



**Socio-Economic Conditions and Activities of Fishermen and Intermediaries Involved in Fish Marketing Chain of Fishery Ghat, Chattogram**

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Roll No: 0122/08

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**Department of Fishing and Post-Harvest Technology**

**Faculty of Fisheries**

**Chattogram Veterinary and Animal Sciences University**

**Chattogram 4225, Bangladesh**

**June, 2023**

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**This is to certify that we have examined the above Master's thesis and have found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made**

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## **ABBREVIATION**

**AHP** = Analytic Hierarchy Process

**BFDC** = Bangladesh Fisheries Development Corporation

**DOF** = Department of Fisheries

**ESBN** = Estuarine Set Bag Net

**FGD** = Focus Group Discussion

**HSC** = Higher Secondary Certificate

**MC** = Marketing Cost

**MSBN** = Marine Set Bag Net

**NGO** = Non-governmental Organization

**PP** = Purchase Price

**PRA** = Participatory Rural Appraisal

**RMA** = Rapid Market Appraisal

**SP** = Sales Price

**SPSS** = Statistical Package for the Social Sciences

**SSC** = Secondary School Certificate

**UFO** = Upazilla Fisheries Officer

## ABSTRACT

Bangladesh's coastal regions are integral to the livelihoods of its fishing communities, primarily engaged in artisanal and small-scale fishing. This research, conducted in Fishery Ghat, Chattogram, aimed to comprehensively understand the socio-economic conditions and activities of various stakeholders involved in the fishing industry. Additionally, the study sought to analyze the marketing channels and value chains of different marine fish species within the region. The investigation identified three distinct markets in the fishing ecosystem: primary, secondary, and consumer. A random sample of 60 individuals representing diverse stakeholder groups was selected for data collection. This data was collected through questionnaires, Participatory Rural Appraisals (PRA), and cross-check interviews, and subsequently analyzed using Microsoft Excel and SPSS software. The survey revealed that the majority of stakeholders were aged over 40, with 90% being male. Although various marital statuses were observed, most stakeholders were married, and polygamous marriages were rare. The majority (60-90%) adhered to the Muslim faith and possessed limited educational qualifications. Additionally, 60-80% of stakeholders had family sizes ranging from 7 to 9 members, with most families relying on a single active earning member. The research uncovered that many fishermen and intermediaries frequently borrowed funds, particularly during the fishing ban period, from sources such as lenders, microfinance organizations, NGOs, and relatives. Daily income among fishermen typically ranged from 200-1000 BDT, while Aratdars and Bepari earned between 2000-7000 BDT. Wholesalers reported daily incomes ranging from 2000-4000 BDT, with Aratdars and Bepari earning relatively higher incomes compared to other groups. The study further identified the main fish species caught, including Hilsha, Silver pomfret, Ribbon fish, Bomby duck, koral, Red koral, Tuna, among others, using various fishing techniques such as beach seines, set bag nets, trammel nets, bottom gillnets (doba jal), long lining, and gill netting. An analysis of the fish market structure revealed five key intermediaries: Fishermen, Aratdars, Bepari, Wholesalers, and Retailers, with each group contributing significantly to the profit margins. Value chain analysis of major fish species were Hilsha, Silver pomfret, Ribbon fish, Pama croaker, Scribbled goby, Yellow fin tuna, Gangetic hairfin anchovy, Bomby duck, Indian pike conger and Malabar blood snapper and it was found that the total marketing margin were 22%, 26%, 30%, 29%, 36%, 32%, 37%, 34%, 20% and 35% respectively. The study highlighted key challenges in the fish marketing channel, including inadequate transport infrastructure and a high number of intermediaries. To ensure the viability of the fish marketing systems in the region, government intervention and support in the marketing process are deemed essential. This research provides valuable insights into the socio-economic dynamics and marketing channels of the fishing industry in Fishery Ghat, Chattogram, and underscores the need for policy interventions to enhance the sustainability and efficiency of this critical sector in Bangladesh's coastal regions.

**Keywords:** socioeconomic status, stakeholders, market value chain, Marketing channel

# CHAPTER I

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## INTRODUCTION

# CHAPTER I

## INTRODUCTION

Bangladesh is a developing nation in South Asia, and its future economic growth is heavily reliant on the agricultural and fishing industries. With the fisheries industry playing a crucial and prospective role in agro-based financial expansion, poverty alleviation, employment, animal protein delivery, and foreign exchange earnings, it has established a respectable track record of sustained growth within a stable macroeconomic framework (Mome et al., 2007). Fish is a valuable protein source and plays an important role in the socioeconomic fabric of South Asian countries (Rao et al., 1988). The production and consumption of fish have a big impact on the economy and food supply. Bangladeshis are frequently referred to as "Mache Bhate Bangali" or "Fish and Rice Makes a Bengali" (Ghose, 2014). Bangladesh produced enough fish to satisfy its own needs, and daily intake per person exceeded the target of 60 grams to 62.58 grams (BBS, 2017). Thus, boosting fish output can help to solve the starvation issue. In the form of farmers, operators, workers, merchants, mediators, day laborers, and transporters, it generates a variety of economic choices for a lot of individuals, many of whom live below the poverty line (Ahmed and Rahman, 2005).

With a harvest of about 20 million tonnes of fish, the fisheries sector's GDP growth was 5.74 percent, contributing 3.57% to the national GDP, 26.50% to the agricultural GDP, and 1.24% to foreign currency earnings (DoF, 2022). According to MoFL (2022) 1.95 million people, or more than 12% of the nation's entire population, including 1.4 million women, rely on the fishing industry for their primary source of income. The government's implementation of several fishery-friendly programmes has increased fish production during the fiscal year 2020–21 by 118000 tonnes, from about 8621000 tonnes to 8621000 tonnes. The hilsa fish is a symbol of our pride and cultural history. 12.22% of all fish produced in the country is produced in Hilsa. This one fish contributes more than 1% to the country's GDP (DoF, 2022). The government's adoption of numerous coordinated initiatives for the protection and development of hilsa resources has resulted in a major increase in Hilsa production (DoF, 2022). A 1738 square kilometre region in the Bay of Bengal has been classified as a "Swatch of No-Ground Marine Protected Area" in order to enhance marine fishery resources and biodiversity. As a result, the Bay of Bengal is generating more fish with a high commercial value, preserving fish populations, and permitting a variety of fish species to successfully hatch their eggs. Bangladesh's fisheries are extremely diverse, with 475 marine species (Billah et al., 2018). The country is currently among countries that can generate enough fish on its own as a result. Bangladesh lacks an extensive institutional and regulatory framework as well as effective marine governance (Akhtar et al., 2017). Nevertheless, because of marketing difficulties,

natural calamities, and artisanal fisherman are becoming less prevalent at an alarmingly rapid rate, despite an increase in commercial fishing activity (Rahman, 2017). As a result, they are losing money and having to spend a sizable chunk of it for food and clothing. When it comes to fishing, they are up against formidable obstacles (Akhtar et al., 2017). Employing relatively tiny boats for fishing. Artisanal fishing is done in shallow water, typically up to a depth of 40 meters, with mechanical or non-mechanical boats. It makes reference to the small-scale, low-tech fishing techniques employed by individual fishing households. The majority of these households come from coastal or island-based national groups. These families go fishing on brief (rarely overnight) excursions near the water.

A person's abilities, resources (cultural and psychosocial), and needs for a source of support determine their lifestyle (FAO, 2010). Communities of fishermen use fishing to safeguard their way of life from nearby bodies of water. They do this through catching fish, trading fish, drying fish, preserving aquatic life, and weaving nets. Due to their poor income, they are one of Bangladesh's most marginalized and vulnerable communities. The poorest people are sometimes denied access to many basic necessities, and they are often fisherman who risk their lives by venturing out in dangerous conditions to catch fish in order to supply the demand for animal protein. The capacities, resources, activities, and access to those things that together define the level of living obtained by each household make up livelihood. Among these resources are natural, physical, human, financial, and social capital. According to Chambers and Conway (1992) a livelihood is sustainable if it can withstand stresses and shocks, recover from them, and retain or enhance its capacities and resources both now and in the future. This is done without diminishing the natural resource base. The framework for sustainable lifestyles includes five key categories of capital: social, natural, financial, physical, and human capital (Scoones, 1998). The sustainable livelihood approach has slowly grown to incorporate its own core values and guiding principles for development initiatives that prioritize eradicating poverty (DFID, 1998). Water is critical to the region's economic and social growth. Diverse livelihood activities in the coastal zone are sensitive to water-related natural hazards and are also affected by man-made hazards. Fishing communities are still the most common poor people's communities in coastal locations, especially in developing countries (FAO, 2010). As a result, there were fewer fish in the river, and the fisherman was having difficulty catching any. Therefore, the socioeconomic situation of fisherman is poor. They are unable to earn enough money to meet their basic needs (Alam, 2005). A substantial number of fisherman lack access to several facilities. The livelihood status for the fishing community is insufficient; they must constantly work to survive (Rahman et al., 2015). Fishermen face a shortage of fishing vessels and equipment, which necessitates the payment of substantial fees for renting such equipment (Alam, 2007; Saberlin et al., 2013). According to Yeasmin et al., (2010) fishers experience

significant challenges during fishing bans and lean fishing periods due to their limited availability of alternative job opportunities. Consequently, they employ various coping strategies to mitigate the adverse effects of these circumstances. Consequently, the excessive exploitation of fish resources has significantly disrupted natural fish production.

Chattogram Fishery Ghat is the largest landing center in Bangladesh. It is located adjacent to the Karnafuli River. Prior to reaching the final consumers in the marketing process, fish travels through numerous market actors and exchange venues. In order to make fish available to customers at the appropriate time and location, a successful marketing strategy is needed. Working fishermen who catch fish are unlikely to sell their catch in a retail setting overnight. They transport their catches to locations where shopkeepers, called Nikaries/Beparies, meet them early in the morning and bargain in quantity. There are only a few middlemen at the landing site. There may only be one or two mediators who approach a fisherman. Other mediators observe the proceedings from a safe distance and wait for their opportunity to mediate if the first one is unsuccessful. A second mediator is brought in to bargain for the catch if the first one fails. The first Nikari/Paiker-retailer typically stops this from happening and seizes control of the entire lot. Due to middlemen's involvement in the marketing channel, the price of fish is low where it is caught but expensive when it is consumed; oftentimes, it is double at the consumer level from the fisherman (World Bank, 1991). The fish marketing system, which is mostly based on private ownership activities, is made up of numerous interconnected activities, including fish farmers, fishermen, or landing centers, local or village markets, township markets, gathering stations, wholesale markets, and retail markets. This sequential market structure, referred to as the "marketing channel," spans from the production sector to the consumer sector with specific intra- and interlinkage intermediaries or middlemen. The supply chain and a substantial number of people who work in fish farming, processing, and packaging are both impacted by Bangladesh's exclusively private sector-controlled fish marketing system.

The typical fish market in our country is a typical scene of chaotic activity that is controlled by prominent locals and involves a wide range of social, economic, and political components (Aktar et al., 2013). The trader/middleman (Aratdar or Paikar) typically requires fishermen and fish farmers to sell their catch for a reportedly set amount. Considering that they depend on the immediate intermediaries for cash flows and Due to their illiteracy and inability to advocate for the proper pricing of their goods, fishermen and fish growers are powerless to challenge the unfair prices set for their goods by the local intermediaries. The immediate intermediaries are gradually absorbing the fishing communities as a result of the middlemen's development of a regulated marketing chain, which has allowed them to absorb the marginal fishing communities by establishing a limited pricing policy through the intermediaries at various levels of the three

marketing chains. The most difficult marketing issues are currently being faced by marginal rural areas due to their lack of financial stability, limited transportation, storage, and fishing skills (Rahman, 1997). In terms of profit, middlemen or intermediaries often control the marketing route (Bryceson, 1993). Consumer demand, global competition, and consumer desire all affect manufacturers' capacity to sustain a lucrative, healthy, and high-quality product supply chain (Muir et al., 1995). The construction of sustainable market regulations, which preserve a balanced profit margin for producers and all other intermediaries participating in the fish marketing system, will be aided by determining the appropriate price and market margins in the fish marketing channel (Sayin et al., 2011). The rise in fish prices can be attributed to the presence of intermediaries in the marketing sector. These intermediaries have created a marketing chain that exploits fishing communities by implementing an artificial pricing structure through various levels of intermediaries (Kleih et al., 2003).

The fish marketing system in Bangladesh is predominantly overseen by private entities, exerting a substantial influence on the livelihoods of numerous individuals engaged in fish farming, processing, packaging, and the associated supply chain. Within the confines of our nation, a customary fish market serves as a vivid representation of a recurring situation characterized by chaotic undertakings orchestrated by influential individuals within the vicinity, alongside a diverse range of social, economic, and political factors. Fishermen and fish growers often find themselves compelled to sell their catch to intermediaries known as traders or middlemen, who dictate the price at which the transaction takes place.

A few studies on the activities, socio-economic condition of different stakeholders of Fishery Ghat in Chattogram have been conducted in the past (Rashed et al., 2017). However, since the covid-19 outbreak hit the country, few research has been conducted in this area. Additionally, fisherman and intermediary's livelihoods, situations and economic conditions have been changed in last five years as an impact of covid-19, requiring indepth investigation of socioeconomic condition and the livelihood status of the stakeholders. It will help to understand the impact of the covid-19 on the fishermen and other stakeholders. It is crucial to have extensive understanding of the current state of fishermen's and intermediaries' livelihood in this area for planning, decision-making, and expanding Chattogram's fisheries industry.

### **1.1 Objectives of the Study**

1. To recognize the socio-economic conditions of different stakeholders
2. To notice the activities of different stakeholders
3. To learn the marketing channel and value chain of some major marine fishes



## CHAPTER II

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## LITERATURE REVIEW

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Socio-economic Conditions of Different Stakeholders Involved in Fishing**

The term "livelihood" encompasses the necessary capabilities, resources, assets, and activities that are essential for sustaining one's existence (Scoones, 1998). Typically, a livelihood evaluation is undertaken to analyse the behaviour of an individual, household, or society in response to particular circumstances. Various methodologies have been utilised to promote sustainable rural development and alleviate poverty, with the strategy of sustainable livelihoods gaining prominence as a framework for poverty-focused expansion endeavours (DFID, 1998). According to Chambers and Conway (1992), a sustainable livelihood refers to the capacity of a system to endure stresses and shocks, while simultaneously preserving or enhancing its ability to recover, without causing depletion of the natural resource base. The concept of a sustainable livelihood encompasses the consideration of development goals, scope, and objectives, with the aim of promoting advancements in poverty eradication (Scoones, 1998).

The socioeconomic conditions of the fishermen and intermediaries in the research region of Cox's Bazar were suboptimal. Approximately 35% of individuals engaged in fishing activities and acting as intermediaries were identified as lacking literacy skills, whereas 16% of fishermen and intermediaries possessed limited literacy abilities, being able to solely write their own names (Ahsan et al., 2016). Approximately 55 percent of the households belonging to the fishermen and intermediaries were found to possess a dwelling constructed with tin materials, including both the shed and wall. The mean income for the majority of fishermen and intermediaries was approximately Tk. 400-500, with 66% of this population requiring financial assistance from diverse channels to sustain their business operations. The primary concerns encompassed inadequate road and transportation infrastructure, a dearth of financial resources, an insufficient provision of ice, inadequate training facilities, and a substantial presence of intermediaries within the supply chain (Ahsan et al., 2016).

Hossain et al., (2014), investigated the socioeconomic standing of the fisherman that live in Jelepara, which is a village in the Chattogram district's Pahartoli region. The study revealed that 94% of the individuals engaged in fishing activities were male, while the remaining 6% were female. The majority of the population consisted of Hindus, accounting for 88%, while the remaining 12% comprised Muslims. Approximately 84% of the individuals surveyed were identified as being married. The percentage of single-family households was significantly higher (94%) compared to joint-family households. The study revealed that the average number

of school-age children per household was 1.9. Furthermore, it was observed that 54% of the school dropouts were boys, while the remaining 46% were girls. Eighty-eight percent of the houses surveyed were constructed with katcha materials, while semi-pacca houses accounted for 12% of the total. It is worth noting that all the families included in the study had access to electricity facilities. Various types of nets were utilised, including the set bagnet, tong jal, current jal, and tanajal, among others. Engine boats were utilised, with engine power ranging from 8 to 22 horsepower. On average, a cohort of four individuals engaged in fishing activities was able to capture a daily haul ranging from 35 kilogrammes to 80 kilogrammes, employing the utilisation of a watercraft. The majority of fishermen sold their fish upon meeting their respective demand. The monthly average income ranged from BDT 6000 to BDT 15000. Fifty-six percent of the fishermen obtained loans from private money lenders, while 44% sought financial assistance from non-governmental organisations (NGOs) (Hossain et al., 2014).

Billah et al., (2018) also investigated fisheries status and socio-economic condition of fishing community in Bhatiary coastal area Chattogram. The demographic group with the highest percentage (36%) of individuals engaged in fish farming was middle-aged, while the lowest proportion (6%) was observed among individuals aged 60 years and above. Approximately 96% of fishermen identified as Muslim in terms of their religious affiliation, while the remaining fishers comprised 6% Hindus and 2% Buddhists. At the primary level, approximately 78% of individuals possess educational qualifications below the Secondary School Certificate (S.S.C.) level. Only 12% of fishermen have attained the S.S.C. qualification, while the remaining 10% have achieved the Higher Secondary Certificate (H.S.C.) qualification. The present study revealed that 74% of the fishers were male, while 26% were female. In the present study area, it was discovered that 82% of families belonged to the nuclear family structure, while the remaining 18% were classified as joint families. The findings of this current study reveal that the majority of houses, specifically 80%, were under ownership, whereas a smaller proportion of 8% were designated for free use, and a mere 12% were rented. Within the study area, the dwellings of fishermen were primarily classified into two main categories: tin shed houses, accounting for 68% of the total, and concrete houses, constituting the remaining 32%. In the current investigation, it was observed that 88% of the respondents possessed semi-concrete toilet facilities, while the remaining 12% of fishermen had access to concrete toilets for the purpose of maintaining hygiene. Approximately 54% of the respondents possessed a television set within their household. Furthermore, it was found that 90% of the fishermen surveyed owned a portable radio, while 48% of them possessed a personal mobile phone. The remaining individuals relied on shared mobile phones. Lastly, a mere 36% of the fishermen reported having a CD player in their household for entertainment purposes. The primary secondary occupations observed among the population were small-scale business (40%),

agriculture (36%), and rickshaw pulling (24%) as means of sustenance. The fish farmers with the highest proportion (26%) reported an annual income ranging from BDT 30,000 to 40,000, while the fish farmers with the lowest proportion (12%) reported an income of BDT 70,000 and above. Within the study area, it was observed that 67% of the fishermen sought medical assistance from village quack doctors, while the remaining 33% sought medical care from doctors with MBBS qualifications. Within the boundaries of the study area, it was found that 41% of children from households headed by fisherman received their education from governmental and non-governmental institutions, while the remaining 59% had no access to any kind of educational institutions. The study revealed that 47% of the fishermen utilised personal funds for their financial support, while 26% obtained loans from banks and 27% received loans from various non-governmental organisations (NGOs). Approximately 78% of the fishermen surveyed in the study area identified insufficient credit as the most significant problem for any kind of initiative.

According to the study conducted by Rashed et al., (2017) a significant proportion of fishermen (31% of the total sample) fell within the age categories of 21 to 30 and 31 to 40. On average, each household consisted of 3.78 members in a nuclear family structure. The mean number of individuals residing in joint family households was 7.83. These individuals represent a segment of our society that experiences significant socio-economic disadvantages, while certain fishing nets utilized by fishermen have a detrimental impact on the fish population. Each net captured a variety of species, including several that are considered rare. Poverty and deprivation are prevalent issues commonly experienced by fishing villages. Due to their geographical positioning, socio-economic vulnerability, and limited capacity for adaptation, they exhibit a high degree of susceptibility to the impacts of climate change and natural disasters. Coastal fishing serves as the primary economic sustenance for numerous fishing communities, primarily due to the absence of viable alternative livelihood options (FAO, 2014). According to the Food and Agriculture Organization (FAO, 2014) a significant proportion of Bangladesh's marine fisheries were characterized by small-scale operations.

Mitu et al., (2021) have reported on the south-east coast of Bangladesh, has garnered substantial assistance in the production of a substantial quantity of dried fish. This assistance has been extended to thousands of socioeconomically disadvantaged individuals residing in coastal areas. The present study employed a combination of qualitative and quantitative methodologies, specifically utilizing the Analytic Hierarchy Process (AHP), to assess the socioeconomic attributes, livelihood aspirations, and resilience levels of individuals involved in fish drying activities along the southeastern coastline. The socio-economic underdevelopment of groups involved in drying can be attributed to factors such as lower levels of literacy, unpredictable

revenues, and reliance on labor-intensive employment. In addition to the notable utilization of child labor for the process of fish drying in Naziretek, it was observed that female workers outnumbered their male counterparts. In contrast, the female employees exhibited a lower degree of autonomy in determining their daily wages, with reported earnings ranging from USD 3.5 to 4.89. This amount significantly falls short of the compensation received by their male counterparts, who earned between USD 4.1 and 8.31. A limited number of employees, producers, and traders were discovered to possess self-sufficiency through their engagement in fish drying endeavors. In contrast, the stability of the employees' livelihoods was comparatively lower than that of the processors and traders. The community's resilience was upheld by various factors, including the involvement of dried fish processors and employees, dried fish traders, off-season revenue, a diverse range of fish species, fish drying facilities, the presence of a trader's association, and strong social relationships. These factors played a crucial role in maintaining resilience, despite the community facing multiple shocks and constraints. The study proposes effective interventions aimed at promoting alternative income diversification strategies, fostering strong community ties, encouraging active involvement of local government, and promoting government engagement to enhance sustainable livelihoods and bolster community resilience.

### **2.2 Activities of Different Stakeholders Involved in Fishing**

Nazrul (2018) collected information from 13 coastal fish landing stations in southeast Bangladesh during a one-year study from July 2016 to June 2017, totaling 32,241.74 MT of landed fish and prawns as well as other resources. The catch increased to 4,787.24 MT on April 17 before declining to In July 16, 413.29 MT. The highest catch was made by the landing centers based in Cox's Bazar. According to fish weight, MSBN fishery was the most popular type of fishing. The study's conclusions show that 68,364 boats (the average number of boats active fishing days) fished at 13 landing centers over the course of the Page 8 of 82 study period. The range of active fishing days was 16 to 28, with the highest and lowest activity levels being recorded in Teknaf and Fishery Ghat, respectively.

Between April 2014 and April 2015, Ghosh et al., (2016) conducted studies on the catch evaluation of some artisanal marine fishing gears used in the Cox's Bazar and Teknaf regions. There were found to be 16 different varieties of fishing gear, with the gill net, beach seine net, estuary set bag net, marine set bag net, and trammel net being the most common. According to their research, despite being a legally prohibited fishing technique, estuarine set bag net (ESBN) recorded out of 52 fish species, marine set bag nets (MSBN) had the highest catch per unit effort (CPUE) (110 kg/gear/day) in July, followed by ESBN (100 kg/gear/day), in Cox's Bazar. The highest CPUE was recorded by ESBN in June at 100 kg/gear/day, followed by MSBN (90 kg/gear/day). Poa (*Otolithoides argenteus*), Churi (*Trichiurus haumela*), Loittya (*Harpadon*

*nehereus*), Ranga chokha (*Lutjanus johni*), Lal poa (*Johnius argentatus*), Olua (*Coilia dussumieri*), Rup chanda (*Stromateus chinensis*), Foli chanda (*Stromateus argenteus*), and Ilish were the prominent fish species that (*Tenualosa ilisha*). During the study period, they also discovered three significant crab species and 10 commercially significant shrimp species. Most fish species were most readily available in June and July, whereas December and January were lean months. According to this study, *Trichiurus haumela*, *Harpadon nehereus*, and *Coilia dussumieri* were the next most common fish species, followed by *Otolithoides argenteus* as the dominant species.

A survey was carried out by Rashed et al., (2017) at The Patharghata Fishery Ghat, one of Bangladesh's main marine fish landing sites. The study sought to investigate the various watercraft and equipment utilized by the landing center's fishermen, the types of fish they were catching, and to some extent, their socioeconomic situation. The nets were divided into categories such as Marine Set Bag Nets, Large Mesh Drift Gill Nets, and so forth. These gears' mesh sizes ranged from 1.5 to 3 inches for trammel nets and 2.5 to 16 inches for LMDs. The majority of fishing trawlers was primarily hand-built and propelled by inboard engines. The boats' carrying capacities ranged from 8.82 to 22.05 tons. According to Akter et al., (2017) coastal fisheries resources are essential for sustainable economic development, livelihood security, management, and conservation as one of the key elements of the blue economy and food security. There are, however, few contemporary thorough studies evaluating the richness and composition of faunal diversity from coastal and marine waters. A year-long field inventory was conducted to assess the current condition of the fish and shellfish taxa that are found in the marine and estuarine waters of Bangladesh's south-eastern coast, specifically in the Chattogram and Cox's Bazar districts. Both qualitative and quantitative data were taken into consideration while assessing the existing perspectives of fishing resources and the actual reality of species compositions. The collected taxa (specimens) were identified using expert knowledge sharing, secondary document consultation, and generally accepted acceptable methodologies. The research area yielded 64 taxa in total, including 10 shellfish species and 54 finfish species from 27 families. The highest percentage by family was achieved by the Sciaenidae (11%) with six species, followed by the Gobiidae (9%) and Scombridae (9%) with five species each, and the Engnaulidae and Cynoglossidae (7%) with four species apiece. Eight species of Pennidae made up (80%) the species of shellfish (prawn), whereas two species of Hippolytidae made up (20%). Akter et al., (2009) planned a study to determine the cost/return structures and economic efficacy of small-scale marine fishing employing the selected gears in Bangladesh. To achieve these goals, a total of 90 fishing units (enterprises) were selected, of which 30 were gill net, 30 were roke net, and 30 were set bag net fishing firms. Information was received from fishermen and boat owners over the course of a year. The study's findings demonstrated that the fishing

gear chosen was extremely profitable. The gillnet, roke net, and set bag net had yearly earnings of Tk. 111,022, 75,525, and 147,241 for the selected gears, respectively. Set bag net fishing was proven to be more profitable than the other two gears.

### **2.3 Marketing Channel and Value Chain Analysis of Some Major Marine Fishes at Fishery Ghat, Chattogram**

The emergence of the idea of value chains can be traced back to the 1960s, where it was initially introduced as an analytical tool within the field of research on agriculture (Raikes et al., 2000). Since then, the concept has been implemented in various contexts beyond agricultural systems. The increasing development and utilization of value chains indicate their efficacy in comprehending the distribution of benefits within production systems, such as those found in the fisheries industry. The analysis of value chains for primary products, such as fish or crops, is frequently employed to monitor fluctuations in prices and costs that are accrued as a product transition between different actors, such as fishermen and wholesalers. The flow of products within production systems encompasses the entire process, starting from the initial inflow of products from the producer and concluding with the delivery to the final consumer (Dimitriadis et al., 2005).

The objective of market chain analysis is to furnish data regarding the profitability of different entities involved in the market chain (Cronin et al., 2011). The concept of economic value chain analysis encompasses the various activities involved in delivering a product to the ultimate consumer. Additionally, in the context of international products, it examines the degree to which intermediaries or agents benefit from their involvement in the value chain (Jacinto, 2004). The conventional food industry value chain encompasses various stakeholders, including the producer, processor, wholesaler, exporter, importer, retailer, and consumer.

Over the past few years, various studies have been undertaken to examine the cultivation and distribution of coastal and marine fish in Bangladesh. Several studies primarily examined the socioeconomic status of marine fishers and the various stakeholders engaged in marine fishing and the promotion of fisheries goods (Islam and Wahab, 2005). The coastal populations in Bangladesh represent a socioeconomically disadvantaged and marginalised segment of the population within the country. The individuals within this community mainly participate in the occupation of fishing, whether as proprietors of fishing vessels or as workers, and are also engaged in the activities related to the handling and commercialization of aquatic resources (Jayawardhan, 2017). Nevertheless, while the marketing of these products exhibits promising potential, the individuals engaged in the production chain, including fishing, processing, and local trading, are confronted with limited value and consequently generate meagre profits.

However, a comprehensive assessment to quantify the magnitude of these challenges in the marketing of coastal and marine fish in Bangladesh has not yet been conducted. According to Islam (2006), approximately 60-80% of the fishing-related earnings from fish sales are allocated to intermediaries. However, within the coastal and marine fish marketing system, various intermediaries play a role in different stages of the market, resulting in a significant variation in fish prices from the primary market to the consumer market (Faruque et al., 2012). Consequently, fishermen are subjected to a lack of equitable pricing, resulting in an inadequate allocation of their rightful portion of the overall sales revenue. A well-functioning marketing system is essential in order to ensure equitable distribution of sales revenue for fishermen and to enhance the availability of fish from the sea in the domestic marketplace, as well as to tap into export opportunities. Multiple investigations have been conducted to examine various economic facets of coastal and marine fish promotion in Bangladesh. According to Sabur and Rahman (1977) conducted a study that examined the marketing channels and marketing institutions involved in the marine fish industry. In a separate study, Islam et al., (2001) investigated the marine fish marketing system and assessed its profitability across various market levels. The fish production sector has been recognised as a promising contributor to job creation, foreign currency earnings, and protein deliver within the broader context of the country's agricultural economy. A considerable proportion of individuals, a significant portion of whom reside below the threshold of poverty, are engaged in various roles within the domestic fish marketing sector. These roles encompass fishers, processors, traders, intermediaries, day laborers, and carriers (Ahmed et al., 2007; Islam, 2006; DFID, 1997).

### **2.4 Overview of Fish Markets**

The complicated state of Bangladesh's fish markets is primarily due to the participation of numerous parties in the supply chain. Although there have been examples of shorter distribution lines due to the presence of huge production zones and wealthy outlets participating in profitable transactions, the distribution path that is typically observed is characterised by its complexity (Nowsad, 2010).

In a typical supply chain, fresh fish is shipped to buyers through a series of intermediaries, starting with commission agents known as aratdars, who then pass it on to paikers (wholesalers/transporters), and finally to retailers. Local brokers, commonly referred to as "Forias," play a crucial role in the fish supply chain by facilitating the collection of fish from fishermen and fish farmers. These brokers establish a connection between the fishermen/farmers and the aratdars or wholesalers, known as "Mahajons" (Alam, 2016). In certain instances, wet fish may be introduced into the secondary or tertiary markets, where it undergoes a sequential process involving multiple commission agents. In prosperous urban



areas, city markets frequently receive regular shipments of fish from major producers or suppliers, facilitated by intermediaries such as agents or brokers (Juran, 1992). Both commission agents and wholesalers, commonly referred to as "Mohajons" in the local context, play a significant role in both the marketing and distribution of fish.

### **2.4.1 Primary market**

Primary markets are defined as markets that are situated in villages, district headquarters, or at crossroads. Typically, they are commonly found in close proximity to regions where fish are captured. Fishermen transport a diverse range of fish, primarily consisting of small fish obtained through both open-water fishing and pond fishing, to the main markets. According to Coulter and Disney (1987), A majority of primary rural markets, specifically 52%, are conducted twice a week. Additionally, 28% of these markets are held three times a week, while the remaining 20% are held on a daily basis. The majority of these markets, specifically 80%, operate during morning hours (Edmunds et al., 1996) . These markets primarily facilitate the trading of milk, vegetables, and fish. It is worth noting that these morning markets tend to have a relatively smaller number of sellers and buyers in comparison to the typical afternoon markets.

### **2.4.2 Secondary market**

The Beparies transport the fish acquired from the Nikaries, who are the primary suppliers from the fishermen or landing points, to the nearby Upazila or riverport markets using various modes of transportation such as road, river, or rail. The purpose of this transportation is to sell the fish either directly to wholesalers or indirectly through intermediaries known as Aratdars. According to Rahman and Ataur (2016) the distribution of fish from secondary markets/assembly points involves various channels through which it is transported to urban markets/higher secondary markets. This transportation is facilitated either by commissioned agents working on behalf of wholesalers/Aratdars or by other types of Beparies.

### **2.4.3 Higher secondary markets**

Beparies transport fish from secondary markets and fish assembly points to higher secondary markets that cater to extensive consumer and terminal markets. The higher secondary market encompasses one or multiple wholesale markets or centres, wherein Aratdars engage in the trade of fish. The transportation infrastructure in these markets is efficiently interconnected through roadways, waterways, and railways. According to Chowdhury (2004) The higher secondary markets are interconnected with multiple secondary markets for trading purposes. Landing ports such as Cox's Bazar, Chattogram, Khulna, Bagerhat, Khepupara, Chandpur, and

Barisal serve as significant secondary markets and prominent landing and marketing hubs for the substantial volumes of marine and brackish-water fish and shrimp species. The markets located in district headquarters can be classified as higher secondary markets, as they are interconnected with multiple secondary markets for the purpose of fish supply.

### **2.4.4 Final consuming market**

Following the acquisition of fish from secondary markets, local wholesalers or traders, commonly referred to as "paikers," proceed to sell the fish to retailers known as "nikaries" in outlying upazilla markets and village markets, also known as "hats" (Alam et al., 2012). It is through these retailers that the fish ultimately reaches the end consumer. In certain instances, the wholesaler may assume the role of a retailer when the proximity of the upazilla markets or hats to the supply source allows for such dual functionality. Within the distribution system, there exist wholesalers and retailers operating at various tiers, each catering to the demands of consumers within their respective localities.

### **2.5 The Composition and Marketing System of Fish in Chattogram**

Begum et al., (2014) found that *Hippocampus nehereus*, with a species composition of 7.2%, exhibits the highest contribution to the market. Conversely, the highest recorded market price was observed for *Pseudosciaena chinensis*. The market consisted of three distinct categories, namely the primary market, secondary market, and retail market. These sectors were predominantly overseen and regulated by a consortium of intermediaries, including sales agents, suppliers, wholesalers, and retailers. Fishermen and fish assemblers engage in the sale of their catch to suppliers, commonly known as baperies or paikers, with the assistance of commission agents, also referred to as aratdars. These agents facilitate the transaction process by conducting auctions at the landing centres, where they earn a commission ranging from 3% to 5% of the final sale price. The marketing cost of fish exhibited the highest value in the secondary market ( $5.60 \pm 0.383$  BDT kg<sup>-1</sup>), followed by the primary market ( $4.30 \pm 0.401$  BDT kg<sup>-1</sup>) and the retail market ( $3.20 \pm 0.208$  BDT kg<sup>-1</sup>). The wholesalers reported the highest income, ranging from 8000 to 10000 BDT per day. They were followed by baperies, who earned between 600 and 900 BDT per day, aratdars, who earned between 500 and 800 BDT per day, and fishermen, who earned between 220 and 500 BDT per day. Whereas Shafikul et al., (2018) research suggested that insufficient physical infrastructure, including In Cox's Bazar, it was possible to observe processing, packing, sanitation, water supply, drainage, cleaning, washing, maintenance, and other crucial procedures. By managing the Cox's Bazar committee well and keeping careful watch over the situation, the government can improve the situation.

## **2.6 Storage and Transportation**

The primary objective of the storage function is to ensure the availability of goods at the desired time, thereby facilitating traders in obtaining more favourable prices for their products. Due to its inherent perishability, fish necessitates highly specialised storage facilities that align with the fluctuating seasonal demand. However, transportation plays a crucial role in the preservation and distribution of highly perishable commodities such as fish. The establishment of a robust and effective transport network is a fundamental pillar of the contemporary marketing system (Kohls and Uhl, 2005). It is encouraging to see that at least some private entrepreneurs in the Fishery Ghat areas have adopted these enhanced packing techniques and containers to some extent, taking full advantage of them. Widespread use of these techniques would undoubtedly result in improved economic utilization of our fish landings, an improvement in the socioeconomic standing of the fishermen, and a significant reduction in our nation's protein malnutrition problem. Lack of proper infrastructure facilities in the landing centre and market, an unsanitary environment, middlemen's influence, excessive interest rates on loans, and other issues were frequently cited as impediments. Appropriate authorities should pay due attention to improve fish landing and distribution so that both quality and fair price are guaranteed (Rahman et al., 2013).

## CHAPTER III

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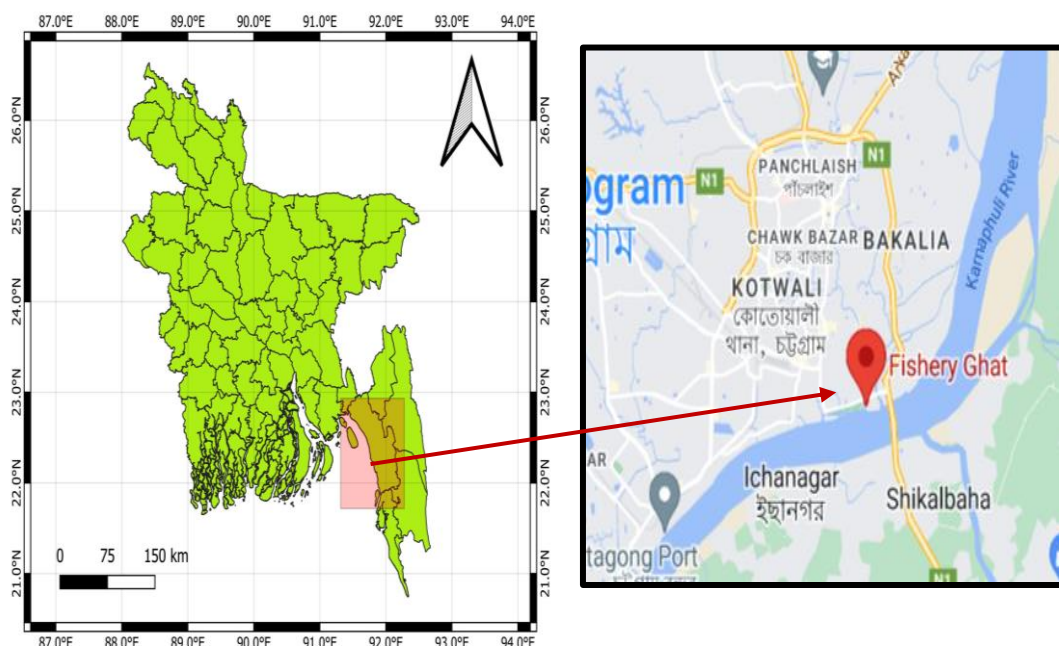
### MATERIALS AND METHOD

## CHAPTER III

### MATERIALS AND METHODS

#### 3.1 Study Area

The study was conducted using a market survey encompassing individuals involved in fishing, such as fishermen, fish traders, intermediaries, and fish retailers. The data utilised in this study were obtained from Fishery Ghat, Chattogram. This study examined three distinct categories of fish markets, namely primary markets, secondary markets, and consumer markets. The survey encompassed a sample size of 60 individuals, consisting information taken from fishermen, including beparis and aratder, as well as wholesalers, retailers, and consumers each group of 10 members. The relevant data for the study was collected through the administration of a questionnaire (Appendix).



**Fig 1:** Map of survey area, Fishery Ghat, Chattogram

#### 3.2 Data Collection Methods

Data were collected from January 2023 to June 2023 where a total of 60 stakeholders were interviewed with a combination of field survey, questionnaire interviews and participatory rural appraisal (PRA) methods *viz.* focus group discussion (FGD). A total of 10 FGD sessions were conducted in the study areas where each group had 8 to 9 persons and duration of FGD was approximately two hours per session. Thereafter data were cross-checked with proper authorized personnel like Upazila Fisheries Officer (UFO) or, Manager of BFDC for the accuracy of collected primary data. Primary data were gathered by field survey at the fish markets and nearby communities. Data gathering techniques included a mix of interactive,

qualitative, and quantitative approaches according to method described earlier by Ahsan et al., (2016).

### **3.3 Preparation of Questionnaire**

The goals of the study were carefully taken into account when creating a painstakingly constructed semi-structured questionnaire to collect essential data. A thorough editing procedure was carried out before the final questionnaire was created. As a result, based on actual and practical experiences, some questionnaire sections were improved, rearranged, changed, and added to. At the end, a collection of items was enumerated and arranged coherently to understand the intended demographic's scenario.

### **3.4 Participatory Rural Appraisal (PRA)**

PRA refers to a group of techniques used to actively engage rural people in the information-gathering process. In compared to other techniques, Participatory Rural Appraisal's (PRA) ability to foster greater community involvement enhances the dependability and trustworthiness of the data gathered (Chambers, 1992; Kundhlande et al., 1995).

### **3.5 Personal Interview**

A series of personal interviews were conducted with various stakeholders involved in the fish marketing system, such as fishermen, bepari, and retailers. The purpose of these interviews was to collect firsthand information regarding their respective roles and responsibilities within the system. A questionnaire with a structured and semi-structured format was utilised to facilitate the interview process. Approximately 10 individuals were surveyed in order to gather insights and perspectives pertaining to the fish marketing process.

### **3.6 Focus Group Discussion (FGD)**

The utilization of focus group discussions (FGDs) was employed to gain a more comprehensive understanding of specific issues, including the examination of current marketing channels, price policies, limitations in fish marketing, and suggestions for the establishment of a sustainable fish marketing system.

### **3.7 Rapid Market Appraisal (RMA)**

The Rapid Market Appraisal (RMA) is a method that allows for the efficient collection of data pertaining to a specific commodity sub-sector, with the aim of providing information that is relevant to policy-making and intervention strategies (Holtzman, 2003). The most often used

approaches for resource management assessment (RMA) are semi-structured interviews with key informants, competent observers from a particular sub-sector, and a small group of participants from various phases of the commodity system.

### 3.8 Collecting Information



**Fig 2:** Information collected from fishermen



**Fig 3:** Information collected from Aratdar



**Fig 4:** Information collected from Bepari



**Fig 5:** Information collected from Paikar



**Fig 6:** Information collected from Retailer

### 3.9 Cross-Validation Analysis

Interviews with resource staff in the research region were undertaken in order to confirm the accuracy of the data acquired from the fishermen and intermediaries, such as the Karnafuli Upazilla Fisheries Officer (UFO), Department of the Fisheries (DOF), Chattogram and the Manager of the Bangladesh Fisheries Development Corporation (BFDC), Chattogram.



**Fig 7:** Visiting Karnafuli Upazilla



**Fig 8:** Visiting Department of the Fisheries, Chattogram



**Fig 9:** Visiting BFDC, Chattogram



**Fig 10:** Visiting FIQC, Chattogram

### 3.10 Data Processing and Analysis

Following the collection of data from the field, a thorough verification process was conducted to identify and rectify any errors or inconsistencies. The preliminary data sheets were cross-referenced with the original questionnaire and result sheets in order to verify the precision of the data entry. The data underwent processing and subsequent analysis utilizing the Microsoft Excell and SPSS software.



### 3.11 Calculation

$$\text{Total marketing margin (\%)} = \frac{\text{Total marketing margin}}{\text{Consumer purchase price}} * 100$$

Total marketing profit = Total marketing margin- Total marketing cost

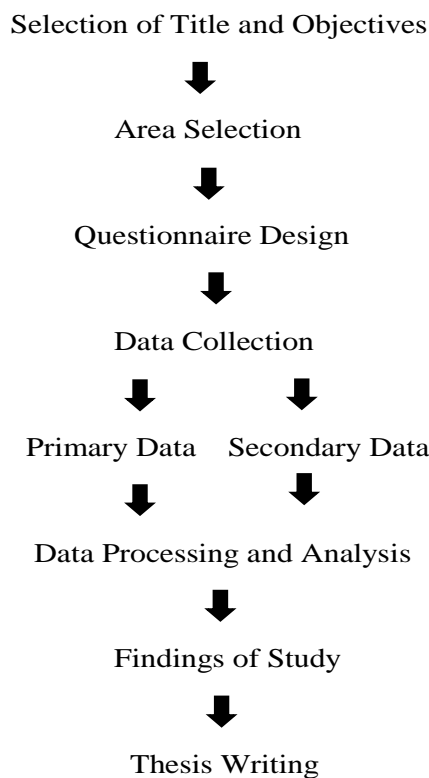
$$\text{Fishermen share in sales price (\%)} = \frac{\text{Purchase price}}{\text{Sales price}} * 100$$

$$\% \text{ of Consumer purchase Price} = \frac{\text{Purchase price}}{\text{Consumer purchase price}} * 100$$

### 3.12 Ethical Consideration

Prior to conducting the questionnaire survey, due consideration was given to obtaining participants' informed consent. Prior to commencing the survey, all participants were provided with information regarding the primary objective and potential advantages of the study. It obtained informed consent from all participants involved in this study, ensuring their voluntary participation. Furthermore, it rigorously upheld the principles of anonymity and confidentiality during each interview.

### 3.13 Overview of the Research Methodology



**Fig 11:** Overview of the Research Methodology

## CHAPTER IV

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## RESULTS

## CHAPTER IV

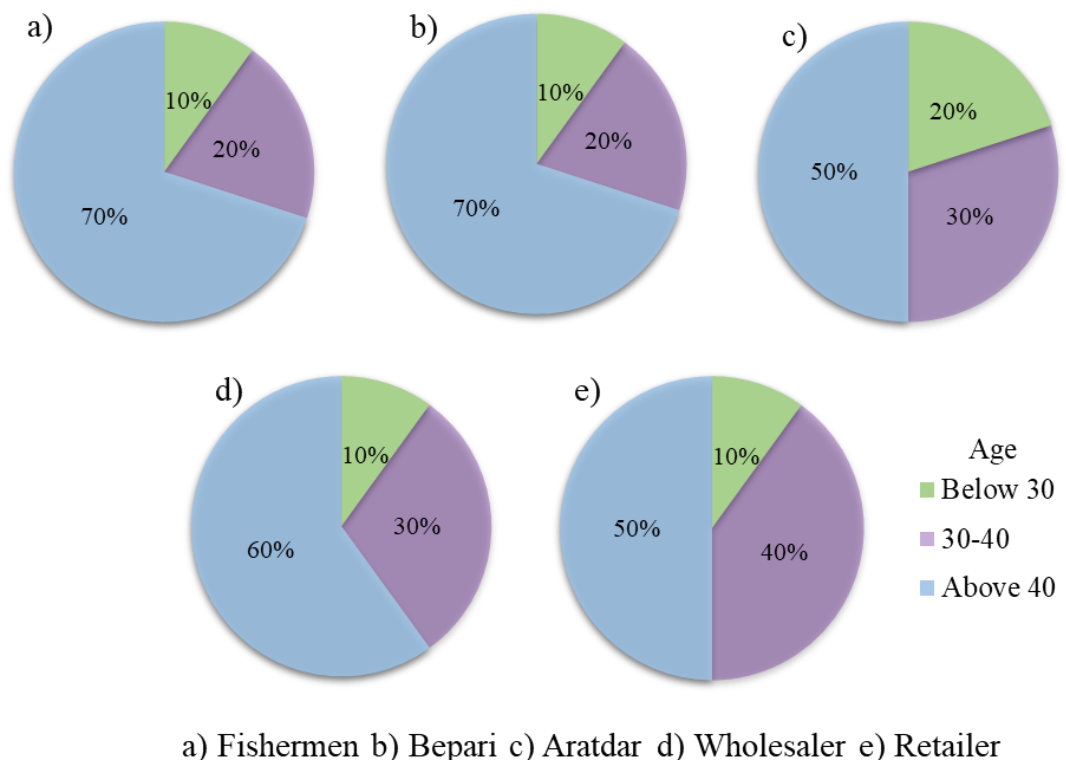
### RESULTS

#### PART-A

#### 4.1 Socio-economic Conditions of Different Stakeholders Involved in Fishing

##### 4.1.1 Age structure

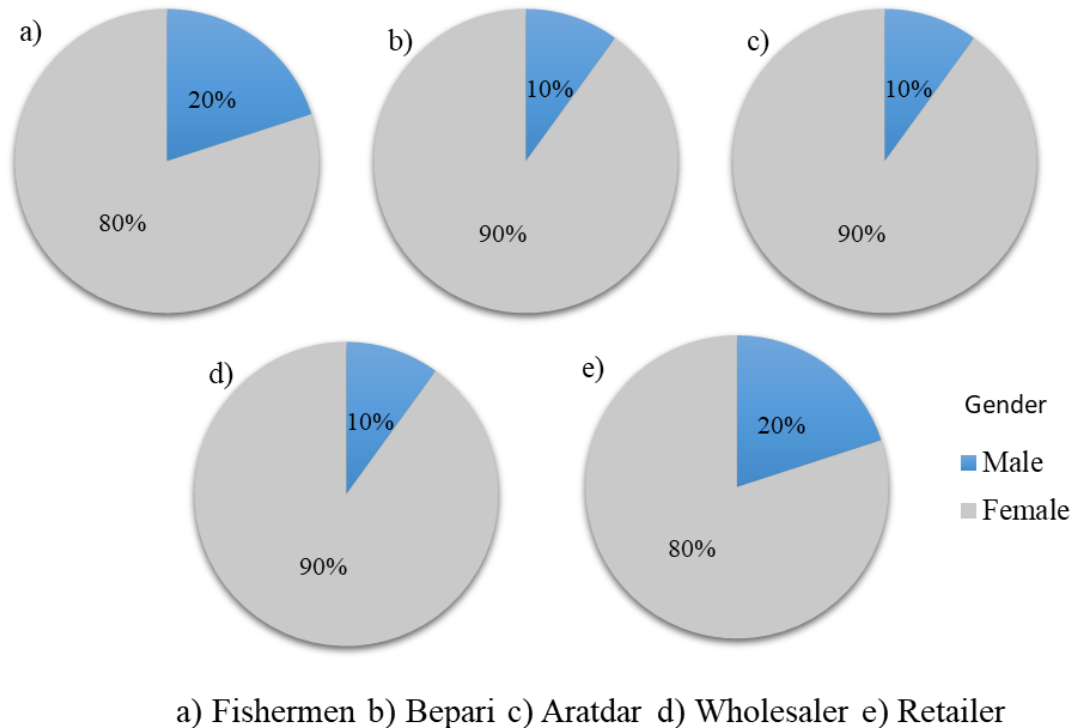
The survey findings provide insights into the demographic composition of stakeholders engaged in the fish marketing and broader value chain. Individuals are categorized into three distinct age cohorts: those below the age of 30, those between the ages of 30 and 40, and those above the age of 40. The presented pie chart depicts the distribution of age groups among various stakeholders, including fishermen, aratder, and bepari. Based on the research results, it is evident that a significant proportion of individuals engaged in fishing and the upper value chain are aged 40 and above. Specifically, the percentages for fishermen, beparis, aratders, and wholesalers, Retailers are 70%, 70%, 60%, and 50% respectively (Figure 12 ).



**Fig 12:** Age structure of different stakeholders

### 4.1.2 Gender group

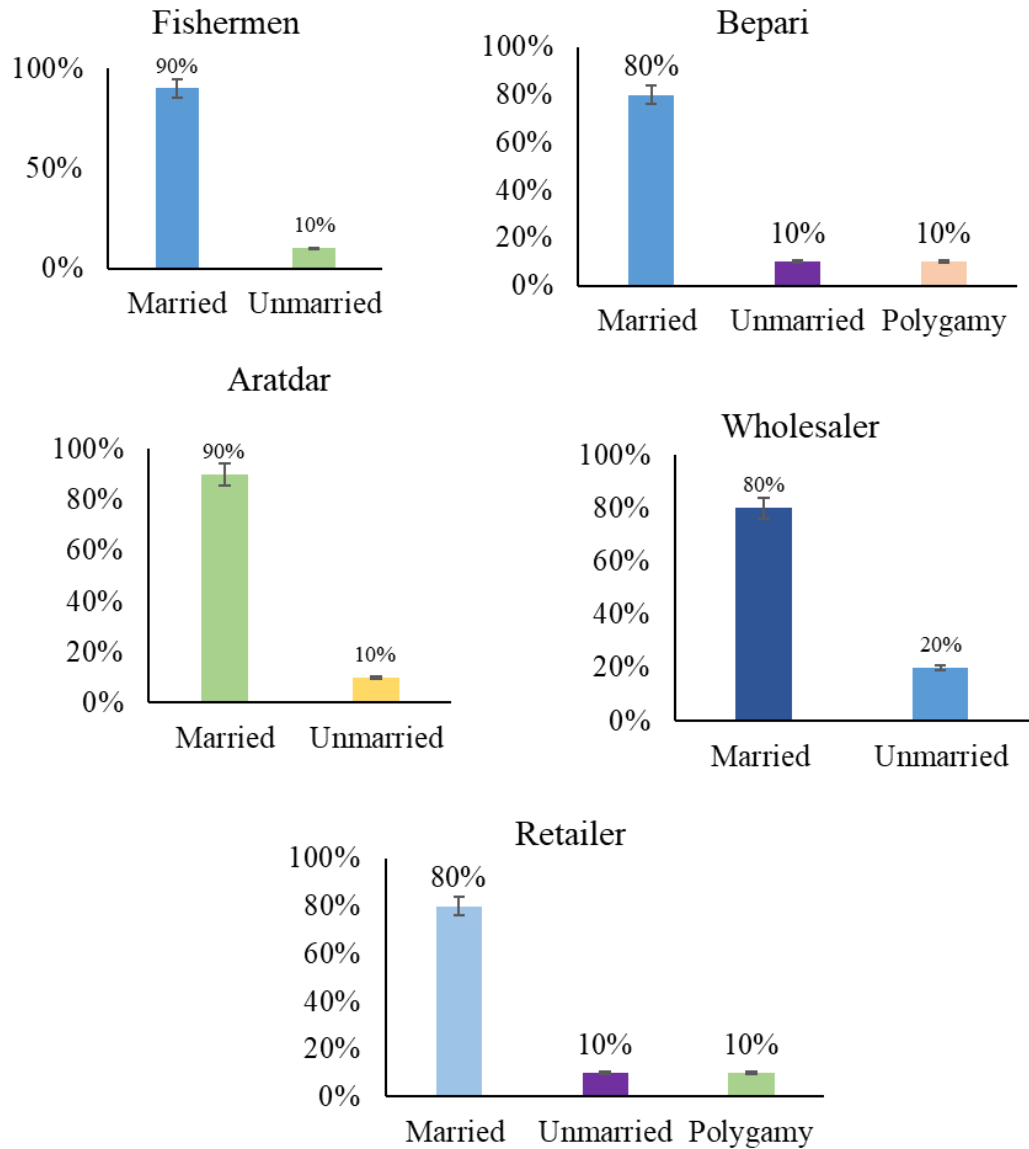
The survey specifies the gender of interviewers and stakeholders who participated. They are separated into male and female gender categories. Study areas are represented by pie charts that depict the gender distribution within each category. Male participation is greatly noticeable in every group (Figure 13). Fishermen and retailers have a 20% female presence, whereas wholesalers, beparis, and aratders have 80-90% female participation.



**Fig 13:** Gender group of different stakeholders

### 4.1.3 Marital status

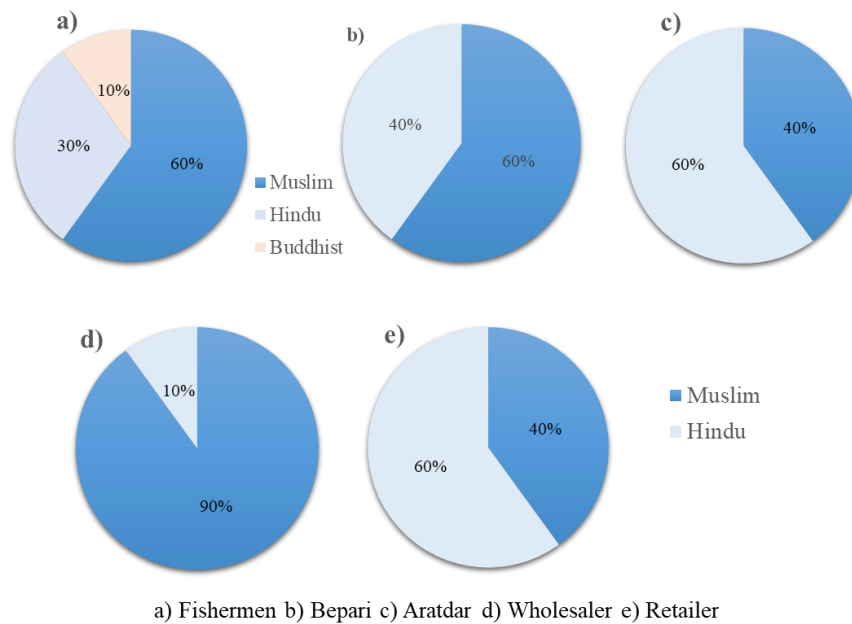
The subsequent bar charts depict the marital status of five distinct groups of stakeholders. The community is comprised of three distinct subgroups, namely married, unmarried, and polygamous individuals. The married group exhibits the highest numerical value among all five groupings and constitutes over 70% in each instance. The proportion of individuals who are unmarried is the second highest among the various communities, with wholesalers having the highest representation at 20%. Polygamy has been observed exclusively within the context of the retailer, constituting a mere 10 percent of the total cases respectively (Figure 14).



**Fig 14:** Marital status of different stakeholders

#### 4.1.4 Religion status

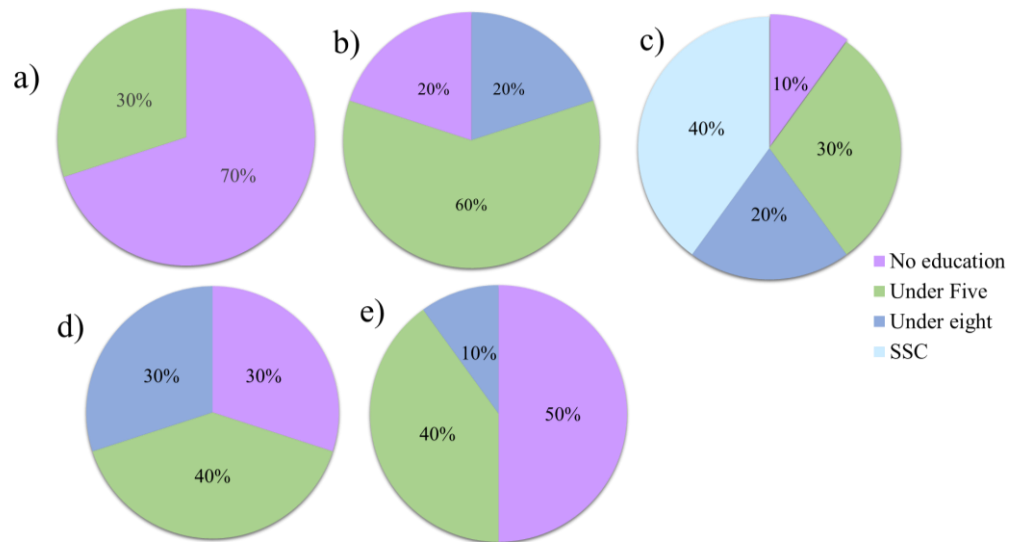
In the accompanying pie charts, various religious groups are represented by different sampling areas. This group contains four subgroups, including Muslims, Hindus, and Buddhists. Muslims are evident in each of the four groups, with the exception of the Retailer group, where 60% of the retailers were Hindu. Ninety percent of the wholesaler community is comprised of Muslims. Other groups such as fisherman, bepari, and aratder comprised 60%, 60%, and 80%, respectively (Figure 15).



**Fig 15:** Religion status of different stakeholders

#### 4.1.5 Educational status

The educational attainment of individuals has a significant impact on their preferences, behavioral tendencies, performance, skills, and capabilities. The literacy rates among fishermen were significantly deficient. The majority of individuals within the studied population exhibited a lack of literacy skills, while only a small subset of fishermen possessed educational attainment up to the primary level. Additionally, only a small number of people were permitted to sign their names and write their own names. The kids went to school until they reached the primary level, at which point they stopped going so they could focus on earning money. In order to assess the literacy levels of the five distinct groups, the educational backgrounds of the participants were classified into five distinct categories: (a) individuals who are unable to read or write; (b) those who have completed education up to grade five; (c) those who have completed education up to grade eight; (d) individuals who have completed secondary school certificate (S.S.C.); (e) individuals who have completed higher secondary education (HSC) or possess higher qualifications. The survey data indicated that 30% of the fishermen possessed an educational qualification below the fifth grade, while the majority of the remaining fishermen were predominantly characterized as illiterate. The literacy rate among retailers is also relatively low, standing at approximately 50 percent. When compared to other groups, wholesaler groups exhibited a higher level of education, with 30 percent having attained education up to the eighth grade. The percentages of individuals with formal education under class five were 30 percent for fishermen, 60 percent for beparis, 30 percent for aratders, and 40 percent for both wholesalers and retailers respectively (Figure 16).

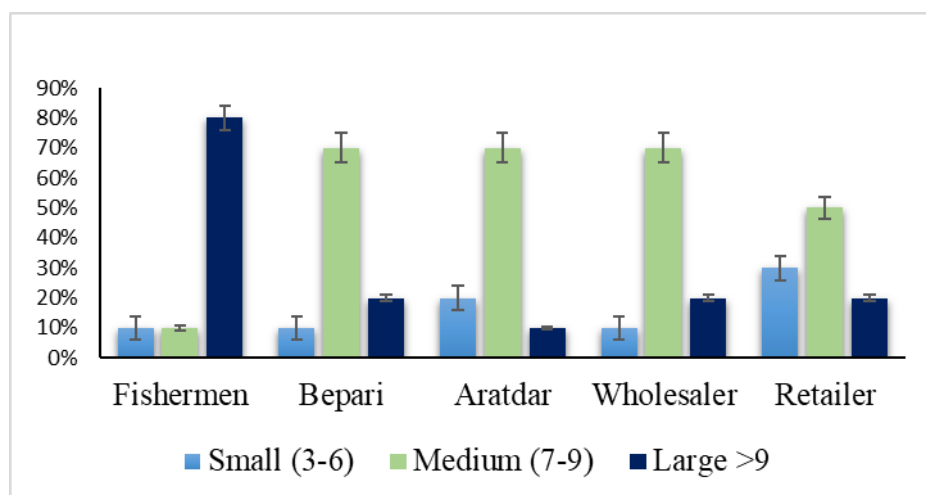


a) Fishermen b) Bepari c) Aratdar d) Wholesaler e) Retailer

**Fig 16:** Educational status of different stakeholders

#### 4.1.6 Family size

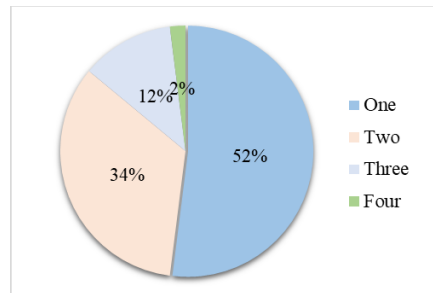
It has been found that the majority of families in the study area belong to the middle size family structure. Three categories were created: small (3–6), medium (7-9), and large (>9). According to the data, fishing households have over 80% more members than other categories. The majority of the other participants were medium-sized families with 7-9 people respectively (Figure 17).



**Fig 17:** Family size of different stakeholders

#### 4.1.7 Earning family members

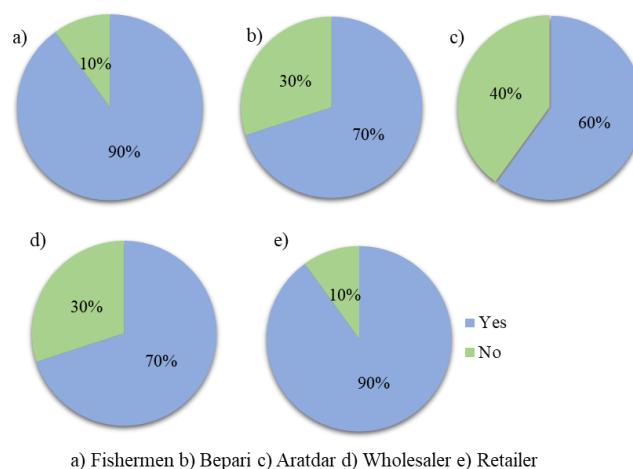
Out of the total sample size of 50 participants, the majority (52%) reported having a single economically active member in their household, while the second largest proportion (34%) indicated that their household had two economically earning members and three economically active member were 12% among them. The bottom 2% of the population had more than three individuals contributing to their household income respectively (Figure 18).



**Fig 18:** Earning family members of different stakeholders

#### 4.1.8 Borrowing money during ban period

For running business and livelihood, fisherman and other stakeholders needs to borrow money from different sources. Fisherman and retailer mostly face the most financial challenge during the ban period. To bear their livelihood, they frequently take loan. Survey suggests that both fisherman and retailer give 90% positive answer that they need to take loan during the ban period. On the other hand, aratders are taking lowest amount of loan during the ban period which is around 60% percent. Both wholesaler and bepari has 70 percent rate in case of taking loan during the ban period respectively (Figure 19).

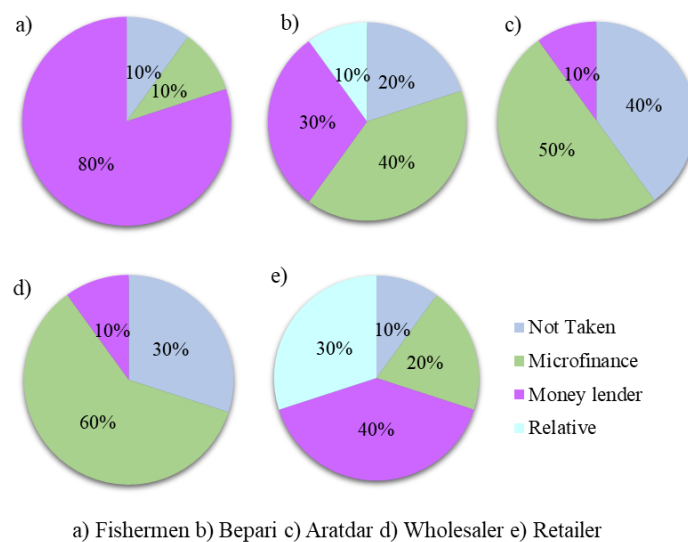


**Fig 19:** Borrowing money of different stakeholders



#### 4.1.9 Source of loans

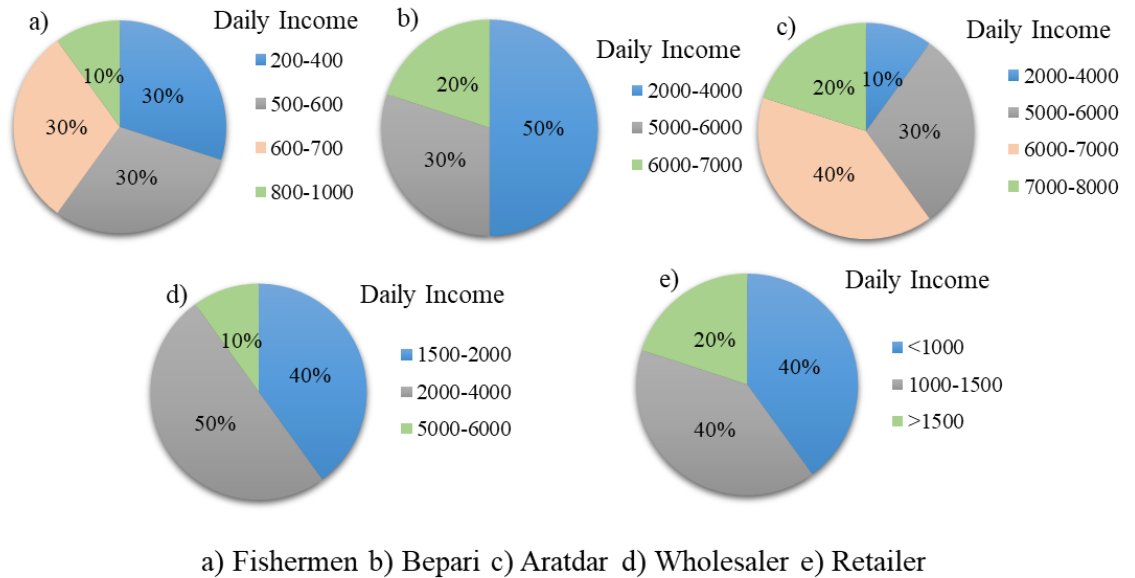
Fishing and fish business personals take loans from different sources. This study showed that mostly take loan from money landers (Mohajon). This may because of flexibility, quick access and easy hassle-free process of loan taking. That's why this study showed that fisherman take loan 80% from money landers (mohajon) which were 30%, 10%, 60% and 40% for bepari, aratder, wholesaler and retailers respectively. Other main sources are microfinance companies and relatives from where stakeholders generally take loan. Incase of bepari and aratder, it encompasses 40% and 50% respectively (Figure 20).



**Fig 20:** Loan taken of different stakeholdes

#### 4.1.10 Daily income

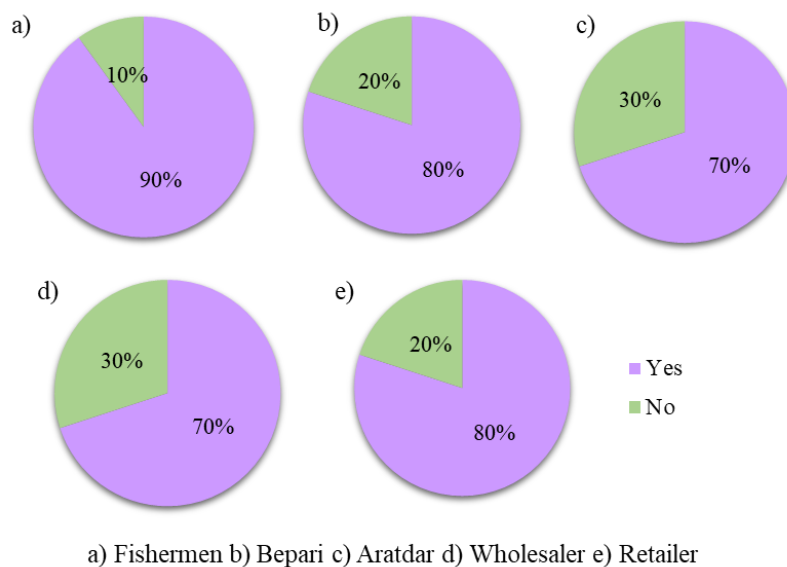
Daily incomes vary from one group to another, fisherman incomes range generally in-between 200-1000 and it depends on directly fish catch. Bepari's income ranges from 2000-7000 where majority belongs to the range of 2000-4000 BDT (50%). Aratdar's income ranges from 2000-8000 where majority belongs to the range of 6000-7000 BDT (40%). Same percentage of wholesaler belong to 2000-4000 daily income. Only 20% of the retailer daily income was above 1500 BDT. Their most of the income was vary from 1000 BDT to 1500 BDT respectively (Figure 21).



**Fig 21:** Daily income of different stakeholders

**4.1.11 Effect of fishing ban on the livelihood of stakeholders**

For the protection and production increase of important species, government imposes ban in different times around the years. Duration of those bans are generally 2-3 months. In the ban period fisherman become temporarily unemployed which direct impact their lifestyle. This study showed that almost all the groups have been affected by this ban period. More than 70% cases stakeholders said that they are facing financial crisis. Fisherman showed most vulnerability for ban period respectively (Figure 22).



**Fig 22 :** Effect of fishing ban on the livelihood of stakeholders

## Part- B

### 4.2 Activities of Different Stakeholders Involved in Fishing

#### 4.2.1 Major fish and shrimp species caught by fishermen

Most of the fishermen catch fish from Karnafuli River and the Bay of Bengal. They mainly catch marine fishes such as Silver pomfret, Bomby duck, koral, Red Koral, Ribbon fish, Kamila, Lal poa, Paishsha, Hangor, Baila etc. (Following the table 1).

Table 1: List of major marine fish and shrimp caught by fishermen

Sl. no.	Local name	Scientific name	Common name	Monson	Winter
1	Coral, Vetki	<i>Lates calcarifer</i>	Sea bass, Barramundi	C	A
2	Baila, Chewabele	<i>Apocryptes bato</i>	Gobi mudskipper	F	C
3	Ilish	<i>Tenualosa ilisha</i>	Hilsa shad, Hilsa	C	C
4	Kamila	<i>Congresox talabonoides</i>	Indian pike conger	F	C
5	Lakkha	<i>Leptomelanosoma indicum</i>	Indian threadfin	C	A
6	Lalpoa/ Vola fish	<i>Pennahia argentata</i>	Malabar red snapper	C	A
7	Loitta	<i>Harpadon nehereus</i>	Bomby duck	C	A
8	Phasa/Modup hasa	<i>Setipinna phasa</i>	Scalyhairfin, anchovy	C	A
9	Poa, Jewfish	<i>Panna microdon</i>	Panna Croaker	C	A
10	Rupchanda	<i>Stromateus chinensis</i>	Silver pomfret	C	A
11	Saplapata	<i>Dasyatis zugei</i>	Pale-edged Stingray	C	A
12	Surma	<i>Auxis thazard</i>	Frigate tuna	C	A
13	Nunabaila	<i>Acentrogobius cyanomos</i>	Gobi	C	A
14	Maittya	<i>Scomberoides guttatus</i>	Indo-Pacific king mackerel	C	A
15	Kukurjeeb	<i>Plagusia blochii</i>	Tongue sole	C	A
16	Bagda chingri	<i>Penaeus monodon</i>	Giant tiger shrimp	A	A
17	Harina Chingri	<i>Metapenaeus monoceros</i>	Brown Shrimp	A	C
18	Honni chingri	<i>Metapenaeus brevicornis</i>	Yellow shrimp	C	F
19	Karnafuli chingri	<i>Palaemon karnafuliensis</i>	Karnafuli shrimp	C	F
20	Sada icha	<i>Penaeus semisulcatus</i>	Green tiger prawn	A	A

\*Here: Abundant (A) – a lot of or plenty, Common (C) - frequently available, Few (F) -present but not frequently available

#### 4.2.2 Commonly used fishing nets

##### a) Marine Set Bag Nets (MSBNs):

Marine Set Bag Nets (MSBNs) are utilized in deeper aquatic environments. The nets in the region were commonly known as Behundi Jal. The dimensions of these objects ranged from 8 to 40 meters in length, 5 to 30 meters for the opening mouth, and 12 to 25 millimeters for the cod end mesh. Both mechanized and non-mechanized crafts utilize Microbial Synthetic Biology Networks (MSBNs). Smaller nets were employed in non-mechanized boats, while larger nets were utilized in mechanized boats. The captured fish and prawn species predominantly consisted of pre-adults and adults, as observed by MSBN. Various species of animals, including Loitya (Bombay duck), Chingri (Shrimp), and Poa Mach (Goatee Croaker), were captured using fishing nets.

##### b) Trammel Net:

The trammel net, also known as the three-layered pocket net, was referred to by various names. Trammel nets were a type of gill nets that consisted of three panels, with a bottom-set configuration. These nets were characterized by an outer and inner loose panel, each with a specific mesh size. The outer panel had a mesh size of 265 mm, while the inner panel had a mesh size of 2.25 m (equivalent to 50 mm). The nets were operated by means of a manually operated, unmechanized, open wooden dinghy boat measuring approximately 8 to 10 meters in length. Trammel nets, which are specialized bottom gill nets, were deployed to the ocean floor through the utilization of sinks and floats. In the sampling regions of Chattogram Fishery Ghat, two primary categories of trammel nets were predominantly observed. The individuals in question were referred to as Tong Jal and Pondora Jal, respectively.

##### c) Cast net (Jhaki jal):

Cast nets are utilized from terrestrial locations in order to capture aquatic organisms in remote water regions. The apex of the conical net is fastened using a robust rope. Multiple iron or lead weights are affixed to the periphery. With one hand grasping the rope, the fisherman delicately casts the net onto the water, causing it to settle completely taut on the surface. As a result of the weights affixed to the margin, the net descends gradually towards the ocean floor, concurrently becoming entangled with diverse marine species, such as juvenile seabass and prawn. The net is manipulated through the utilization of a rope.

##### d) Koral jal (Gill net):

In order to capture seabass, fishermen residing in the Chattogram Fishery Ghat region have devised a modified variant of the extensive meshed gill net, known as the Koral jal. A mesh

aperture is strategically positioned in a linear arrangement along the vertical surface of the net, with the purpose of ensnaring fully grown seabass. Long nets are composed of various interconnected components. The attachment of floats and sinkers is facilitated through the utilization of plastic ropes, which serve the dual purpose of functioning as head ropes and providing weight.

**e) Behundi jal (Set bag net):**

A behundi jal, also known as a set bag net, is a conically shaped net with two extensions. Historically, the net has been constructed using knotted nylon ropes. The opening of the fishing net is expanded and secured to the water current through the utilisation of materials such as iron, wood, or bamboo. The fish are confined within the central pouch of the net.

**f) Thella jal (Push net):**

The Thella jal, commonly referred to as the Push net or Fenni jal, is a type of bamboo net characterised by a relatively small mesh size and a triangular frame. Lagoons and the shallow peripheries of floodplains are the primary areas where this technique is commonly utilised. The object is extracted from the aquatic environment subsequent to its submersion. Prawns, small fish, and fish fry are captured using a net constructed with mosquito netting material.

**g) Tana Ber jal (Shore Seine net):**

In coastal or beach environments, a type of seine net called a "ber jal" is commonly employed. The ber jal is characterised by its fine mesh structure. Once the net has been fully deployed to enclose the entirety of the water body, the fish are subsequently captured by raising the ground rope from the central area of the water.

**h) Ilish jal :**

The principal species that was caught, the hilsha fish, gave rise to the name of the specific kind of net known as Ilish Jal. Cotton twine was used to create the net. This net was enormous, both in length and in width. The net varies in length from 1250 to 2500 metres. It varied in width between 10 and 25metres. The net's mesh size was smaller than Vasha jal and Tonne Jal. medium, ranging from 3 to 3.5 inches. Each net required seven to ten fisherman to run it.

**i) Vasha Jal:**

The Vasha Jal is a rectangular net (*Tenualosa ilisha*) mostly used to catch Hilsha Shad. The net was made of white cotton thread, had a mesh size of 4-4.5, and was 20–25 metres in width. This net is 42–45 metres long. It took five to six men to handle this net. The great majority of relatively small vessels employ this net. Along with Hilsha fish, other species including

Croakers and Pomfrets were also caught in the net. Seven to ten fishermen were needed to operate each net.

#### j) Lakkha Jal:

The main species Lakhua that was caught served as the inspiration for the name Lakkha Jal. Cotton thread measuring 60 inches long was used to make the net. The length of the net was 5000 metres, and its width was 12 metres. The mesh ranged in size from 12 to 16 inches. The capture ranged from 8 to 10 tonnes for the smallest catch to 30 to 100 tonnes for the greatest. For around five to six hours, the net was let to drift in the open water. The carrying of the net requires more than ten hours even though the placing only takes an hour. To cast and haul the net, 20 to 22 men were required. Along with the Lakhua, other animals of every kind were also caught in the net.

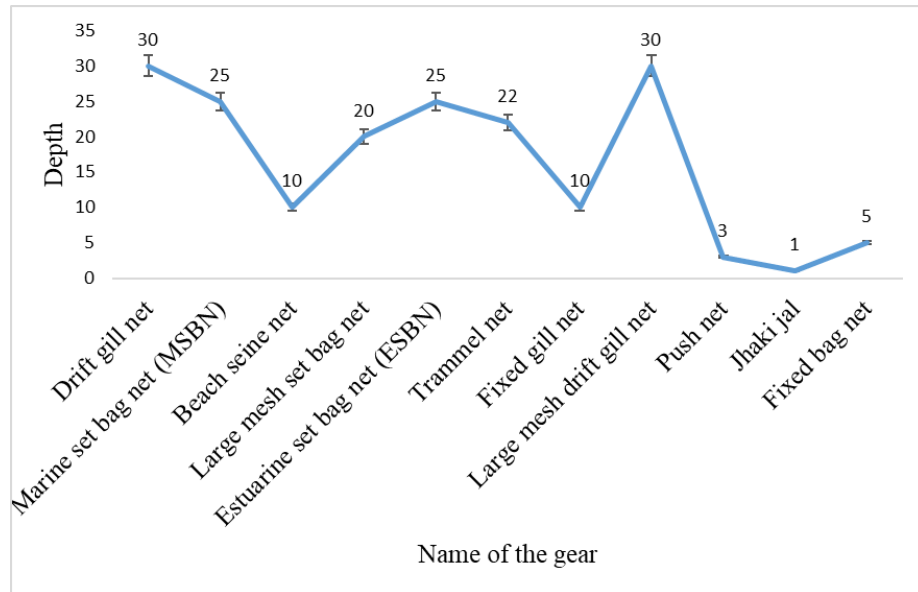
Table 2: Seasonality map of different nets

	J	F	M	A	M	J	J	A	S	O	N	D
Illish Jal			■	■			■	■	■	■	■	
Lakkha Jal							■	■	■			
Lal Jal	■	■	■	■						■	■	■
Behundi Jal		■	■	■		■	■	■	■	■	■	
Char Suta Jal	■	■	■	■			■	■	■	■	■	■
Hangor Jal	■	■	■	■			■	■				
Ton Jal	■	■	■	■		■						
Moda Jal					■		■	■	■	■	■	
Vasha Jal					■		■	■	■	■	■	
Current Jal	■	■	■	■	■		■	■				

#### 4.2.3 Uses of fishing gears across different depth of operation

This study found that most frequently used fishing nets are Drift gill net, Marine set bag net (MSBN), Beach seine net, large mesh set bag net, Estuarine set bag net (ESBN), Trammel net, Fixed gill net, large mesh drift gill net, Push net, Jhaki jal and Fixed bag net. Our survey result found that these nets are generally operated in the depth of 30-meter, 25-meter, 10-meter, 20

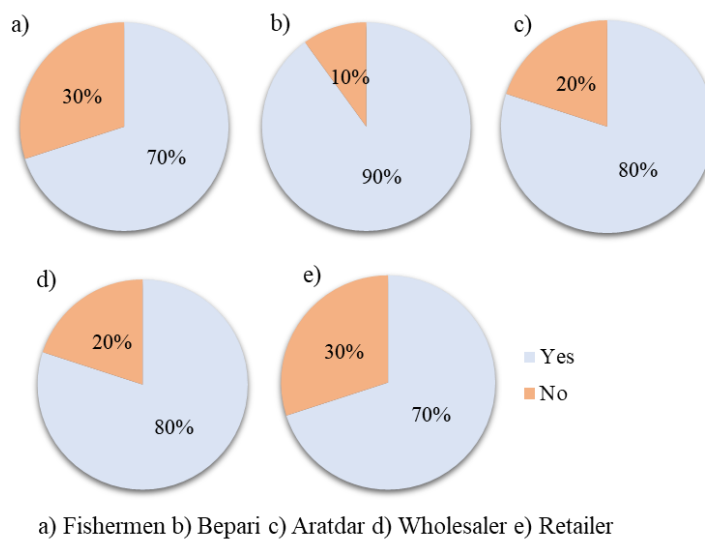
meter, 25-meter, 22 meter, 10-meter, 30-meter, 3-meter, 1 meter, and 5 meters respectively (Figure 25).



**Fig 23:** Uses of fishing gears across different depth of operation

#### 4.2.4 Sorting

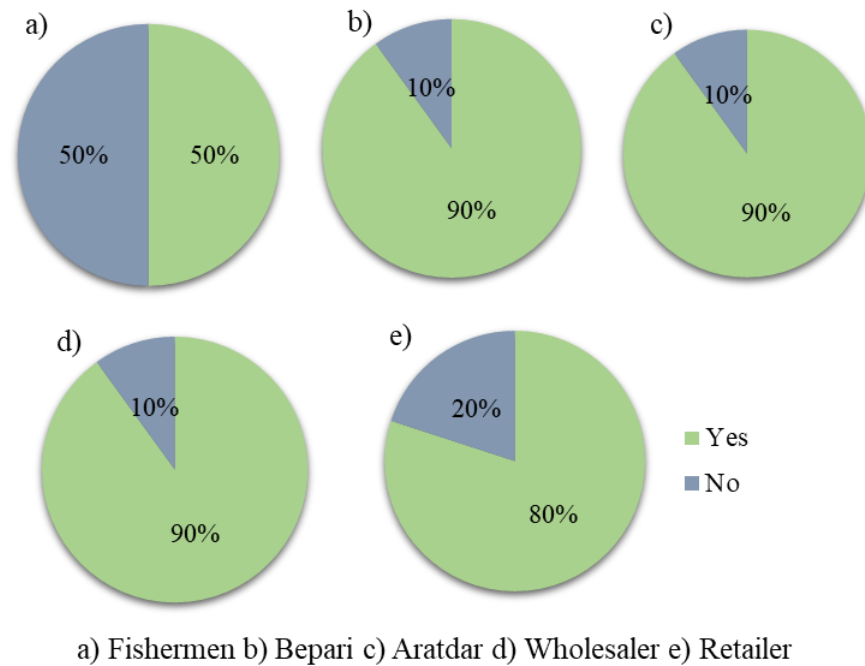
During fish storage and transporting, sorting works as a vital part for fish quality maintain and business sustainability. From this survey, it found that most fisherman and retailer didn't take part in sorting (almost 70%). Bepari, Aratdar and wholesaler were the main participant in case of sorting. Bepari took 90% case sorting where as wholesaler 80%, Aratdar 80% and Retailer 70% respectively (Figure 24).



**Fig 24:** Fish sorting of different stakeholders

### 4.2.5 Icing

Icing is very important for fish preservation and saving from quality deterioration. Local landing center and fish markets have ice factory and ice machine for ice supplying . This research showed that all the stakeholders need icing facilities. Fisherman used 50% case icing , Bepari, aratder, and wholesaler were 90% for icing respectively (Figure 25).



**Fig 25:** Fish icing of different stakeholders



## **Part –C**

### **4.3 Marketing Channel and Value Chain Analysis of Some Major Marine Fishes at Fishery Ghat, Chattogram**

#### **4.3.1 Marketing system of marine fish**

The marketing system runs through a set of middlemen who perform real-world business duties along a supply chain from the producers to the final consumers. The three primary categories of fish businesses are fish suppliers (beparies), fish brokers (aratdars), and fish merchants. that comprise the fish marketing system as a whole. fishermen who arrive with their catch Fish are only available in Beparies (also known locally as "Forsay") from haul. Aratdars are seen in small numbers at district (or expanded) markets and in large numbers in big cities, such as Dhaka, and frequently buy their items from beparies. Then, at the landing locations, fish merchants purchase their products from an aratdar, a bepari, or, if it is more convenient, straight from the producer. The entire marketing function for the fishing sector is carried out through these kinds of intermediaries. In this network of commercial ties that links fish growers with fish consumers, the private sector handles more than 95% of the fish produced in the country.

The marketing channel is the network of middlemen that harvested fish travels through on its way from farmers to customers. This channel could be short or long, depending on the kind and calibre of fish advertised, the accessibility of marketing services, and the present social and physical environment. To determine the main species and the marketing channels used for marine fish, the subjects for the current study were those that make up more than 90% of the marketed marine fish. Fish was considered for both home and foreign markets, both frozen and dried. In the research regions, it has been shown that sellers of various categories participate in the marketing channels for marine fishes as well as the distribution networks for frozen and dried fish. arket participants include producers (fishermen), beparies, aratdars, merchants, processing facilities, and export companies.

#### **a) Producers**

At the Fishery Ghats or fish landing places, the fish producers in Chattogram frequently sell their catch directly from the boats. Only a small number of fish producers have the necessary boats and catches to transport their fish to wholesale marketplaces (arat) in the town or district markets. Occasionally, during the busiest season, the producers travel to district markets to sell their fish for a higher price. The bulk of producers normally sell their commodities to beparies at landing points and, to a lesser extent, through inter-district aratdars, processing facilities, and agencies.

**b) Beparies**

Aratdars or commission brokers help professional marine fish dealers known as beparies sell their consignments to retailers after purchasing fish from producers. They frequently purchase fish from farmers at landing locations, then transport their products to other arats centres for sale. Over 70% and 52% of the produced dry and frozen fish, respectively, are managed by beparies. They are arranged well. In each inter-district wholesale market, there are normally 10 to 40 parties of these beparies, each having 12 to 20 individuals. They have in-depth understanding of fish marketing and are seasoned businesspeople. The majority of enterprises engage in fish marketing operations using temporary labour. When beparies purchase fish from landing hubs or fishery ghats, they sell it through aratdars and pay auditors a commission of 3–5% in exchange.

**c) Aratdars**

The aratdar is a commission representative that helps beparies sell their products while working from a fixed location. He or she usually levies a fixed fee of 30 to 40 taka for every \$1,000 in sales revenue. Due to the fee that is taken from sales proceeds, an aratdar strives to sell fish at higher rates. There are 20 to 35 aratdars in various district headquarters. In addition to providing short-term storage options, they rate products. They pay brokers in cash and frequently provide merchants access to fish on credit. Aratdars don't divide any commissions from brokers or sellers. They hire people who are paid a salary or an hourly wage to perform duties like loading, unloading, weighing, grading, etc. They handle fish more frequently than beparies do. The aratdars frequently give beparies loans in exchange for them selling fish on their behalf.

When a bepari accepts payments from multiple aratdars, he splits the proceeds from the sale of his product and employs additional aratdars to sell it. According to beparies and aratdars, almost 70% of marine fish produced is sold at auction through these organisations. Several aratdars in landing stations purchase fish directly from producers that may be exported. The most significant component of aratdars' business is that they facilitate fish sales by collecting commissions rather than actually purchasing it. Kleih et al., (2003) found 24 aratdars earning 2% commission from the Beparies in the Asadganj dry fish market. A licence is necessary for Aratdars to operate legally.

**d) Retailers**

The store is the last link in the chain of marine fish marketing. They occasionally pay cash, but they usually buy fish from the aratdars on credit, and then they sell it to the clients. The consumer purchases fish from the fish merchant, who obtains it from beparies and aratdars.

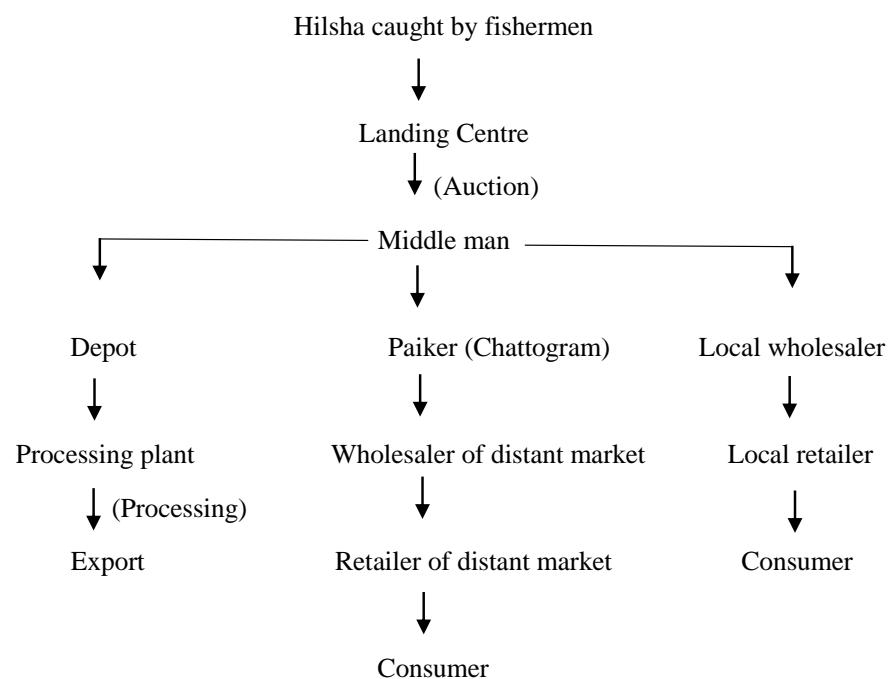
### 4.3.2 Marketing channel for some major marine fishes

The study identified three distinct tiers within the fish trade distribution channel, namely primary, secondary/higher secondary, and final consuming markets. The primary market served as the focal point within the landing area. The secondary market, also known as the higher secondary market, refers to a designated location where collectors transport fish acquired from the primary market to the nearest market. Fish were distributed to consumers in the final market through retailers. Some marketing chain of fishes from this Fishery Ghat Market are given major four below:

#### 4.3.2.1 Hilsha (Ilish)

Scientific name: *Tenualosa Ilisha*

For the marketing and distribution of hilsha, three marketing channels were found. The hilsha fish is moved along the marketing chain from the fishermen to the export market via a number of middlemen, such as the landing centre, depot, and processing facility. The hilsha fish is moved from the fishermen to the distant consumers in the second stage of the marketing chain via a number of middlemen, including landing centres, distant paikers, distant wholesalers, and distant retailers. The hilsha fish is conveyed to local consumers in the third stage of the marketing chain through a sequential procedure involving local fishermen, wholesalers, and retailers respectively (Figure 26).

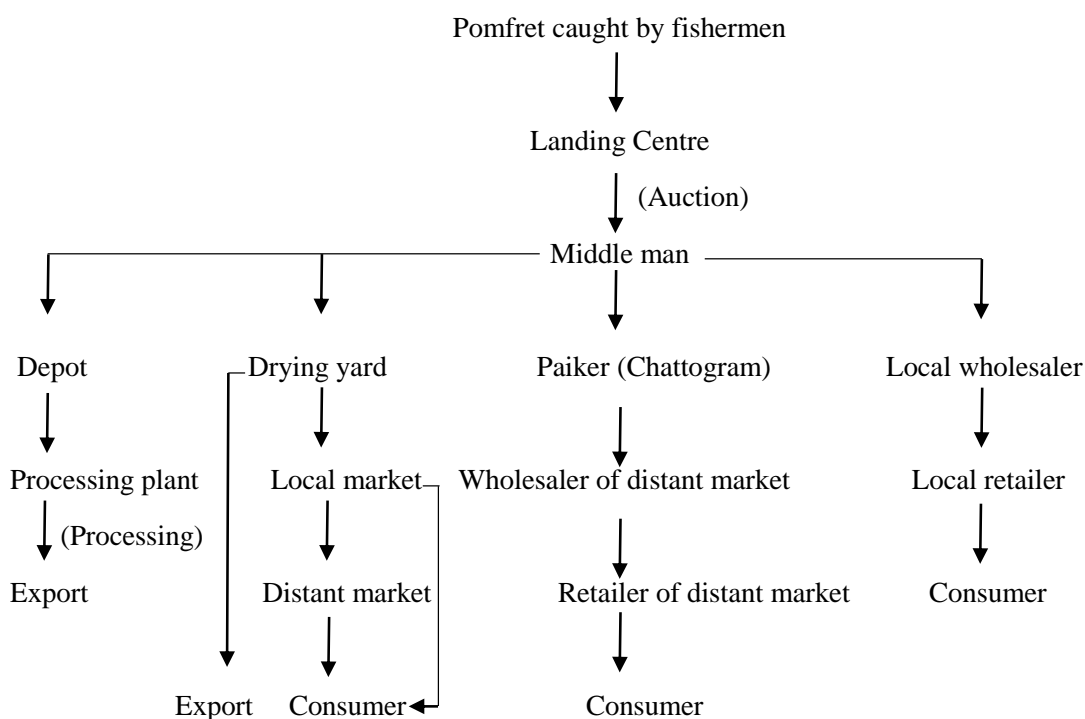


**Fig 26:** Marketing channel of Hilsha (Ilish)

#### 4.3.2.2 Silver pomfret (Rupchada)

Scientific name: *Stromateus chinensis*

For the marketing of Silver pomfret fish, a total of four marketing chains were found. The pomfret fish travels through a number of phases in the marketing chain from the fishermen to the export market, including the landing centre, depot, and processing factory. Pomfret fish underwent a drying process in the second stage of the marketing chain before being sold to the final consumer via the local market, distant market, and export market. The pomfret fish is moved through a number of middlemen in the third marketing chain, including the landing centre, distant paker, distant wholesaler, and distant retailer, to get from the fishermen to the distant consumer. The pomfret fish is distributed to consumers by a number of middlemen in the fourth marketing chain, starting with the fishermen and moving through regional wholesalers and local merchants respectively (Figure 27).



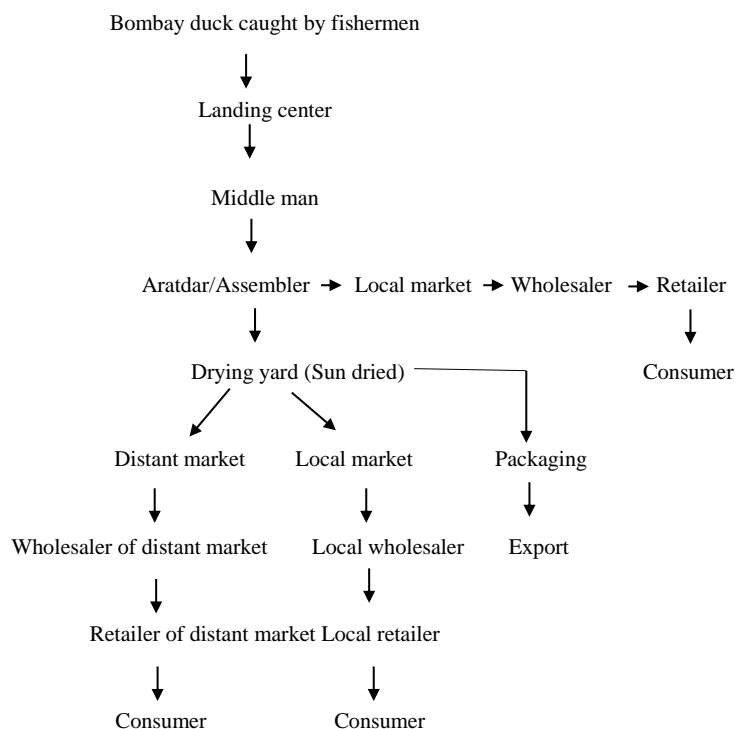
**Fig 27:** Marketing channel of Silver pomfret (Rupchada)

#### 4.3.2.3 Bombay duck (Loitta)

Scientific name: *Harpadon nehereus*

For the marketing of Bombay duck, numerous marketing channels were found. Through a network of middlemen, including fishermen, aratdar, local marketplaces, local wholesalers, and local merchants, Bombay duck was originally distributed to local consumers. With the use of a

middleman or aratdar/assembler, Bombay duck was moved from fishermen to a drying yard in the second selling chain. Dried Bombay duck was then sold to far-off customers by far-off wholesalers and retailers after leaving the drying yard. The dried Bombay duck was distributed to local consumers through local wholesalers and shops in the third marketing chain. Last but not least, from the drying yard, dried Bombay duck was immediately exported to the global market in the fourth marketing chain respectively (Figure 28).



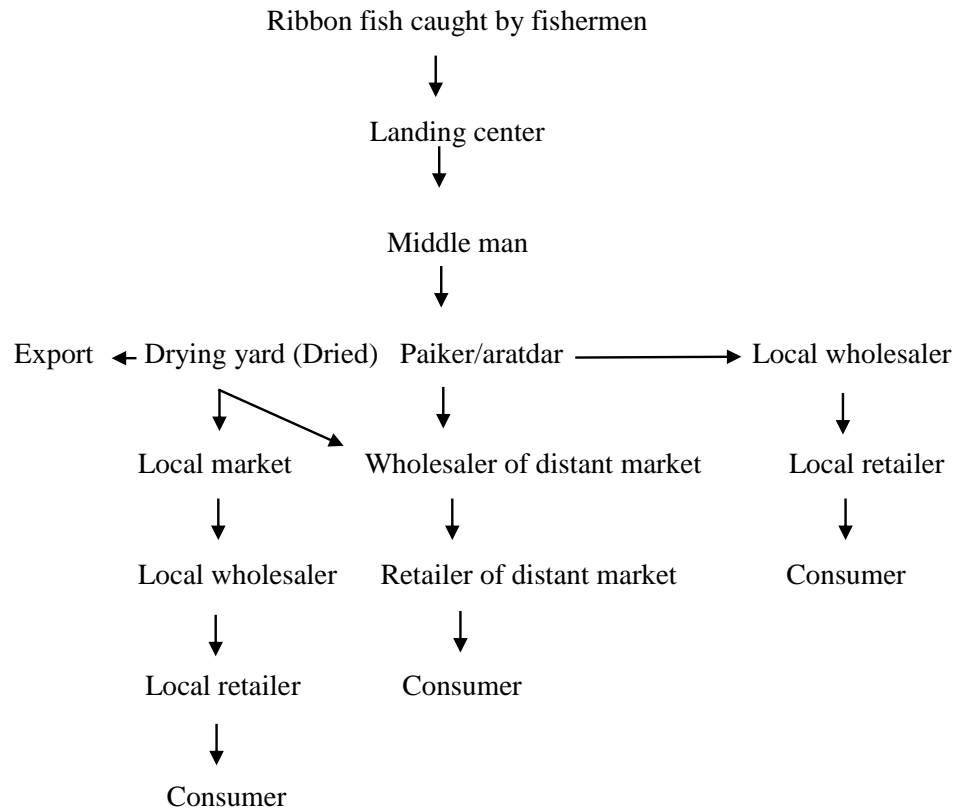
**Fig 28:** Marketing channel of Bombay duck (Loitta)

#### 4.3.2.4 Ribbon fish (Churi)

Scientific name: *Trichiurus haumela*

In the marketing of ribbon fish, various market channels were found. Ribbon fish is moved around the supply chain from fishermen to the drying yard by means of middlemen or aratdars/assemblers. The local customer, local wholesaler, and local retailer all received the dried ribbon fish that was collected from the drying yard. Through middlemen like distant wholesalers and retailers, dried ribbon fish is moved from the drying yard to the distant consumer in the second stage of the marketing chain. The dried ribbon fish is sent straight from the drying yard to the export market in the context of marketing chain III. In the fourth marketing chain, ribbon fish is delivered from fishermen to far-off consumers via a number of middlemen, including landing centres, paikers/aratdars, wholesalers in far-off markets, and

retailers in far-off markets. Ribbon fish is distributed to local consumers through a number of middlemen in the marketing chain V, including local wholesalers, local shops, local markets, and local fishermen respectively (Figure 29).



**Fig 29:** Marketing channel of Ribbon fish (Churi)

### 4.3.3 Marketing margin and profit of some major marine fishes

#### 4.3.3.1 Hilsha (Ilish)

Scientific name: *Tenualosa Ilisha*

The total marketing margin for each kilogram of Hilsha (Ilish) amounted to BDT 210, representing 22% of the consumer purchase price of BDT 950. This margin was distributed across the primary, secondary, and consumer markets, accounting for 6%, 8%, and 8% respectively. The cumulative total marketing profit amounted to BDT 140, with BDT 40, BDT 55, and BDT 45 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 78%, 84%, and 92% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 93%, 85% and 78% for the primary, secondary, and consumer markets, respectively (Table 3).

Table 3. Marketing margin and profit of different stakeholders involved in marketing of Hilsha (Ilish) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
Primary market	Purchase price (PP)	740	78%		
	Marketing cost (MC)	15			
	Sales price (SP)	795		84-78= 6%	93 %
	Marketing margin (MM=SP-PP)	55			
	Marketing profit (MP=MM-MC)	40			
Secondary market	Purchase price (PP)	795	84%		
	Marketing cost (MC)	25		92-84= 8%	
	Sales price (SP)	875			85 %
	Marketing margin (MM=SP-PP)	80			
	Marketing profit (MP=MM-MC)	55			
Consumer market	Purchase price (PP)	875	92 %		
	Marketing cost (MC)	30			
	Sales price (SP)	950		100-92=8 %	78 %
	Marketing margin (MM=SP-PP)	75			
	Marketing profit (MP=MM-MC)	45			
<b>Consumer purchase price</b>		<b>950</b>	<b>100%</b>		
<b>Total marketing margin: 55+80+75=210 (22 %)</b>					
<b>Total marketing profit: (40+55+45) = 140 BDT / Kg</b>					

### 4.3.3.2 Silver pomfret (Rupchada)

Scientific name: *Stromateus chinensis*

The total marketing margin for each kilogram of Silver pomfret (Rupchada) amounted to BDT 180, representing 26% of the consumer purchase price of BDT 700. This margin was distributed across the primary, secondary, and consumer markets, accounting for 5%, 11%, and 10% respectively. The cumulative total marketing profit amounted to BDT 120, with BDT 20, BDT 50, and BDT 50 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 74%, 79%, and 90% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 95%, 83% and 74% for the primary, secondary, and consumer markets, respectively (Table 4).

Table 4. Marketing margin and profit of different stakeholders involved in marketing of Silver pomfret (Rupchada) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	520	74 %		
	Marketing cost (MC)	10		79 -74= 5%	
	Sales price (SP)	550			95 %
	Marketing margin (MM=SP-PP)	30			
	Marketing profit (MP=MM-MC)	20			
<b>Secondary market</b>	Purchase price (PP)	550	79 %		
	Marketing cost (MC)	30			
	Sales price (SP)	630		90- 79= 11%	83 %
	Marketing margin (MM=SP-PP)	80			
	Marketing profit (MP=MM-MC)	50			
<b>Consumer market</b>	Purchase price (PP)	630	90 %		
	Marketing cost (MC)	20			74 %
	Sales price (SP)	700		100-90=10 %	
	Marketing margin (MM=SP-PP)	70			
	Marketing profit (MP=MM-MC)	50			
<b>Consumer purchase price</b>		<b>700</b>	<b>100%</b>		
<b>Total marketing margin: 30+80+70=180 (26 %)</b>					
<b>Total marketing profit: (20+50+50) = 120 BDT / Kg</b>					



### 4.3.3.3 Ribbon fish (Churi)

Scientific name: *Trichiurus haumela*

The total marketing margin for each kilogram of Ribbon fish (Churi) amounted to BDT 70, representing 30% of the consumer purchase price of BDT 230. This margin was distributed across the primary, secondary, and consumer markets, accounting for 8%, 13%, and 9% respectively. The cumulative marketing profit amounted to BDT 39, with BDT 15, BDT 15, and BDT 9 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 70%, 78%, and 91% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 89%, 76% and 70% for the primary, secondary, and consumer markets, respectively (Table 5).

Table 5. Marketing margin and profit of different stakeholders involved in marketing of Ribbon fish (Churi) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	160	70 %		
	Marketing cost (MC)	5		78 -70= 8%	
	Sales price (SP)	180			89 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	15			
<b>Secondary market</b>	Purchase price (PP)	180	78 %		
	Marketing cost (MC)	15			
	Sales price (SP)	210		91- 78= 13%	76 %
	Marketing margin (MM=SP-PP)	30			
	Marketing profit (MP=MM-MC)	15			
<b>Consumer market</b>	Purchase price (PP)	210	91 %		
	Marketing cost (MC)	11			70 %
	Sales price (SP)	230		100-91=9 %	
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	9			
<b>Consumer purchase price</b>		<b>230</b>	<b>100%</b>		
<b>Total marketing margin: 20+30+20=70 (30 %)</b>					
<b>Total marketing profit: (15+15+9) = 39 BDT / Kg</b>					

#### 4.3.3.4 Pama croaker (Poa Fish)

Scientific name: *Otolithoides pama*

The total marketing margin for each kilogram of Pama croaker (Poa Fish) amounted to BDT 70, representing 29% of the consumer purchase price of BDT 240. This margin was distributed across the primary, secondary, and consumer markets, accounting for 9%, 11%, and 10% respectively. The cumulative total marketing profit amounted to BDT 46, with BDT 15, BDT 17, and BDT 14 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 70%, 79%, and 90% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 90%, 79% and 70% for the primary, secondary, and consumer markets, respectively (Table 6).

Table 6. Marketing margin and profit of different stakeholders involved in the marketing of Pama croaker (Poa Fish) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	170	70 %		
	Marketing cost (MC)	5		79 -70= 9%	
	Sales price (SP)	190			90 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	15			
<b>Secondary market</b>	Purchase price (PP)	190	79 %		
	Marketing cost (MC)	8			
	Sales price (SP)	215		90- 79= 11%	79 %
	Marketing margin (MM=SP-PP)	25			
	Marketing profit (MP=MM-MC)	17			
<b>Consumer market</b>	Purchase price (PP)	215	90 %		
	Marketing cost (MC)	11			70 %
	Sales price (SP)	240		100-90=10 %	
	Marketing margin (MM=SP-PP)	25			
	Marketing profit (MP=MM-MC)	14			
<b>Consumer purchase price</b>		<b>240</b>	<b>100%</b>		
<b>Total marketing margin: 20+25+25=70 (29 %)</b>					
<b>Total marketing profit: (15+17+14) = 46 BDT / Kg</b>					

#### 4.3.3.5 Scribbled goby (Sagor Bele)

Scientific name: *Awaous guamensis*

The total marketing margin for each kilogram of Scribbled goby (Sagor Bele) amounted to BDT 65, representing 36% of the consumer purchase price of BDT 180. This margin was distributed across the primary, secondary, and consumer markets, accounting for 8%, 11%, and 17% respectively. The cumulative total marketing profit amounted to BDT 45, with BDT 11, BDT 13, and BDT 21 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 64%, 72%, and 83% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 88%, 77% and 63% for the primary, secondary, and consumer markets, respectively (Table 7).

Table 7. Marketing margin and profit of different stakeholders involved in marketing of Scribbled goby (Sagor Bele) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
	Purchase price (PP)	115	64 %		
<b>Primary market</b>	Marketing cost (MC)	4		72 -64= 8%	
	Sales price (SP)	130			88 %
	Marketing margin (MM=SP-PP)	15			
	Marketing profit (MP=MM-MC)	11			
	Purchase price (PP)	130	72 %		
<b>Secondary market</b>	Marketing cost (MC)	7		83- 72= 11%	
	Sales price (SP)	150			77 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	13			
	Purchase price (PP)	150	83 %		
<b>Consumer market</b>	Marketing cost (MC)	9			63 %
	Sales price (SP)	180		100-83=17 %	
	Marketing margin (MM=SP-PP)	30			
	Marketing profit (MP=MM-MC)	21			
<b>Consumer purchase price</b>		<b>180</b>	<b>100%</b>		
<b>Total marketing margin: 15+20+30=65 (36 %)</b>					
<b>Total marketing profit: (11+13+21) = 45 BDT / Kg</b>					

#### 4.3.3.6 Yellowfin tuna (Tuna)

Scientific name: *Thunnus albacares*

The total marketing margin for each kilogram of Yellowfin tuna (Tuna) amounted to BDT 95, representing 32% of the consumer purchase price of BDT 300. This margin was distributed across the primary, secondary, and consumer markets, accounting for 7%, 12%, and 13% respectively. The cumulative total marketing profit amounted to BDT 59, with BDT 07, BDT 23, and BDT 29 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 68%, 75%, and 87% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 91%, 79% and 68% for the primary, secondary, and consumer markets, respectively (Table 8).

Table 8. Marketing margin and profit of different stakeholders involved in marketing of Yellowfin tuna (Tuna) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	205	68 %		
	Marketing cost (MC)	13		75 -68= 7%	
	Sales price (SP)	225			91 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	07			
<b>Secondary market</b>	Purchase price (PP)	225	75%		
	Marketing cost (MC)	12		87- 75= 12%	
	Sales price (SP)	260			79 %
	Marketing margin (MM=SP-PP)	35			
	Marketing profit (MP=MM-MC)	23			
<b>Consumer market</b>	Purchase price (PP)	260	87 %		
	Marketing cost (MC)	11			68 %
	Sales price (SP)	300		100-87=13 %	
	Marketing margin (MM=SP-PP)	40			
	Marketing profit (MP=MM-MC)	29			
<b>Consumer purchase price</b>		<b>300</b>	<b>100%</b>		
<b>Total marketing margin: 20+35+40= 95 (32 %)</b>					
<b>Total marketing profit: (07+23+29) = 59 BDT / Kg</b>					

### 4.3.3.7 Gangetic hairfin anchovy (Paissha)

Scientific name: *Setipinna phasa*

The total marketing margin for each kilogram of Gangetic hairfin anchovy (Paissha) amounted to BDT 55, representing 37% of the consumer purchase price of BDT 150. This margin was distributed across the primary, secondary, and consumer markets, accounting for 10%, 14%, and 13% respectively. The cumulative total marketing profit amounted to BDT 34, with BDT 08, BDT 12, and BDT 14 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 63%, 73%, and 87% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 86%, 73% and 63% for the primary, secondary, and consumer markets, respectively (Table 9).

Table 9. Marketing margin and profit of different stakeholders involved in marketing of Gangetic hairfin anchovy (Paissha) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	95	63 %		
	Marketing cost (MC)	7		73 -63= 10%	
	Sales price (SP)	110			86 %
	Marketing margin (MM=SP-PP)	15			
	Marketing profit (MP=MM-MC)	08			
<b>Secondary market</b>	Purchase price (PP)	110	73 %		
	Marketing cost (MC)	8		87- 73= 14%	
	Sales price (SP)	130			73 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	12			
<b>Consumer market</b>	Purchase price (PP)	130	87 %		63 %
	Marketing cost (MC)	06			
	Sales price (SP)	150		100-87=13 %	
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	14			
<b>Consumer purchase price</b>		<b>150</b>	<b>100%</b>		
<b>Total marketing margin: 15+20+20= 55 (37 %)</b>					
<b>Total marketing profit: (08+12+14) =34 BDT / Kg</b>					

#### 4.3.3.8 Bombay duck (Loitta)

Scientific name: *Harpadon nehereus*

The total marketing margin for each kilogram of Bombay duck (Loitta) amounted to BDT 62, representing 34% of the consumer purchase price of BDT 180. This margin was distributed across the primary, secondary, and consumer markets, accounting for 6%, 14%, and 14% respectively. The cumulative total marketing profit amounted to BDT 47, with BDT 09, BDT 20, and BDT 18 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 66%, 72%, and 86% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 90%, 76% and 66% for the primary, secondary, and consumer markets, respectively (Table 10).

Table 10. Marketing margin and profit of different stakeholders involved in marketing of Bombay duck (Loitta) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	118	66 %		
	Marketing cost (MC)	3		72 -66= 6%	90 %
	Sales price (SP)	130			
	Marketing margin (MM=SP-PP)	12			
	Marketing profit (MP=MM-MC)	9			
<b>Secondary market</b>	Purchase price (PP)	130	72 %		
	Marketing cost (MC)	5		86- 72= 14%	
	Sales price (SP)	155			76 %
	Marketing margin (MM=SP-PP)	25			
	Marketing profit (MP=MM-MC)	20			
<b>Consumer market</b>	Purchase price (PP)	155	86 %		66 %
	Marketing cost (MC)	07			
	Sales price (SP)	180		100-86=14 %	
	Marketing margin (MM=SP-PP)	25			
	Marketing profit (MP=MM-MC)	18			
<b>Consumer purchase price</b>		<b>180</b>	<b>100%</b>		
<b>Total marketing margin: 12+25+25= 62 (34 %)</b>					
<b>Total marketing profit: (09+20+18) =47 BDT / Kg</b>					

#### 4.3.3.9 Indian pike conger (Kamila)

Scientific name: *Congresox talabonoides*

The total marketing margin for each kilogram of Indian pike conger (Kamila) amounted to BDT 55, representing 20% of the consumer purchase price of BDT 280. This margin was distributed across the primary, secondary, and consumer markets, accounting for 6%, 7%, and 7% respectively. The cumulative total marketing profit amounted to BDT 33, with BDT 10, BDT 12, and BDT 11 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 80%, 86%, and 93% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 94%, 87% and 80% for the primary, secondary, and consumer markets, respectively (Table 11).

Table 11. Marketing margin and profit of different stakeholders involved in marketing of Indian pike conger (Kamila) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
Primary market	Purchase price (PP)	225	80 %		
	Marketing cost (MC)	5		86 -80= 6%	94 %
	Sales price (SP)	240			
	Marketing margin (MM=SP-PP)	15			
	Marketing profit (MP=MM-MC)	10			
Secondary market	Purchase price (PP)	240	86 %	93- 86= 7%	
	Marketing cost (MC)	8			
	Sales price (SP)	260			87 %
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	12			
Consumer market	Purchase price (PP)	260	93 %		80 %
	Marketing cost (MC)	09			
	Sales price (SP)	280		100-93=7 %	
	Marketing margin (MM=SP-PP)	20			
	Marketing profit (MP=MM-MC)	11			
<b>Consumer purchase price</b>		<b>280</b>	<b>100%</b>		
<b>Total marketing margin: 15+20+20= 55 (20 %)</b>					
<b>Total marketing profit: (10+12+11) =33 BDT / Kg</b>					

#### 4.3.3.10 Malabar blood snapper (Red koral)

Scientific name: *Lutjanus malabaricus*

The total marketing margin for each kilogram of Malabar blood snapper (Red koral) amounted to BDT 240, representing 35% of the consumer purchase price of BDT 680. This margin was distributed across the primary, secondary, and consumer markets, accounting for 10%, 14%, and 12% respectively. The cumulative total marketing profit amounted to BDT 180, with BDT 45, BDT 70, and BDT 65 derived from the primary, secondary, and consumer markets, respectively. The distribution of consumer purchase prices was observed to be 64%, 74%, and 88% for the primary, secondary, and consumer markets. And fishermen share in sales price was observed to be 88%, 74% and 65% for the primary, secondary, and consumer markets, respectively (Table 12).

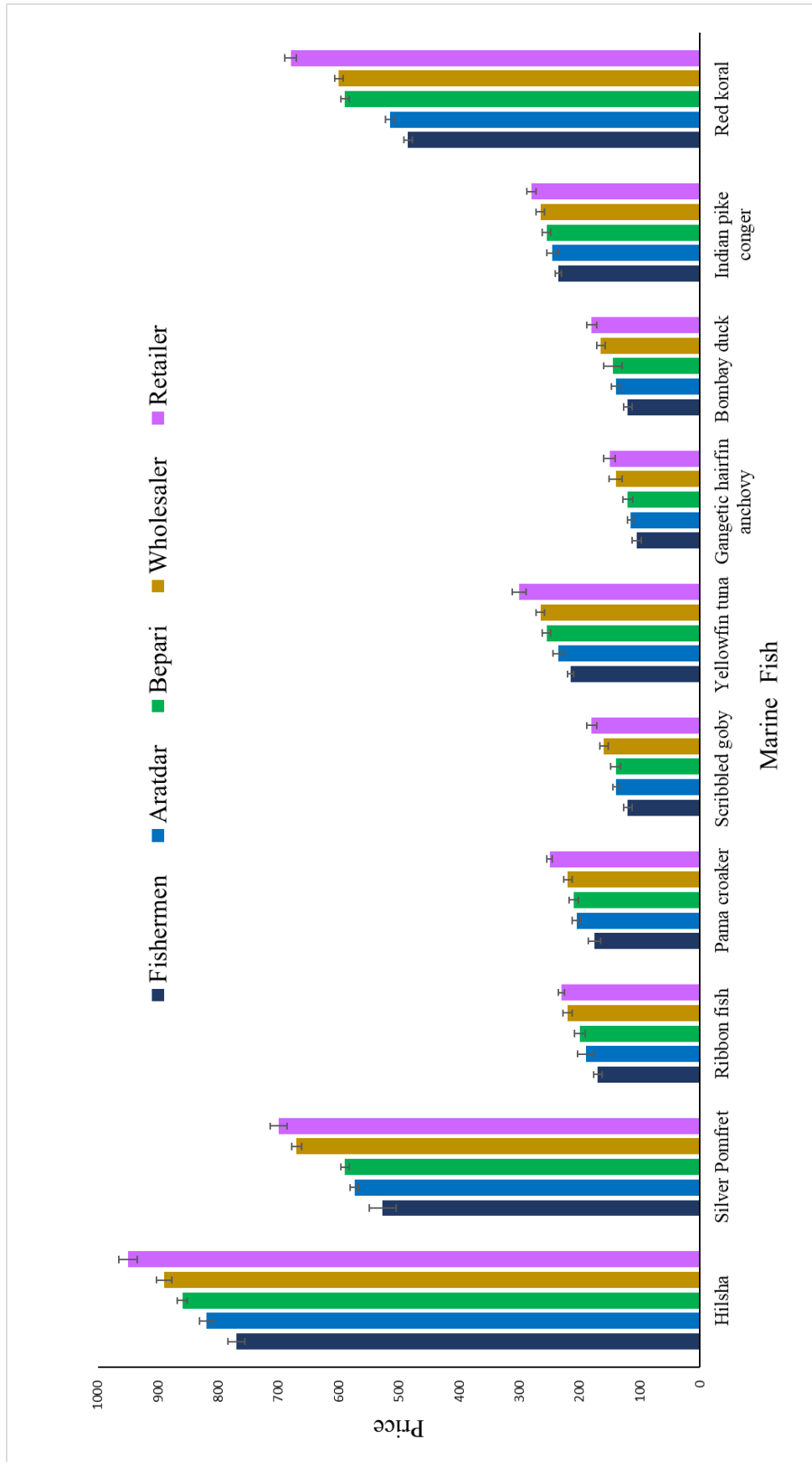
Table 12. Marketing margin and profit of different stakeholders involved in marketing of Malabar blood snapper (Red Koral) in domestic marketing (BDT / kg)

Market level	Particulars of marketing	Price BDT / kg	% of consumer purchase price	Marketing margin (%)	Fishermen share in sales price (%)
<b>Primary market</b>	Purchase price (PP)	440	64 %	74-64= 10%	
	Marketing cost (MC)	15			88 %
	Sales price (SP)	500			
	Marketing margin (MM=SP-PP)	60			
	Marketing profit (MP=MM-MC)	45			
<b>Secondary market</b>	Purchase price (PP)	500	74 %	88- 74= 14%	
	Marketing cost (MC)	25			74 %
	Sales price (SP)	595			
	Marketing margin (MM=SP-PP)	95			
	Marketing profit (MP=MM-MC)	70			
<b>Consumer market</b>	Purchase price (PP)	595	88%		65 %
	Marketing cost (MC)	20			
	Sales price (SP)	680		100-88=12 %	
	Marketing margin (MM=SP-PP)	85			
	Marketing profit (MP=MM-MC)	65			
<b>Consumer purchase price</b>		<b>680</b>	<b>100%</b>		
<b>Total marketing margin: 60+95+85= 240 (35%)</b>					
<b>Total marketing profit: (45+70+65) =180 BDT / Kg</b>					



#### 4.3.4 Price Variation of some major marine fishes

Price variation of Hilsha (Ilish) was found according to fishermen  $770 \pm 14$  BDT/Kg, Aratdar  $820 \pm 11$  BDT/Kg, Bepari  $860 \pm 8$  BDT/Kg, Wholesaler  $890 \pm 13$  BDT/Kg and Retailer  $950 \pm 15.63$  BDT/Kg; Silver pomfret (Rupchada) was found according to fishermen  $525 \pm 22$  BDT/Kg, Aratdar  $575 \pm 7$  BDT/Kg, Bepari  $590 \pm 7$  BDT/Kg, Wholesaler  $670 \pm 8$  BDT/Kg and Retailer  $700 \pm 13.54$  BDT/Kg; Ribbon fish (Churi) was found according to fishermen  $170 \pm 7$  BDT/Kg, Aratdar  $190 \pm 13$  BDT/Kg, Bepari  $200 \pm 9$  BDT/Kg, Wholesaler  $220 \pm 8$  BDT/Kg and Retailer  $230 \pm 5.27$  BDT/Kg; Pama croaker (Poa fish) was found according to fishermen  $175 \pm 10$  BDT/Kg, Aratdar  $205 \pm 7$  BDT/Kg, Bepari  $210 \pm 8$  BDT/Kg, Wholesaler  $220 \pm 7$  BDT/Kg and Retailer  $250 \pm 4.38$  BDT/Kg; Scribbled goby (Sagor Bele) was found according to fishermen  $120 \pm 7$  BDT/Kg, Aratdar  $140 \pm 5$  BDT/Kg, Bepari  $140 \pm 8$  BDT/Kg, Wholesaler  $160 \pm 7$  BDT/Kg and Retailer  $180 \pm 8.16$  BDT/Kg; Yellowfin tuna (Tuna) was found according to fishermen  $215 \pm 5$  BDT/Kg, Aratdar  $235 \pm 9$  BDT/Kg, Bepari  $255 \pm 7$  BDT/Kg, Wholesaler  $265 \pm 7$  BDT/Kg and Retailer  $300 \pm 11.55$  BDT/Kg; Gangetic hairfin anchovy (Paishsha) was found according to fishermen  $105 \pm 8$  BDT/Kg, Aratdar  $115 \pm 5$  BDT/Kg, Bepari  $120 \pm 8$  BDT/Kg, Wholesaler  $140 \pm 11$  BDT/Kg and Retailer  $150 \pm 9.56$  BDT/Kg; Bombay duck (Loitta) was found according to fishermen  $120 \pm 7$  BDT/Kg, Aratdar  $140 \pm 7$  BDT/Kg, Bepari  $145 \pm 15$  BDT/Kg, Wholesaler  $165 \pm 7$  BDT/Kg and Retailer  $180 \pm 8.32$  BDT/Kg; Indian pike conger (Kamila) was found according to fishermen  $235 \pm 5$  BDT/Kg, Aratdar  $245 \pm 9$  BDT/Kg, Bepari  $255 \pm 7$  BDT/Kg, Wholesaler  $265 \pm 7$  BDT/Kg and Retailer  $280 \pm 7.82$  BDT/Kg; Malabar blood snapper (Red Koral) was found according to fishermen  $485 \pm 7$  BDT/Kg, Aratdar  $515 \pm 8$  BDT/Kg, Bepari  $590 \pm 7$  BDT/Kg, Wholesaler  $600 \pm 7$  BDT/Kg and Retailer  $680 \pm 9.43$  BDT/Kg respectively (Figure: 30).



**Fig 30:** Price Variation of some major marine fishes

#### **4.3.5 Problems of fishery Ghat, Chattogram landing center**

Within the realm of research, individuals involved in the processing and distribution of marine fish faced a multitude of challenges and obstacles. Fishermen encounter significant challenges when trying to get into the market due to various factors, such as substantial non-cooperation as well as obstruction from the Paikers/retailers. Consequently, it is evident why fishing communities have continued to experience poverty or even worsened economic conditions over time, despite engaging in the trade of a crucial and essential commodity. The primary catch stage of markets lacks competition, leading to a significant degree of exploitation.

The identified issues encompassed inadequate capital, natural disasters, limited scientific understanding and technology, price volatility, insufficient storage facilities, inadequate physical marketing infrastructure, and a dearth of marketing information, among others. The primary factor contributing to the high marketing expenses can be attributed to the functional inefficiencies within the marketing system. The allocation of the wholesale price to producers and processors was not insignificantly low, and there is potential for further enhancement through the improvement of marketing infrastructure and the elimination of redundant, inefficient, and exploitative intermediaries.

## CHAPTER V

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## DISCUSSION

## CHAPTER V

### DISCUSSION

#### 5.1 Socio-economic Conditions of Different Stakeholders Involved in Fishing

The present data revealed that a majority of the stakeholders (50%) were aged above 40, while a minority (10%) fell below the age of 30. This finding suggests that individuals belonging to the upper middle age groups actively participate in fishing activities. Ahmed (1996) conducted a study in Tangail, and Ahamed (1999) also conducted a study in a coastal region. The study reported a prevalence rate of 66% among individuals under the age of 40, whereas the latter study reported a prevalence rate of 70% in the same age group. A separate study revealed that the effectiveness of fishing operations exhibited variations based on the age and quantity of fish in the Tangail district (Kubra et al., 2020). According to a study conducted by Islam (2015) in the Sundarban region, it was observed that the maximum age range of individuals was between 20 and 30 years old. According to the findings of Asif and Habib (2018) 44% of farmers belonged to the age range of 31-40 years. Similarly, another study reported that 38% of individuals fell within the age group of 51-60 years, which aligns with the current study (Zaman et al., 2017). Additionally, a separate study revealed that 44% of farmers had an age range of 36 to 50 years, which is relatively consistent with the present study (Sultana et al., 2015).

In the present study location, the predominant demographic among stakeholders was the Muslim community, comprising a range of 40% to 90% representation. However, it is noteworthy that within the retailer category, the proportion of Muslim stakeholders decreased to 40%. Additionally, the second largest demographic group consisted of Hindus, while the remaining stakeholders were classified as Buddhist. The prevalence of Hindus in the realm of retailers can be attributed to the fact that fish selling has been a traditional occupation within their ancestral lineage. In contemporary times, individuals who identify as Muslims have increasingly turned to fishing as a means of sustenance due to shifts in the socio-economic landscape, limited employment prospects, and recognition of the fishing industry's potential as a viable source of income. According to Chantarasri (1994) research conducted in the Sundarbans Reserve Forest, the majority of individuals engaged in fishing activities were identified as followers of the Islamic faith. According to Ahamed (1999) the demographic composition of fishermen in the Sundarban region was predominantly Muslim, accounting for 68% of the total, while Hindu fishermen constituted 32% of the population. This dissimilarity may arise as a result of regional variation. Mondal et al., (2018) reported comparable results regarding the demographic composition of Kattoli, where approximately 65% of the population

identified as Hindu and 35% as Muslim. In 2005, Kumira, a sub-region within Kattoli, consisted of 80% Hindu individuals and 20% Muslim individuals.

Furthermore, in 2018, Kattoli had approximately 45% Hindu communities and 55% Muslim communities, with Kumira comprising 40% Hindu individuals and 60% Muslim individuals (Mondal et al., 2018).

According to the present research, 80-90% male and 10-20% female. The outcome is comparable to Mridula et al., (2015) in the South West region of Bangladesh revealed that 82% of male participants and 18% of female participants were actively involved in the practise of fishing.

Based on the findings of the present survey, it was observed that 80% of the stakeholders were in a married relationship, while the remaining individuals were either unmarried or had experienced low instances of polygamy or divorce. Polygamy showed only in case of retailer and bepari. The percentages of married noted by Islam et al., (2014) in Jessore, Mannu (1999) in Kuakata, and Shamima (2000) in Gallamari reported the prevalence of marital status among fishermen as 94%, 92%, and 70% correspondingly. Based on the findings of Momotaz (2009) study on the socioeconomic status of individuals benefiting from small indigenous species in three distinct locations, it was observed that a majority of the fishermen, specifically 84%, were married, whereas the remaining 16% were identified as single.

Based on the findings of the present survey, it has been observed that there exists a deficiency in literacy among all the stakeholders involved in the Fishery Ghat of the Chattogram region. The fisherman and retailer exhibited significantly elevated levels of illiteracy. It can be inferred that these two groups encounter greater financial challenges. Furthermore, the availability of education beyond or at the same level as Secondary School Certificate (SSC) and Higher Secondary Certificate (HSC) is extremely limited and, in certain instances, virtually non-existent. The results differ from the study conducted by Hannan (1994) which reported that 96.97 percent of the fishermen in the Kalapara Upazila, who are engaged in coastal fishing activities, possessed varying levels of literacy. The findings of this study exhibit similarities to the research conducted by Ahamed (1999) in the estuary regions, where the literacy rates were reported as 25% and 23% respectively. It is plausible that the disparity in these rates could be attributed to the varying availability of amenities within the respective study areas.

The average family size of Bangladeshi fishermen is large as a result of a high birth rate and insufficient family planning measures (Kabir et al., 2012). In addition, there exists a significant correlation between family size and composition with occupation, wealth, and education. The findings of the current study indicate that a majority of stakeholders, specifically over 70%, reported having a medium-sized family, ranging from 7 to 9 members. It was observed that

fishermen, in particular, exhibited a higher prevalence of large family sizes, with more than nine members. Based on the findings of Ahsan et al., (2016) a significant majority of fishermen, specifically 87 percent, were reported to originate from households characterized by medium to large sizes. According to the survey, 52% of the stakeholders indicated that they had one additional economically active member in their family, while 34% reported having two earning members. Based on the testimonies of the participating fishermen, it was observed that an increase in the number of children within a family contributed to the generation of additional income for the household. The findings pertaining to family size and the presence of economically active family members indicate a positive correlation, whereby an increase in family size corresponds to a higher count of family members engaged in economic activities.

National and local non-governmental organizations (NGOs), such as BRAC, exclusively extend credit to economically disadvantaged individuals who demonstrate an inclination towards acquiring fishing equipment and boats. The interest rate applied to these loans fluctuates in accordance with the prevailing seasons. There exists a claim in certain circles that the magnitude of credit extended by non-governmental organizations (NGOs) was inadequate and lacked alignment with the genuine requirements of individuals living in poverty. Around 90 percent of stakeholders had obtained loans, with the wholesaler having the lowest percentage. The majority of individuals obtained loans from money lenders, also known as brokers.

The income profile is a significant economic indicator that assesses the advancement of a nation. The income of individuals in the fishing region has an impact on their catching ability, the number of crafts they possess, and the productivity of fish. Moreover, it is contingent upon various factors such as meteorological conditions, market dynamics, and an individual's physical well-being. Our study revealed that the fisherman and retailer of the Fishery Ghat had the lowest income compared to other stakeholders. The daily income of fishermen ranges from 200-1000 BDT, while retailers earn between 200-1500 BDT. The price range for bepari, aratder, and wholesaler is between 2000-7000 BDT, 2000-8000 BDT, and 1500-6000 BDT, respectively. As per the findings of Rani et al., (2020) the fishermen's yearly income fell within the bracket of 50,000–75,000 tk. In the domain of gear operation, stakeholders commonly observed a significant level of friction among fishermen, with approximately 87% acknowledging its presence. Frequent tidal occurrences were observed in this geographical region. Two distinct types of shocks were encountered, namely flooding (54.05%) and fisherman's illness (45.95%).

## 5.2 Activities of Different Stakeholders Involved in Fishing

Most of the fishermen catch fish from Karnafuli River and the Bay of Bengal. They mainly catch marine fishes such as Silver pomfret, Bomby duck, koral, Red Koral, Ribbon fish, Kamila, Lal poa, Paissha, Hangor, Baila etc. Different types of fishing gear were used by the artisanal fishery in Chattogram Fishery Ghat, according to the survey. They included gill net, set bag net, Ilish jal, and Lakkha jal, Vasha jal, Koral Jal, Thela jal etc.. The two nets that were used the most frequently in the survey were gill nets and set bag nets. The outcome is consistent with Ali et al., (1980) results that showed the set bag net was the most important fishing tool in the coastal area, bringing in about 45% of the total catch while gill nets brought in 35%. In Bangladesh's northeast, especially in the bigger Sylhet and Mymensingh regions, fishing vessels such the Donga, Bachari, Kosa, Chandi, and Dinghi were used (CIDA, 1993). Rafts, Kosha Donga or Konda, Chandi Nauka, Balam Nauka, and Dinghi Nauka were a few of the seven varieties of fishing boats used in the Megna, Padma, and Jamuna Rivers (BCAS, 1989). Chandi Nauka, Kosha Nauka, Dinghi Nauka, and motorised boats were operated in several locations along the Megna River 50% of the fishing boats in the river's lower reaches had motors (Moula et al., 1993). Rashed et al., (2017) discovered four different types of fishing gear, including the Chor jal (enclosure net), tiny gill nets, beach seines, and estuarine set bag nets (ESBN), were employed in the Naaf River for fishing.

Based on the report, the Fisherman utilized a total of eleven distinct fishing apparatus. The following fishing gear types were included in the study: drift gill net, marine set bag net (MSBN), beach seine net, large mesh set bag net, estuarine set bag net (ESBN), trammel net, fixed gill net, large mesh drift gill net, push net, jhaki jal, and fixed bag net. The survey indicated that the Gill net and set bag net were the most frequently employed nets. The results align with the findings of Ali et al., (1980), who observed that the set bag net was the predominant fishing gear in the coastal area, accounting for approximately 45% of the total catch, while gill nets accounted for 35%. Gill nets and behundi nets, specifically set bag nets, were commonly employed along the coastline of Bangladesh. Brandt (1984) classified fishing equipment and methods into different categories in order to organize the tools and crafts utilized in the activity. In the region of Hatiya, located in the Noakhali district, a range of fishing nets are utilized, including fixed purse nets, gill nets, dip nets, and cast nets (Shafiul et al., 2014).

The current investigation discovered the combination of inboard motors and wooden plant-made Chandi and Balam boats in small-scale fisheries. The findings of the current study are consistent with those of FAO (1985) which identified the Dinghi, Chandi, and Balam as the three primary types of traditional boats used in coastal artisanal fisheries.



### **5.3 Marketing Channel and Value Chain Analysis of Some Major Marine Fishes at Fishery Ghat, Chattogram**

Various marketing systems have been developed for the commercialization of marine fishes obtained from the Fishery Ghat, Chattogram. The marine fish marketing chain encompasses various categories of intermediaries, including wholesalers, commission agents, beparies, aratdars, paikers (both in local and distant markets), and retailers. The marketing channels employed for various fish species exhibited distinct variations. Certain fish species exhibited a longer marketing channel characterized by a greater number of intermediaries, such as those involved in distant markets. Conversely, other fish species had a shorter marketing chain, primarily involving local retailers. According to Khalil (1999) the predominant marketing channel for marine fish in the Cox's Bazar and Chattogram districts involves a sequential flow from fishermen to beparies, aratdars, retailers, and ultimately consumers. According to Monir et al., (2013) the supply chain for marine dried fish typically involves multiple stakeholders, including producers, wholesalers, aratdars, middlemen, retailers, and ultimately, consumers. In a study conducted by Alam (2012) it was observed that the fish supply chain consists of six intermediaries: the farmer, aratdar, paiker, trader, retailer, and consumer. These intermediaries play a crucial role in facilitating the movement of fish within the domestic market, particularly for distant locations. The findings of the current study exhibited a degree of similarity to those of prior research. The consumer market exhibited comparatively higher marketing margin and marketing profit, with the primary and secondary markets also demonstrating involvement of beparies and aratdars. The data clearly indicated that fish with higher prices incurred greater marketing expenses in comparison to fish with lower prices. According to the report, the transportation expenses were found to be greater for species with higher value in comparison to those with lower value.

Ahmed et al., (2007) conducted a comprehensive examination of the marketing system and discovered that manufacturers faced significant constraints in managing marketing and supply chain activities. Instead, they encountered a situation where prominent merchants and brokers exerted stringent control, resulting in monopolistic practices. Consequently, this arrangement led to distortions in domestic market pricing. Reza et al., (2005) reported that the trade of sun-dried fish in the coastal region of Bangladesh is facilitated by a network of six intermediaries. The author identified five marketing channels through which the aforementioned intermediaries were involved in the promotion of dried fish. The findings of Samad et al., (2009) and Flowra et al., (2010) exhibit a degree of interconnectedness. In the Nilphamari region of Bangladesh,

Monir et al., (2013) identified four distinct channels through which dried fish is marketed and sold.

Value chain analysis of major fish species are Hilsha, Silver pomfret, Ribbon fish, Pama croaker, Scribbled goby, Yellow fin tuna, Gangetic hairfin anchovy, Bomby duck, Indian pike conger and Malabar blood snapper and it found that the total marketing margin were 26%, 22%, 30%, 29%, 36%, 32%, 37%, 34%, 20% and 35%. According to Islam et al., (2006), the marketing margin for pomfret was found to be 20%, while for hilsa it was 30%. According to a study conducted by Faruq (2009), the marketing margin for hilsa fish was found to be 33% of the consumer purchase price. According to the findings of Ahsan et al., (2016), the marketing margin for Bombay duck was 29%, while the marketing margin for Ribbon fish was 28%. The results obtained in the current study exhibited a considerable degree of similarity with those reported by Islam et al., (2006), Ahsan et al., (2016) and Faruq (2009). The proportion of the consumer market that fishermen were able to access was below 75%-90%. This indicates that fishermen received a relatively low price for the marine fishes they caught. According to a study conducted by Islam et al., (2006) the marketing of certain marine fish species such as pomfret, hilsa, bombay duck, catfish, tuna, and shrimp resulted in an average share of 68% of the consumer purchase price being received by the fishermen. The results of the current study exhibited a notable resemblance to the findings of Islam et al., (2006) indicating that fishermen received a relatively modest remuneration for the marine fish they captured. The enhancement of the fishermen's economic situation was unattainable in the absence of government intervention and the involvement of other organizations within the marketing chain.

## CHAPTER VI

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## CONCLUSIONS

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Bangladesh is an emerging nation in which the fishing industry plays a pivotal role in the overall economic landscape. Fishing and its related activities in coastal regions constitute the predominant sector within the marine fishing industry, yet the socioeconomic conditions of the individuals engaged in this occupation are deemed inadequate. Both their financial prospects and educational attainment were insufficient. On a daily basis, these individuals engaged in fishing activities face perilous circumstances in order to sustain their livelihoods, yet their predicament remains largely unrecognized. These individuals can be regarded as the underappreciated heroes of the coastal regions.

In the context of the market value chain, it was observed that the price of fishes progressively increased, reaching its peak at the consumer level. The inevitability of the situation can be attributed to the consistent profitability experienced by the individuals involved. This resulted in a low price at the point of catch, juxtaposed with a higher price at the consumer level. Therefore, the fishermen's portion of the purchase price paid by consumers is relatively low within the marketing channel. The presence of government and non-government organizations in the marketing channel is imperative for the effective promotion and distribution of marine fishes such as Bombay duck and ribbon fish. This intervention is crucial in order to enhance the economic well-being of fishermen.

## CHAPTER VII

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### RECOMMENDATIONS AND FUTURE PERSPECTIVE

## CHAPTER VII

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- ❖ Government should provide wireless system when fishermen go to the onshore fishing.
- ❖ Providing training and skill development to unemployed or underemployed youth living in homes with fishermen.
- ❖ The government ought to take the required actions to stop robberies during the fishing season.
- ❖ Establishment of more ice factories for sufficient supply for fish preservation
- ❖ Introduction of improved preservation techniques both in the boat and market as well
- ❖ Drainage and transportation system should be prioritized by the authority
- ❖ Ensuring pure water and sanitation facility
- ❖ A well-organized market pricing policy including proper monitoring system should be introduced as soon as possible to prevent the autonomy of different actors in the m pricing scheme.
- ❖ The law and order in the fish market should be maintained and credit should be supplied timely based on an easy terms and policies. Different NGOs can provide easy access credit in the crisis moment of retailer.
- ❖ Implementation of strict rules and regulations to stop the exploitation of middlemen.
- ❖ The ban duration ought to be managed in accordance with the marine fishes' breeding season.
- ❖ Bank. For the small-scale fishermen, NGOs and other financial organisations should offer lenient loan terms.
- ❖ The government need to issue VGF cards to legitimate fishermen but not to politicians.
- ❖ Set hag nets must be identified because they are frequently utilised in the coastal area.
- ❖ Future research can be done on the amount of by catch in Bangladesh using all available resources and accurate information
- ❖ Future research can be done on the market margin and profit for other available marine fish species in Chattogram and Cox's bazar .

## CHAPTER VIII

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## REFERENCES

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### REFERENCES

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## APPENDIX

### A. Questionnaire for Fisherman

#### General information:

1. Name of the interviewer:
2. Address:

Village	
P/S	
P/O	
District	

3. Gender:

Male (1)	Female(2)
1	2

4. Age:

Below 30	30-40	Above 40
1	2	3

5. Religion:

Muslim	Hindu	Buddhist/Rakhai n	Christian	Others
1	2	3	4	5

6. Marital status:

Married	Unmarried	Polygamy
1	2	3

7. Educational background:

No education	Under Class five	Under class eight	SSC
1	2	3	4

8. Number of family member?

Small family (4-6)	Medium family (7-9)	Large family (>9)
1	2	3

9. Do you have available electricity in your house?

1= Yes ,0=No

10. What type of house you are belong?

Kacha house	Straw house	Fenced house	Tin house	Building house
1	2	3	4	5

11. Number of economically active (earning) household members:

12. Do you have own land?

1= Yes ,0=No

13. What are the alternative income source of the family ?

Agril crop	Net making/repairing	Boat making/repairing	Daily labor	Rearing livestock animals	Others (Specify)	No work
1	2	3	4	5	6	7

14. Have you ever borrowed money from any source ?

1=Yes 0=No

If yes, when was the last time and how much? Last time was in (month and year)

.....

Amount:\_\_\_\_\_Tk

15. [if Yes Q 20 above, then] who do you usually borrow money from ]?

Microfinance institutions (e.g. Grameen Bank or other local MFIs)Tk	1
Local money lendersTk	2
Relatives and friends (no interest rate)Tk	3
Other please specify	4

16. Do you have access to sanitary latrines ?

1=Yes 0=No

**Fishing activities:**

17. What is the primary purpose of your involvement in fishing ?

Subsistence or consumption	1
Consumption and selling	2
To sell in the local market, (generate income)	3
Labour (employed by others)	4
Other	5

18. How do you access fishing rights?

Lease	Share	Labour	Contract	License	Free access
1	2	3	4	5	6

19. Are you a member of fisheries association?

1=Yes 0= No

20. Do you have fishing license?

1=Yes 0=No

21. Do you own fishing boat?

1=Yes 0=No

22. Do you own fishing net?

1=Yes 0=No

23. Do you have dry fishes?

1=Yes 0=No

24. Do you catch hilsafish?



1=Yes 0=No

25. Are you sorting fish?

1=Yes 0=No

26. Are you icing fish?

1=Yes 0=No

27. What types of net are you used?

Serial	

28. What type of fish you are catch?

Serial	

29. Over the last 5 years, has your hilsa catch?

Increased	Decreased	Stable	Don't know
1	2	3	4

30. Are you aware of any hilsa management regimes introduced by the government?

1=Yes 0=No

31. In which depth, the gears are operated?

Gear name	Depth

32. Mesh size of the used net of catch

Net name	Size

33. Do you think the pressure to repay loan is an obstruction to abide with ban period?

1= Yes 0= No

34. Do you think the fishing ban period fits well with the breeding season?

Yes	No	Don't Know
1	0	2

35. Is your livelihood affected by the closed/off season and zone?

1= Yes 0= No

36. How sufficient is the compensation provided?

Not enough	Just enough	More than enough
1	2	3

37. Have any work facilities for your women?

1= Yes 0= No

38. How much money did you earn daily from fishing?

200-400	500-600	600-700	800-1000	>1000
1	2	3	4	5

### B. Questionnaire for Aratdar, Bepari, Wholesaler and Retailer

#### General information:

1. Name of the interviewer:

2. Address:

Village	
P/S	
P/O	
District	

3. Gender:

Male (1)	Female(2)
1	2

4. Age:

Below 30	30-40	Above 40
1	2	3

5. Religion:

Muslim	Hindu	Buddhist/Rakhain	Christian	Others
1	2	3	4	5

6. Marital status:

Married	Unmarried	Polygamy
1	2	3

7. Occupation:

Small scale fisherman	Businessman	Labor
1	2	3

8. Educational background:

No education	Under Class five	Under class eight	SSC
1	2	3	4

9. Number of family member?

Small family (4-6)	Medium family (7-9)	Large family (>9)
1	2	3

10. Number of economically active (earning) household members:

11. Are you sorting fish after buying?

1=Yes 0= No

12. Are you icing fish after buying?

1=Yes 0= No

13. which problem do you face?

Serial	Problem names
1	
2	
3	

14. Have you ever borrowed money from any source ?

1=Yes 0=No

If yes, when was the last time and how much? Last time was in (month and year)

.....

Amount:\_\_\_\_\_Tk

15.[if Yes Q 20 above, then] who do you usually borrow money from ]?

Microfinance institutions (e.g. Grameen Bank or other local MFIs)Tk	1
Local money lendersTk	2
Relatives and friends (no interest rate)Tk	3
Other please specify	4

16. Is your livelihood affected by the closed/off season and zone?

1= Yes 0= No

17. How much money did you earn daily from fishing?

2000-4000	5000-6000	6000-7000	8000-10000	>10000
1	2	3	4	5

**C. Questionnaire for Consumer**

**General information:**

1. Name of the interviewer:

2. Which fish most common?

1	
2	
3	
4	

3. which fish are costly?

1	
2	
3	

4. When vary fish price?

Summer	1
winter	2

5. which type of fish buying? 1= Scale 0=Non-scale

6. Which type of fish most buying?1= Finfish 0=Non-finfish

7. Are you buy scale removing fish?1= Yes 0=No

8. Are you buy cutting fish?1= Yes 0=No

9. Which fish found seasonally?

1	
2	
3	
4	

10. Which fish like you most?

1	
2	
3	
4	

11. How much buy you Fish?

1	
2	
3	
4	

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