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Climate Change and Socioeconomic Challenges of Fishing Communities in the Coastal District of Shariatpur in Bangladesh

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ABSTRACT

The study addresses the socioeconomic incidents, vulnerabilities, and adaption strategies of the fishing community in Shariatpur, Bangladesh, in response to climate change. Bangladesh's geographical and climatic conditions make it highly sensitive to the effects of environmental change. These consequences have had an enormous impact on the lives of coastal fishermen. The study focuses on two communities, South Char Atra and North Char Atra, where quantitative and qualitative data were collected through individual interviews, focus group discussions, and interviews with key informants. The study emphasizes that the fishing community is particularly vulnerable to climate variability, with challenges such as extreme weather, poor healthcare systems, limited access to financial services, and reliance on natural resources. These risks are exacerbated by socioeconomic factors such as poor education, unsuitable housing, and a low income. The study proposes strategies for strengthening these communities' resilience by adopting targeted interventions that improve resource accessibility, upgrade financial capital, and promote the use of sustainable fishing practices.

1. Introduction

Bangladesh is located in South Asia, with its geographical coordinates ranging from 20°34' to 26°38' N latitude and 88°01' to 92°42' E longitude. It has a total land area of 147,570 square kilometres **(Dey, et al., 2021; Sultana et al., 2022)**. Climate change is a global phenomenon that has significant effects on the entire planet, impacting numerous aspects of contemporary life. The climate changes have a direct and indirect impact on the fishing community in Shariatpur **((DoF, 2018; Alam et al., 2021; Sunny et al., 2019; Islam et al., 2018a)**. The variability in climate has had a substantial influence on the livelihood patterns of fishermen in this coastal zone. The lives

of these fishermen depend on collecting fish from the many coastal sights, rivers, and canals in the area and selling them in nearby marketplaces for sustenance **(Sunny et al., 2020; Nahar, et al., 2018; Haque, et al., 2021; Sarker, et al., 2022)**. Nevertheless, fishermen encounter a multitude of climate-related obstacles when engaging in their fishing activities, which have a detrimental impact on their total means of livelihood **((Pandit et al., 2015; Islam et al., 2018b)**. The objective of this study is to evaluate the current condition of their means of livelihood and associated vulnerabilities to climate change.

The fishing sector plays a crucial role in Bangladesh's Gross Domestic Product (GDP) and overall economic progress. Regrettably, the fishermen, namely those who rely on coastal wetlands in Shariatpur, are among the most susceptible populations to the impacts of climate change **(Kuddus et al., 2020; Sazzad et al., 2023; Alam et al., 2023a)**. These communities sometimes experience natural tragedies and disasters, which worsen their already poor circumstances. Moreover, the use of fisheries has experienced a substantial surge in recent times, propelled by economic, social, political, and cultural influences **(Chakma et al., 2022)**. Many fishermen face challenges due to limited access to adequate healthcare facilities and financial services, which worsens their problems. Local moneylenders, commonly known as *Mohajan*, often force fishermen to turn to them for loans, stipulating that they sell their catch to them exclusively **(Allison, 2005; Ali et al., 2009; Mohammed and Wahab, 2013; Rana et al., 2018; Alok et al., 2018)**. The intricate bureaucratic procedures trap the fishermen in a cycle of dependence, leaving them with few options to obtain financial aid from NGOs or government organizations.

On a global scale, the climate is undergoing changes characterized by notable variations in average temperature **(Agarwala et al., 2014; Sunny et al., 2018)**. An analysis of current data indicates a substantial change in worldwide temperature levels, primarily attributed to human activities that have adverse effects on the ecosystem. Diverse locations around the globe, especially coastal zones, have already encountered rising ocean temperatures, elevated temperatures, modified precipitation patterns, and more severe and frequent storms **(Hossain et al., 2023; Narula, et al., 2017; Natarajan, et al., 2022; Guo et al., 2022)**. We anticipate significant and potentially irreversible alterations to the environment due to anticipated ongoing increases in ocean levels and temperatures. These changes include the melting of polar ice caps in Greenland and West Antarctica, which may lead to sea-level rises surpassing 10 meters, disturbances in ocean currents, and heightened emissions of methane. A widely held assumption asserts that human activities are responsible for about 90% of the global warming observed over the last 15 years. If we fail to address climate change, it will inevitably weaken global communities' ability to withstand and recover from social and economic challenges. So, the aims of this study are to analyse the socio-economic condition of the fishermen in Shariatpur, estimate the susceptibility of the coastal community to climate change, and propose measures for reducing these problems and enhancing the situation.

2. Research Methodology

2.1 Study location and data collecting site:

The research was carried out in two fishing communities located in the coastal area of Bhedarganj Upazila under Shariatpur district. The settlements of South Char Atra and North Char Atra were chosen due to the plentiful natural resources and unique livelihood systems found in the region. A combination of quantitative and qualitative methods was used to acquire primary data. The research included many methodologies, such as focus group discussions (FGDs) with different stakeholder groups, individual interviews (IIs), and key informant interviews (KIIs) with experts. Additionally, oral histories were collected. In addition, supplementary data were collected from other sources, such as local and international publications, reports, and newspapers.

2.2 Questionnaire design and on-site data collection:

A semi-structured questionnaire was created and utilized for exploratory interviews in two places within the coastal district of Shariatpur, based on observations and interactions with the population. A grand total of 120 interviews were carried out, comprising of 85 individual interviews and 15 focus group discussions (FGDs) with resource recipient groups, each comprising of 6-9 participants. In addition, a total of 20 key informant interviews (KIIs) or cross-check interviews were carried out with specialists in coastal and fisheries resources, NGO staff, and local business owners to verify the accuracy of the obtained data. The interviews were carried out in several locations, including as boats, riverbanks, paddy fields, local marketplaces, and the residences and premises of fishermen. Each interview had a duration of roughly 25-35 minutes, and a summary was created afterwards.

MS Excel (Version 2016) was employed for the purpose of data processing and analysis. The study utilized the Sustainable Livelihoods Approach (SLA) as proposed by **Sunny et al. (2020a)** to structure and analyze both qualitative and quantitative data. This approach was chosen to ensure that the study's findings may be replicated due to the inclusion of comprehensive information.

3. Results and Discussion

3.1 Socio-economic attributes:

Socio-economic characteristics refer to the demographic and economic factors that influence individuals and communities. These factors include income level, education level, occupation, and social class.

Data regarding socio-economic attributes was gathered, with a particular emphasis on variables including gender, age bracket, religious affiliation, marital status, household composition, housing conditions, educational attainment of fishermen, family size, occupation, sanitation facilities,

ownership of agricultural land, monthly income and expenses, possession of domestic animals, sources of drinking water, access to medical treatment, and loan status.

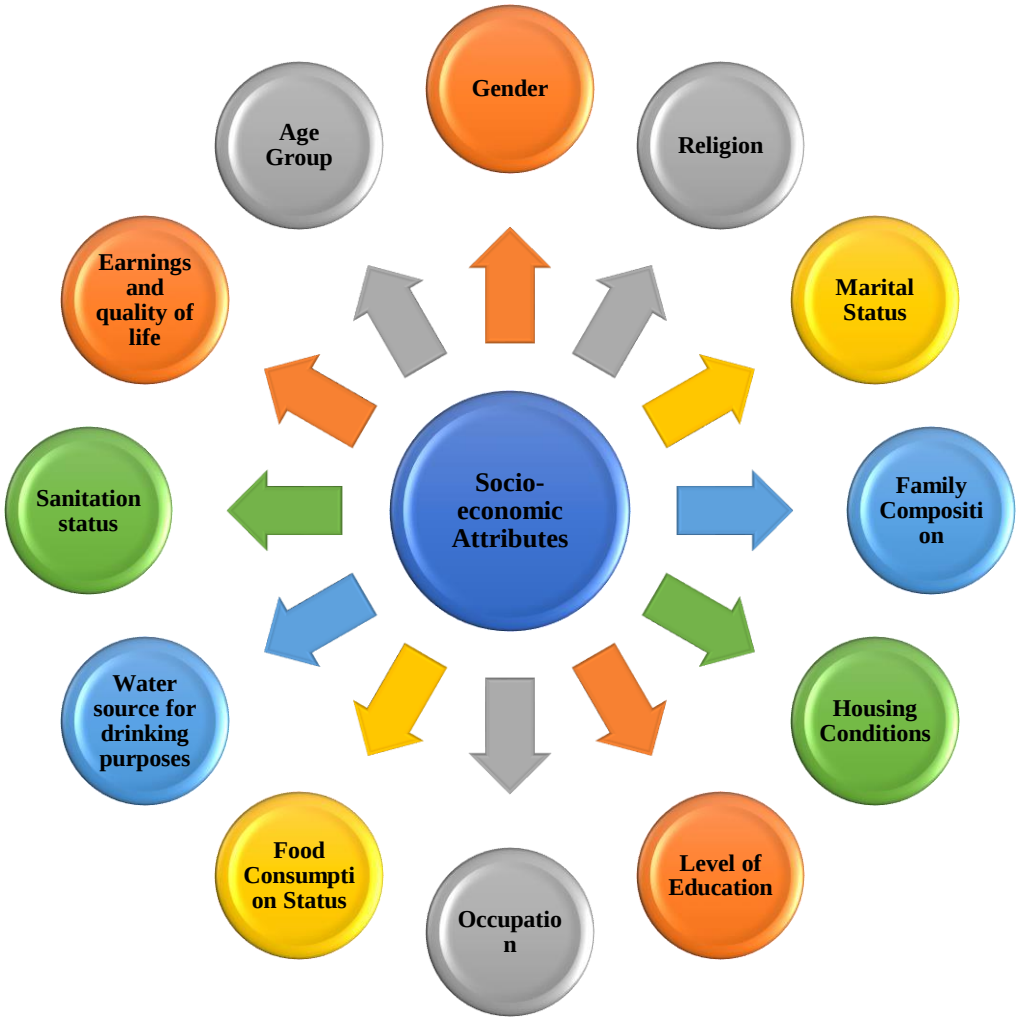

Figure 1: Socio-economic attributes

3.2 Gender:

A study was carried out among 10 male fishermen in the coastal area of Shariatpur. Within these communities, women predominantly do domestic chores and encounter substantial social obstacles, such as the potential for trafficking and other societal limitations, which hinder their involvement in extensive fishing endeavors. Consequently, males are mostly engaged in fishing activities in the nearby coastal site and rivers.

3.3 Age Group:

Figure 5 depicts the age distribution of fishermen in the coastal area of Bhedarganj of Shariatpur. The data indicates that 25% of fisherman fall within the age range of 21-30, another 35% fall

within the age range of 31-40, 25% fall within the age range of 41-50, 10% fall within the age range of 51-60, and the remaining 5% fall within the age range of 61-70. The findings suggest that the majority of fisherman fall between the age range of 41-50. These findings indicate that middle-aged adults exhibit the highest level of dominance in fishing activities, most likely attributable to their superior physical strength and extensive expertise, both of which are crucial for meeting the demands of fishing.

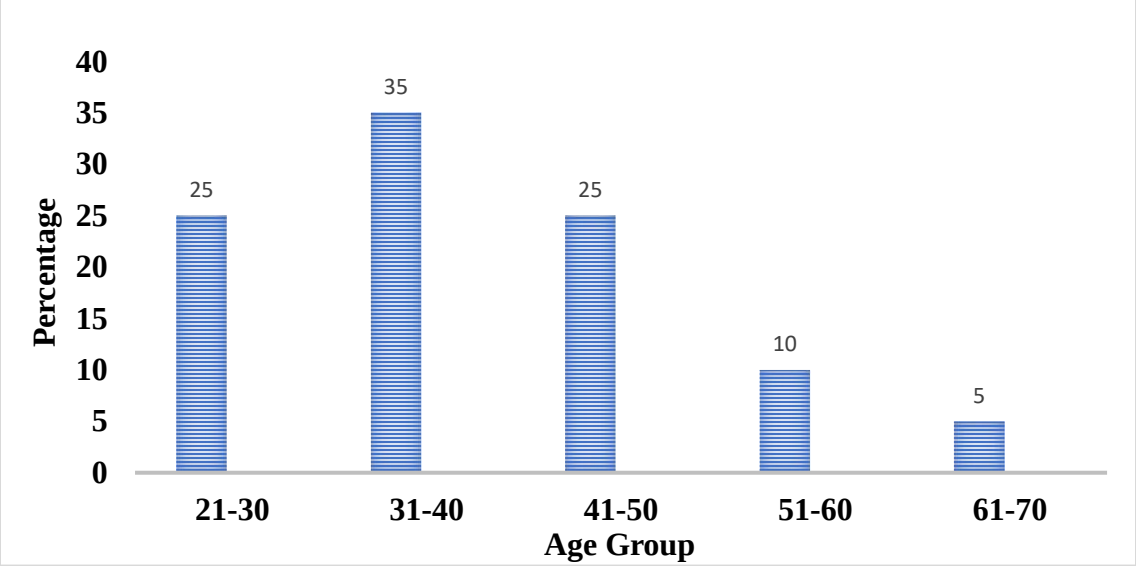

Figure 2: Age Group

3.4 Religion:

Religion has a substantial impact on the socio-cultural and environmental aspects of societies and can serve as a significant limitation on societal transformation. According to the survey, conducted in the coastal region of Shariatpur, 88% of the fishermen identified as Muslim, while 7% identified as Hindu and other is 5% **(Islam et al., 2018b)**. No other religious groupings were observed in the study locations (Figure-4). The results align with the research conducted by Miah (2004), which indicated that over 94% of the population of Zolkar Beel were Muslims, while roughly 6% were Hindus.

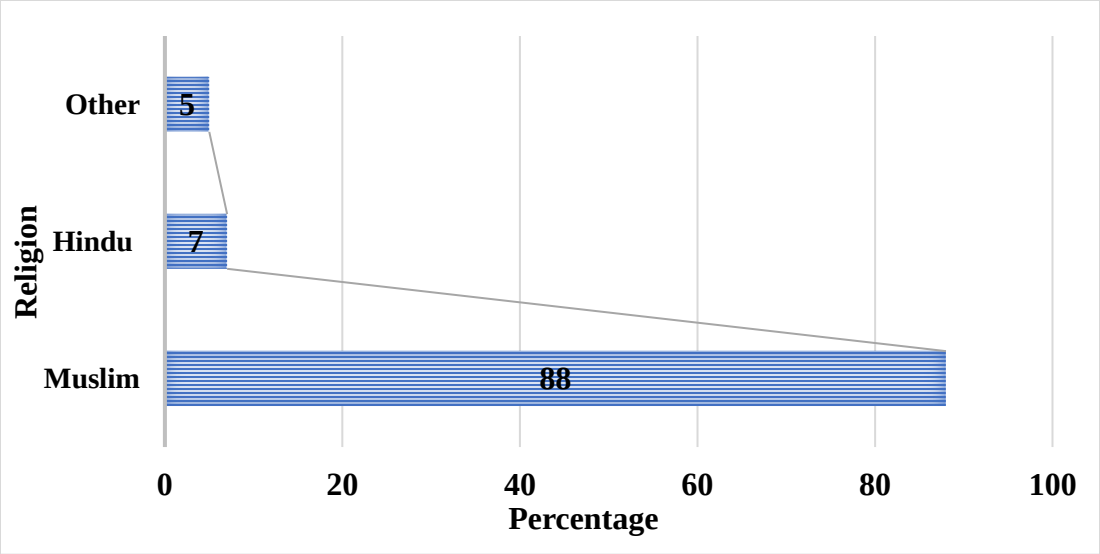

Figure 3: Religion Status

3.5 Marital Status:

The study also investigated the marital status of fishermen in the coastal area of Shariatpur. The findings indicated that 82% of the fisherman were in a state of matrimony, whilst 18% were not married. None of the fisherman surveyed were found to be divorced or widowed. Based on the statistics, it can be inferred that most fisherman in the region are living with their families, which indicates the social organization of the community.

3.6 Family Composition:

Rural Bangladesh often categorizes families into two main types: nuclear households and joint families. Within the coastal district of Shariatpur, the research region revealed that 40% of the population resided in joint families, while 60% lived in nuclear households. The nuclear family structure gained popularity mostly owing to enhanced mobility, higher economic prospects, expanded educational and sartorial accessibility, and greater empowerment of women within the household. Figure 8 depicts the distribution of different family types in the research region.

3.7 Housing Conditions:

In the study area within the coastal district of Shariatpur, the housing structures of the community were categorized into two main types: Kacha Houses which are constructed with bamboo, thatch, or tin and have mud flooring and the other is Semi-Pacca Houses made of wood or tin with more durable construction materials.

The study revealed that 87% of the housing structures were kacha, while only 13% were semi-pacca. No pacca (fully brick or concrete) houses were found in the study area (Figure-9). This indicates that the majority of the community lives in more traditional and less durable housing,

which may be more vulnerable to environmental challenges.

Figure 4: Status of the fisher's house

3.8 Level of Education:

The educational attainment of fishermen in the research region within the coastal district of Shariatpur was shown to be far below the expected level. The analysis indicated that a mere 15% of the fishermen had obtained elementary schooling. Of the total, 62% possessed merely the ability to sign their names, suggesting a significant lack of reading abilities. In addition, a total of 23% of the fishermen were found to be fully illiterate, as shown in Figure-10. These findings emphasize a significant deficiency in education within the community, which may affect their capacity to get knowledge, enhance their livelihoods, and adjust to evolving socio-economic and environmental circumstances. The inadequate level of formal education indicates a necessity for specific initiatives aimed at improving literacy and education in these fishing villages.

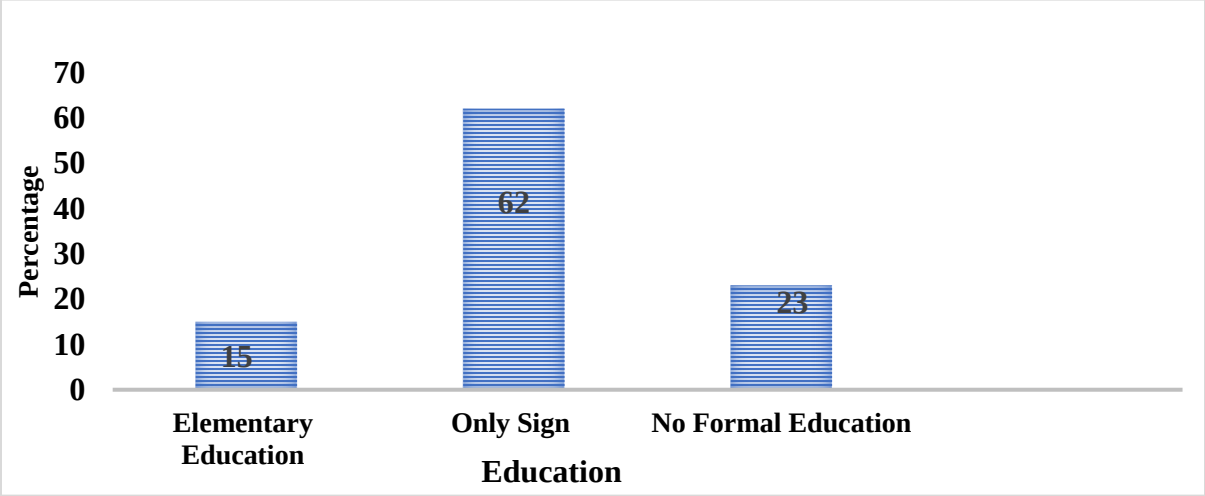

Figure 5: Educational Status

3.9 Occupation:

The study conducted in the coastal district of Shariatpur specifically highlighted fishing as the predominant employment among the fishermen. The survey found that 61% of the fishermen were engaged in full-time fishing, depending only on fishing as their source of income. In addition, 12% of the individuals were engaged in fish drying, 9% in fish selling, and 10% in agriculture. An additional 8% of the fishermen were involved in fishing as well as day laborer.

The occupational distribution highlights the significant importance of fishing in sustaining the livelihoods of these populations. The inclusion of fishermen engaged in associated industries such as fish drying and trade underscores the interdependent nature of professions within the fisheries industry. Nevertheless, the participation of select fishermen in agriculture and other occupations indicates a degree of diversification, most likely as a tactic to minimize risks and provide a steady income in response to uncertainties such as environmental shifts or variations in fish abundance.

3.10 Food Consumption Status:

In the coastal area of Shariatpur, fishermen mostly consumed fish, meat, vegetables, and eggs as their main dietary items. Although the fishermen managed to have three meals each day, the investigation revealed that their nutritional condition and dietary variety did not meet the intended criteria. This implies that while there may be an adequate amount of food, the nutritional value and diversity of their diet may be insufficient, which might result in deficits in essential nutrients. This problem highlights the necessity for enhanced availability of a well-rounded and nourishing food in these areas.

3.11 Water source for drinking purposes:

The investigation also investigated the origins of the fishermen's drinking water. A study revealed that 57% of the fisherman depended on tube-well water for drinking, whilst the remaining 43% utilized coastline water. The accessibility of potable water was significantly inadequate, with often only one tube well serving each town. The limited availability of tube-well water posed challenges for households in routinely accessing it, particularly when the wells were situated at a considerable distance from their residences. Consequently, several fishermen turned to consuming coastal water, which is frequently contaminated and has substantial health hazards. This discovery emphasizes the pressing requirement for enhanced water infrastructure and the provision of safe drinking water in these areas to mitigate waterborne illnesses and other health complications linked to the use of polluted water.

3.12 Sanitation Status:

The sanitation conditions among fishermen in the coastal region of Shariatpur were determined to be below the desired level of quality. The study categorized the sanitation facilities utilized by the

fisherman into three primary types: kacha toilets, sanitary latrines, and open fields. 57% of the population depended on kacha toilets, which are basic constructions often constructed from impermanent materials and without adequate sanitary services. Just 23% of the fishermen had the opportunity to use sanitary latrines, which are more hygienic and provide superior protection against pollution. Disturbingly, 20% of the fisherman engaged in the unsanitary practice of open defecation, utilizing open fields as their toilets **(Kuddus et al., 2021; Kuddus et al., 2022).**

This data reveals substantial obstacles in sanitation within these areas, with a considerable fraction of the population without adequate access to sanitary facilities. The dependence on rudimentary toilets and the practice of defecating in the open present significant threats to public health, such as the transmission of waterborne illnesses and environmental pollution. These findings emphasize the immediate necessity for interventions aimed at enhancing sanitation infrastructure, advocating for the utilization of sanitary latrines, and eradicating open defecation habits in order to protect the health and well-being of the community.

3.13 Economic earnings and quality of life:

The income levels of fishermen in the coastal area of Shariatpur were deemed inadequate, indicating the economic difficulties experienced by these groups. The main sources of income were fishing and selling fish at local markets, with limited prospects for non-fishery occupations, such as working as day laborers in agricultural areas. Based on the conducted interviews, the fishermen reported a maximum daily income of 300+20 BDT, while the minimum income was 80+15 BDT. The narrow range of revenue exemplifies the unstable financial circumstances of fishermen, who are increasingly confronted with the challenges of overfishing and the consequences of climate change. Consequently, several fishermen are actively pursuing alternate sources of income to complement their earnings, which is placing more pressure on their traditional way of life.

3.14 Livelihood capitals and associated vulnerabilities:

The fishing communities in Shariatpur hold diverse livelihood assets, as outlined by the DFID Sustainable Livelihoods Framework. The assets encompassed in this list consist of human, natural, financial, social, and physical capital, all of which have a role in enhancing the overall welfare and ability to recover of the society **(Nicholls and Tol, 2006; Paik and Chakraborty, 2003)**.

3.14.1 Human Capital:

Human capital refers to the collective knowledge, skills, and overall health of the fishers. These traits are essential for their capacity to engage in fishing operations efficiently and adjust to environmental changes.

3.14.2 Natural Capital:

The natural capital in this area includes land, water, fish, and other aquatic resources. The community's livelihood is heavily dependent on these resources, which makes them extremely susceptible to environmental changes and excessive exploitation.

3.14.3 Financial Capital:

This encompasses several financial aspects including as earnings, accumulated funds, and the ability to obtain loans. The communities' insufficient financial resources hinder their capacity to engage in sustainable activities or expand their revenue streams, rendering them susceptible to economic shocks.

3.14.4 Physical Capital:

These are the physical resources that contribute to the community's well-being, including residences, fishing equipment, vessels, automobiles, roadways, marketplaces, energy, water infrastructure, and sanitary amenities. The community's living standards and ability to withstand harsh situations are directly influenced by the quality and accessibility of these resources.

3.14.5 Social Capital:

Social capital encompasses the interpersonal connections, shared values, and collaborative efforts throughout rural communities. Robust social capital can serve as a protective barrier during times of hardship, cultivating the ability to bounce back and promoting reciprocal assistance among individuals within a community.

These livelihood capitals, although necessary, are also linked to different vulnerabilities. For instance, the reliance on natural resources renders these communities vulnerable to environmental fluctuations, but their limited financial and physical resources restrict their capacity to adjust **(Pandit et al., 2015; Rahman, 1989)**. It is crucial to improve the resilience and sustainability of the fishing community in Shariatpur by implementing specific interventions that strengthen these capitals.

Table 1: Livelihood Capitals of Fisherman

Capital	Existing resources
Human capital	Fishing experience and traditional knowledge
Natural capital	River, land, water, fish and aquatic resource
Physical capital	Fishing gear, boat, transportation and road network

Social capital	Membership of groups, access to wider institution, community bonding
Financial capital	Credit, income and savings

3.15 Livelihood Constraints and Vulnerability Context:

The fishermen in the coastal area of Shariatpur face several limits and vulnerabilities that have a substantial influence on their well-being and economic stability. The restrictions may be classified into three main categories: shocks, bad trends, and unfavourable seasonal patterns **(Stirrat, 2004; Stanton, Foreman, and Wilson, 1998)**. Each of these categories presents unique problems to the fishing community.

3.15.1 Shocks:

Shocks are abrupt and unforeseen occurrences that disturb the livelihood of fisherman. An important finding of the study is the occurrence of fishermen being unwell, which hinders their ability to engage in fishing activities and therefore disrupts their revenue. In addition, natural disasters like as hurricanes may cause substantial disruptions to the community, frequently resulting in the devastation of essential resources, including fishing equipment, vessels, and even residences. These shocks not only result in immediate financial burden but also have enduring consequences for the community's recovery and resilience.

3.15.2 Trends:

Long-term problems such as population expansion, diminishing natural resources, and environmental changes have a detrimental impact on the revenue and sustainability of the fishing community. With the growth of the population, there is a heightened demand for natural resources, resulting in overfishing and the deterioration of the aquatic ecosystem. The problems faced by fishermen in maintaining their livelihoods are worsened by environmental changes, including increased temperatures and changing weather patterns.

3.15.3 Seasonality:

The vulnerability of fishing villages is significantly influenced by seasonality. Seasonal stress is caused by variations in fish supply, which has a direct impact on the earnings of fishermen. During some periods, fish populations may diminish, posing challenges for fishermen to secure an enough harvest to support their livelihoods. The fluctuation in fish supplies over different seasons produces a recurring pattern of vulnerability, where fishermen have to deal with periods of plentiful supply followed by periods of shortage, sometimes with little resources to mitigate these variations.

The results of this study are consistent with those of **(Sunny et al., 2019; Bangladesh Bureau of Statistics BBS, 2014; Brocklesby & Fisher, 2003)**), suggesting that these limitations and weaknesses are widespread across fishing communities in comparable situations. To tackle these challenges, a comprehensive approach is needed. This approach should involve enhancing healthcare accessibility, strengthening assets to withstand natural disasters, managing population growth, preserving natural resources, and devising strategies to minimize the effects of seasonal variations on fish availability. These initiatives are crucial to protect the livelihoods and well-being of fishing communities in Shariatpur and other comparable places.

Table 2: Vulnerabilities of fishing Communities

Shocks	Trends	Seasonality
• Fishers' illness • Damage due to natural calamity • Death of family member	• Frequent occurrence of natural calamities affect income • Decreasing catching rate due to increasing fishing pressure	• Fluctuation fish availability • Seasonal unemployment

3.16: Trends of Climate Variability and Associated Vulnerabilities of Small-Scale Fishers:

The climatic variability's effect on small-scale fishermen in the coastal regions, namely in the Shariatpur district, has intensified, resulting in notable alterations in temperature, rainfall patterns, and the occurrence of extreme weather events **(Nair, Madhusoodanan, and Suryanarayanan, 1989)**. These emerging patterns have resulted in several weaknesses that directly impact the lives and welfare of fishermen.

3.16.1 Temperature Fluctuations:

Over time, the amplitude of temperature variations resulting from climate change has increased, resulting in intensified heat during the summer and unbearable cold during the winter. Consequently, small-scale fishers have encountered several obstacles as a result. The intense heat experienced during the summer season decreases their physical strength, impairs their ability to engage in strenuous activities, and ultimately affects their capability to produce income. In addition, the extreme heat worsens health problems, further reducing their capacity to work. In order to mitigate the intense noon sunlight, fishermen frequently employ monofilament gill nets (referred to as current jal locally) to maximize their capture during the early hours of the day **(Downing, Ringius, Hulme, & Waughray, 1997)**. However, this technique can have negative consequences on fish populations and overall biodiversity.

During the winter season, fishermen encounter adverse circumstances characterized by extremely cold temperatures and foggy weather, which can cause disorientation while at sea. Consequently, these conditions pose higher dangers and result in decreased fishing yields. The cold has a dual impact on their work: it impairs their physical capacity and raises their operational expenses by necessitating longer journeys and the allocation of extra resources for warmth and safety.

3.16.2 Analysis of Rainfall Patterns:

Climate change has caused rainfall patterns to become increasingly unpredictable, which has added extra complexity to the lives of small-scale fishers. Periodically, an abundance of precipitation causes premature flooding, which hampers fishing operations and devastates crucial fishing equipment. Conversely, certain years see notable deficiencies in precipitation, leading to dry conditions that hinder the typical fishing patterns **(Agarwala et al., 2014; Adger et al., 2009; Adger, 2000)**. The inherent unpredictability of fishing conditions compels fishers to employ illicit fishing techniques, such as the utilization of monofilament gill nets, as a means to offset their financial setbacks. Nevertheless, these activities exacerbate environmental degradation and lead to the depletion of fish populations.

3.16.3 Extreme Weather Events:

Shariatpur, along with other coastal areas of Bangladesh, is seeing a growing impact from severe weather phenomena such as storms, cyclones, unpredictable floods, powerful winds, and tidal surges **(World Bank, 2013; Scoones, 1998)**. The fishing villages are severely impacted by these natural catastrophes, resulting in the destruction of houses, equipment, and even loss of life. Coastal fishermen are especially susceptible to tidal flooding, which not only causes damage to their residences but also limits their movement, so hindering their ability to do their daily tasks. Furthermore, aside from causing bodily harm, these severe weather occurrences also facilitate the dissemination of waterborne illnesses, hence exacerbating the health and production challenges faced by fishing communities (**Khanum, 2013)**. The convergence of these circumstances engenders a recurring state of susceptibility, wherein fishers persistently grapple with recuperating from one calamity, just to be subsequently assailed by the next.

The escalating fluctuation in climatic patterns presents substantial hazards to small-scale fishermen, intensifying preexisting susceptibilities and giving rise to fresh obstacles. To tackle these problems, a comprehensive strategy is needed, which involves enhanced prediction methods, adaptable tactics for sustainable fishing, increased availability of healthcare services, **(Karuppusamy and Karthikeyan, 2017; Kabir and Amin, 2007)** and the establishment of robust infrastructure to safeguard against severe weather occurrences. In the absence of these initiatives, the economic stability of small-scale fishermen would remain in jeopardy, posing a danger to both their livelihoods and the overall ecological equilibrium of the region.

3.17 Effects on Economic, Social, and Physical Conditions:

The fishing population residing in coastal areas, namely in districts such as Shariatpur, is experiencing extreme poverty and grappling with a multitude of economic, social, and physical hardships **(Milton, 2010; Islam et al., 2017; Islam et al., 2018b)**. From an economic standpoint, these communities face significant vulnerability as a result of their restricted access to financial resources, including loans, credit, and savings. The absence of financial stability impedes their capacity to invest in superior technology, restore impaired infrastructure, or even ensure their fundamental necessities, resulting in a continuous condition of economic adversity.

In social contexts, fishermen are frequently subjected to marginalization, experiencing stigmatization and holding subordinate positions within the wider social order. This marginalization intensifies their economic vulnerabilities, since they possess restricted entry to social networks and resources that may assist them in enhancing their livelihoods. Fishing communities are highly vulnerable to the effects of climate risks in terms of their physical well-being. Natural calamities, such as cyclones, floods, and storms, can result in significant destruction to residential dwellings and infrastructure. These harsh weather conditions not only demolish unproductive assets like residential buildings but also do serious harm to productive assets that are crucial for their means of living, such as fishing equipment, nets, and boats. The obliteration of these resources immediately impacts their capacity to generate income and exacerbates the decline of their already tenuous financial circumstances.

In addition, the infrastructure in these settlements, such as roads and transit networks, is frequently underdeveloped and extremely susceptible to climate catastrophes. Intense precipitation can inundate roadways, resulting in the isolation of crucial commodities and services and causing scarcities in nearby markets **(Fine, 1999; Coleman, 1988)**. Consequently, this leads to an increase in the pricing of essential goods, placing further pressure on the financial means of the fishing community.

3.18 Effects on Lives and Reproductive Assets:

Coastal regions are witnessing a growing number of vulnerabilities that pose a danger to the livelihoods of small-scale fishers. Residing in close proximity to rivers and coastal regions renders individuals more susceptible to natural disasters, so exposing them to ongoing peril. Fishing, an inherently dangerous industry, **(Dixon, Smith, & Guill, 2003; DFID, 2000)** becomes much more precarious during severe weather phenomena, since fishermen are confronted with imminent dangers arising from abrupt calamities such as cyclones and floods.

The persistent impacts of climate change have worsened the difficulties experienced by these populations. The variability in temperature and weather patterns has caused a decline in biodiversity and fish productivity, thereby affecting the fishermen' capacity to maintain their

livelihoods. The decrease in fish populations not only diminishes their current revenue but also jeopardizes the future viability of their fishing methods.

Aside from environmental issues, fishermen encounter many fundamental vulnerabilities that impact their means of making a living. These factors encompass periods of fishing prohibition, inadequate backing from governmental and non-governmental entities, substantial financial obligations, declining fish yields, unfavourable market circumstances, dependence on fishing as their only revenue stream, insufficient incentives, and harm to fishing equipment. Each of these variables contributes to the overall susceptibility of fishing villages, rendering it progressively challenging for them to sustain a stable income and safeguard their means of living.

The combined impact of these vulnerabilities leads to a substantial decline in income and an increasing concern over their future. In the absence of sufficient intervention and support, these communities would persistently experience deteriorating living conditions and heightened vulnerabilities to their lifestyles and sources of income, eventually jeopardizing their capacity to maintain themselves amidst continued climatic unpredictability and change.

4. Conclusion and Recommendation:

The study delivers a comprehensive analysis of the socio-economic status and vulnerabilities encountered by fishing communities in the coastal region of Shariatpur, Bangladesh, particularly in perspective of the consequences of climate change. The study emphasizes the substantial influence of climatic fluctuation on the sustenance of these people, which significantly depend on natural resources such as rivers, fish, and aquatic resources. The study reveals that fishermen in Shariatpur encounter a multitude of obstacles, such as restricted availability of financial resources, insufficient educational prospects, and substandard housing and sanitary conditions. Most fishermen engage in conventional fishing methods, and their income levels are often meager, rendering them vulnerable to economic and environmental disruptions. The study also emphasizes the importance of social capital in mitigating these vulnerabilities, emphasizing the value of community relationships and access to wider institutional assistance.

Climate change poses significant threats to the long-term viability of fishing communities, as it leads to higher temperature variations, changes in precipitation patterns, and more frequent and severe weather events, exacerbating their current vulnerabilities. The study emphasizes the need for targeted interventions to enhance the resilience of these communities through the enhancement of healthcare, education, and financial services access. Additionally, it suggests promoting sustainable fishing techniques and improving the management of natural resources.

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Author Contribution
Each author took involved in the creation of the study design, data analysis, fieldwork, and execution stages. Every writer gave their consent after seeing the final work.

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A statement of conflicting interests
The authors declare that none of the work reported in this study could have been impacted by any known competing financial interests or personal relationships.

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