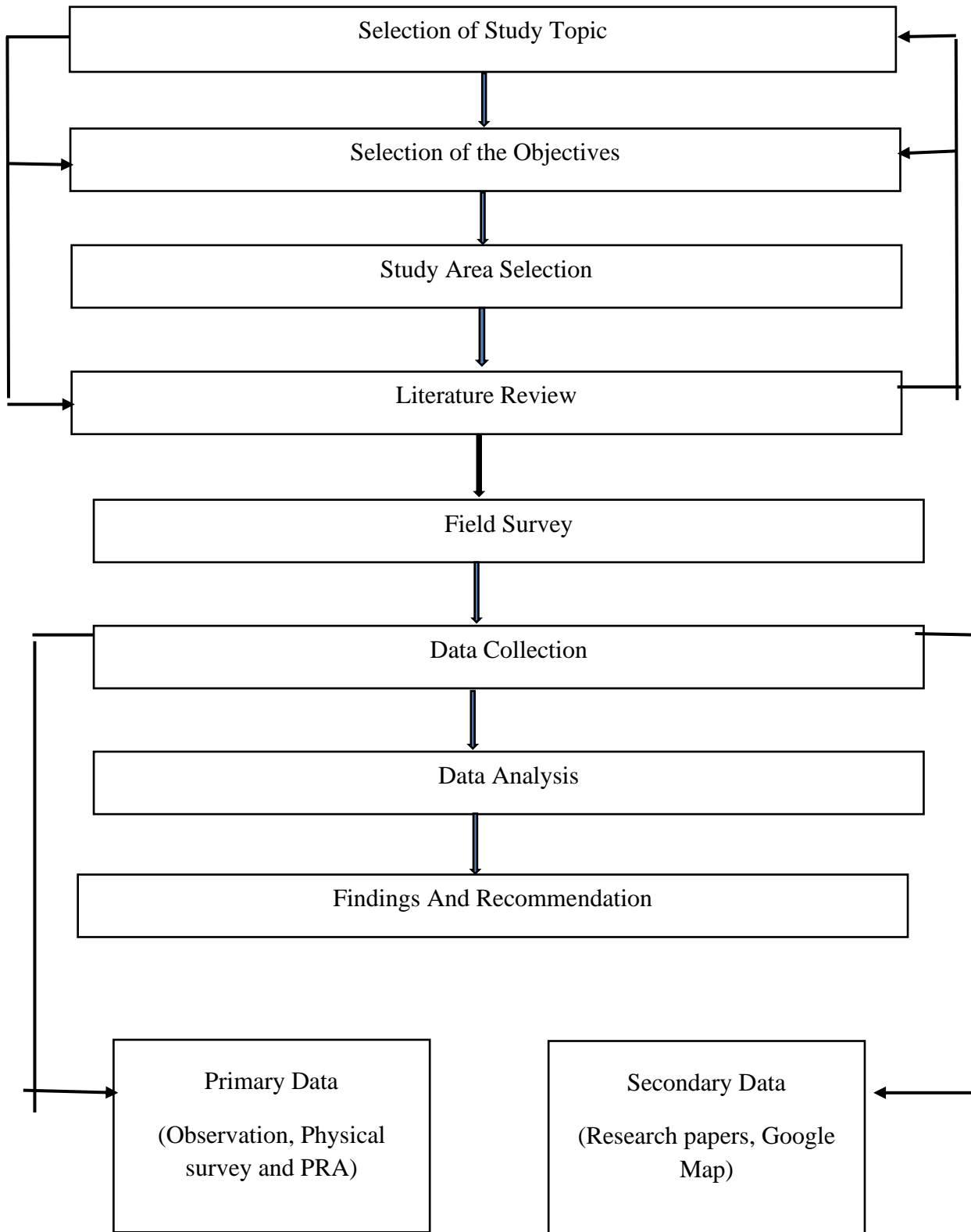


Figure 3: Methodology (Author's Preparation, 2023)

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

A literature review is a critical examination and analysis of existing literature, scholarly articles, books, and other sources that are relevant to a particular topic or research question. This chapter presents the terms in the literature related to the examination of common pool resource management. This section provides a detailed discussion of subjects including common pool resources, tragedies of the commons, institutions, and strategies for handling conflicts. Common resources are goods that cannot be sufficiently excluded from private use and are often shared by a community or society. They are characterized by collective ownership and have the potential to be neglected or overused if not properly regulated as mentioned by Garret Hardin in his classic article ‘The Tragedy of the Commons’ (1968). Therefore, it is crucial to engage in cautious and sustainable administration of these resources since numerous households rely on them for their livelihood and sustenance (Agrawal, 2001:1). Ostrom et al. (1994:4) characterize commons as resources that can prevent users from accessing them. Common-pool resources (CPRs) encompass the natural resources consumed by a group of individuals or a community (Ostrom, 2002:1).

Thus, it is imperative to establish a clear distinction between open-access common-pool resources and common property resources or regimes. The principal differentiation between the two lies in the realm of property rights. The former does not imply any form of ownership (lacking any property rights for anyone), yet it may be utilized or exploited by all. Consequently, it becomes susceptible to the perils and potential degradation resulting from over-exploitation. In essence, there exists no formal or informal institution to oversee and govern it. Ostrom contends that it shares certain characteristics with private goods, such as the ability to subtract resource units, as well as with public goods, encountering difficulties in exclusion. In contrast, Bromley (1990:20) refutes the existence of such common resources. He posits that only resources controlled and managed as common property, state property, or private property are present. The latter, common property regimes, postulate that there is a degree of human involvement through formal or informal institutions to manage and regulate it (Bromley, 1990; Ostrom et. al,1994;

Agrawal,2001; Agrawal, 2003). It operates and functions as property regimes both in the private and state spheres (Bromley,1990: 3). This encompasses a set of rules that delineate access, use, exclusion, management, monitoring, sanctioning, and arbitration behaviors of users about specific resources (Schlager & Ostrom, 1992; cited in Agrawal, 2003: 244). The present study deems the common-pool resources of Haltibeel as common property resources/regimes, as the common resources consumed by villagers have been autonomously managed and controlled by themselves since ancient times.

3.2 Theories on Common Pool Resources

The concept of common-pool resources (CPR) evolved after the publication of Hardin's "Tragedy of the Commons" in 1968. Hardin argued that herdsmen, with free access to grazing land, tend to increase cattle numbers, leading to the misuse of common resources. He suggested that to prevent the degradation of common resources, they should be either privatized or managed by the state. Despite its influence, Hardin's article faced criticism for oversimplification, leading to corrections in later writings.

Berkes et al. (1990) criticized Hardin's insightful but incomplete article, prompting a correction in 1998. Hardin acknowledged the mistake of not using the term "unmanaged commons" and highlighted that unmanaged commons would face issues like overgrazing.

Hardin's model significantly influenced global development and environmental policies, often misguiding them with the assumption that common-property resources are open access. Scholars noted two key factors driving changes: the increasing demand for natural resources and environmental services and the techniques applied by humans to manage these resources.

CPR theorists, like Ostrom (1999) and Agrawal (2003), have developed conditions for sustainable management, emphasizing small user groups, proximity to resources, group homogeneity, effective enforcement mechanisms, and past experiences of cooperation. They identified regularities for successful CPR management, considering characteristics of resources, the nature of user groups, institutional regimes, and the relationship with external forces.

The Community-Based Natural Resource Management (CBNRM) approach draws theoretical insights from CPR theories. While initially designed based on conditions postulated by earlier theorists, contemporary CPR theorists have evolved their thinking beyond conventional understandings.

3.3 Common-Pool Resources and the Influence of Local Norms

Past research on the local communities in Manang Valley of Manang (Aase et al., 2006) and Dolpo of Dolpa (Bauer, 2004) in Nepal has acknowledged that villagers demonstrate a willingness to adhere to societal rules and regulations when utilizing Common-Pool Resources (CPRs). This compliance may be attributed to the longstanding embedded rules and regulations that have been followed for generations in managing, controlling, and distributing such resources. These local regulations contribute to the "established structure of power and authority" within the community (Dasgupta, 1993:208; cited in Sethi et al., 1996: 768). The communities also possess the capacity to enforce specific behavioral rules and bear the costs associated with their implementation (Ibid).

For example, in the Manang Valley, farmers adhere to fixed planting and harvesting dates determined by the village headman, who consults with an alama (Buddhist priest). This practice, rather than spreading the risk by extending the planting and harvesting seasons, is followed to prevent potential damage to all crops (Aase et al., 2006:1). Similarly, in Dolpo, individuals come to agreements with their neighbors regarding a set of enforceable rules and regulations that govern households' access to and use of community resources (Bauer, 2004:53).

CPR theorists also recognize the pivotal role of local institutions in shaping human behavior. Local norms play a crucial role in influencing the management and control of common resources, as they both facilitate and constrain the actions and property rights of individuals (Agrawal, 2003:244). When people realize their dependence on CPRs, they establish their institutional arrangements to allocate and distribute resources and benefits equitably.

3.4 Utilizing PRA to Comprehend Community Involvement in the Management of Common-Pool Resources

The primary focus of Participatory Rural Appraisal (PRA) lies in a collection of techniques, with its efficacy contingent on practitioner attitudes. Successful PRA involves participants actively engaging with facilitators, and contributing relevant information. Adequate time allocation is crucial, and information gathered should undergo cross-verification from diverse sources to ensure accuracy and prevent misunderstandings. The concept of "optimal ignorance" discourages the inclusion of irrelevant or false information from participants.

PRA serves as an approach to integrate the knowledge and opinions of rural communities in development projects. It entails the use of various participatory methods, including mapping, transect walks, matrix scoring, and analytical diagramming. Social mapping delves into spatial dimensions, while resource mapping focuses on natural resources. Services and opportunities mapping explores the availability and accessibility of local services as perceived by participants.

Transect walks involve systematic observations during walks across the community, aiming to understand cause-and-effect relationships related to topography, soils, vegetation, and human settlement patterns. Mobility maps aim to comprehend the movement patterns of individuals or communities, while dream maps depict future aspirations. These methods collectively contribute to community understanding and involvement in project planning and management.

Regarding urban agriculture and gender, trends such as changes in cropping patterns, access to land and water, and shifts in gender participation can be analyzed. Gender-specific exercises are crucial to unveil differences in the conditions and perceptions of men and women.

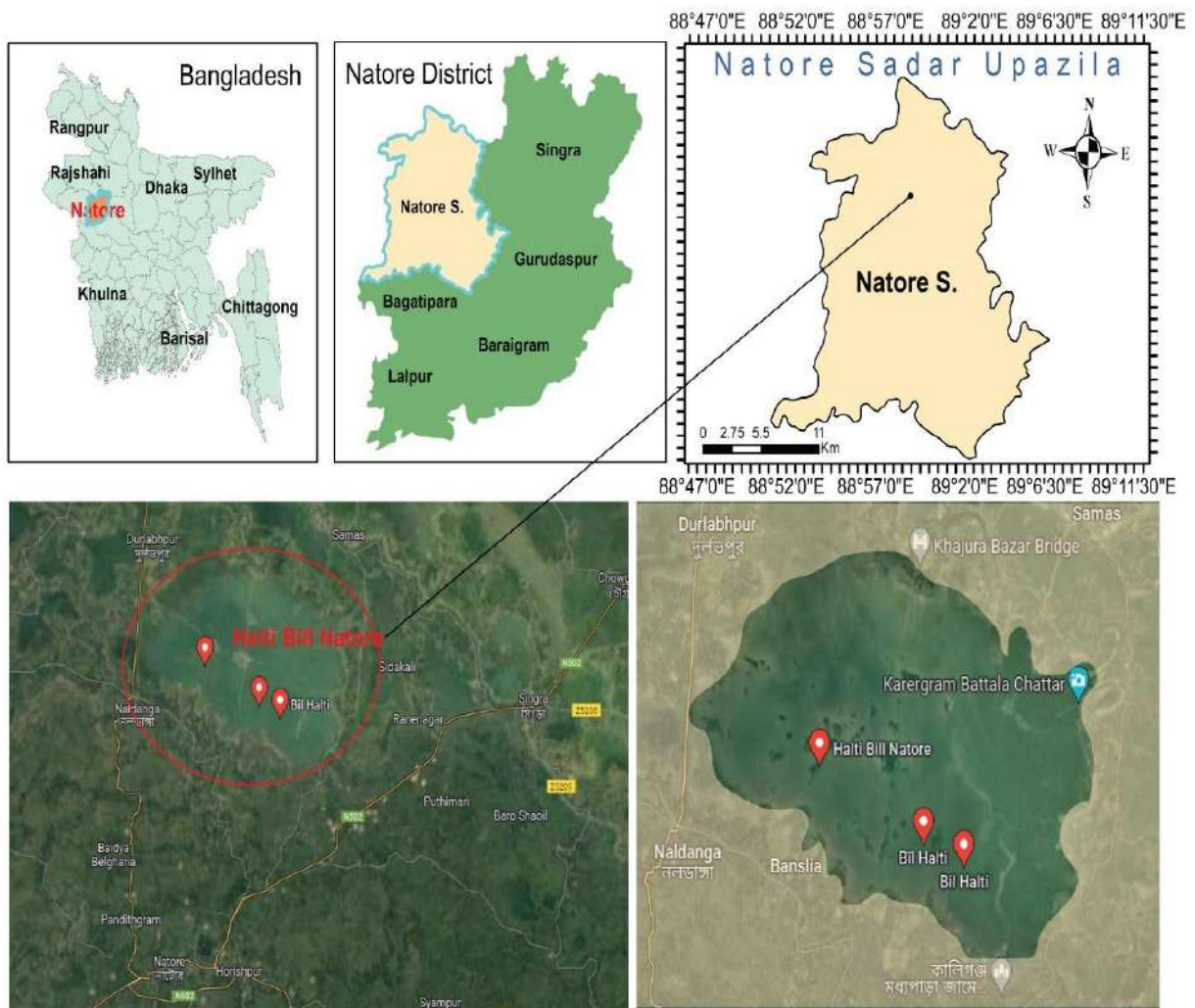
The concept of community encompasses a social unit sharing common norms, values, and identity within a specific geographical area. Community organization, synonymous with community work and development, involves activities aimed at enhancing social well-being. Biodiversity Management Organization (BMO) is an entity managing natural resources and social welfare related to Haldi-Beel, with membership categories, legal aid provisions, and a focus on fisheries, agriculture, and animal resources.

CHAPTER 4

STUDY AREA

The study area, Haldi Beel, is located in the Chalan Beel region, spanning a significant portion of the districts of Natore, Piparul, Khajurah, Madhanagar, and Brahakpur Union of Noldanga Upazila. Here are some essential traits and factors to take into account for the research field:

4.1 Geographical Location:



Halti Beel is located in Bangladesh's Chalan Beel region, a sizable wetland region renowned for its ecological significance. Nature is one of the districts covered; the study area also includes several unions including Piparul, Khajurah, Madhanagar, and Brahakpur. The total area of the water body is about 1012.5 hectares during the monsoon season and 15.95 hectares during the dry season. The water depth varies from 1.5 to 6 m depending on the season.

4.2 Topography:

One of the largest depressions in the Chalan Beel region, Halti Beel is thought to be at a lower elevation than the surrounding surroundings. One of the water body's distinctive topographical features is its asymmetrical shape and semi-closed nature.

4.3 Hydrology:

The water levels in the study region fluctuate seasonally, with Halti Beel submerged for about half of the year. This points to a cyclical pattern of recession and flooding that affects the hydrological dynamics of the area. An 8-kilometer submerged road that connects the Piprul and Khajuria unions within Halti Beel suggests that there is some kind of infrastructure inside the marsh. Think about how this connectivity affects community relations, accessibility, and local transportation.

4.4 Duration of Submersion:

Emphasize how important the six-month immersion time is to comprehending the local ecology and social dynamics. Examine the effects of this prolonged submersion on the wildlife, plants, and people that depend on the wetland for their lives.

4.5 Community and Land Use:

Explain the neighboring communities' historical and present reliance on Halti Beel for resources like fisheries, water, and wetland services. Examine the patterns of land use, including farming operations and any effects on the ecosystem of wetlands.

4.6 Economic and Social Importance:

Evaluate the socio-economic significance of Halti Beel for the surrounding community, taking into account the wetland's cultural significance, sources of income, and way of life.

4.7 Ecological Considerations:

Examine the biological diversity of the study region while keeping in mind the distinctive plants and animals that live in Halti Beel. Examine any problems or alterations to the environment that might result from human activity or natural processes. Including these components in your research will aid in offering a thorough grasp of Halti Beel and offer insightful information about the region's common pool resources and how they are managed.

Existing Condition of the Study Area

This chapter provides a comprehensive overview of the current state of Haldi Beel, offering insights into its existing conditions. Additionally, it delves into the various fundamental services and institutions that are prevalent within the society. The content of this lesson not only highlights the present situation of Haldi Beel but also encompasses a detailed examination of the essential services and institutions that play a crucial role in shaping the community. To obtain anticipated insights into society, we have undertaken a comprehensive approach involving social mapping, analysis of mobility patterns, and conducting transect walks. This multifaceted methodology encompasses the systematic examination of societal structures, understanding how individuals move within the community, and observing transect walk in various contexts. Through social mapping, we chart the intricate relationships and structures that define the community's social fabric. Mobility pattern analysis involves studying how people navigate and interact spatially, shedding light on the dynamics of movement within society.

5.1 The existing social status of communities



Figure 5: Housing Condition of Farmers (Source: Field Survey, 2023)

Farmers are comparatively wealthier than fishermen in the area. Most houses are solidly constructed with bricks, two stories high, while others are semi-permanent structures made of tin and brick. A few houses are of "katcha" type, built with materials like soil, straw, and tin. Farmers take the initiative to build barricades using bricks, soil, and sand at their own expense to protect their homes. Initially, when they cultivated "Amon," floodwater couldn't enter their houses, eliminating the need for barricades. However, with the shift to other high-yield crops like "Boro," "Untirish," and maize, flood waters began inundating their houses. Consequently, they started building barricades for protection. Despite cultivating seasonal crops, they thrive economically from "Magh-Joistho" and reside in well-constructed, two-story houses due to extensive cultivable land ownership, averaging 4-5 bigha per individual. Some possess up to 100 bighas. Those without land lease plots or cultivate "Khas" land. The government allocates "Khas" land to landless farmers, but some falsely claim landlessness to gain ownership. They engage in dry-season cultivation and pursue various activities during the remaining time. Some migrate to cities or other villages, while educated family members pursue alternative professions, such as teaching.



Figure 6: Housing Condition of Farmers (Source: Field Survey, 2023)

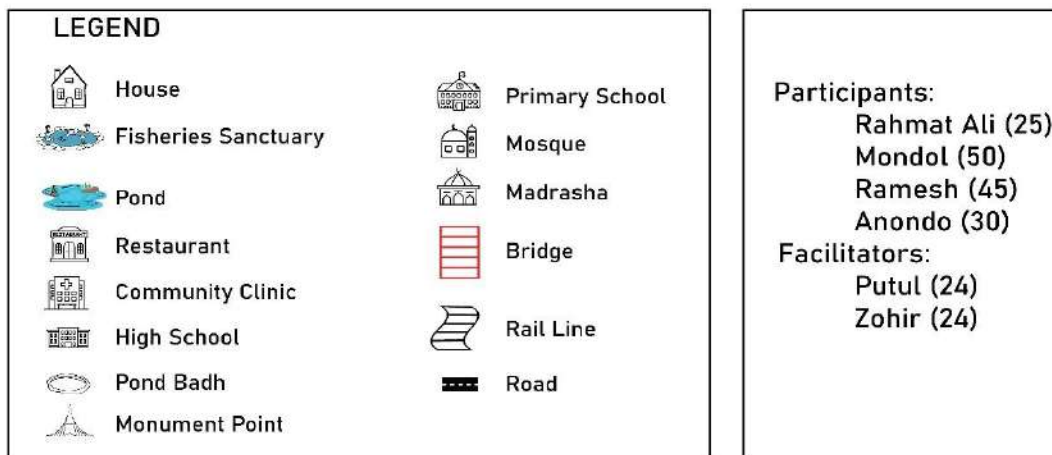
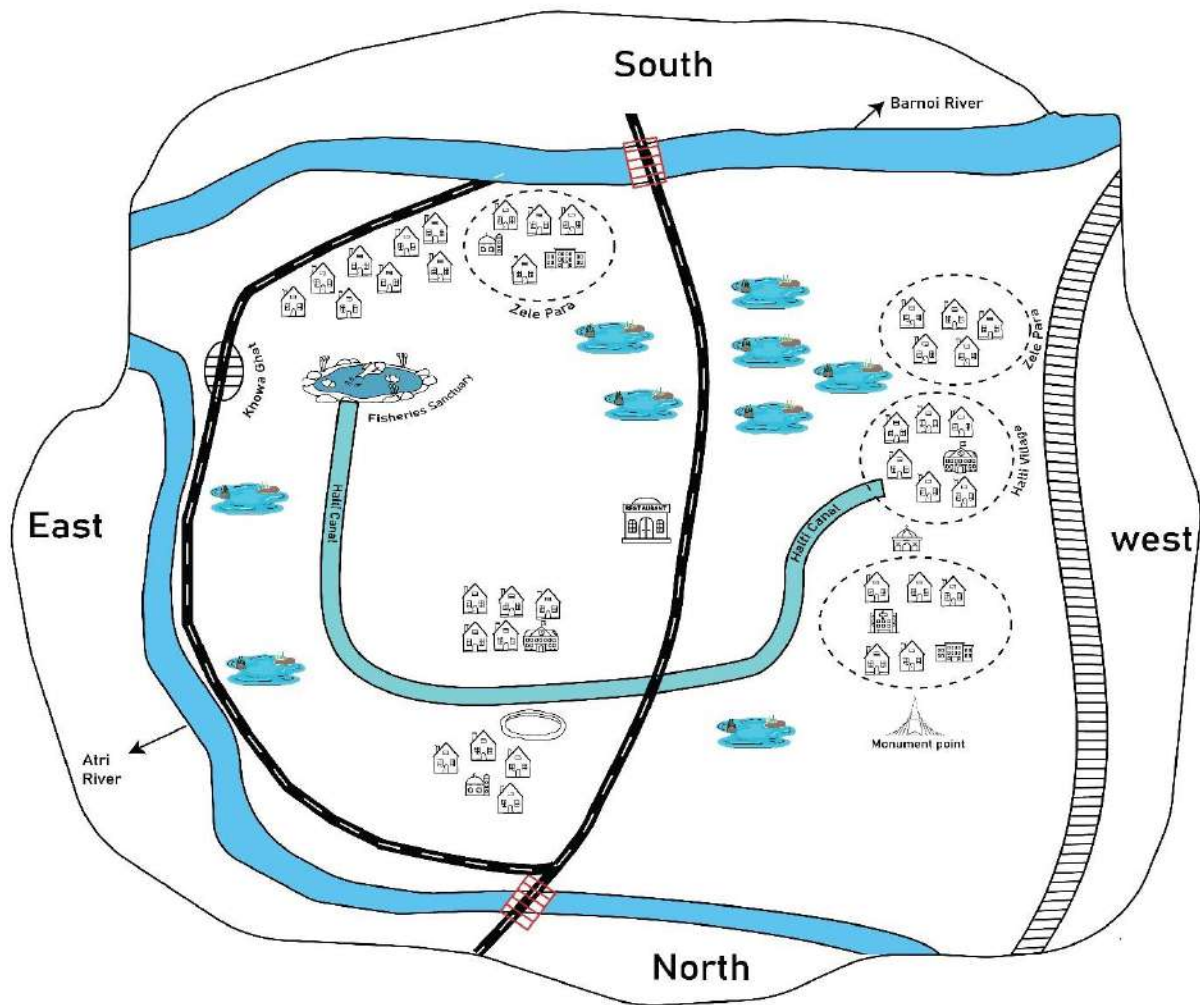


Figure 7: Social Map (Source: Field Survey, 2023)

Fishermen are divided into two communities, Hindus known as "Halder" and Muslims referred to as "Jioni." Hindu fishermen reside along the riverside in Halder Para, while Muslim fishermen live in Jioni Para.



Figure 8: Housing Pattern of Fishermen (Source: Field Survey, 2023)

To promote the development of the water bodies ("Jalmohal"), a fishermen's association named "Motsho Somobai Somity" has been established. Members of the society contribute 20 takas monthly, and the current membership stands at 2309. Only some members can catch fish in "Jalmohal" during the dry season. Non-member fishermen can still catch fish by making a monetary deposit with the somity. They collectively harvest fish from "Jalmohal," and the proceeds from the fish sales are evenly distributed among all fishermen. Those not affiliated with the somity find themselves unemployed during the dry season and often migrate elsewhere.

Communities' basic services and facilities

Different types of facilities are available there. There are 6 primary schools, one high school, one madrasa, and one community clinic. There are also 7 mosques and 3 bazar. Recently there has been a restaurant under construction. There is a memorial as a tourist spot.

Table 2: Basic Services and Facilities

Basic Services	Number
Primary School	6
High School	1
Madasa	1
Mosque	7
Restaurant	1
Bazar	3
Community Clinic	1

(Source Field Survey, 2023)



Restaurant



Memorial



Figure 9: Basic Facilities of Halti Community (Source: Field Survey,2023)

5.2 Locational attribute of resources

Transect mapping is used in various fields such as soil surveys, community mapping, and creative domain mapping. In practice, a transect map serves to determine the spatial characteristics of a community's assets. This map incorporates various variables such as ground elevation, land type, ownership, soil attributes (type and fertility), vegetation, and issues and solutions related to vegetation. The transect map is not only a practical tool for engaging in discussions with the community but also for analyzing on-site data. It employs straightforward illustrations to depict the agricultural system and habitat patterns within the community (R.S. Pomeroy, 1994).

Transects are frequently carried out after resource or social mapping activities to cross-verify information. However, a resource map is different from a transect map.



Figure 10: Existing Condition of Roads (Source: Field Survey, 2023)

Typically, the resource map finds a bird's eye perspective of the assets, whereas the transect map finds a cross-sectional picture of the assets. In general, after creating the resource map, we must create the transect walk map (Somesh Kumar, 2002). Income-generating activities in Haltibeel included the collection and sale of firewood, leaves, fish, and agricultural harvesting. Transect diagrams are used to record information gathered during a transect walk, which is commonly done after creating a natural resource map. The map indicates the locations of the various CPRs, and a systematic walk with facilitators and representatives of the local community to observe the surrounding environment and obtain information such as geography, natural resources, opportunities, and challenges. The tragedy of the commons was highlighted by the common pool resources. A systematic walk with facilitators and representatives of the local community to observe the surrounding environment and obtain information such as geography, natural resources, opportunities, and challenges.

Enrollment of Transect Walks:

- The transect map can be used to determine the veracity of the databases in the social map and transect map.
- Relocating interventions across the many community sectors is necessary for resource management.

5.3 Observation of physical, natural, and capital assets







Land Scape									
									
									
	Road Land Type	Pacca	Semi Pacca	Kacha	Kacha	Kacha	Kacha	Semi Pacca	Pacca
	Trees	Neem	Palm, Date	Tamarind	Date	Coconut		Papaya, Banyan	
Crops	Paddy	Paddy, Corn	Jute	Jute	Onion, Corn	Paddy, Corn	Tomato, Momondica Charantia		
Land type	Roadside pond	Village	Low Land	Village	Pond	Agricultural Land	Village	Bridge	
Fish	Catfish	Mudfish	Shrimp	Silver carp	Tilapia	Puti Fish	Tangra Fish		
Soil type	Atel	Bele do-ash	Atel	Atel, Bele do-ash	Bele do-ash	Bele do-ash	Do-ash	Atel	
Birds	Heron, Crowned Night Heron, Pankouri, Open Bill stork								
Waterbody	Pond	Pond	Pond	River	Beel	Dighi			
Livestock	Goat, Bafelo, Duck, Hen, Swans								
<p>Participators: Robiul (25), Jalal (45), Sweet (30), Rahmat (52)</p> <p>Participators: Putul (24), Zohir (24)</p>									

Figure 11: Transect Map (Source: Field Survey, 2023)

The transect map covers selected locations in Halti Beel, Natore district, Rajshahi division, extending from south to north along the main street. The area is encompassed by three villages connected by the primary road. Our data collection focused on key variables: land type, crops, trees, livestock, fish, and soil type, including details about streets paved with pitch. However, certain sections exhibit gaps in pitch coverage, affecting street conditions adversely. During the dry season, vehicles can traverse the street, though some areas have ponds with reserved cultivation along the roadside. The locals predominantly cultivate catfish, hornfish, silver carp, Tilapias, etc. The landscape is adorned with various trees, including Neem, Mango, Guava, Jackfruit, Tamarind, Litchi, Date Palm, Coconut, Betel nuts, Papaya, and Banyan, providing seasonal fruits. Additionally, households along the street raise diverse livestock. The collected data has been organized into a tabular format for analysis.

Livestock in the area include Goats, Buffaloes, Ducks, Hens, and Swans. During the dry season, paddy cultivation occurs in the flat land areas. However, there has been a noticeable decline in both the value and quantity of resources over time. This decline is attributed to a significant increase in consumption and changes in geographic conditions. Consumption patterns are closely tied to ownership. According to local villagers, individuals who invest capital in crop cultivation tend to benefit from fixed land. Those involved in cultivating crops are the primary consumers of the harvested produce. A consensus has emerged that individuals consuming a particular crop should refrain from cultivating it to maintain a balance. The crops harvested include paddy, corn, pulses, cabbage, cauliflower, ladies' finger, and "Momondica Charantia." The soil types comprise atel, bele-do-ash, do ash, and bele, with the most common being atel bele-do-ash and bele. The soil along roads consists of bele and atel, while cultivated land primarily features bele-do-ash soil.



Figure 12: Walking with the Community People to Prepare Transect Map (Source: Field Survey, 2023)

The soil in the house premises is of the bele type, allowing for effective drainage and keeping the area dry. Houses are constructed using a combination of brick, tin, and straw materials. Moving along the street from south to north, some areas serve as agricultural land within the village premises. Occasionally, these lands contain low canals meticulously used for fish cultivation.

The transect map delineates the boundaries of the resource system and identifies individuals or households with the right to harvest resource units during the night. Land ownership privileges are confined within these boundaries, and those situated at the boundary have the authority to establish rules governing resource extraction levels. This area is rich in wild resources, making it an ideal habitat for birds, especially during the winter season when numerous migratory birds seek refuge from the cold. Villagers consider it a significant tourist destination and propose that the government's involvement in establishing tourist motels would enhance their lives. The common pool resources, in the form of forage for livestock, play a crucial role in supporting their livelihoods.

The pressure on common pool resources at Haltibeel is moderate, impacting the living environment but potentially increasing benefits for specific groups. As pressure on these resources intensifies, conflicts arise, particularly regarding the utilization of fish and crops. This

conflict stems from one villager consuming resources that could otherwise benefit others. Tensions between fishermen and farmers emerge during both rainy and summer seasons. Three economic indicators—income, land ownership, and livestock ownership—measure household economic conditions, representing the primary income sources in rural areas. In Haltibeel, the government owns the majority of land, redistributing it to economically vulnerable individuals without property.

A conflict arises between fishing activities and land cultivation, with influential individuals engaging in unauthorized fish extraction using their power. Fishermen suffer from the undue influence of powerful figures and landlords. Landlords unlawfully seize "Khas" land, originally owned by landless individuals, leading to conflicts between the landless and landlords.

5.4 Mobility Pattern of The Community

Understanding the movement patterns of individuals, groups, or communities is essential as it provides insights into the relationships between villagers and outsiders. Examining people's interactions for specific purposes informs us about critical issues tied to daily activities, particularly livelihood challenges. Identifying places that hold significance to the community is crucial for obtaining additional data on conflicting land management issues. The distances preferred or necessary for the residents should be determined through community participation.



Figure 13: Movement Pattern during Rainy Season
(Source: Field Survey, 2023)

The creation of a mobility map for villagers is essential for understanding their interactions with common pool resources and related problems. To achieve this, several steps must be followed. Identifying the target group is crucial, as it helps elucidate individuals closely connected to the identified issues. Communicating the map's purpose to the community allows them to provide insights into activities related to common pool resource problems.

Once the target individuals are identified, they are asked to draw places they frequent, using alphabetical letters and symbols to denote locations and distances. In Haltibeel, a mobility map was conducted to establish significant relationships between government bodies, institutional facilities, and the targeted people. The selection of target individuals involved understanding their activities and conversations, with careful evaluation of their input. Clear communication about the objectives ensured accurate representation on paper.

The Halti community comprises five major localities, with people daily visiting locations such as rice mills, schools, and tea stalls. Patul is a frequently used area, serving as a hub for meals, education, and shopping, with its stalls remaining open during the dry season. To access land-related services, people visit the AC land office near Patul Union Parishad. The mobility pattern also extends to Natore Upazila, where community members go for medical check-ups, clothing purchases, and better educational facilities. Fishermen travel to Madhna Gorstation to sell fish to other parts of the country, leveraging the area's reputation for quality fish. Additionally, children attend educational facilities in Noldanga. The mobility map effectively summarizes the community's movement patterns and interactions with various facilities.

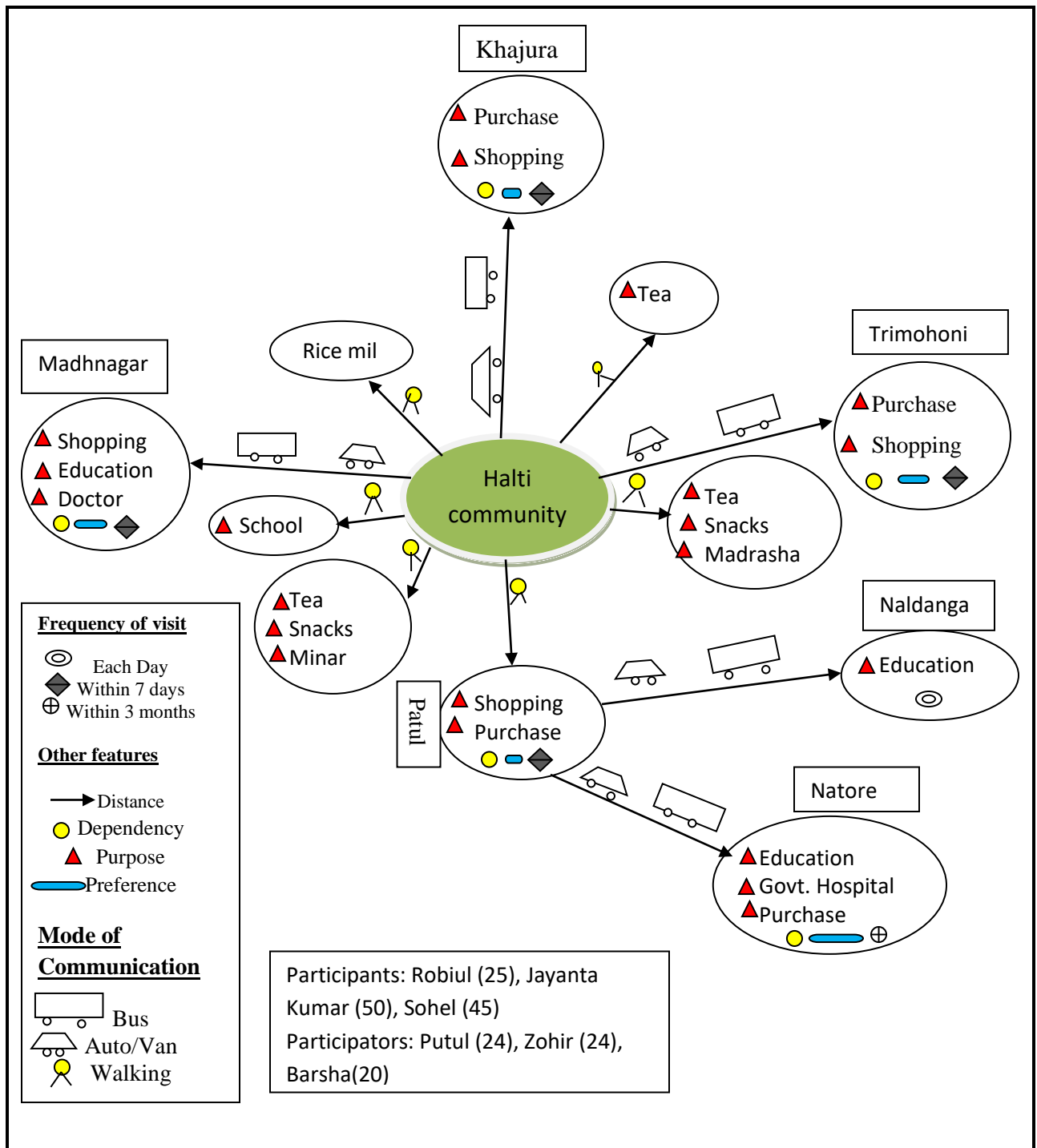


Figure 14: Mobility Map for Male (Source: Field Survey, 2023)

It is a well-established fact that, in the social context of Bangladesh, women are less engaged in the daily activities of rural villages compared to men. The women residing there obtain essential individual services, such as emergency assistance, for themselves. Girls residing in Noldanga, which is the closest vicinity to Patul, avail educational opportunities. Rawson Ara, a resident of our research area, expressed, "In Patul, we never receive readily available healthcare services; we have to rely on the hospital in Natore." Women receive healthcare from community clinics which is not sufficient for them. During the dry season, they utilize auto vans and rickshaws to access their desired locations. Regrettably, the community lacks access to bus services. To reach Natore or Rajshahi, they travel by auto to the Natore-Rajshahi road and then switch to buses or CNG vehicles. The mobility behavior of women has been effectively depicted through a mobility map specifically designed for women.

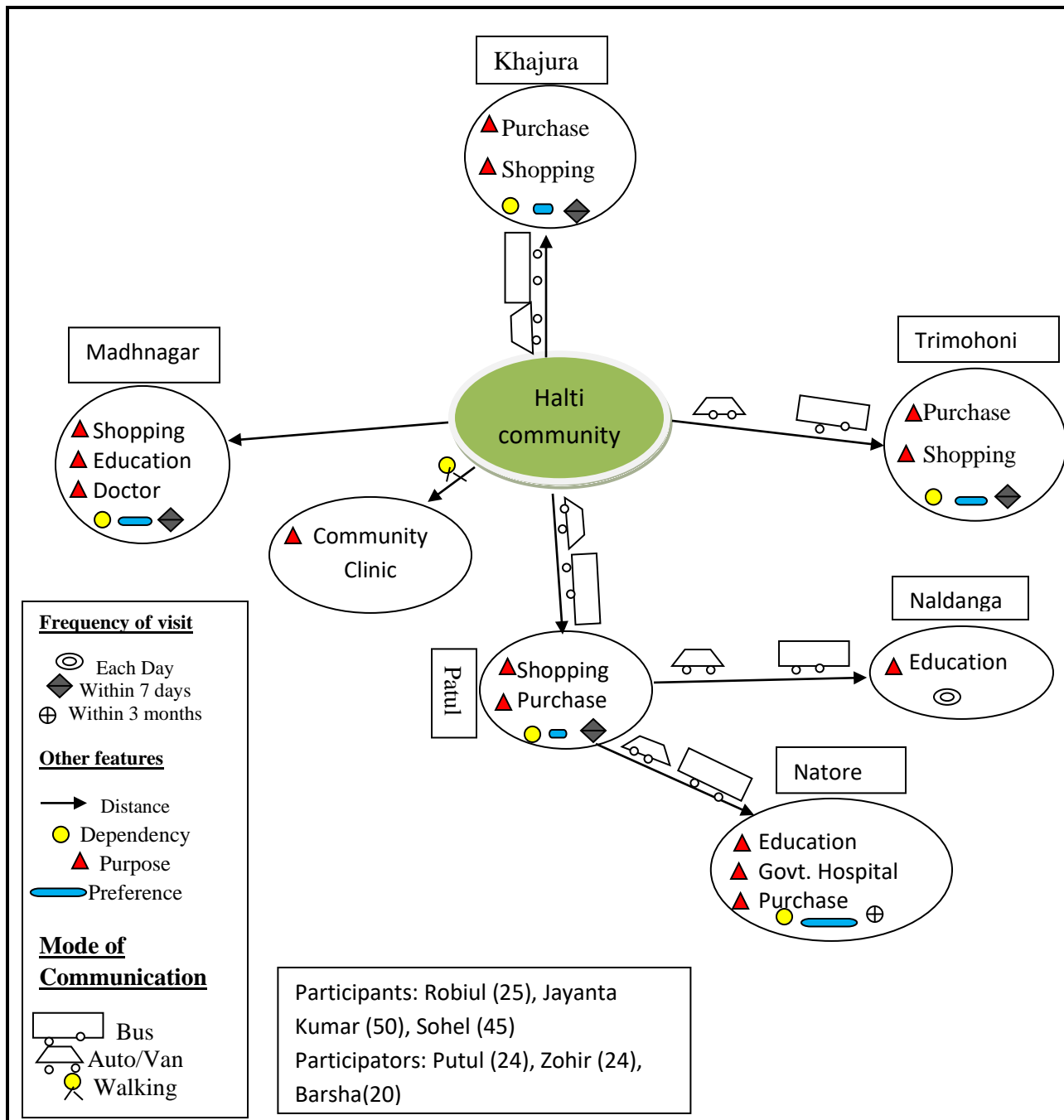


Figure 15: Mobility Map for Female (Source: Field Survey, 2023)

Chapter 06

Resources extraction and tragedy of commons

This chapter explores conflicts stemming from the resource extraction process within the Haldi-Beel community. To effectively manage common pool resources, understanding prevalent contradictions among the community members is essential. Resource mapping has been employed for this purpose. The chapter delves into discussions on land ownership conflicts and provides historical insights into conflict management. Process mapping and trend analysis were utilized to obtain historical information. Additionally, the chapter utilizes the seasonal conditions of farmers and fishermen to discern conflicts arising in various seasons

6.1 Assessing Resource Extraction and Conflict Dynamics within the Community

Haldi Beel is renowned for its intricate ecosystem and serves as a natural breeding ground for fish, connecting to the Atria River. Within Haldi Beel, there are 63 fish species, including 3 critically endangered, 11 endangered, and 8 vulnerable species (Galib and Imteazzaman, 2013). Among the endangered species are Bata, calbaus, pabda, chitol, bou, lohachata, tangra, boali pabda, gojar, and baim, while the vulnerable ones include foli, raikhor, titoputi, gulsha tangra, chanda, ranga chanda, and chang (TUNCN Bangladesh, 2000).

Haldi Beel experiences water levels ranging from 5 to 8 feet underwater during the Bengali months of Ashar to Kartik. A designated portion of Haldi Beel has been declared a fishery sanctuary, serving as a habitat and natural breeding ground for fish. During the pre-monsoon period, fishing is prohibited, and the monsoon period becomes a vital source of livelihood as people engage in fishing activities.

Water stands out as a critical resource for Haldi Beel characterized as a semi-closed perennial water body with an irregular shape. This wetland is particularly known for its consistent fish production, supporting the livelihoods of numerous fishermen in nearby villages. Positioned between the Atrai and Barnai rivers, Haldi Beel receives regular floodwaters during the monsoon season. The total water-body area varies, reaching approximately 1012.5 hectares during the

monsoon and 15.95 hectares during the dry season. The water depth ranges from 1.5 to 6 meters, contingent on the season.



Figure 16:Halti Beel during the rainy season (Source: Field Survey, 2023)

Resouce Map (Dry Season)

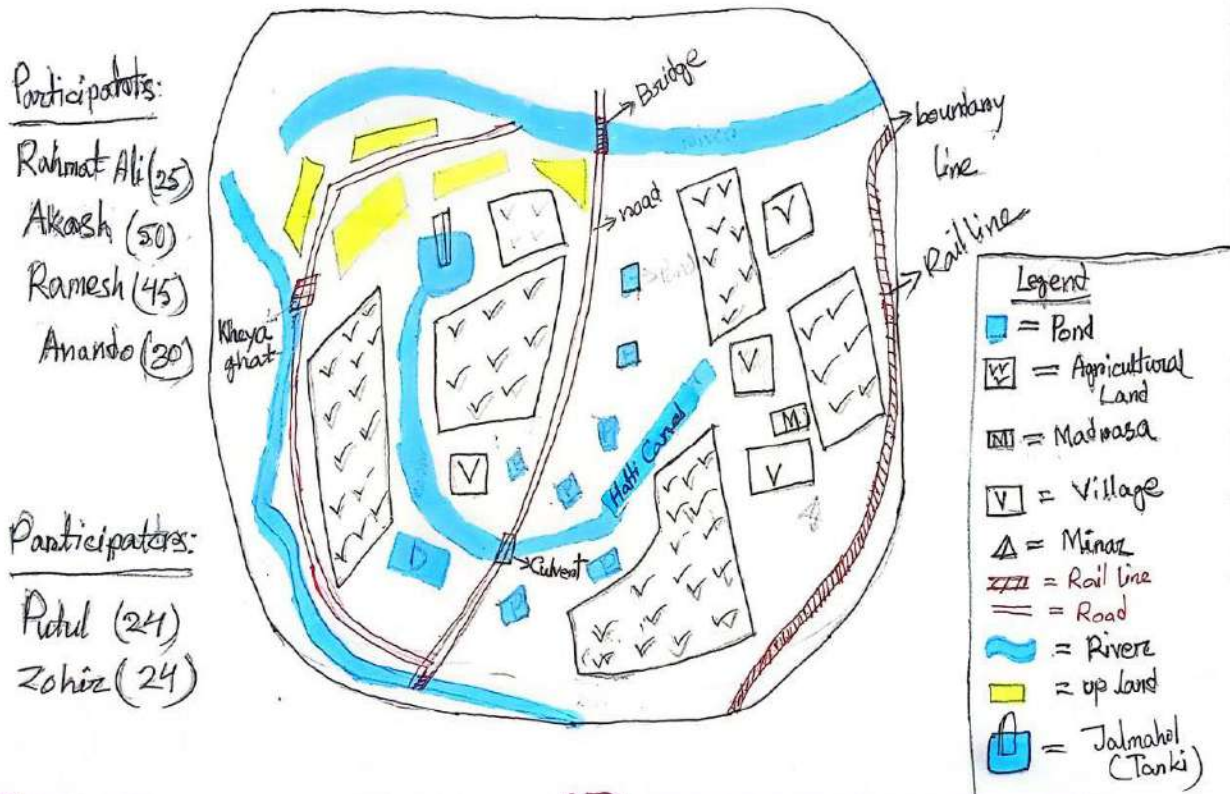


Figure 17: Resource Map of the dry season (Source: Field Survey, 2023)

There is an association known as "Motsho Somobai Somity" that collects contributions from its members to fund the development of "Jalmohal". "Jalmahal" is also known as "Tanki" locally. This somity also organizes various training sessions for fishermen. Before the establishment of the fishery sanctuary, there was a shortage of fish, particularly larger ones. The construction of "tanki" resulted in the presence of a diverse range of fish, including larger specimens weighing around 10-15 kg, in the beel.

During the dry season, only somity members collaborate to catch and sell fish in the markets. In contrast, during the rainy season, all individuals are allowed to catch fish, but those using large fishing nets are typically fishermen.



Figure 18 Agricultural land during the dry season (Source: Field Survey, 2023)

Land serves as a crucial resource in Haldi-Beel, especially during the dry season when the water recedes. People utilize two main types of land: infield and upland. Farmers own the majority of the land, including some "Khas" land. The primary crops cultivated by farmers are paddy and maize, with various types of paddy such as hybrid, unotirish, miniket, and atash. Initially, only "Amon" was cultivated, but technological advancements and increased production led to the adoption of hybrid and miniket varieties, with the cultivation of "Akfosla" crops.

Farmers in the area are relatively prosperous, owning an average of 4-5 bigha of land, while some possess up to 100 bigha. Besides maize, they cultivate a variety of vegetables, including radish, tomato, pea, pumpkin, bottle gourd, wax gourd, cucumber, ribbed gourd, bitter gourd, palwal, and brinjal. Various trees, such as mango, jackfruit, coconut, palm, guava, lichi, custard-apple, and betel nuts, are also present.

Halti Beel boasts rich biodiversity, featuring diverse fish species, trees, herbs, and birds during the rainy season. Notable bird species include "parijai duck" like "chokhachokhi," "Rajshorali," "goradmata," "dholabele," "ghughu," and "Machraga", "Heron", "Pankouri", "Crowned Night Heron", "Open Bill Stork". In the winter months, hunters from different parts of the country engage in hunting activities in the Haldi-Beel area, often facilitated by lessees and local elites. While hunting wildlife is illegal and subject to punishment, the enforcement of legal measures is not robust enough to deter such activities effectively.



Figure 19: Jalmohal during the rainy season (Source: Field Survey, 2023)

6.2 Challenges in Managing Common Pool Resources: Conflicts Unveiled

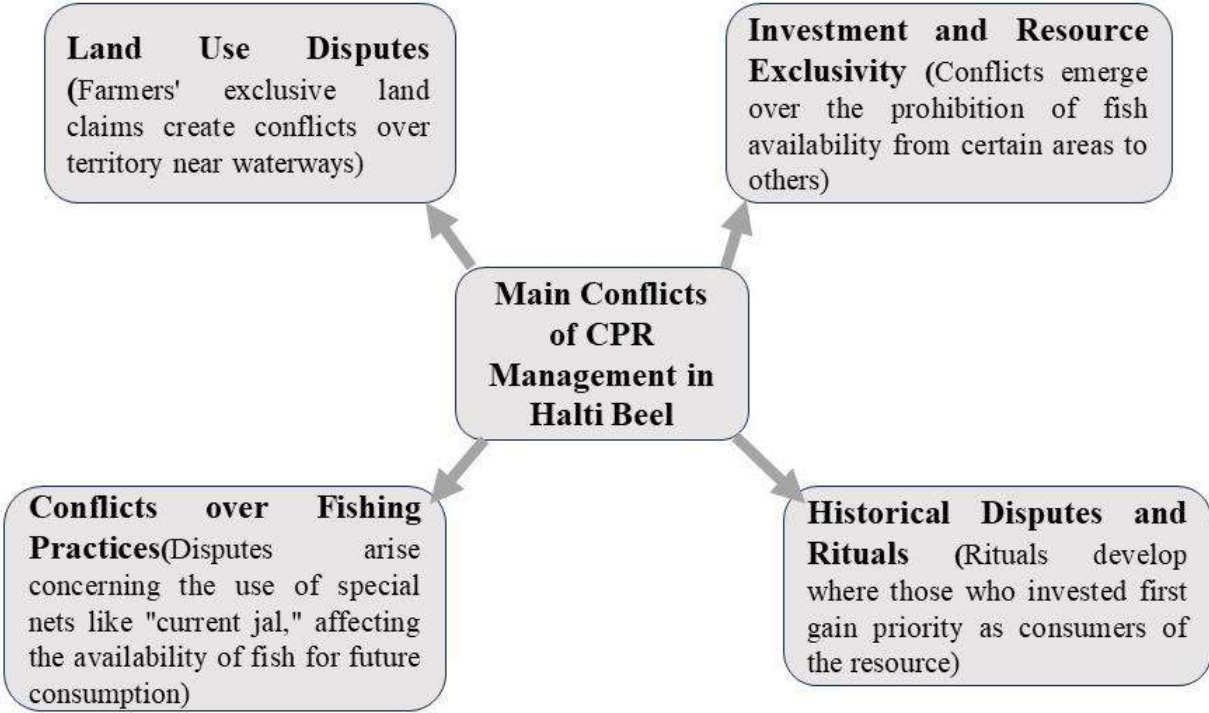


Figure 20: Challenges in Managing Common Pool Resources

The primary conflict arises from the restriction on farmers to catch fish with big fishing nets during the flooding of Haldi-Beel. The clash between farmers and fishermen intensifies as farmers, unable to use large nets, are limited to catching fish for personal consumption. The disparity in fishing rights and the claim of using large nets, even when catching fish for personal use, becomes a contentious issue. Additionally, the allocation of "Khas" land, primarily distributed to landless farmers, creates tension as fishermen, who are generally landless, aspire to receive such land. Unfair practices in obtaining "Khas" land by some farmers through presenting family members as landless individuals further exacerbate conflicts between farmers and fishermen. These conflicts intensify during the rainy season when the entire beel is flooded, disrupting livelihoods and leading to disagreements over fishing rights and property ownership.

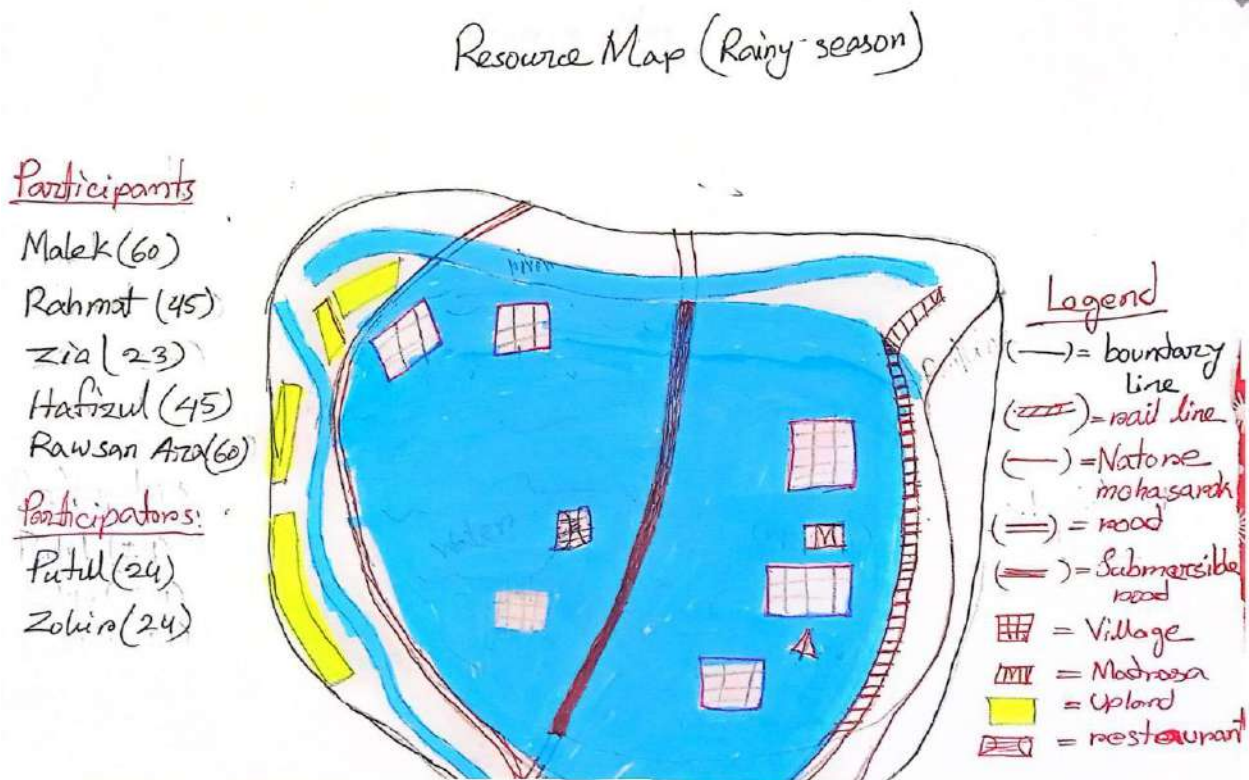


Figure 21: Resource map of rainy season (Source: Field Survey, 2023)

During the rainy season, uplands become submerged in water, creating an abundance of water and fish. This period brings joy and financial stability to fishermen, as they can freely engage in fishing activities, yielding ample fish for consumption and sale. Various fish species, including

"katala," "Rui," "shol," "koi," "Baim," and "Jiol," are readily available during this time. Farmers also participate in fishing, but they confine their activities to the submerged areas of their land.

However, the rainy season poses challenges for the general population, as the excess water restricts movement, causing inconvenience. People, especially farmers, experience a sense of monotony and purposelessness during this time, as their usual agricultural activities come to a standstill.



Figure 22: Situation of Halti Beel during the rainy season (Source: Field Survey, 2023)

During the rainy season, the beel experiences extensive flooding, causing difficulties for people to sustain their livelihoods. Mobility becomes a challenge, resulting in widespread unemployment. Farmers adopt various means of earning a living, such as fishing, pulling rickshaws in nearby cities, crafting diverse handicrafts for fishing, and operating boats for communication with nearby villages or cities. To protect their homes from flooding, farmers construct barriers and embankments.



Figure 23: Situation of Halti Beel during the rainy season (Source: Field Survey, 2023)

During the rainy season, cultivable lands are submerged, leading farmers to engage in fishing on their portions. However, local authorities, including magistrates and community leaders, prohibit them from using large nets for fishing. Despite the restrictions, farmers express a desire to employ big nets, citing their property rights as a compelling reason for doing so.

6.3 Unraveling Challenges in Land Acquisition

In the early days of Halti Beel, the absence of landownership and the non-designation of land as "Khas" resulted in unrestricted cultivation, leading to conflicts over land resources. To address these issues, the Landlord Acquisition and Republic Act of 1950 was enacted, leading to the government acquiring these lands, now termed "Khas" land. The intention was to distribute this land among landless poor farmers through a general procedure. However, the implementation faced challenges as political and financial influences allowed many wealthy farmers to acquire ownership of "Khas" land. A testimony from farmer Rashid Ali highlighted the plight of genuinely landless individuals who, despite cultivating leased land, struggled to gain ownership of "Khas" land. The absence of effective monitoring and management systems in the land acquisition process perpetuated landlessness among vulnerable farmers, contributing to the increasing concentration of land in the hands of wealthier individuals over time.

6.4 Wetland Acquisition

6.4.1 Evolution from Unrestricted Fishing to Sustainable Management:

In the early stages, the Haldi Beel community engaged in unregulated fishing, allowing fishermen, farmers, and others to catch fish without constraints. As the population burgeoned, escalating pressure on fishing prompted the enactment of the "Jaal Jar Jola Tar" Act, introducing a structured management framework. Subsequently, exclusive fishing rights were granted to fishermen, marking a pivotal shift in the fishing dynamics.

6.4.2 Establishment of Haldi Beel Biodiversity Management Organization (BMO):

- Haldi Beel BMO emerged to oversee biodiversity management, enforcing rules and regulations to ensure sustainable fishing practices.

6.4.3 Creation of a Fishing Sanctuary – "Tanki":

- The designation of "Tanki" as a fishing sanctuary aimed to preserve it as a natural habitat and breeding ground, with a prohibition on fishing during the pre-monsoon period.

6.4.4 Implementation of "Chalan Beel Prokolpo" under Upazila Chairman's Supervision:

- "Chalan Beel Prokolpo" was executed under the vigilant oversight of the Upazila chairman, enhancing fishing management strategies.

6.4.5 Membership System and Financial Contributions:

- BMO introduced a membership system, allowing only members to fish from "Jalmohal" during the dry season.
- Members contributed funds (20 takas per month) for the development of "Jalmohal."

6.4.6 Equitable Distribution of Fishing Proceeds:

- Proceeds from fish sales were equitably distributed among fishermen, fostering a sense of collective benefit.

6.4.7 Collaboration with External Organizations – WBMO-DOF:

- In 2014, BMO collaborated with WBMO-DOF, a German institute, initiating the construction of "Jalmohal" for the betterment of fishermen and fishery resources.

6.4.8 Comprehensive Institutional Support from WBRP:

- WBRP provided extensive institutional support to the community, including microcredit for impoverished fishermen, contributing to the overall enhancement of the fishery resource.

6.5 Grasping the Variability in Crop Yields Across Seasons

December-January marks the winter season, characterized by dry conditions conducive to cultivation. Towards the end of Magh, farmers commence the sowing of paddy, with their primary focus on the cultivation of rice and maize. Initially producing "Amon," they later shifted to "Boro," "Untrish," and maize due to higher production yields. They also cultivate "Akfosla" crops, including maize and various vegetables such as cauliflower, cabbage, tomatoes, and carrots. Given the dry season, fish are not widespread and can only be found in "Jalmohal," though farmers are unable to catch them. Despite initial idleness, farmers find fulfillment as they engage in work during this season, leading to overall contentment.

Month	Baishakh	Jaishtho	Asar	Srabon	Vadro	Aashin	Karthik	Agrohayan	Poysh	Magh	Falgun	Chaitro
Variable												
Rice	Water	Water	Water	water	water	water	Water					Water
Maize	Water	Water	Water	Water	Water	Water	Water					
Onion	Water	Water	Water	Water	Water	Water	Water					
Garlic	Water	Water	Water	Water	Water	Water	Water					
Jute			Water	Water	Water	Water	Water					
Vegetables												
Fish												
Unemployment												
Migration												

Participants: Robiul Islam (25),
 Saiful (30), Kader (45), Obaidul (45),
 Khalek (50)
 Participators: Anutosh Das, Putul (24),
 Zohir (24), Barsha (20)



Map preparation with community participation

Figure 24: Seasonal diagram for Farmers (Source: Field Survey, 2023)

During this dry season, individuals are actively involved in cultivating paddy, maize, and vegetables. The cultivable lands thrive with abundant crops, bringing joy to farmers. However, fish are not present during this season.



Figure 25: Crops Cultivation (Source: Field Survey, 2023)

During the crop-cutting period, farmers are occupied with harvesting activities. Many possess ample land, with some owning up to a maximum of 100 bighas. Despite cultivating "Akfosla" crops, farmers find satisfaction in their production. Following the sale of crops, most farmers spend the remainder of the month without engaging in further activities. They also cultivate various vegetables like brinjal, ladies-finger, pumpkin, radish, etc.

With the onset of the rainy season, lands gradually submerge in water, reaching full submersion by the end of Ashar. People resort to boat transportation as their primary mode of movement. During this time, farmers face a lack of work in agriculture, leading some to pursue alternative activities such as van pulling and shopkeeping. In the absence of viable work options, farmers may migrate to cities like "nature" and "Rajshahi," where they often take on labor-intensive tasks. Fish become abundant during the rainy season, and farmers, despite restrictions on large fishing nets, catch fish for consumption. The constraints on movement during this season can lead to boredom among farmers.



Figure 26: Inundated land during the rainy season (Source: Field Survey, 2023)

As Ashin concludes, water levels begin to recede, signaling a period when farmers abstain from cultivation. During this time, there is a noticeable decline in the availability of certain fish species. By the end of Kartik, water sources are completely dry, and with the onset of Aagrahayan, farmers commence the sowing of maize. Additionally, they cultivate various seasonal vegetables like cauliflower, cabbage, peas, carrots, and more. Individuals who migrated during the off-season return home and actively participate in cultivation, bringing joy to farmers as they embark on the new agricultural season.

6.6 Fish extraction by fishermen

In the rainy season, the village becomes inundated with water, offering a variety of fish like "shol," "Jiol," "koi," "Magur," and more. Fishermen capitalize on this abundance, catching fish and generating income through their sales. This period brings happiness to fishermen due to the ample availability of fish.

Seasonal Diagram for Fisherman

Month	Baishakh	Jaishtho	Asar	Srabon	Vadro	Aashin	Karthik	Agrohayan	Poysh	Magh	Falgun	Chaitro
Variable												
Fish												
Unemployment												
Migration												

Participants: Rabiul(25), Kader(30), Obaidul(45), Khalek (50)
 Participators: Putul (24), Zohir (24), Barsha (20)

Source: Field Survey, 2023

Figure 27: Seasonal diagram for fishermen (Source: Field Survey, 2023)

During the initial stages of the drying period at the end of Ashin, fish remain accessible, allowing fishermen to earn a livelihood without the need for migration. As the season progresses and the water dries up, fishermen face unemployment, except for those affiliated with the "Motsho Somobai Somity." Members of this association can still catch fish from "Jalmohal" by contributing a fee known as "Joma."

Despite the dry conditions, fishermen affiliated with the "Motsho Somobai Somity" continue to find employment by fishing in "Jolmohol." However, those fishermen who are not members of the association encounter unemployment and resort to various activities. Some fishermen opt to migrate during this dry season, seeking opportunities in places like "Natore" and "Rajshahi," where they often engage in labor-intensive work. The absence of a stable income source during this season leaves fishermen discontent.

6.7 Implications of Excessive Exploitation of Natural Resources

Through an examination of trends, alterations in various variables, such as fish size, fish species, fish quantity, birds, trees, rice cultivation, and maize cultivation, to water levels have been observed. Post-independence, there was a discernible decline in both the size and quantity of fish, accompanied by a reduction in fish species from 200-220 to 180-200. Simultaneously, the number of birds and trees experienced a decrease. Rice cultivation remained consistent during this period, with no cultivation of maize.

The pivotal year of 1988 marked a significant shift when the water level of Haldi Beel surged dramatically due to a devastating flood that ravaged numerous villages, agricultural lands, and homes. This calamitous event led to widespread suffering among the populace, forcing many to seek refuge in safer locations. One individual, Asraf Ali (76), vividly recalled the hardships faced during the 1988 flood, emphasizing the severity of the situation.

Subsequently, from 1988 to 2004, the water level remained relatively stable. However, after 2004, a noticeable decline in water levels commenced. Correspondingly, as water levels rose, there was an augmentation in fish size and quantity, and the number of fish species increased from 180-200 to 200-220. Unfortunately, this positive trend was accompanied by a decline in the number of trees and a reduction in rice cultivation.

Post-2004, as water levels receded, a reversal in trends occurred. Fish size and quantity diminished, and the number of fish species decreased to the current range of 100-120. Additionally, this period witnessed the initiation of maize cultivation, which started gaining popularity after the 1988 flood. People started to cultivate maize after 1988. As the water level reduced, Jute cultivation also started nowadays.

Trend Analysis






































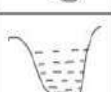






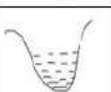







Criteria	Water	Fish Size	Fish Species	Fish Quantity	Birds	Trees	Rice Cultivation	Maize cultivation	Jute Cultivation
Period									
Before Independence			Found 200-220 types of fish						
1971			Found 180-200 types of fish						
1980			Found 180-200 types of fish						
1988			Found 200-220 types of fish						
1998			Found 180-200 types of fish						
2004			Found 160-200 types of fish						
2010			Found 140-160 types of fish						
2023			Found 100-120 types of fish						

Figure 28: Trend analysis (Source: Field Survey, 2023)

6.8 Degradation of resources in Halti Beel

Over time, various transformations have occurred in Halti Beel, impacting factors like water levels, fish size and quantity, fish species, bird population, tree numbers, and rice cultivation. The majority of these changes are attributed to resource degradation, leading to a loss of biodiversity in Halti Beel.

PRA (Participatory Rural Appraisal) tools serve as effective instruments to analyze the shifts in these aspects. This study utilizes trend analysis to illustrate both the degradation of resources and

the ensuing consequences. The size and quantity of fish in Halti Beel are diminishing progressively, with the reduction attributed to the over-extraction of common pool resources. Before 1971, Halti housed 200-220 fish species, including substantial ones like “Gojar,” “Title,” “Boal,” “Baus,” and “Mrigel,” weighing between 2-20 kg. However, due to conflicts over resources, the number of fish species has dwindled to 120-140. Fishermen like "Shreepodo Halder" highlight the extinction of flavorful species like “Dhoda,” “Baitka,” and “Guipoi,” attributing it to over-extraction.

In the past, Halti Beel attracted various winter migratory birds like “Balihash,” “Komontil,” “Sovolor,” "Melard,” and “Orchard,” contributing to tourism and income sources. Unfortunately, the bird population has steadily declined due to ongoing conflicts.

Similarly, the number and types of trees have diminished over time, impacting herbal plants that once served medicinal purposes. Rice, the primary crop in the Halti Beel area, has changed both quantity and types of cultivation. Initially, "Amon" rice was prevalent, but due to low production and increased population, farmers transitioned to "Boro" production. The varieties of "Boro" paddy include "Atash," "Minikate," and "Hybrid." Additionally, some farmers shifted to maize production, experiencing increased yields after 2000.

CHAPTER 7

Management of the Conflict

This chapter has highlighted issues related to the deterioration of common pool resources, elucidating both its causes and ensuing conflicts. To address and improve the management of these resources, it is crucial to identify and understand the root causes and their resulting impacts.

7.1 Exploring the Reasons for Common Pool Resource Degradation and Its Implications

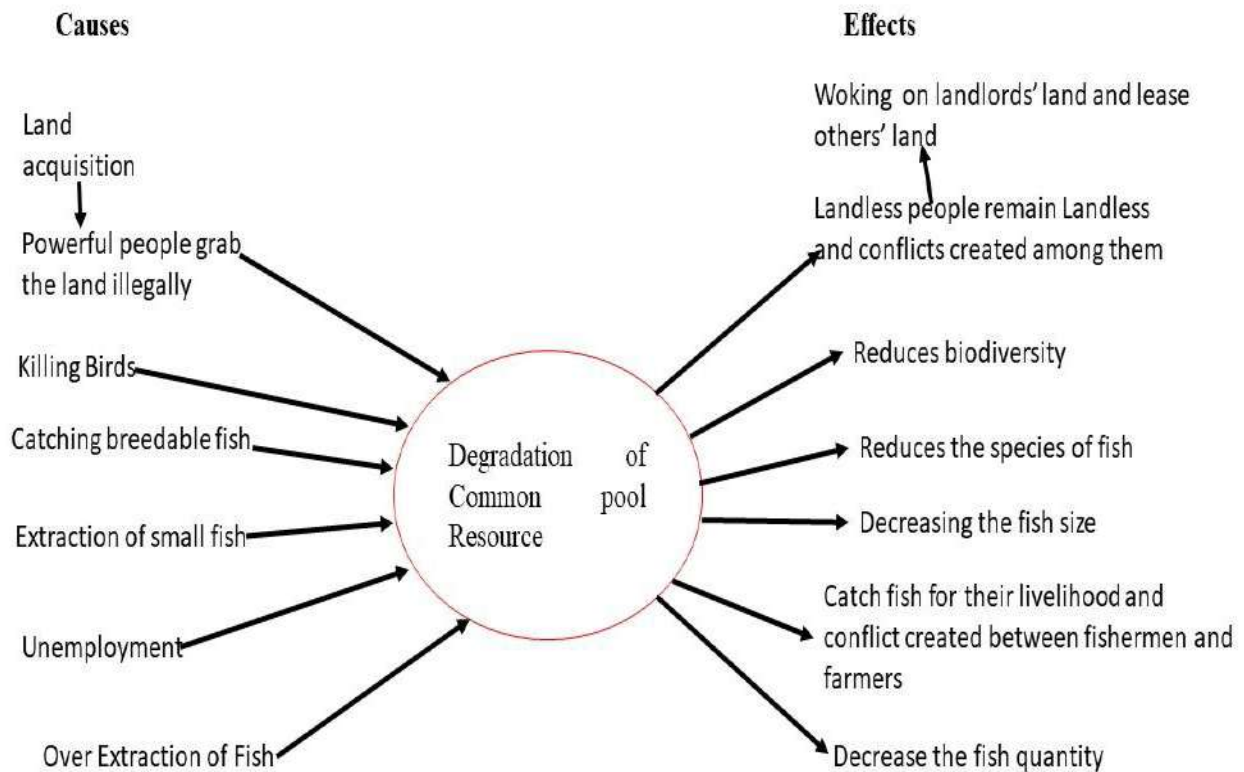


Figure 29: Cause-effect diagram of degradation of CPR in Haldi Beel (Source: Field Survey, 2023)

Numerous factors contribute to the degradation of common pool resources, and an exploration of these causes and effects has been facilitated through a cause-effect diagram. Among the various reasons, corruption in land acquisition stands out as a significant factor. Individuals often manipulate land ownership, falsely representing their sons as landless to acquire "Khas land." However, true landless farmers, relying on leased land, and fishermen dependent solely on

fishing find themselves without land, relying heavily on wetlands like Haltibeel for their livelihoods.

Another notable cause is the indiscriminate killing of birds at Haltibeel. Despite the area's rich biodiversity, the population of migratory birds declines steadily due to rampant bird hunting during the winter season.

The practice of breeding fish using current nets is a detrimental factor leading to the degradation of fish species in Haltibeel. To curb this, the government has designated a portion of Haltibeel as a fishing sanctuary, prohibiting fishing during the breeding season.

Furthermore, the tendency to catch small fish, known as "Jatka," using current nets has led to a decline in the size of fish over time. To address this issue, the government has imposed restrictions on using current nets for fish catching.

The scarcity of employment opportunities in the Haltibeel area has compelled a significant portion of the population to rely on fishing for their livelihoods.

Lastly, over-extraction of fish emerges as a predominant cause contributing to the degradation of fishery resources in Haltibeel.

7.2 Involving Community Members in Conflict Management

In practice, handling conflicts related to common pool resources proves to be a costly endeavor. Implementing effective management procedures and administration encounters numerous challenges. Government regulations, often influenced by power and financial motives, can lead to a lack of transparency in the execution process. Consequently, the general populace, including the impoverished and landless individuals, may face obstacles in accessing fair utilization of land and water resources.

In the realm of common pool resource (CPR) management, numerous challenges arise, demanding careful consideration and strategic approaches. This includes the distortions and biases observed in regulations favoring powerful individuals, making the imperative need for a conflict management system evident. The establishment of a strong sense of belonging among

resource users and clear delineation of ownership emerges as a crucial element in conflict resolution.

According to Ostrom's principle, if individuals are affected by the regulations, there ought to be an opportunity to incorporate them in the process of modifying said regulations. However, he does not specify how affected individuals can be integrated into the modification of regulations. The establishment of the Land Acquisition Act was intended to benefit landless farmers, but unfortunately, due to corruption and political influence, these farmers continue to be deprived of land and remain landless. Therefore, to address this issue, it is imperative to modify the existing regulations with the active involvement of landless farmers.

Ostrom asserts that common pool resources should be localized, yet he fails to establish a definitive limit and duration for resource extraction. Consequently, individuals can degrade resources according to their own whims and exclude others from accessing these resources.

In his set of principles, Ostrom suggests the development of a system that is implemented by community members to monitor the behavior of its members. The absence of such a monitoring system has resulted in numerous problems and conflicts in Haldi-Beel, particularly in the realm of land acquisition where there is no mechanism in place to identify landless farmers.

Furthermore, Ostrom advocates for the implementation of sanctions for those who violate regulations. However, in Haldi-Beel, there is a lack of such sanctions, which contributes to degradation and conflicts. Policymakers must exercise caution when formulating policies. Ostrom emphasizes the importance of identifying the specific users of resources who possess the ability to consume said resources. In addition, inclusive policies should be implemented instead of singular rules. Merely establishing rules without proper enforcement and regulation will perpetuate management issues related to common pool resources.

The entire government body must operate efficiently and effectively, with every organization and department adhering to regulations concerning conflict management. Each government department should respond to the claims made by victims, who can be categorized based on their consumption patterns. If a farmer encounters difficulties, they should report the issue to the

nearest administration. Upon receiving such complaints, the administrative body must take appropriate measures to address and mitigate the problem.

Firstly, it is imperative for the administrative body, such as the assistant land commissioner, to conduct field research to observe and understand the actual phenomena. Subsequently, the findings should be presented to the higher authority with clear and substantiated evidence. The higher authority can be represented by the district commissioner or any other authoritative officer in Bangladesh. Each step in this process should be accompanied by transparent evidence and adhere to a predetermined time frame established by the government. In the event of any delays, the authority must demonstrate accountability. It is essential to note that the process of conflict management should not conclude at this stage. If the victim receives an unfavorable verdict, they should be allowed to appeal and review the consequences within a specified period. Once the land allocation management is completed, both the authority and the community should oversee the procedure.

In the management of common pool resources (CPR), the local government encounters numerous administrative challenges. There are instances when the government is unable to exercise its authority due to internal factors. Therefore, it becomes imperative for the central government to empower each department under its jurisdiction, such as the matsho office, agricultural office, and water resource department, to fulfill their respective roles effectively in the designated areas. These offices will then assist the consumers by providing supplementary initiatives that are necessary during times of contradiction.

In many countries, the management of common pool resources involves a complex set of regulations that encompass both state and traditional laws. The exploitation and utilization of CPR are subject to strict and effective control, with only certain individuals, groups, or communities being granted defined access rights. However, in the majority of countries, the situation is less straightforward, and CPR often operates under free and open-access conditions, sometimes with localized restrictions based on the authority of local governing bodies or specific actors. For example, in Cambodia, valuable inland fish resources are increasingly under the control of private individuals who exclude other users, particularly poor rural households, including farmers and fishermen. Similarly, in Indonesia, the government enforces traditional

tenure systems at the local level to safeguard fish resources for the benefit of the local community, thereby excluding outsiders. In many countries, community participation plays a crucial role in enhancing the active management of common pool resources.

During the process of conducting Participatory Rural Appraisal (PRA) in Haltibeel, the expectations of the rural population are derived. Many of them express the need for effective management of land acquisition and the prevention of fish over-exploitation to mitigate conflicts and reduce degradation. Moreover, when performing the dream map exercise, the villagers put forth their desired measures, emphasizing the importance of enforcing land acquisition and the Republic Act of 1950.

When the landless individuals receive the diara property, commonly referred to as khasland, they will be able to sustain their livelihood whether it be seasonal or year-round. As a result, they will no longer need to exploit resources from other sources, such as extracting fish from wetlands. When this outcome becomes prevalent, it will significantly decrease the conflict between fishermen and farmers.

The members of the community require engagement in educational activities to encourage their participation in non-farm activities. When a member of a farmer's family becomes self-reliant by engaging in other forms of work, the family will no longer be obligated to solely rely on crop cultivation. Consequently, the depletion of resources due to competitive consumption will be diminished.

They desired a reformation of the geographical and structural conditions, to create a designated area for tourism. They aspired to establish a park adjacent to the road, with the hope that it would yield significant economic profit. During the onset of the rainy season, they planned to shift their business focus from cultivation to other endeavors. Additionally, they expected to establish a market adjacent to the park. There is a restaurant under construction, so they want a park beside the restaurant. They also want to construct some shops beside the Minar.

Another faction of individuals from the fisherman community shared their desires regarding the management of resources in Halti-Beel. One of the community people expressed the need for an

additional sanctuary for fish, located beside the Jalmohal, which is commonly referred to as Tanki. They aimed to address and resolve conflicts related to resource consumption.

While engaging in dialogue with the local inhabitants, the agriculturalists expressed a desire for a reservoir to be constructed to facilitate the year-round collection of aquatic fauna. The village chief of the halti community articulated that the reservoir would serve as a means of generating monetary resources throughout the entirety of the year.

7.3 The consequences of their wants

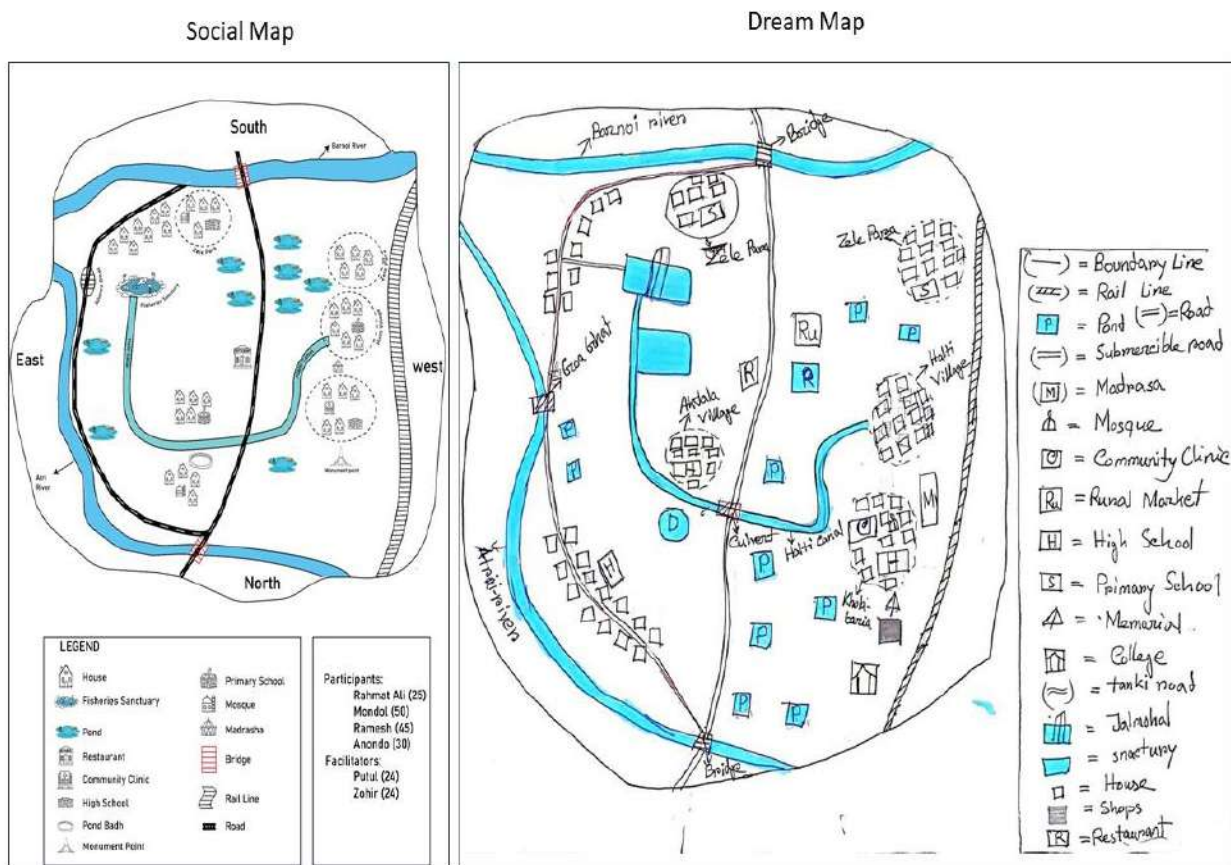


Figure 30: Dream map (Source: Field Survey, 2023)

If farmers have access to a marketplace beside the park, they can sustain their livelihood throughout the year, reducing the need for conflict-inducing fish collection. This would lead to decreased consumption compared to previous levels.

If the restaurant accesses the employer from the halti community, it will increase the employment opportunities for the farmers and fishermen which can reduce the over-exploitation of fish.

The proposed reservoir for the farmer community is expected to provide a consistent source of fish throughout all seasons. This, in turn, could contribute to a reduction in conflicts related to land acquisition, fostering biodiversity growth and increasing overall production value.

Fishermen are advocating for an additional sanctuary beside Jalmohal, anticipating that it would eliminate conflicts in fish consumption. A year-round supply of fish would support their livelihoods, contributing to a sustained and reduced conflict in unrestrained consumption.

These positive outcomes hinge on the adherence to rules and regulations governing the proposed program as per the community's preference

7.4 Strategies to reduce conflict and degradation

Community engagement through focus group discussions can offer effective strategies to mitigate conflict and degradation.

Negotiation is the most effective strategy for reducing conflict and degradation in the management of common pool resources.

In the dry season, there should be good management of ponds so that farmers and fishermen can catch fish equally.

In the community's view, addressing the structural weaknesses of community-based organizations like the BMO involves granting independence to the BMO, enabling it to make decisions autonomously based on the prevailing circumstances. The current lack of organization and political influence in the BMO necessitates corrective measures.

Given the seasonal submersion of the entire Haltibeel area during the rainy season, localizing fishery resources becomes challenging. The non-localization of fishery resources complicates

their management and contributes to conflicts. To address this, the community advocates for the localization of fishery resources through active community involvement.

The improper implementation of the Land Acquisition Act results in landless individuals being deprived of ownership rights to "Khas land," while wealthy individuals accumulate more wealth through land ownership. To rectify this, a proper monitoring system is deemed necessary before the distribution of "Khas land." Additionally, the application of environmental governance is suggested to ensure equitable benefits for all resource users.

Identifying local norms to convey to them not to over-exploit the breeding fish.

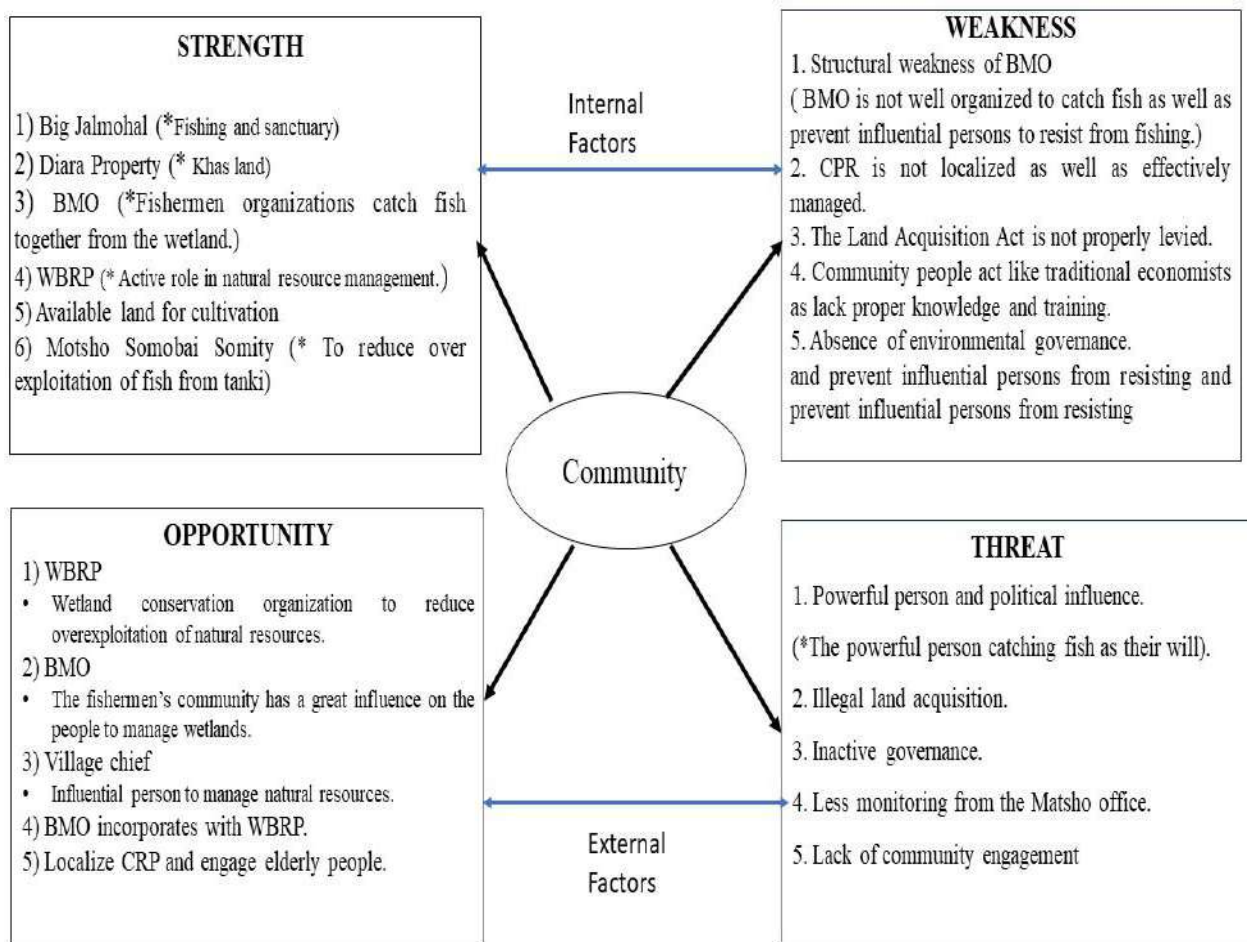


Figure 31: SWOT analysis Community of Haldi Beel (Source: Field Survey,2023)

7.5 Policy recommendation

The rural populace must unite in their efforts to achieve effective oversight of fish and crop resources to avert any potential calamities. In the context of resource management, privatization of ownership can yield positive outcomes by mitigating conflicts, as private entities are motivated to maximize profits from their investments. However, it is important to recognize that when resources become scarce, the assets in question may face degradation. This concern is particularly salient in our developing nation, where conflict mitigation is intrinsically linked to the scarcity of resources. Given the limited availability of resources, it becomes imperative to meet the growing demand, thereby engendering competition among private entities to increase profits. In such circumstances, policymakers must introduce environmental governance as a means to address these challenges. Environmental governance represents a novel approach that entails the distribution of power through institutional processes and structures, thereby ensuring equitable decision-making in natural resource management. This framework can significantly contribute to securing the entitlements of impoverished communities, as it empowers stakeholders by involving them in decision-making processes. To confront these emerging challenges, participatory governance within the management system has emerged as a pivotal factor in fostering relationships between the state administration, civil society, and the private sector (Bavinck 2009; Kjaer 2004; Kooiman et al. 2005; Pimbert 2004; UNDP 1997). By ensuring the engagement of community members, conflicts can potentially be minimized, thereby simultaneously mitigating resource degradation. The administration can designate specific areas of land and water based on their respective uses, thus enabling effective resource allocation. The state bears a crucial role in dispute resolution, monitoring the implementation of resource use agreements, providing technical and managerial support to local organizations, and conducting environmental assessments.

Additionally, the government can establish time durations through the assistance of informal and formal institutions. For instance, one group may be granted the right to collect fish from a reservoir for the initial 15 days, while another group assumes this responsibility for the subsequent 15 days. One of the primary goals of management is to delineate the group of individuals who lack land and have no alternative but to engage in agriculture and fishing. The

susceptibility of a group of landless farmers is not greater than that of other groups, as an individual farmer is unable to withstand the influence exerted by dominant factions.

Consequently, the collective territory may be fragmented into various smaller groups. These smaller groups can effectively facilitate the exchange of information within the management process using regular meetings focused on resource extraction. Consequently, they will establish a distinctive force capable of confronting conflicts with influential individuals or entities. The formation and discussions of such groups have proven to be effective in conflict management. In all instances, governments have endeavored to clarify issues related to land tenure and reinforce the rights of local communities to autonomously manage their resources. This has been achieved through the bestowal of legal recognition and decision-making authority.

CHAPTER 8

Conclusions

Community participation can serve as a crucial instrument for the management of current conflicts and the degradation of resources. Participation of the community helps to identify the tragedy of the commons. The desires and ambitions of community members aid in identifying the key issues that give rise to conflicts and will continue to do so in the future. While the administrative approach to resource management is complex, involving the local populace helps the government ensure transparent execution of resource extraction. Despite the time-consuming nature of the participatory rural appraisal method, it facilitates the acquisition of in-depth information necessary for research purposes. Local individuals are the primary sources of authentic knowledge on the resource extraction system. By understanding the potential factors contributing to overfishing and uncontrolled land usage, conflicts, and degradation can be mitigated. To alleviate conflicts concerning the common pool resources in Halti-Beel, community members must be encouraged to collaborate to achieve sustainable consumption. Participation in the management system will increase their awareness of critical issues that may arise in the future. The strength of the participatory rural appraisal lies in its ability to provide a platform for minority groups, such as farmers and fishermen, to establish a connection with the government and voice their concerns. Consequently, the government will be held accountable for addressing conflicts and resource management issues. This study exemplified how local individuals, as well as community-based organizations, NGOs, schools, and religious institutions, can actively contribute to resource management efforts.

While the study encompasses a broad scope, it does have some limitations. The primary outcome is the ongoing degradation of resources in Halti-Beel. Currently, the community is unable to obtain the expected amount of resources, such as large fish and valuable crops. The conflict surrounding resource management predominates in the beel due to unrestricted competition for consumption. Therefore, community engagement in the management system, coupled with an awareness of resource degradation, will help mitigate conflicts and find a solution. The findings of this study can be valuable in developing effective strategies, policies, and plans for the existing organizational procedures related to common pool resource management.

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