

# Livelihoods and Resource Management in Tanguar Haor: Addressing Socioeconomic Vulnerabilities and Enhancing Sustainable Development

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## Abstract

This study investigates the socio-economic vulnerabilities of residents in the Tanguar Haor areas of Tahirpur and Dharmapasha upazilas in Sunamganj district, focusing on their reliance on wetland resources. The local population, characterized by extreme poverty, has an average per capita income of Tk 6,000 and a literacy rate of 22.5%. The cultivable land spans 29,912.75 hectares, with 2,007.59 hectares classified as fallow, and most land is dedicated to single-crop cultivation (81.25%). Irrigation covers 88% of the land. Essential livelihoods include fishing (22.71%), duck rearing (5.25%), and cow rearing (8.64%). Approximately 72% of households are landless, 53% entirely without land, and 18% have migrated. Food insecurity affects 80% of households due to landlessness, mono-crop farming, seasonal unemployment, and natural disasters. The study recommends halting the current leasing system of haor water bodies and developing year-round income-generating alternatives. It also suggests reforming the money lending system and implementing preventive and curative measures to address natural calamities.

**Keywords:** Haor Area, Socioeconomic Indicator, Sustainable livelihood, Climate change

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## I. Introduction

Tanguar Haor, located in the Tahirpur and Dharmapasha upazilas of Sunamganj district, is a crucial wetland in the Meghna and Surma basin near the Indian border. This wetland area covers approximately 100 km<sup>2</sup>, including 2,802.36 hectares of wetland, and supports a population exceeding 40,000 (International Union for Conservation of Nature [IUCN], n.d.). Tanguar Haor is notable for its rich biodiversity, including around 200 migratory bird species, numerous resident birds, over 140 fish species, and remnants of swamp forest (Talukdar & Nixon, 2012). However, the area's ecological integrity is threatened by unsustainable resource use. In response, the Government of Bangladesh designated Tanguar Haor as an 'Ecologically Critical Area' in 1999. It later recognised it as the country's second Ramsar site in 2000, emphasising the need for conservation efforts (Bangladesh Forest Department, 2024). Tanguar Haor, positioned between Latitude 25°5'25" and Longitude 91°1'91", is a low-lying wetland that remains inundated for 7-8 months each year. It transforms into a vast water body during the rainy season, isolating villages as islands. This area is vital for fishing and boro rice cultivation; however, early flash floods frequently damage crops, perpetuating poverty among residents. Additionally, the government leasing water bodies to wealthier individuals have restricted poor residents' access to natural resources, exacerbating socioeconomic vulnerabilities (World Bank, 2021). The region lacks infrastructure, including poor communication, transportation, health, and educational services (UNICEF, 2023).

This study aims to assess the socioeconomic vulnerabilities of Tanguar Haor's residents, particularly their dependence on natural resources. It will explore the current education, health, communication, transportation, agriculture, livestock, and fisheries conditions and identify factors contributing to socioeconomic instability. Recommendations will be provided to both government and non-governmental organisations to enhance the livelihoods of Tanguar Haor residents and ensure the long-term sustainability of the wetland ecosystem.

## II. Review of Literature

Gillingham (2016) conducted a situational analysis of the Haor region, leading CARE Bangladesh to identify key program areas for the next five years, including Women's Empowerment, Inclusive Governance, Resilience Building, Climate Change Adaptation, Livelihoods Strengthening, Water, Sanitation and Hygiene (WASH), and Maternal and Child Nutrition and Health (MCNH). These cross-cutting areas aim to enhance

program impact through partnerships with government departments, local authorities, NGOs, the private sector, and research institutions. However, the paper does not clearly define how to collaborate with public-private organisations in the region. Sarma (2012) explored the socioeconomic vulnerability of residents near deep haor areas, noting that most 110,912 people dependent on the wetland are impoverished, with an annual per capita income of Tk 3,175 and a literacy rate of 20.5%. The study highlighted landlessness, food insecurity, and unemployment, suggesting the need for alternative income-generating activities and changes to the existing water body leasing system. The Government of Bangladesh (2012) outlined investment portfolios across six thematic areas in the Master Plan of Haor Area, comprising 154 projects to achieve the Plan's development objectives. While the plan includes an extensive institutional framework involving 38 government agencies, it does not sufficiently focus on sustainable livelihood development for the haor population, a critical regional need.

Chakraborty (2011) described Bangladesh's vast wetlands, emphasizing the potential of haors, beels, and baors to enhance fish production. Despite the significant biodiversity in these wetlands, including 163 species of wildlife in Chanda Beel, challenges remain in preserving the area's natural resources and maintaining sustainable livelihoods. Hossain (2013) studied flash floods in the haor region, particularly their impact on boro crop production. Using a risk model, the study assessed flood damage risks for various return periods, suggesting mitigation measures such as altering crop varieties and improving embankment structures. However, the study did not focus on sustainable development in the Haor Basin. The Asian Development Bank (2011) addressed extreme poverty in the haor areas of Sunamganj, Kishoreganj, Habiganj, Netrakona, and Brahmanbaria, where seasonal flooding creates significant biophysical constraints. Bangladesh: Haor Infrastructure and Livelihood Improvement Project aimed to improve livelihoods by managing the rich fisheries resources that provide essential protein to the population. However, it focused on environmental management and did not fully integrate sustainable development strategies.

### **III. Methodology**

#### *Study Area*

The research will be conducted in Tahirpur and Dharmapasha upazilas, located in the Sunamganj district of Bangladesh.

#### *Research Design*

A mixed-method approach will be employed to achieve the study's objectives, incorporating qualitative and quantitative methodologies. In-depth interviews will be conducted to gather detailed insights from the participants. Two focus group discussions (FGD) will be held, one in each upazila, with eight participants per group. A structured questionnaire will collect quantitative data from 150 respondents, ensuring an equal representation of male and female participants.

#### *Sampling Strategy*

A simple random sampling method will be employed to select the study sample. Twelve villages will be chosen from the two upazilas, six from each upazila. From each village, 12 households will be randomly selected, resulting in a total sample of 144 households.

#### *Data Collection*

The study will gather both primary and secondary data. Primary Data was collected through structured questionnaires, FGDs, in-depth interviews with villagers, and interviews with the Upazila Nirbahi Officers (UNO) of Dharmapasha and Tahirpur upazilas. Secondary Data was collected from different sourced academic journals, magazines, national and international research reports, and relevant online resources.

#### *Data Analysis*

The collected data will undergo a rigorous editing, coding, and tabulation process to ensure accuracy and reliability. The analysis will integrate qualitative and quantitative data to understand the research questions comprehensively.

#### IV. Results and Discussion

##### *Socioeconomic Vulnerabilities in Haor Areas*

The study identified several critical socioeconomic vulnerabilities faced by people in Haor areas.

**Table 1. Socioeconomic Vulnerability Profile**

Vulnerability	Number of respondents against each of the three-problem level			Rank order
	high	medium	low	
Village & homestead erosion	80	39	25	1
Flash flood	78	37	29	2
Sanitation and hygiene vulnerability	74	41	29	3
Temporary migration for limited Livelihood options	79	34	31	4
Health insecurity	71	57	21	5
Food insecurity	65	44	23	6
Climatic change vulnerability	31	30	44	7
Lack of financial support	49	47	40	8
Marketing System	48	44	44	9

Table 1 summarizes these vulnerabilities, ranked by their severity. The most pressing vulnerability is village and homestead erosion, affecting 80 respondents at a high level. Erosion frequently destroys entire villages, necessitating significant expenditure (BDT 6000-7000) for flood protection each monsoon season. The destruction often forces temporary migration as large portions of the village become submerged. Flash floods are the second major vulnerability, affecting 78 respondents. These floods inundate fertile lands, disrupting agriculture and leading to seasonal unemployment. The shift to floodplains for fishing during the floods affects boro rice cultivation, exacerbating food insecurity. Sanitation and hygiene emerged as the third vulnerability. Survey findings indicate that only 13% of households have hygienic latrines. About 67% use unhygienic latrines, while 20% practice open defecation. Flooding and river erosion significantly contribute to poor sanitation, impacting public health. Temporary migration due to limited livelihood options ranks fourth. Approximately 80% of households depend on wage labour and seasonal fishing. Migration becomes a coping strategy during monsoon floods and river erosion, disrupting livelihoods and causing economic strain. Health insecurity is the fifth vulnerability, with 71 respondents reporting high levels. The prevalence of preventable diseases like diarrhoea and pneumonia is high, and access to healthcare is limited. Low-income households often avoid government healthcare services due to perceived inadequacy and inaccessibility. Food insecurity ranks sixth, affecting 65 respondents. The high seasonality of haor-based economies and natural calamities lead to food shortages. Approximately 79% of households face food insecurity, with 43% having food for less than three months. Climate change vulnerability, though less immediate, affects agricultural productivity and livestock. Altered weather patterns and environmental changes impact land use and resource availability, affecting livelihoods and economic growth.

##### **Household Food Sufficiency**

Table 2 provides an overview of household food sufficiency in Tanguar Haor. The findings reveal a significant food security issue, with 79% of households experiencing food insecurity. Specifically, 43% of households have food for less than three months, and only 3% report food sufficiency throughout the year. Seasonal unemployment and natural disasters contribute to these challenges.

**Table 2. Household Food Sufficiency**

Time duration	Percentage
Less than 3 months	43%
Up to 6 months	36%
Whole year (no surplus)	3%
Whole year (surplus sold)	18%

### Primary Livelihood Options in Haor Areas

The primary occupation was the socioeconomic condition for sustainable livelihood development of study areas. Table 3 shows that seasonal wage labour was the main occupation for most people (30.08%). The second occupation was labour, with 25.93% in agriculture farming and 22.71% in fishing. More than 80% of households directly and indirectly depend on haor's natural resources. Despite the abundance of water and land, agriculture and fishing were an essential livelihood option; poor families could not access water and land unless they contracted their services to the rich land and water loads (Jalmahals, ejaradars and Mohajon).

**Table 3.** A summary statement showing primary livelihood options in the Study area

Name of Village	No of Households	The primary occupation in haor areas							
		Wage labour	Fishing	Farming (Agri)	Small business	Cow rearing	Duck rearing	Boat hunting	others
<i>Tahirpur Upazila Uttar Sripur Union</i>									
Chilani	113	30	38	21	3	9	3	6	3
Golabari	90	42	7	22	2	13	1	1	2
Shibrampur	98	39	9	23	3	14	4	3	3
<i>Tahirpur Upazila Dokkhin sripur Union</i>									
Ramsingpur	105	39	30	22	2	5	3	2	2
Lamagao	85	12	24	25	4	8	7	3	2
Vobanipur	122	31	38	31	2	7	6	3	4
<i>Dharmapasha upazila Joysri Union</i>									
Nojorpur	90	25	19	26	4	10	4	1	1
Sworoswatipur	103	31	22	36	2	5	4	1	2
Sadipur	88	24	21	19	4	9	8	2	1
<i>Dharmapasha Upazila Taikurati Union</i>									
Razapur	101	31	21	25	5	8	7	2	2
Chokiachapur	90	26	18	30	2	5	7	1	2
Balijuri	95	25	21	26	3	9	8	2	1
Total	1180	355	268	306	36	102	62	27	25
Percentage	100	30.02	22.71	25.93	3.05	8.64	5.25	2.29	2.11

### Alternative Livelihood Activities

Surveys of 144 households identified potential alternative income-generating activities. Fishing remains a preferred option during the monsoon season (33%), while small businesses (36%) and handicrafts (24%) are favoured during the off-season. Tables 4 and 5 highlight these preferences.

**Table 4. Alternative Income Generating Activities (Agricultural Intervention)**

Activities	Percentage
Fishing	33%
Poultry Rearing	16%
Goat Rearing	9%
Case fish Culture	8%
Cow Rearing & Beef Fattening	17%
Dry fish Processing & Marketing	13%
Floating Vegetable	5%

**Table 5. Alternative Income Generating Activities (Non-Agricultural Intervention)**

Activities	Percentage
Small Business	36%
Handicraft	24%
Jari Chumki	15%
Sewing & Embroidery	19%
Pickle Making	5%
Cell Phone Business	1%

### **Education**

Education in Haor areas is substandard. Literacy rates are below the district average, with Tahirpur at 40% and Dharmapasha at 45%. Key issues include inadequate school infrastructure, poor pupil-teacher ratios, and limited access to educational resources. Transportation challenges exacerbate these problems, with children often using boats, increasing the risk of accidents.

### **Health**

Health services are severely lacking, with many residents relying on traditional healers. Government healthcare facilities are scarce and poorly equipped. The shortage of medical personnel and resources, coupled with poor transportation, impairs access to necessary health services, leading to high child and maternal mortality rates and prevalent malnutrition.

### **Communication and Transport**

In Haor areas, transportation is critically limited, with waterways being the primary route. Boats and trawlers are the main modes of transport, but their scarcity results in long waiting times and inadequate access to urban centres. This hampers emergency medical care, contributing to high mortality rates, particularly among children and pregnant women. The unregulated operation of boats and trawlers exacerbates safety issues, leading to accidents and property damage. The lack of paved roads and poor infrastructure maintenance further isolate these communities. Dredging rivers and improving transportation are essential for enhancing livelihoods and safety.

### **Water and Sanitation**

Access to safe drinking water is inadequate, with government tube wells often out of order due to poor maintenance. This scarcity leads to widespread waterborne diseases like diarrhea and dysentery. Many households use unhygienic latrines, posing serious health risks. While sanitation coverage is around 50% in Tahirpur and 60% in Dharmapasha, water coverage is higher, at 80-90%. NGOs, such as People's Oriented Program Implementation (POPI), are working to improve water access by distributing tube wells.

**Agriculture and Livestock** Agriculture, the main livelihood in Haor, is declining due to flooding and siltation. Limited employment options and bureaucratic hurdles in accessing credit further strain livelihoods. Seasonal migration to cities is common during lean periods.

### **Migration**

Both permanent and seasonal, migration is prevalent due to river erosion and flooding. Seasonal migration, particularly among poorer families, results in significant hardship and vulnerability, especially for children.

### **Livestock and Fisheries**

Livestock, particularly dairy and poultry, has potential but remains underutilized due to poor awareness and infrastructure. Fishing is vital, yet the new leasing system benefits elites over ordinary fishermen, who face high rental costs for fishing equipment.

## **V. Recommendations**

To improve Haor's livelihoods, the study recommends:

1. **Education:** Design and equip schools with the necessary infrastructure, qualified teachers, and essential resources. Create incentives for teachers to work in Haor areas.
2. **Health Services:** Increase healthcare facilities in remote areas, with regular oversight. Implement policies that support doctors, such as mandatory two-year postings and restricted transfers. Improve patient transport with speedboats and ambulances.
3. **Sanitation and Water:** Ensure fair distribution of sanitary latrines and tube wells and address misuse of shared resources like Jalmahals. Revise the leasing system to benefit ordinary fishermen.
4. **Transportation:** Build submergible roads and regularly dredge water bodies to improve transport.
5. **Land Use and Livelihoods:** Re-establish the Bangladesh Haor and Wetland Development Board. Create non-agricultural employment opportunities and enhance logistical support for local services.
6. **Tourism:** Develop Haor's tourism potential with coordinated efforts from the government and private sectors.

## **VI. Conclusion**

Addressing the challenges faced by Haor areas requires a multifaceted approach. Enhancing educational infrastructure, health services, and transportation is critical to improving livelihoods. Investing in qualified teachers, healthcare professionals, and better facilities and resources will address current deficiencies. Ensuring

equitable access to sanitation and water resources, revising leasing systems for expected properties, and developing submergible roads will enhance the quality of life. Furthermore, re-establishing the Bangladesh Haor and Wetland Development Board and creating diverse employment opportunities will support sustainable development. By focusing on these critical areas, both government and NGOs can drive meaningful change, mitigate the impact of natural disasters, and unlock the region's potential for tourism. Collaborative efforts and strategic planning are essential to foster long-term improvements and ensure the well-being of Haor communities.

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