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MARKETING SYSTEM OF THE HILSA FISH (*Tenualosa ilisha*) IN THE MEGHNA RIVER ESTUARY OF CHANDPUR, BANGLADESH

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Abstract

The objective of the study was to investigate the marketing system of Hilsa fish (*Tenualosa ilisha*) in the Meghna River estuarine region of Bangladesh. Hilsa fish, the national fish of Bangladesh, is highly popular among the people. However, many common people cannot access this fish due to high price owing to apparent the absence of an effective marketing system. Our research revealed that the marketing of Hilsa fish in the Meghna River estuary involves various key stakeholders, including fishers, *faria* (middlemen), *bapari (*wholesalers), *aratder* (commission agents), and ultimately reaches the consumers through retailers. To analyze the marketing patterns and pricing strategies of Hilsa fish, a sample size of 60 respondents was selected as key informant. Data was collected through a semi-structured questionnaire. The findings suggest price of the fish at the retail market is determined based on market conditions, negotiations between retailers and consumers. Fishermen and aratder utilize an auction method for selling their fish, while faria employ open bargaining, auctions, and the prevailing market price. Additionally, our findings indicate that though Hilsa fish continues to be sold at high prices, however, fishers are unable to receive a reasonable price for their catch due to the involvement of *mahajons* (money lenders), who compel fishers to sell at a predetermined rate, much lower than existing market price. As a result, the economic conditions of the fishers remain poor and vulnerable.

Keywords: *Marketing system, national fish, hilsa fishery.*

Introduction

The Hilsa shad fish (*Tenualosa ilisha)*, belongs to the Clupeidae family and is a species closely related to the herring. It is an extremely popular and highly desired food fish in the Indian subcontinent, particularly in Bangladesh and some regions of India, such as West Bengal, Odisha, Tripura, Assam, Southern Gujarat, Mizoram, and Andhra Pradesh. Bangladesh contributes 76% of the global Hilsa fish catch, while India accounts for 15%, and Myanmar for 4% (BoBLME, 2010) . The Hilsa fish holds a special place in the hearts and palates of the people in Bangladesh. It is a significant source of nutrition and plays a vital role in the country's economy. Consequently, it has been designated as the national fish of Bangladesh. The Department of Patents, Designs, and Trademarks (DPDT) under the Ministry of Industries of Bangladesh officially recognized Hilsa as a Geographical Indication (GI) product of Bangladesh in 2017 (Mahmud, 2020).

Known for its exquisite flavor, delicate texture, and significant nutritional value, Hilsa has held a prominent position in Bangladeshi cuisine and symbolized national pride (Islam and Chuenpagdee, 2018). This fish offers a wealth of nutrition, containing essential elements such as fat, protein, carbohydrates, iron, calcium, and vitamins C and Kcals 262 per 100 grams. Hilsa is an oily fish known for its abundance of omega-3 fatty acids. Recent experiments have demonstrated its potential health benefits in reducing cholesterol levels and increasing insulin sensitivity (Alam et al., 2012). Hilsa enjoys immense popularity in Bangladesh, not only for its taste and nutritional value but also due to its economic and cultural significance (Islam and Chuenpagdee, 2012). The fishing of Hilsa provides employment opportunities for thousands of fishers and derserve credit in earning export revenue. This fish accounts for approximately 12% of the country's total fish production and directly contributes around 1% to the GDP of Bangladesh. Roughly half a million fishers are directly involved in catching Hilsa, with an estimated annual catch of around half a million metric tons. Moreover, another 2 million people indirectly depend on the Hilsa fishery for their livelihoods (Mahmud, 2020; Islam et al., 2016).

Bangladesh's captivating waterways serve as the Hilsa fish's natural habitat. Historical records indicate that until 1972, the fishing of Hilsa was predominantly limited to the upstream regions of rivers such as Padma, Meghna, Karatoya, Rupsa, Shibsa, and Payra. However, since 1972, there has been a significant decline in Hilsa fishing in these upstream areas. Presently, the fishing activities primarily occur in downstream rivers, estuaries, coastal areas, and the sea. Specifically, the Padma-Meghna-Jamuna delta, which flows into the Bay of Bengal, and the Meghna (lower

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Brahmaputra) and Jamuna rivers serve as important locations for catching Hilsa. Particularly, Chandpur, known as the "city of Hilsa" in Bangladesh, holds remarkable fame for its Hilsa fish from the Padma-Meghna River. The Chandpur Fish Landing Center, one of the largest Hilsa landing centers in the country, receives abundant supplies of Hilsa collected from various rivers and regions. From Chandpur, the Hilsa is transported to Chattagram and then distributed to different parts of the country. Additionally, it is also exported abroad (Hossain, 2019).

The marketing system surrounding the Hilsa fish in Bangladesh plays a crucial role in ensuring its availability, distribution, and economic significance. However, the journey of this beloved fish from river to plate has encountered numerous challenges over the years, impeding its efficient marketing and distribution processes. The marketing system for Hilsa fish in Bangladesh has been historically characterized by a complex and fragmented supply chain, involving multiple stakeholders such as fishermen, wholesalers, retailers, and consumers. The fish is predominantly harvested from rivers and estuaries. The journey of the Hilsa fish from the river to the market begins with experienced fishermen venturing into the vast waters using traditional fishing methods and specialized nets during the peak season (Ahmed, 2007). These fishermen leverage their knowledge of the fish's behavior and migratory patterns to maximize their catch while ensuring the sustainability of the species. Once caught, the fish undergoes a series of transactions through intermediaries, including wholesalers, retailers, and middlemen before reaching the end consumers. This intricate process often results in high post-harvest losses, increased costs, and unfair profit distribution, as middlemen exert considerable control over prices and profit margins. These middlemen facilitate the flow of Hilsa fish from primary fishing areas to reach consumers across the country and even beyond the borders. The complex nature of the Hilsa fish supply chain, combined with challenges such as inadequate infrastructure, outdated techniques, and a lack of proper marketing mechanisms, has hindered the industry's potential for growth and development (Hossain et al., 2019; Ahmed, 2007).

The Hilsa stocks are targeted by various fishing gears, including the clap net, gillnet, driftnet, seine net, barrier net, and fixed bag net. Among these, the gill/drift nets contribute significantly to the catch, especially in mechanized fishing operations at sea. Consequently, there has been a steady increase in the number of fishing vessels and gears over time. However, this excessive fishing effort has resulted in a drastic decline in catches for both mechanized and non-mechanized boats, indicating the risk of overexploitation and the vulnerability of the fishery. The diminishing catch per unit effort in Hilsa fishing poses a significant threat to the livelihoods of dependent fishers (Hossain et al., 2019; Islam et al., 2016). It is important to adopt a pragmatic approach to maximize the sustainable benefits derived from these renewable fish stocks. Protection of the resources from irreversible damage and their sustainable management are paramount. Given the current state of the Hilsa fishery, a comprehensive assessment is necessary, and strategies should be devised to stimulate the recovery of the fishery while ensuring its long-term sustainability and maximizing economic gains.

The sustainable growth of the Hilsa fish marketing system has broader implications for the economy, society, and environment of Bangladesh. The increased profitability and competitiveness of the Hilsa fish industry contribute to the country's overall economic development, generating employment opportunities and boosting export revenues. Moreover, by promoting sustainable fishing practices, the marketing system safeguards the ecological balance of rivers and estuaries, protecting biodiversity and preserving the natural resources on which the industry depends.

The Hilsa stocks are exploited by a variety of gears, the most common of which are the clap net, gillnet, driftnet, seine net, barrier net, and fixed bag net; the largest contribution, however, comes from gill/drift nets. Mechanized fishing with gillnets accounts for the bulk of the landings from the sea. For this reason, the number of fishing vessels and gears increased day by day. The radical decrease of catches of both mechanized and non- mechanized boats indicates the excess of fishing effort, which could lead to over–exploitation and vulnerability of the fishery. The declining trend of catch per unit effort of Hilsa fishing is threatening the livelihoods of about 464 thousand Hilsa fishermen. Fish stocks are renewable, and a pragmatic approach is essential to maximize their sustainable benefits. It must be ensured that the resources are protected from irreversible damage and managed on a sustainable basis. The existing situation of the Hilsa fishery suggests that proper assessment is necessary and finding a way to stimulate the fishery’s recovery and make it sustainable while maximizing economic benefits.

Recognizing the significant economic and nutritional value of Hilsa, the government of Bangladesh has taken proactive measures to safeguard the brood and juvenile Hilsa in their nursery and spawning grounds. To tackle the challenges faced by the Hilsa fish marketing system, Bangladesh requires a comprehensive plan aimed at modernizing and streamlining its operations. There need to enhance the efficiency, transparency, and sustainability of the entire Hilsa value chain, spanning from harvesting to processing, packaging, and distribution. By embracing innovative technologies, adopting best practices, and implementing robust regulations, Bangladesh is laying the groundwork for a

more organized, transparent, and profitable Hilsa fish market. This type of transformation would ensure the fair and equitable distribution of Hilsa fish, benefiting all stakeholders involved, including fishermen, traders, processors, and consumers. Through the establishment of a level playing field, a transformative marketing system could eliminate exploitation by middlemen, minimize post-harvest losses, and secure a greater share of profits for the primary producers.

Simultaneously, the new marketing system prioritizes the preservation of the ecological balance in rivers and estuaries, promoting sustainable fishing practices, and safeguarding the Hilsa fish population for future generations. To address these challenges and establish a more efficient and transparent marketing system, Bangladesh has undertaken various initiatives. One key step is the modernization of fishing techniques and infrastructure. The government has implemented regulations to encourage responsible and sustainable fishing practices, such as prohibiting the use of fine-mesh nets during the Hilsa breeding season and imposing restrictions on fishing in specific areas. These measures contribute to the protection of the Hilsa fish population and ensure its long-term sustainability.

In order to improve the existing condition of the Hilsa marketing, it is crucial to bridge the knowledge gap surrounding the Hilsa marketing system. Thus, the objective of the present study is to extensively explore the complexities of the existing Hilsa fish marketing system in Chandpur, thoroughly analyzing its different facets to gain a comprehensive understanding of fish marketing system, supply chain, and associated problems.

Materials and Methods

The study was conducted in purposively selected three unions namely Duhalia, Pandergaon and Mannargaon union of Dowarabazar upazila of Sunamganj district. A current list of all BRRI dhan87 growers was collected from the UAO office. The population of the study was made up of the 250 farmers of the selected three unions. Following simple random selection method, 20% of respondents were chosen (Kerlinger, 1993) as sample. In this way the sample size became 50. Data were collected from the sample farmers rather population from 10 October to 25 November 2020, data were gathered from the 50 selected farmers.

Selection of the study villages

A set of criteria (refer to Table 1) was devised to guide the selection process of the study villages. Additionally, we actively sought input from a diverse range of stakeholders, including the Department of Fisheries (DoF), local personnel from different non-governmnetal organizations (NGOs) (namely CNRS, ASA, BRAC, and SAJIDA), the WorldFish, school teachers, fish traders, and members of the fishing communities. This collaborative effort aimed to gather unbiased perspectives on the fishing villages. After thoroughly assessing the advantages and disadvantages of various locations, we ultimately chose 'Anandabazar', Haimchar, Uttar Motlobpur, and Dakshin Motlobpur villages of Meghna Estuarine area of Chandpur district as the final study sites (Fig. 1).

Table 1 . Matrix of decision making for final selection of the study villages.

Potential sites	**Time-tested knowledgeable respondents *1**	**Community cohesiveness & attitude *2**	**Location & 'ecosystem community' attributes *3**	**Prevalence and function of local institution *4**	**Gender sensitivity *5**
Ananda Bazar ***F**	+++	+++	++	+++	+++
Haimchar ***F**	+++	+++	+++	+++	+++
Uttor Motlobpur ***F**	++	+++	+++	++	+++
Dakshin Motlobpur ***F**	+++	+++	+++	++	+++
Algi	++	+++	++	++	++
Bishnupur ***F**	+++	+++	+++	++	+++

Note: +++ Highest, ++ moderate, + minimum
*1 Prevalence of old experienced fishers, story teller, active fishers of varying age, availability for interview
*2 Community functions, connectedness, joint rituals, positive attitude, willingness to share
*3 Distance from waterbody, dependence on natural resources for livelihood
*4 Traditional leadership, local resource management system
*5 Women's distinct productive role, willingness to share, degree of social conservatism

Data collection and analysis

The empirical data for this study was mainly collected through key informant interviews. Recognizing that not all fishers in the communities possess equal knowledge in socio-economic, cultural, and ecological aspects, it was imperative to identify key informants. To select the key informants, we established specific criteria: 1) a minimum of 10 years of fishing experience, 2) dependence on fishing for their livelihood, 3) recognition within the fishing community as holders of knowledge, and 4) willingness to share information. One advantage of conducting key informant interviews was the ability to gauge the respondent's reactions and responses instantly. Interviews were most effective when interviewees could recall and articulate information related to their field. Consequently, fishing boats were identified as the ideal setting for interviewing the fishers. In the case of interviewing women, it was considered respectful to avoid entering their homes in the absence of male counterparts, adhering to social customs.

Figure 1. Map of the study areas (Source: https://en.banglapedia.org/index.php/Chandpur _District)

We also gained valuable insights from informal conversations, commonly known as 'aadda', that take place in tea stalls where fishers gather and engage in spontaneous discussions while enjoying hot tea and cookies. These tea stalls serve as meeting points for the local community, making them ideal public spaces to verify information in the presence of experienced fishers. We took the opportunity to actively listen to their comments, share our own perspectives, and engage them in meaningful discussions, often accompanied by another round of tea and toast. It was during these interactions that passing remarks or casual comments occasionally revealed significant information and sparked new

thoughts. In addition, we conducted interviews with a total of 60 fish traders (retailers or wholesalers) as the key informants. These interviews were carried out using a structured questionnaire designed specifically for this purpose. From each of the selected village markets, we interviewed 15 respondents, allowing us to gather comprehensive insights from multiple perspectives within the fish trading sector.

Data analysis

After collecting all the data, it was organized and analyzed using Microsoft Excel. Descriptive analysis techniques were employed to examine the data and derive meaningful insights. The findings were then presented in a comprehensive manner through textual descriptions, tables, and graphical representations. This approach aimed to provide a clear and comprehensive understanding of the Hilsa marketing system.

Results and Discussion

The average net marketing margins of all intermediaries involved in the Hilsa fish trade are presented in Table 2. Retailers consistently achieve the highest profits, followed by faria, bepari, and aratder, in terms of the amount of fish handled. The variation in profits among intermediaries can be attributed to differences in costs, purchase price, sales price, and market conditions.

Table 2. Information of fish traders and price of fish.

Upzila	Group name	No. of arat	No of aratder	No. of fisher aligned	Number of boats	Hilsa shad landed (Kg)	Other fish landed (kg)	Market value of Hilsa (BDT)	Market value of other fish (BDT)
Matlab Uttar	Babu Bazar mach ghat	14	34	1600	185	300000	160000	150000000	32000000
	Eklaspur Mach ghat	6	11	990	100	120000	80000	60000000	16000000
	Amirabad mach ghat	8	18	465	70	48000	80000	24000000	16000000
Chadpur Sadar	Akhoner hat mach ghat	14	15	4450	400	360000	84000	180000000	16800000
Haim char	Katakhali mach ghat	13	30	1560	200	180000	90000	90000000	18000000
	Telir more mach ghat	6	12	1650	150	120000	60000	60000000	18000000
	Haimchar machghat	6	11	760	80	90000	240000	45000000	12000000
	Char Bhairob mach ghat	24	36	1930	250	600000	60000	300000000	12000000
	Katakhal machghat	7	11	810	90	180000	72000	90000000	48000000
	Ishan Berir mach ghat	4	4	780	180	120000	96000	60000000	14400000
	Puran Berir machghat	10	21	1450	200	240000		120000000	19200000

All intermediaries play a role in the buying and selling of fish (Table 3). Fishermen primarily sell their fish through open bargaining auctions. However, there are instances where fishermen sell their fish at prefixed prices to aratder and bepari, usually due to the condition of dadon taking. Aratder mostly follows auction methods, with 90% of their transactions being conducted through auctions and 10% through open bargaining. Bepari, on the other hand, employs the cost plus method, along with auctions, open bargaining, and market-based pricing. Faria determines the price of

their fish using open bargaining, auctions, and the prevailing market prices. Retailers, in turn, utilize open bargaining and market-based pricing strategies when selling fish to consumers.

Table 3. Pricing determination strategies followed in selling fishes in Bangladesh

Pricing methods	**% Market Intermediaries**		
	Fisherman	Aratder	Retailer
Open bargaining	30	10	45
Auction	55	90	0
Based on going market Prices	0	0	30
Prefixed prices	15	0	0
Cost-plus method	0	0	25
Total	100	100	100

Based on the information presented in the Table 4, it was observed that prices vary based on factors such as fish size, season, and special occasions like Pahela Baishakh and Pooja. During the peak season when there is a high supply of fish, the prices tend to remain relatively low. Price also varied on its size, for example, less than 300 grams (Tk. 250/kg), around one kilogram (Tk. 800/kg), and larger sizes (Tk. 1100/kg). However, during the lean season, prices can increase significantly, ranging from 60% to 100% higher than usual. Notably, there is a price surge during Pahela Baishakh (First day of Bengali New Year), where the price of larger sizes can reach as high as Tk. 3000-4000/kg.

Table 4. Price (Tk/Kg) variation of hilsa in peak and lean season based on size at retail market

Size	Peak season(./kg)	Lean season(Tk./kg)
Less than 300gm	250	500
300-700gm	500	850
700-1000gm	800	1200
Above 1000 gm	1100	1600

Based on the data presented in Table 5, it is evident that there are numerous challenges in the market. Out of the 100 individuals surveyed, 55 people identified infrastructure problems, 42 people highlighted issues with the supply of ice, 35 people mentioned concerns regarding credit facilities, and 25 people expressed dissatisfaction with hygiene and quality. Furthermore, a significant number of respondents, 70 people, expressed their discontent with government policies related to the market. To provide a visual representation of these market problems, please refer to Figure 2. This figure illustrates the specific challenges faced by individuals in the market.

Table 5. Problem of the Market

Problem	People Suffering	People not Suffering
Infrastructure	55%	45%
Supply of ice	42%	58%
Credit facilities	35%	65%
Hygiene and quality	25%	75%
Government policy	70%	30%

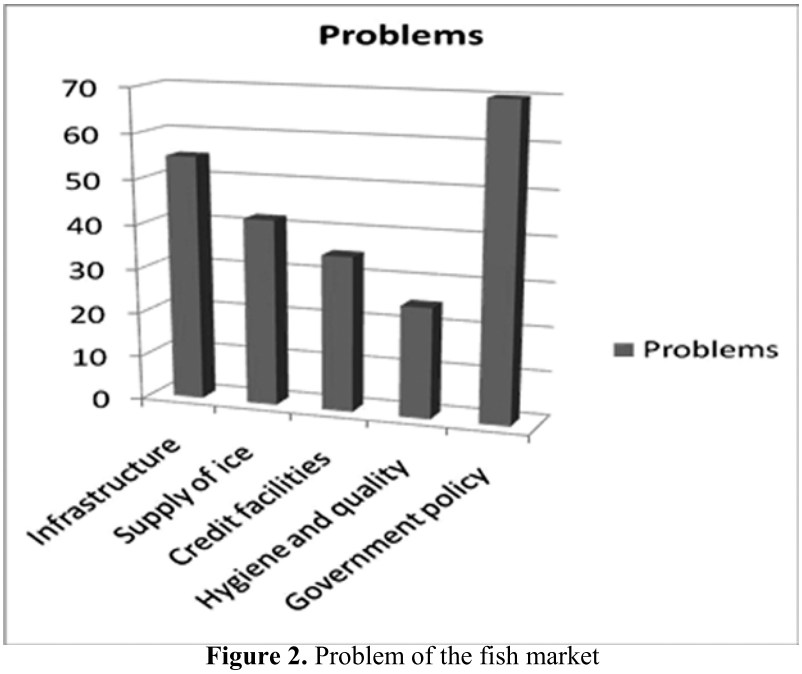

Figure 2. Problem of the fish market

When analyzing the Hilsa marketing system, various factors are taken into account, such as marketing costs, marketing margins, the number of middlemen in the marketing channel, distance between primary and retail markets, and consumer behavior in relation to pricing. The marketing of Hilsa in the meghna estuary retail markets involves a significant number of intermediaries. Fishermen receive 55% of the price paid by consumers, which amounts to US$ 1.61 per kilogram of Hilsa. The price of Hilsa is influenced by factors such as quality, size and weight, season, market structure, and supply and demand dynamics. Hilsa prices exhibit a seasonal pattern, with peak demand occurring during festivals, which may not always align with bumper harvests. Furthermore, prices can vary across different markets. Town markets generally have higher prices due to a larger consumer base and higher family incomes compared to coastal markets. Additionally, prices differ based on the size of the Hilsa, with larger fish commanding significantly higher prices per kilogram. Intermediaries involved in Hilsa trade receive relatively high margins due to the long distances involved in transportation and the presence of multiple trader categories. Among the intermediaries, wholesalers receive the highest margins. Secondary markets exhibit the highest average marketing margin per kilogram of Hilsa, followed by retail and primary markets. Similarly, secondary markets yield the highest average marketing profit (US$ 0.30 per kg) compared to retail and primary markets.

Fish markets typically lack proper facilities, exhibiting minimal hygiene and sanitation standards. Currently, there are no established protocols for handling, washing, sorting, grading, cleaning, and icing of fish. Fishermen at the primary market level face challenges related to a lack of bargaining power and access to market information. The existing marketing infrastructure, including cold storage, ice, and transportation facilities, is generally inadequate, unhygienic, and in a state of disrepair. Additionally, political disturbances such as strikes and roadblocks disrupt fish transportation and marketing activities. While wholesale markets tend to have better facilities, conditions at primary and retail markets are generally unsatisfactory. Issues regarding stalls, parking, spacing, sanitation, drainage, and overall management contribute to the subpar conditions. It is crucial to address these challenges and prioritize the development and sustainability of Hilsa marketing.

Conclusion

The private sector has historically led the development of the Hilsa fish marketing system in Bangladesh, supported by government infrastructure investments. However, market regulation is limited, and fish prices are typically determined through open bargaining. The fresh fish market involves multiple intermediaries, with limited access to alternative markets for fishermen. Some intermediaries contribute little value, increasing costs for consumers and causing losses for fishermen. Supermarkets have emerged as game-changers in the fish marketing industry, expanding beyond the capital city and offering high-quality fish that is fresh and chemical-free. They directly purchase fish from fishermen at landing points, shortening the marketing chain and providing better prices to fishermen. These supermarkets cater to higher-income customers and claim a larger portion of the consumer price. Efficient transportation facilitated by the government, free from unnecessary tolls and fees, is crucial for effective fish marketing. Improving road and transport

networks can reduce the involvement of excessive middlemen, benefiting both fishermen and consumers. Establishing assembly points with refrigerated storage facilities would minimize fish spoilage, enable bulk transfers, and reduce post-harvest losses, leading to better prices for fishermen.

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