

Commercial Diversity and Market Dynamics of Dried Fish: Processing Methods, Drying Duration, Pricing, and Marketing Systems in Cox's Bazar's Burmese Market, Bangladesh

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Abstract

The Burmese dry fish market in Cox's Bazar Sadar is a traditional hub for a variety of dried fish products in coastal Bangladesh, playing a crucial role in local fisheries-based livelihoods and trade. This study offers a comprehensive review of commercial diversity, processing methods, drying times, pricing structures, and marketing channels based on a one-month field survey. Data were gathered from 15 retail shops through systematic observation and semi-structured interviews with experienced traders and shop owners. A total of 58 different dried fish products were documented, representing at least 24 scientifically identified taxa along with numerous market variants distinguished by size, processing level, and presentation form. Whole and near-whole products dominated the market, indicating limited post-harvest modification beyond initial preservation. Sun-drying was identified as the main processing technique, reflecting its low cost and reliance on suitable climatic conditions, while salt-curing was also widely employed to extend shelf life and improve product stability. Less common methods, including mechanical drying, premium processing, and fermentation, highlighted specialized products and higher value addition. Drying times varied significantly, from 1–2 days for quickly processed products to 120–150 days for fermented items such as puti shidol, illustrating species- and method-specific processing characteristics. Retail prices showed considerable variation (BDT 300–5,500/kg), mainly determined by species type, product size, salting method, and perceived quality. The marketing system operated on multiple levels, involving fishermen, beparis, processors, wholesalers (aratdars), and retailers before reaching consumers, tourists, and regional traders. Overall, the market reflects a highly diverse, economically structured, and value-driven system influenced by biological, technological, and market factors. The findings of this study provide valuable insights for improving value chain efficiency, supporting sustainable fisheries-based livelihoods, and informing policy and market interventions to enhance the quality, profitability, and competitiveness of dried fish products in coastal Bangladesh.

Introduction

Dried fish, locally known as ‘shutki’, is one of the oldest and most significant traditional fishery products in Bangladesh. It plays a crucial role in food culture, nutritional provision, and livelihood support, especially in coastal and fishing communities (UNDP, 2024). Drying is a simple and commonly practised preservation method that lowers moisture content in fish, preventing spoilage and prolonging shelf life. In Bangladesh, dried fish products, locally called shutki, are mainly produced in coastal regions such as Cox’s Bazar, Chattogram, Patuakhali, and Khulna, where favourable climatic conditions and plentiful marine fish resources favour large-scale drying activities. These products are widely consumed across the country and also traded in regional markets (Hasan et al., 2025).

Cox’s Bazar is a key centre for the production and sale of dried fish in Bangladesh. Many drying yards operate in nearby coastal areas such as Nazirartek, Moheshkhali, Kutubdia, and Teknaf, supplying a wide variety of dried fish products to local markets. Among these, the Burmese dry fish market located in Cox’s Bazar Sadar is particularly renowned for its diverse range of dried fish products. The market attracts local residents, tourists, traders, and retailers from across the country. Consequently, it functions as an important hub for the distribution and commercialisation of dried fish (Hamja et al., 2025).

Commercial diversity in dried fish markets often goes beyond just biological species diversity. A single fish species can be sold in various forms depending on size, grade, salting level, cleaning status, cutting style, drying method, and intended culinary use (Paul et al., 2018). These differences produce multiple commercial products from the same species, helping to create market segmentation and add value. Understanding this diversity is vital for assessing market structure, processing techniques, and price differences within the dried fish trade (Fitri et al., 2022).

The dried fish trade also plays a vital role in Bangladesh's coastal economy by creating jobs for fishermen, processors, traders, and transport workers. Thousands of small-scale workers participate in fish drying, sorting, packaging, and

marketing activities along the entire value chain (DoF, 2024). Additionally, dried fish markets act as key centres for price setting, product grading, and distribution across different regions of the country (Al Mehedi et al., 2020). However, differences in processing methods, handling practices, and marketing systems can affect product quality, safety, and consumer perception (Al Banna et al., 2022). Therefore, understanding the characteristics of dried fish products and their market structure is crucial for analysing the dynamics of this traditional fishery sector.

Despite the economic and cultural significance of dried fish in Bangladesh, comprehensive market-level documentation of species diversity, processing practices, drying techniques, and price structures remains limited due to the sector’s traditional and fragmented nature (Hossain et al., 2024). Furthermore, information regarding the marketing channels through which dried fish products move from fishermen to final consumers is still insufficient (Hasan et al., 2025). Such information is crucial for understanding value chain dynamics, market organisation, and opportunities for improving product quality and marketing efficiency. Therefore, the present study aims to investigate the commercial diversity, processing techniques, drying duration, pricing structure, and marketing channels of dried fish products in the Burmese dry fish market at Cox’s Bazar Sadar, Bangladesh. Specifically, the study seeks to (i) identify the diversity of dried fish products and their commercial forms, (ii) examine prevailing processing and drying practices, (iii) analyse price variations among different products, and (iv) map the marketing channels involved in the distribution system. The findings are expected to provide a baseline for improving quality management, market development, and value chain efficiency in the dried fish sector of Bangladesh.

Materials and methods

Study area and survey period

The study was conducted at the Burmese dry fish (shutki) market in Cox’s Bazar Sadar, Bangladesh (Figure 1). A one-month market survey took place from 20 January to 18 February 2026. This period was chosen to record the species-wise diversity, product forms, processing methods, retail price

ranges, and marketing channels of commercially available shutki products during a continuous survey period.



Figure 1. Map of the study area

Shop observation and data collection

A total of 15 dried fish shops in the Burmese dry fish market at Cox's Bazar Sadar were observed during the survey period. One respondent from each shop, usually the shop owner or an experienced trader, was interviewed to gather relevant information on dried fish products available in the market. Product information was collected directly from the market inventory and through discussions with the respondents. For each product, the following variables were recorded: dried fish product name, local name, common name, scientific name (where available), price range in Bangladeshi Taka (BDT) per kilogram, product form, processing method, estimated drying duration, and marketing channel. In total, 58 distinct commercial dried fish products were documented from the surveyed shops during the study period.

Questionnaire development and validation

A structured questionnaire was designed to collect information on dried fish products, processing techniques, drying times, price ranges, and marketing channels within the Burmese dry fish market at Cox's Bazar Sadar. It included both closed and open questions to gather detailed insights from dried fish traders and shop owners. The questionnaire was initially created based on the study's aims and relevant literature on dried fish marketing and processing methods. Before conducting the full survey, it was pre-tested with a small group of traders in the market to check its clarity, relevance, and consistency. After their feedback, minor revisions were made to enhance question wording and structure. The final version of the questionnaire was then used to collect data during the market survey.

Data categorization

Products were categorised by marketed form, including whole, headless, without head and tail, cleaned, sliced, cut, powdered, and fermented forms. Processing methods were grouped into sun-dried, salt-cured, mechanical drying, premium-dried, fermentation, and fermentation plus sun-drying. Scientific names explicitly listed in the market table were used to summarise taxonomic representation. Repeated market variants of the same species were retained as separate commercial products because they differed in size grade, salting status, preparation style, or expected end use.

Data analysis

The dataset was analysed using descriptive statistics. Frequencies were calculated for product form, processing method, and drying duration class, while price ranges were compared across products to identify low-, medium-, and high-value market segments. Since the dataset was derived from a market inventory rather than from landing records, the analysis concentrated on commercial diversity rather than abundance, catch composition, or seasonal production volume.

Results and discussion

Commercial diversity of dried fish products

The survey documented 58 commercial dried fish products across 15 shops observed at the Burmese Market in Cox's Bazar Sadar Upazila, representing at least 24 identified scientific taxa, along with numerous commercial variants of the same fish species. Species identification was carried out based on morphological characteristics and local market names and subsequently verified using standard taxonomic references including FishBase (Froese & Pauly, 2025), FAO fish identification guides (FAO, 2013), and published checklists of Bangladeshi marine fish species (Habib & Islam, 2020). Where necessary, identification was further confirmed through consultation with fisheries experts.

The market was particularly rich in product variants of Bombay duck (*Harpadon nehereus*), ribbon fish (*Trichiurus lepturus*), pomfret, anchovy-type fish, threadfin, and shrimp-based

products. Fermented items such as modhu fayssa sidol, puti sidol, and nappi were also present, indicating that the market included both conventional dried fish and specialised fermented fish products (Tables 1 and 2). This level of diversity is comparable to that of dried fish markets in other parts of South and Southeast Asia, where multiple product forms are produced from the same species through variations in processing and grading (Chrispin & Kumar, 2024). Socio-economical perspective of dried fish value chain is described in In A. Ranjan & S. A. Shanmugam (Eds.), *Dry fish: A global perspective on nutritional security and economic sustainability* (pp. 145–160). Springer, Cham. https://doi.org/10.1007/978-3-031-62462-9_10. This pattern shows that commercial diversification in the market is not driven solely by species identity. Instead, species are divided into different sale categories based on size, head removal, cleaning level, salting status, and end use. For example, Bombay duck was marketed in various forms, including salt-free, salted, cleaned, headless, and thin grades, while ribbon fish appeared as headless, cut, medium, choikkya, trawler-dried, salted, premium-dried, and powdered products. Similar diversification patterns have been documented in coastal dried fish markets of Bangladesh, where species such as Bombay duck (*H. nehereus*), ribbon fish (*T. lepturus*), anchovies, and shrimp are often processed into several market grades depending on size, salting intensity, and cleaning level (Nowsad, 2005;). The presence of fermented products such as sidol and nappi further illustrates how traditional preservation methods are integrated with common sun-drying techniques, which are widely used in the Bay of Bengal region (Nowsad, 2007; Immaculate et al., 2013). Similar multifunctional processing systems have been described in artisanal fisheries value chains worldwide, where species are transformed into multiple products to optimise resource use, extend shelf life, and target different consumer markets (FAO, 2020; Rehbein & Oehlenschläger, 2009). Such diversification and flexibility in processing are crucial in supporting livelihoods of small-scale fishermen, strengthening market resilience, and better utilising marine fish resources in coastal Bangladesh.

Table 1. Study profile and key descriptive findings

Parameter	Observed value
Survey duration	20 January 2026 to 18 February 2026 (30 Days)
Observed shops	15
Total market products documented	58
Explicitly identified scientific taxa	24
Lowest retail price	BDT 300-500/kg (Nappi)
Highest retail price	BDT 5000-5500/kg (large salt-free silver pomfret)
Dominant product form	Whole (45 products) / whole-like forms (47 products)
Dominant processing method	Sun-dried (41 products)
Most common drying classes (product)	2-3 days (19), 3-4 days (15), and 4-5 days (17)

Product forms

Whole-form products dominated the market. Out of 58 products, 45 were sold as whole, 2 as headless (whole), 3 as sliced, 2 as cut, 2 as powdered, 2 as fermented, 1 without head and tail, and 1 as cleaned stated in Tables 1 and 2. This presentation allows buyers to easily identify species and assess quality visually, a common feature of traditional dried fish markets across South and Southeast Asia (Nowsad, 2007; Reza et al., 2005). Additionally, whole dried fish require fewer processing steps and cause less handling damage, helping to preserve structural stability during drying, transport, and storage. Studies on artisanal fish processing in Bangladesh show that sun-drying intact fish remains the most common method due to its low cost, simplicity, and suitability for small-scale coastal processing systems (DoF, 2024;). The presence of sliced, cut, powdered, and fermented products indicates increasing functional diversification in the dried fish market. Products such as sliced hilsa or pomfret and powdered chhuri demonstrated adaptation to specific cooking practices, while fermented items (e.g., sidol-type products) reflect traditional preservation methods and regional fish consumption preferences (Majumdar et al., 2017). Processed forms like sliced hilsa or pomfret enhanced cooking convenience and reduced preparation time, while powdered fish products were frequently used in spice mixes, sauces, or mashed dishes in regional cuisines (Reza et al.,

2009). Thus, although whole fish dominated the market, secondary product forms were commercially meaningful and indicate functional diversification.

Processing methods

Among the 58 products, the present study showed that sun-drying was the dominant preservation technique, accounting for 70.7% of the documented dried fish products, followed by salt-curing (20.7%), while other methods such as fermentation, mechanical drying, and premium drying were seldom used. This distribution confirmed that traditional sun-drying remained the primary preservation method in the Cox's Bazar market system, whereas more specialised techniques occupied only small niche segments (Tables 2 and 3). Previous studies on the dried fish sector in coastal Bangladesh have similarly reported that sun-drying was the most widely practised technique due to its accessibility and minimal capital requirements (Nowsad, 2007; Nowsad, 2010).

Sun-dried products were found across both low- and high-value categories, suggesting that sun-drying was not limited to low-cost products but served as a central processing method throughout the market. Salt-curing was common in loitta, chhuri, hilsa, marine baim, surma, rupchanda, black rupchanda, coral, and rita products, likely improving shelf life and reducing microbial spoilage during drying and storage (Doe, 1998; Rahman et al., 2012). The presence of both salted

and salt-free variants further indicated market segmentation based on consumer preference, storage stability, and trade needs within regional dried fish value chains (Belton et al., 2018).

Drying duration

Drying durations varied significantly among products. The most common categories were 2–3 days (19 products), 3–4 days (15 products), and 4–5 days (17 products). Only a few products required longer periods, such as 5–6 days (2 products), 5–7 days (2 products), 7–10 days (1 product), or 120–150 days (1 product). The shortest duration was 1–2 days for trawler-dried chhuri, while the longest was 120–150 days for puti sidol.

Short drying times were mainly associated with smaller-bodied fishes and shrimp products, including mola, sundori, kachki, fayssa, marine puti, safe nappi, and powdered shrimp products. Short drying periods (2–3 days) were mainly associated with small-bodied fishes and shrimp products, such as mola, sundori, and anchovy-type species, which lost moisture rapidly due to their thin muscle tissues and high surface-area-to-volume ratio (Nowsad, 2005; Azam et al., 2003). Similar drying durations for small marine and estuarine fishes were also documented in artisanal drying systems across the Bay of Bengal region (Immaculate et al., 2013).

In contrast, medium drying durations (3–5 days) were typical for larger species, including loitta, ribbonfish, pomfret, and croaker, reflecting greater flesh thickness and slower moisture diffusion during dehydration (Doe, 1998; Nowsad, 2007). Fermented products showed a distinct pattern: modhu fayssa sidol required 7–10 days, puti sidol required prolonged maturation of 120–150 days, and ngapi required only 3–4 days (Tables 2 and 3). In addition, the very long duration observed for puti sidol (120–150 days) reflected the prolonged microbial fermentation process typical of traditional fermented fish condiments in South and Southeast Asia (Nowsad, 2014). These findings highlighted that drying duration was strongly influenced by fish morphology, processing technique, and preservation pathway, which collectively determined product stability and quality in traditional dried fish markets.

Price structure and value addition

Retail prices varied widely, ranging from BDT 300–500/kg for ngapi to BDT 5000–5500 per kg for large salt-free silver pomfret. Other high-value products included medium silver pomfret (BDT 4500–4700/kg), large Indian threadfin (BDT 4500–4800/kg), deshi and red seabass (BDT 3200–4000/kg), small Indian threadfin (BDT 3500–3700/kg), and several shrimp products priced at BDT 2800–3000/kg. In contrast, lower-priced products included sundori, fayssa, thin loitta, powdered products, nappi etc. (Table 2). Previous studies on fish marketing systems in Bangladesh have similarly reported that high-value marine species such as pomfret and shrimp generally obtained significantly higher prices due to their superior taste, larger body size, and strong consumer demand in domestic and export markets (Acharjee et al., 2023; DoF, 2024).

A clear price premium was observed for salt-free products relative to their salted counterparts, suggesting a strong consumer preference for products perceived as fresher, more natural, or of higher quality. For example, salt-free surma, silver pomfret, coral, and loitta were consistently priced higher than salted forms. This pattern was consistent with findings from previous studies, which indicated that processing methods, including salting intensity and drying technique, significantly influenced product quality, consumer perception, and market price (Nowsad, 2007; Reza et al., 2009). Reduced salting may have also appealed to increasingly health-conscious consumers who preferred products with lower sodium content, thereby enabling traders to market such products as premium items.

The market also showed evidence of strong value addition through grading and product specialisation. Premium or differentiated products such as soft, sweet, large chhuri, trawler-dried chhuri, export-quality chanda, and cleaned special loitta occupied distinct price positions compared with more conventional forms. Earlier research on dried fish value chains in Bangladesh has highlighted that grading by size, appearance, and processing method can significantly increase product value and profitability for traders (Islam et al., 2018; Mandal, 2021). Similar observations were reported by Acharjee et al. (2023), who

noted that each stage of the fish marketing chain contributed to incremental value addition and price escalation before the product reached the consumer. These findings indicated that dried fish prices were determined not only by species identity but also by quality attributes and value-addition practices across the marketing chain.

Implications for the dried fish market

The Burmese dry fish market at Cox's Bazar Sadar represented a structured commercial system in which marine fish resources were transformed into multiple processed retail categories. The coexistence of sun-dried, salt-cured, mechanically dried, premium dried, and fermented products reflected the long-standing importance of drying as a preservation strategy in tropical fisheries and demonstrated the depth of traditional processing knowledge in coastal Bangladesh. Fish drying has been a major small-scale post-harvest activity that enabled the preservation and distribution of seasonal marine catches to inland markets while supporting livelihoods in fishing and trading communities (Al Mehedi et al. 2020).

The diversity of product forms observed in this market also indicated a value-addition system where different processing techniques generated differentiated commodities that targeted diverse consumer preferences and price segments. Similar diversification has been documented in other dried fish markets across Bangladesh, where variations in salting, drying, and fermentation created multiple retail product types (Saha et al., 2022). However, the continued reliance on traditional sun-drying systems posed challenges related to hygiene, contamination risk, and inconsistent product quality (Al Mehedi et al., 2020; Hamja et al., 2025).

Although based on a one-month inventory from 15 shops, the present survey provided a useful baseline describing the commercial diversity of dried fish products in the Cox's Bazar Burmese market and may inform future studies on processing standardization and value-chain development.

Table 2. Commercial dried fish products and their details from the Burmese dry fish market at Cox's Bazar Sadar

*1 USD= 123.44 BDT

Sl. No.	Dry Fish (Shutki) Product Name	Local Name	Common Name	Scientific Name	Price (BDT/kg)	Species Source	Product Type	Processing Type	Drying Days (Winter)		
1	Salt-Free Small Loitta	Lobon Chara Choto Loitta	Bombay Duck	<i>Harpadon nehereus</i>	1300-1500	Bay of Bengal	Whole	Sun-dried	2-3		
2	Large Loitta (Salt-Free, Headless)	Boro Loitta Matha Chara			1600-1800		Headless	Sun-dried	3-4		
3	Large Loitta (Salt-Free, With Head)	Boro Loitta Matha Shoho			1400-1600		Whole	Sun-dried	3-4		
4	Special Thin Loitta (Cleaned)	Special Chikon Loitta			1800-1900		Cleaned	Sun-dried	2-3		
5	Large Loitta (5-8% Salted, Headless)	Boro Loitta Lobon Deya			1200-1400		Headless	Salt-cured	3-4		
6	Large Loitta (5-10% Salted, With Head)	Boro Loitta Matha Shoho			800-900		Whole	Salt-cured	3-4		
7	Thin Loitta (5-10% Salted)	Chikon Loitta			650-800		Whole	Salt-cured	2-3		
8	Salt-Free Thin Loitta (With Head & Tail)	Loitta			1300-1400		Whole	Sun-dried	2-3		
9	Large Chhuri (Without Head & Tail)	Boro Chhuri	Ribbon Fish	<i>Trichiurus lepturus</i>	2400-2500	Bay of Bengal	Headless	Sun-dried	3-4		
10	Small Chhuri (Salt-Free)	Chhoto Chhuri			1400-1500		Whole	Sun-dried	3-4		
11	Cut Large Chhuri (Salt-Free)	Kata Chhuri			2000-2200		Cut	Sun-dried	3-4		
12	Medium Chhuri	Majhari Chhuri			1800-1900		Whole	Sun-dried	3-4		
13	Vorta Chhuri	Vorta Chhuri			800-900		Powdered	Sun-dried	2-3		
14	Trawler-Dried Chhuri	Trawler Chhuri			3000-3200		Whole	Mechanical drying	1-2		
15	Medium Choikkya Chhuri	Majhari Choikkya Chhuri			1400-1600		Whole	Sun-dried	3-4		
16	Large Choikkya Chhuri	Choikkya Chhuri			2000-2100		Whole	Sun-dried	3-4		
17	Cut Large Chhuri (5-8% Salted)	Kata Chhuri			1600-1800		Cut	Salt-cured	3-4		
18	Soft Sweet Large Chhuri	Norom Chhuri			2400-2500		Whole	Premium dried	3-4		
19	Medium Marine Baim	Majhari Baim	Indian Pike Conger	<i>Congresox talabonoides</i>	1400-1600	Bay of Bengal	Whole	Sun-dried	4-5		
20	Large Marine Baim (5-8% Salted)	Boro Baim			1400-1500		Whole	Salt-cured	5-6		
21	Salted Hilsa (Whole)	Nona Ilish	Hilsa	<i>Tenulosa ilisha</i>	1100-1300	Bay of Bengal	Whole	Salt-cured	8-10		
22	Salted Hilsa (Slice)	Nona Ilish Fali			1200-1400		Sliced	Salt-cured	8-10		
23	Vorta Shrimp/Balachao	Vorta Chingri	Shrimp	<i>Metapenaeus monoceros</i>	800-900	Kaptai Lake	Spicy Mixed Shrimp	Sun-dried	2-3		
24	Loilya Shrimp (No sand)	Loilya Chingri			<i>Metapenaeus lysianassa</i>		2800-3000	Whole	Sun-dried	2-3	
25	Large Red Chhaga Shrimp (No sand)	Lal Chhaga					<i>Penaeus canaliculatus</i>	2000-2500	Whole	Sun-dried	2-3
26	Large White Chhaga Shrimp (No sand)	Shada Chhaga						2200-2800	Whole	Sun-dried	2-3
27	Special Large Mola	Boro Mola	Mola Carplet	<i>Amblypharyngodon mola</i>	1400-1500	Kaptai Lake	Whole	Sun-dried	2-3		
28	Medium Mola	Majhari Mola			1000-1100		Whole	Sun-dried	2-3		
29	Large Mola	Boro Mola			1200-1300		Whole	Sun-dried	2-3		
30	Special Sundori / Olua (Large)	Sundori	Indian Anchovy	<i>Coilia dussumieri</i>	800-900	Bay of Bengal	Whole	Sun-dried	2-3		
31	Sundori (Medium)	Sundori			600-700		Whole	Sun-dried	2-3		
32	Surma (Salt-Free)	Lobon Chara Surma	Barred Mackerel	<i>Scomberomorus commerson</i>	1500-1600	Bay of Bengal	Whole	Sun-dried	4-5		
33	Surma (5-8% Salted)	Lobon Deya Surma			1200-1300		Whole	Salt-cured	4-5		
34	Kachki	Kachki	Ganges River Sprat	<i>Corica soborna</i>	1000-1200	Kaptai Lake	Whole	Sun-dried	2-3		
35	Fayssa/Bashpata	Fayssa/Bashpata	Gangetic Hairfin Anchovy	<i>Setipinna phasa</i>	800-900	Kaptai Lake	Whole	Sun-dried	2-3		
36	Choikkya Fayssa	Choikkya Fayssa			Hairfin Anchovy		1000-1100	Whole	Sun-dried	2-3	

37	Modhu Fayssa Sidol	Fayssa Sidol			800-900	Bay of Bengal	Fermented	Fermentation + Sun	80-90		
38	Medium Chanda (Sliced)	Majhari Rup Chanda	Chinese Silver Pomfret	<i>Pampus chinensis</i>	1200-1300		Sliced	Sun-dried	3-4		
39	Small Chanda (Sliced)	Chhoto Rup Chanda	Chinese Pomfret	<i>Leptomelanosoma indicum</i>	800-900		Sliced	Sun-dried	3-4		
40	Large Chanda	Boro Rup Chanda			3200-3800		Whole	Sun-dried	4-5		
41	Lakkha / Salmon (Large)	Boro Lakkha/ Taila	Indian Threadfin		4500-4800		Whole	Sun-dried	4-5		
42	Lakkha / Salmon (Small)	Choto Lakkha/Taila			3500-3700		Whole	Sun-dried	4-5		
43	Tailla Shutki (Medium)	Tailla Shutki			1000-1100		Whole	Sun-dried	4-5		
44	Marine Puti	Samudrik Puti/ Fasha	Indian Anchovy		<i>Stolephorus indicu</i>		800-900	Whole	Sun-dried	2-3	
45	Safe Nappi/Fasha	Nappi/ Fasha					800-900	Whole	Sun-dried	2-3	
46	Puti Sidol	Puti Shidol	Spot-in Swamp Barb				<i>Puntius sophore</i>	1500-2000	Mymensingh/Haor	Fermented	Fermentation
47	Large Rupchanda (5-8% Salted)	Boro/Foli Rupchanda	Silver Pomfret			<i>Pampus argenteus</i>	2800-3000	Bay of Bengal	Whole	Salt-cured	4-5
48	Large Rupchanda (Salt-Free, Export quality)	Boro/Foli Rupchanda					5000-5500		Whole	Sun-dried	4-5
49	Medium Rupchanda	Majhari Rupchanda		4500-4700			Whole		Sun-dried	4-5	
50	Black Rupchanda (5-8% Salted)	Kalo Rupchanda	Black Pomfret	<i>Parastromateus niger</i>			1800-2000		Whole	Salt-cured	4-5
51	Shark (Salt-Free)	Hangor	Spadenose Shark	<i>Scoliodon sorroakowah</i>			1400-1600		Whole	Sun-dried	5-6
52	Red Coral (5-8% Salted)	Lal Coral Lobon Deya	Seabass	<i>Lates calcarifer</i>			1600-1800		Whole	Salt-cured	4-5
53	Deshi Coral (Salt-Free)	Deshi Coral					3600-4000		Whole	Sun-dried	4-5
54	Red Coral (Salt-Free)	Lal Coral Lobon Chara			3200-4000		Whole		Sun-dried	4-5	
55	Rita (5-8% Salted)	Rita	Rita Catfish		<i>Rita rita</i>		1200-1400		Whole	Salt-cured	4-5
56	Tuna (Salt-Free)	Lobon Chara Tuna	Mackerel Tuna		<i>Euthynnus affinis</i>		2600-2800		Whole	Sun-dried	4-5
57	Poa Whole	Poa/Leijja Poa	Croaker		<i>Otolithoides pama</i>	1200-1400	Whole	Sun-dried	4-5		
58	Nappi (Shrimp)	Nappi	Ngapi		<i>Acetes sp.</i>	300-500	Whole	Fermentation + sun	3-4		

Table 3. Distribution of products by market form and processing method

Category	Class	No. of products	Share (%)
Product form	Without Head & Tail	1	1.7
	Headless	3	5.2
	Whole	44	75.9
	Cleaned	1	1.7
	Cut	2	3.4
	Spicy Mixed Shrimp	2	3.4
	Sliced	3	5.2
	Fermented	2	3.4
Processing method	Sun-dried	41	70.7
	Salt-cured	12	20.7
	Mechanical drying	1	1.7
	Premium dried	1	1.7
	Fermentation + Sun	2	3.4
	Fermentation	1	1.7

Marketing channel of dried fish

The marketing channel of dried fish in the Burmese dry fish market of Cox's Bazar Sadar involved several intermediaries through which products moved from producers to consumers (Fig. 2). The chain began with fishermen harvesting marine fish species from the Bay of Bengal and nearby estuarine waters. Immediately after landing, the fish were sold to local collectors or beparis, who assembled fish from different landing sites and transported them to drying centers. This initial stage played a crucial role in linking fishermen with processors and ensuring a continuous supply of raw materials for dried fish production (Ahsan et al., 2016).

The collected fish were then supplied to dry fish processors who carried out processing activities such as cleaning, salting, and sun-drying. Major drying operations were concentrated in coastal areas such as Nazirartek, Moheshkhali, Kutubdia, and Teknaf, where favorable climatic conditions supported large-scale dried fish production (DoF, 2024). After processing, the dried fish products were transferred to wholesalers or commission agents (aratdars), who facilitated bulk trading, grading, and distribution to different markets. These

intermediaries played a significant role in price determination and market coordination (Islam et al., 2018).

From wholesalers, the products were supplied to retailers operating in the Burmese dry fish market of Cox's Bazar. Retailers sold dried fish to different categories of buyers, including local consumers, tourists, and regional traders who distributed the products to other districts of Bangladesh. In addition to traditional marketing channels, some retailers have recently started selling dried fish through online platforms, expanding market access beyond the local area (Rahman et al., 2019).

Overall, the marketing system represented a multi-level value chain where fish moved sequentially from fishermen to collectors, processors, wholesalers, and retailers before reaching final consumers. Although the presence of several intermediaries ensured efficient distribution across regional markets, it may have also increased marketing costs and reduced the profit share received by primary producers.

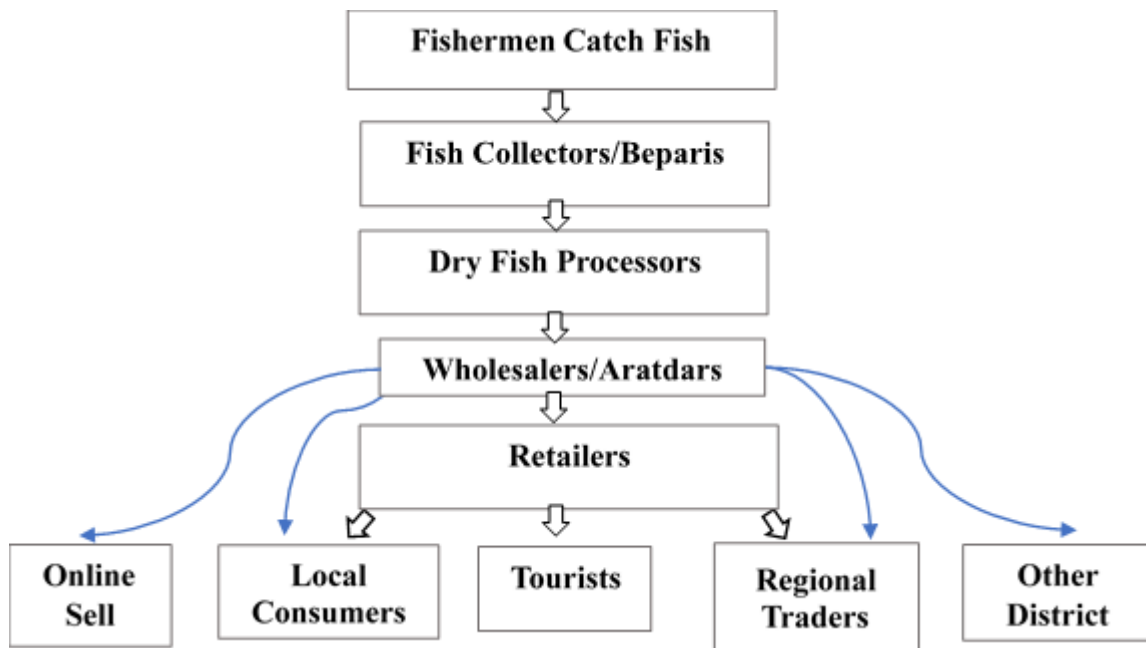


Figure 2. Marketing channel of dried fish products in the Burmese dry fish market

Challenges of dried fish marketing

The marketing of dried fish in coastal areas of Bangladesh, particularly in Cox's Bazar, played an important role in supporting local livelihoods and supplying traditional fish products to domestic markets. However, several challenges affected the efficiency and sustainability of this sector. One of the major constraints was price fluctuation, which was largely influenced by seasonal fish availability, variations in supply, and changing market demand. During peak fishing seasons, increased production of dried fish often reduced market prices, while scarcity in the off-season led to higher prices and market uncertainty for traders and processors (Haque et al., 2015; Nowsad, 2007).

Another significant challenge was the lack of adequate storage facilities. Many traders relied on traditional storage methods, such as bamboo baskets or jute sacks, which provided limited protection from moisture, insects, and contamination. In tropical environments with high humidity, poor storage conditions accelerated quality deterioration and reduced the shelf life of dried fish products (Bala & Mondol, 2001; Reza et al., 2005).

Weather dependency also affected dried fish production and marketing. Traditional sun-drying methods required favourable climatic conditions, including sufficient sunlight and low humidity. Prolonged rainfall or cloudy weather delayed the

drying process, resulting in lower product quality and irregular supply to the market (Al Mehedi et al., 2020; Hamja et al., 2025). Consequently, processors and traders faced economic losses due to spoilage or delayed marketing.

Transportation and logistics limitations further constrained the distribution of dried fish to distant markets. Inadequate packaging, poor transportation facilities, and long travel distances caused product damage and quality degradation during transit (FAO, 2003). In addition, hygiene and quality control issues remained common in traditional dried fish markets, where exposure to dust, insects, and improper handling practices compromised product safety and consumer confidence (Reza et al., 2005).

Addressing these constraints through improved storage systems, hygienic processing practices, and better transportation infrastructure could significantly enhance the efficiency and competitiveness of the dried fish marketing system in Cox's Bazar and other coastal regions of Bangladesh.

Recommendations for improvement of the dried fish market

Based on the observations from the Burmese dry fish market at Cox's Bazar Sadar, several improvements are necessary to enhance the market environment, product quality, and overall trading efficiency.

First, improvement of market infrastructure is essential. Proper market facilities such as hygienic stalls, shaded selling areas, and improved flooring systems should be developed to maintain cleanliness and protect dried fish products from dust, sunlight, and contamination.

Second, better storage facilities should be established within the market. Many traders rely on traditional storage methods that do not adequately protect dried fish from moisture, insects, or rodents. Introducing improved storage systems and moisture-controlled environments would help maintain product quality and extend shelf life.

Third, improved sanitation and hygiene management are needed in the market. Regular cleaning of the market area, proper waste disposal systems, and pest control measures would significantly improve the hygienic condition of the market and increase consumer confidence in dried fish products.

Fourth, quality monitoring and regulatory oversight should be strengthened. Local authorities and fisheries-related institutions could implement quality standards and periodic inspection systems to ensure safe handling and proper processing of dried fish products.

Finally, awareness and training programs for traders on hygienic handling, product preservation, and quality maintenance could contribute to improving the overall condition of the dried fish market. Overall, improving infrastructure, hygiene, storage systems, and market management would enhance the quality, safety, and sustainability of the Burmese dry fish market at Cox's Bazar Sadar.

Conclusion

The present study documented the commercial diversity, processing methods, drying durations, price variations, and marketing channels of dried fish products in the Burmese dry fish market at Cox's Bazar Sadar. A total of 58 products were recorded from 15 shops during a one-month survey, representing at least 24 scientifically identified taxa alongside multiple commercial variants derived from the same species. The market exhibited substantial product diversification, with fish marketed in various forms based on size grade, salting status, processing techniques, and end-use preferences. Whole fish products predominated,

indicating a strong consumer preference for minimally processed forms. Sun-drying was the main preservation method, supplemented by salt-curing, while mechanical drying and fermentation were limited to specialised products. Drying durations typically ranged from 2–5 days, whereas fermented products (e.g. sidol) required extended maturation. Prices varied widely, influenced by species, processing type, and product quality. The marketing chain involved numerous intermediaries from harvesters to retailers, reflecting a complex and value-added supply system in coastal Bangladesh. Overall, the study establishes a baseline characterization of dried fish market structure and product diversity, providing a foundation for future research on processing optimization, quality standardization, and value chain efficiency in coastal fisheries systems. Future studies should focus on year-round assessments to capture seasonal variation in product availability and pricing, detailed quality and safety analysis (e.g., microbial and chemical contamination), and the application of improved drying technologies to enhance product quality. In addition, comprehensive value chain analyses incorporating traceability, market integration, and policy interventions are needed to strengthen the sustainability and competitiveness of the dried fish sector in Bangladesh.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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