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Diverse Value Chains, Pricing Strategies, and Price Information Sources of Selected Dried Fish Varieties in Sri Lanka

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Abstract

The dried fish industry is a diverse and dynamic sub-sector nurturing upon the fisheries sector yet mostly invisible and poorly documented. Hence, this study aims to identify the diverse value chains, roles, and main functions, different pricing strategies, and price information sources of sprats, skipjack tuna, and smoothbelly sardinella, which are the most consumed dried fish varieties in Sri Lanka irrespective of the income levels. Fifty dried fish processors were selected through a simple random sampling technique. Dried fish wholesalers (n=20) retailers (n=20), input suppliers (n=5), and dried fish consumers (n=40) were selected through convenient and snowball sampling techniques. The study was conducted in the Matara, Puttalam, and Jaffna districts representing major dried fish-producing towns from three provinces. Descriptive and inferential data analysis methods were applied such as Friedman test. Value chain (I) is the major chain for skipjack tuna and sprats indicating 37% and 30% respectively. Value chain (VI) is the major chain for smoothbelly sardinella indicating 38% out of total value chain. Cost plus ($P<0.05$, $\bar{x}>3.55$) and competition ($P<0.00$, $\bar{x}>4.12$) based pricing were the main pricing strategies adopted by each value chain actor. Price information is shared among each other through personal contacts intra region ($P<0.05$, $\bar{x}> 4.85$) and inter region ($P<0.05$, $\bar{x}> 4.85$). Therefore, cost plus and competitive based pricing strategies should be structured nationally.

Keywords: *Dried fish, Pricing strategies, Price information, Roles and Functions, Value chain*

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Introduction

The value chain is a collection of actions that adds value to a product at every step of the process, from sourcing to manufacture, distribution, and final consumption (Mandal, 2021; Kaplinsky & Morris, 2001). In its most basic form, a value chain is condensed to fundamental operations such as production, value additions, wholesaling, and retailing, etc. with vertical links (Hossain et al., 2015) The range of goods and services transform and transfer along the value chain towards the final consumer adding values at each stage of the chain (Rosales et al., 2017). Value chain comprises with complete range of actions such as manufacturing, sorting, grading, packing, distribution to end users, and final disposal (Kaplinsky and Morris, 2000). A series of physical and technological differentiation activities are in the value chain, and these are the foundation for developing a valuable consumer product (Mandal, 2021). A constructive flow of information and knowledge is crucial for an effective value chain (Hasini et al., 2020). Besides, trust and bargaining power are essential together with actor interactions and collaboration (Wickrama et al., 2021). Product-related data from upper-stream actors must trickle down to the lower-stream value chain and vice versa (Thu et al., 2021).

In the realm of literature, the Sri Lankan dried fish industry can be analyzed through the lens of various value chains and distinct stages. Gestsson (2010) developed a comprehensive value chain for yellowfin tuna fisheries in Sri Lanka over four distinct steps; supply, primary distributors, secondary distributors, and retail/ export/ processing, which further divides into two sub-value chains: local market value chain and the export market value chain (Gestsson, 2010). The wholesaler and/or commission agent serves as a middleman bridging the assembly market and retail market. Wholesalers buy dried fish from assemblers and resell it to shops, keep sales outlets open and occasionally help assemblers or fishers with financial aid (Amin, 2012). In certain cases, the wholesaler offers food, gasoline, and fishing nets to input suppliers (Hasini et al., 2020). For an 8–10 percent fee, the commission agent sells it on behalf of the assembler, avoiding any inventory, sale, or spoiling risks (Amin, 2012). Retailers buy dried fish from auction markets, and distributors and wholesalers resell it to customers. They bring value to the system by acquiring big quantities from wholesalers and offering a broad selection of tiny portions for the convenience of consumers purchasing modest amounts for their families (Hasini et al., 2020). Some traders transport the dried fish to consumers' homes for their convenience, and they are frequently served on a long-term basis. With the exception of supermarkets dried fish is generally sold as whole, sliced, and packed foams (Gestsson, 2010).

Price determination is always a function of manufacturing costs and a desired degree of markup (Barua et al., 2021) for many consumer goods. Pricing is the amount of money charged for the products, but there is much more to it than that (Adenegan and Bolarinwa, 2010). Indicators of how much value the brand, product, and customers are baked into pricing for the benefit of potential customers (Chen et al., 2019). It's one of the first factors that can influence a customer's decision to purchase the product (Chang and Su,

2022). Pricing strategies refer to the methods and approaches used by businesses to set the prices of their products or services. These strategies consider various factors, such as costs, competition, customer behavior, market conditions, and overall business objectives (Kim, 2018; Nurhaliza, 2022). There are numerous pricing strategies available, but some of the strategies are more popular (Chen et al., 2019; Mafimisebi, 2011). Cost plus pricing, competition-based pricing, dynamic pricing, discount pricing, and geographic pricing are identified as the widely used pricing strategies in the dried fish industry (Nurhaliza, 2022).

The determination of prices by this optimal markup amount is referred to as cost-plus pricing, markup pricing, or maximum cost pricing (Chen et al., 2019). There are some "rules of thumb" about the pricing cost-plus pricing (Barua et al., 2021). However, there is a fine line between the desired discount, production costs, and the price for the consumer (Murray and Little, 2000). A method known as competitive pricing involves setting a product's price in line with those of competitors (Nurhaliza, 2022).

Dynamic pricing

Dynamic pricing is referred to as surge pricing, demand pricing, or time-based pricing, (Kayikci et al., 2021). This strategy is a business approach where sellers modify the price considering the market demand. Dynamics prices are used as a response to price shocks (Harque et al., 2015). From an economic perspective, dynamic pricing makes a potential tactic hence much more productive than static pricing strategy. Food waste could be minimized by 54% in developing countries by adopting a dynamic pricing strategy (Faith, 2118).

Discount pricing

Discount pricing applies to a variety of marketing techniques where the price of a good or service is reduced to attract customers, sell excess stock, or increase sales (Steenhuis et al., 2011).

Geographical pricing

Geographical pricing is the practice of charging a different price for identical goods and services depending on where the buyer is located (Kayikci et al., 2021). Geographical pricing is the widely used pricing method in the dried fish industry. Studies have been conducted in Bangladesh (Shamsuddoha, 2007), India (Khileri et al., 2015) and Sri Lanka (Murray and Little, 2000; Koralagama et al., 2021) clearly stating the price variation among different dried fish markets, especially due to the transportation cost, culture, and consumer preference.

Purchasing power goes in hand with the price and thereby the demand. For example: if the price offered is too high, it has an effect on the drop-in consumer purchasing power (Farque et al., 2012).

Hence, the types of value chains, number of actors, their roles, pricing mechanisms, and information sources are highly diversified based on the geographical areas, marketing systems, intermediaries (Nurhaliza, 2022), market types, product types (Mandal, 2021) and many more. Further, the efficient pricing information is not transmitted to the producers and traders through the marketing channel as a result of processors' lack of specialization to competitive advantage

(Kayikci et al., 2022). Also, the information on value chains and pricing mechanisms is not properly structured creating complicated marketing strategies. Therefore, potential profit gains from the trade are not achieved (Mafimisebi, 2011; Bhuyan et al., 2013).

Determinations of relevant value chain types, roles, and functions of value chain actors are not identified clearly in most of the value chains in developing countries. Also, pricing strategies and information-receiving methods related to value chains are a gap to console between processors, wholesalers, retailers, consumers, and policymakers (Sambuo et al., 2021). Further, studies on the impact of different value chain actor's roles and functions on price determination are very lacking in most industries (Koralagama et al., 2021). The frequent and unpredictable prices and demand changes affect the industry performance (Thu et al., 2021), and functions of processors and consumers (Hatali and Soosaimanickam, 2018), making both ends marginalized.

Furthermore, research on dried fish value chains and pricing mechanisms is lacking because the industry is mostly invisible due to the dominating fisheries sector. Moreover, the dried fish industry is mostly operated as cottage-level industries with women's engagement. Hence, poor attention has been paid to this sector. Nevertheless, details on existing dried fish value chains, pricing strategies, and pricing mechanisms are of paramount importance to assess the industry. It would enable to draw the attention of policymakers with evidence-based information for the betterment of the industry. On the other hand, production can be enhanced and streamlined with accurate pricing, market information, and perfect information (Hatali and Soosaimanickam, 2018). Such a situation would enlarge the efficiency along the value chains (Adenegan and Bolarinwa, 2010). Therefore, this study aims to identify the diverse value chains, roles, and main functions of value chain actors, different pricing strategies, and market price information-gathering techniques of each actor. Three popular dried fish varieties (skipjack tuna, sprats, and smooth belly sardinella) were selected for value chain analysis. The next section elaborates on the method adopted followed by results and discussion. Finally, the paper concludes with important inferences for future studies and policy inputs. Through skipjack tuna, sprats, and smooth belly sardinella dried fish value chains in Sri Lanka.

Methods

Double-spotted queenfish (*Scomberoides lysan*), skipjack tuna (*Katsuwonus pelamis*), smooth-belly sardinella (*Amblygaster clupeoides*), seer fish (*Scomberomorus commersoni*), and giant catfish (*Arlus thalassinus*) are the main marine dried fish varieties produced in Sri Lanka (MFARD 2020; DCS 2021). These dried fish varieties are mainly produced in five major districts in Sri Lanka Trincomalee, Mannar, Jaffna, Puttalama, and Matara. Consumption patterns of these dried fish varieties are different based on the type- small and large pelagic varieties (DCS 2021). Accordingly, Skipjack tuna (113.15g), double-spotted queenfish (74.82g), and shark (84.19g) are the highest-consuming large pelagic varieties whereas sprats (487g), smooth-belly

sardinella (76.41g), gold-striped sardinella (43.69g) and trenched sardinella (22.85g) are the highly consuming small pelagic varieties (DCS 2021).

Major 03 districts and major 03 dried fish varieties in Sri Lanka were selected to conduct the research representing the highest dried fish production district as Jaffna, Puttalam, and Matara and highest consumption dried fish varieties as small pelagic sprats, smoothbely sardinella and large pelagic skipjack tuna. This study followed a mixed methodological approach which effectively combined both qualitative and quantitative data. A pre-tested structured questionnaire was distributed among selected processors, wholesalers, retailers, other selected intermediaries, and consumers in each district to collect sprat data from Jaffna, smoothbelly sardinella from Puttalam, and skipjack tuna from Matara districts representing the highest production dried fish varieties in each district of Sri Lanka (Koralagama et al., 2021). Fifty dried fish processors were selected from each district through a simple random sampling technique by using the dried fish processors' name list available at each fisheries association and divisional fisheries office. Twenty dried fish wholesalers, twenty dried fish retailers, 05 input suppliers, and forty dried fish consumers were selected from each district by using snowball and convenient sampling techniques. The questionnaire was based upon the socio-demographic aspects; of different dried fish value chain actors, their roles and functions through the value chain, different pricing strategies used by each value chain actor, and different factors influencing the price determination of dried fish. Each factor was mainly selected by using past published research materials. Secondary data were obtained through the Ministry of Fisheries and Aquatic Resource Development (MFARD), National Aquatic Resource Development Authority (NARA), National Aquaculture Development Authority (NAQDA), Central Bank reports and other published materials.

Analysis of data was done in a few steps. First, the key economic agents, their roles, and main functions were identified. The survey which was conducted at the research site was utilized for that purpose. Then, the basic configuration of the chain was mapped. It showed the alignment of key economic agents along the chain. The percentage of value chains was simply calculated by identifying the engagements of each consecutive value chain actor together. Then pricing strategies and price information determining sources were analyzed through observed value chains by using collected primary data. Further, other descriptive and inferential data analysis methods were applied as the Friedman test by using SPSS 21 versions to identify the significant impact of results. Data has been presented both qualitatively and quantitatively for better understanding.

Results

Skipjack tuna dried fish value chain

Results revealed different value chains for skipjack tuna dried fish in the Matara district (figure 01). Major 05 value chain actor’s levels are identified in the skipjack tuna dried as input supplier, processor, wholesaler, retailer, and consumer. Furthermore, there are different dried fish wholesalers in the value chain playing different roles as

collectors and distributors within the Matara district and outside the Matara district. There are two major parts of the value chain the geographical location inside the value chain and outside value chain. Dries fish distribute for the very shortest distance through the inside value chain than the outside value chain. The distances for dried fish distribution from processors to consumers are longer in the outside value chain than inside the value chain.

Based on the interaction of value chain actors, there are main 05 dried fish value chains for skipjack tuna. (I) Input supplier, processor, wholesaler (inside), retailer to consumer, (II) Input supplier, processor, retailer to consumer (III) Input supplier, processor, wholesaler (inside) to consumer (IV) Input supplier, processor, wholesaler I, wholesaler ii, wholesaler iii, retailer to consumer and (V) Input supplier, processor to consumer are identified as the major five dried fish value chain. Value chain I is identified as the major value chain indicating 37% while II, III, IV, and V are indicated 17%, 20%, 08%, and 15% respectively out of the total observed skipjack tuna dried fish value chains in the area. Interaction between processors and consumers is very low in the value chain to others. Processors closely interact with consumers in value chain V rather than other value chains.

Furthermore, there are 3% of non-major skipjack tuna dried fish value chains in the Matara district. Processors, wholesalers (inside), wholesalers (outside), collectors, distributors, secondary processors, retailers, and consumers interact in different ways to distribute dried fish from processors until final consumption by adding values.

Smoothbelly sardinella dried fish value chain

Figure 02 indicates the different value chains for smoothbelly sardinella dried for Puttalam District. There are major 05 value chain actor levels in the smoothbelly sardinella dried fish input supplier, processor, wholesaler, retailer, and consumer.

Furthermore, there are different dried fish wholesalers as distributors (inside/outside) and collectors in the value chain. Specific characteristic is identified in this value chain indicating two market types regional wholesale market and regional retail market. These two market types function together to deliver smoothbely sardinella dried fish from processor to consumer. The highest number of wholesalers function their activities within the wholesale market as well as highest number of retailers do their value addition and transaction activity within the regional retail market. Furthermore, there are different types of value chains that deliver smoothbely sardinella dried fish for inside customers as well as outside customers of the Puttalam district. The distances for dried fish distribution from processors to consumers are much longer in the outside value chain than inside the value chain.

Based on the interaction of value chain actors, there are main 05 dried fish value chains for smoothbelly sardinella. (VI) Input supplier, processor, regional wholesaler, distributors, collectors (outside), distributors (outside), retailer to consumer, (VII) Input supplier, processor, regional wholesaler, retailer to consumer (VIII) Input supplier, processor, regional retailer to consumer (IX) Input supplier, processor to consumer and (X) Input supplier,

processor, distributor, collectors (outside), distributors (outside), retailer to consumer are identified as the major five dried fish value chain. Value chain I is identified as 48%, II as 22%, III as 20%, IV as 05%, and V as 03% out of the total smoothbelly sardinella dried fish value chain in Puttalam districts. Interaction between processors and consumers is very low in the value chain I than others. Processors closely interact with consumers in value chain V than other value chains.

Furthermore, there are 02% of non-major smoothbelly sardinella dried fish value chains in the Puttalam district. Processors, wholesalers I, collectors, distributors, secondary processors, retailers, consumers, and dried fish-related companies interact in different ways to distribute dried fish from processors until final consumption by adding values.

Sprats dried fish value chains

Results revealed that different value chains for Jaffna district sprats dried fish as shown in figure 03. Major 05 value chain actor's levels are identified here as mentioned in the previous two chains. Furthermore, there are different dried fish wholesalers in the value chain as collectors and distributors inside distributors and outside distributors in the Jaffna district. There are two major parts of the value chain on the geographical location inside value chain and outside value chain as mentioned in the skipjack tuna value chain. Actors in the outside value chain, distribute their dried fish products from the Jaffna district to the outside area while in the inside value chain within the Jaffna district. The inside value chain is identified as the shortest value chain compared to the outside one. The distances for dried fish distribution from processors to consumers are longer in the outside value chain than inside value chain.

Based on the interaction of value chain actors, there are main 05 dried fish value chains for sprats. (I) Input supplier, processor, wholesaler (inside), retailer to consumer, (II) Input supplier, processor, retailer to consumer (III) Input supplier, processor, wholesaler (inside) to consumer (IV) Input supplier, processor, wholesaler I, wholesaler ii, wholesaler iii, retailer to consumer and (V) Input supplier, processor to consumer are identified as the major five dried fish value chain. Value chain I is identified as 30%, II as 20%, III as 15%, IV as 05%, and V as 25% out of total observed sprats value chains in the Jaffna districts.

Furthermore, there are 05% of non-major sprats dried fish value chains in Matara district. Processors, wholesalers (inside), wholesalers (outside), collectors, distributors, secondary processors, retailers, and consumers interact in different ways to distribute dried fish from processors until final consumption by adding values.

Roles and functions of value chain actors

The dried fish value chain is aligned across five key stages; Input supply, production, wholesaling, retailing, and consumption. Table 03 summarizes the key stages, actors, and their roles along with their primary functions within the value chain. All the actors are responsible for facilitating the delivery of small and large pelagic dried fish from processing to final consumers. The strategic positioning of each actor along the value chains is determined by their roles and functions. The roles of local wholesalers are conclusive and

more powerful within the value chain. Input suppliers mainly engage in the dried fish value chain by supplying raw fish, salt, necessary equipment, financial support, and instructions on new methods, technology, etc. Processors mainly engage with producing dried fish and produce value-added products. Wholesalers purchase dried fish from producers. They collect, store, and distribute the purchase of dried fish for retailers and consumers. Retailers mainly purchase dried fish from wholesalers and sell it to consumers. Sorting, grading, and packing are the common characteristics for each actor of all three dried fish value chains. See Appendix A (Table A1) for more information.

Pricing strategies

Table 01 indicates the different pricing strategies of skipjack tuna, sprats, and smoothbelly sardinella dried fish at processors, wholesalers, and retailers. Sprats and skipjack tuna dried fish processors and wholesalers use a competition-based pricing strategy as the main pricing mechanism while smoothbelly sardinella processors and wholesalers use cost-plus pricing as the main pricing mechanism. Retailers of observed three dried fish varieties mainly use a cost-plus pricing strategy as the main pricing mechanism while determining the product price. According to the results of the Friedman test, each pricing mechanisms significantly affect the price determination of processors, wholesalers, and retailers of observed dried fish varieties.

Sources of price information gathering

Table 02 indicates the daily price information gathering sources of skipjack tuna, sprats, and smoothbelly sardinella dried fish at the processor, wholesaler, and retailer levels. Skipjack tuna dried fish processors used information from another trader in the region as the highest price determination factor. Skipjack tuna wholesalers and retailers use information from other traders outside the region as the most price-determining technique.

Sprats processors, wholesalers, and retailers use information from other traders outside the region as the most price determination technique. Furthermore, smoothbelly sardinella processors use information from another trader inside the region as the most price determination technique while smoothbelly sardinella wholesalers and retailers use information from another trader outside the region as the most important price-determination technique. Other price determination techniques such as weekly price bulletin, central bank reports, mass media, etc. are used by all the processors, wholesalers, and retailers of observed dried fish varieties as the least important price determination technique. According to the results of the Friedman test, each technique significantly affects the price determination of processors, wholesalers, and retailers of observed dried fish varieties.

Discussion

Input supply, production, wholesaling, retailing, and consuming are the five essential stages of the dried fish value chain that are aligned in the three districts under observation. Also, there are five main types of value chains for all observed varieties, and these chains differ based on the percentage distribution, the types of dried fish, and

the geographic location. The primary value chain in the districts of Jaffna and Matara is mostly used to distribute dried fish in the area over short distances. However, the major value chain in the Puttalam district is mostly utilized to transport dried fish outside of the area across great distances.

The results of Hashini et al., 2020 on the small pelagic fish value chain, Hossain et al., 2015 on the dried fish value chain in Bangladesh, and Mandal, 2021 on the value chain analysis of dry fish marketing in the coastal belt of Bangladesh indicate diversification of value chain on geographical areas, marketing systems, intermediaries, market types and product types that aligned with this study findings. Further, it indicates different stages of value chains, actors, and different types of value chains in Bangladesh and the Sri Lankan dried fish industry.

Each actor's strategic placement along the value chains is determined by their roles and functions. Inside market wholesalers play decisive and more potent roles throughout the value chain. In the Matara and Jaffna districts, skipjack tuna and sprats were shown the same value chain types. There are specific regional wholesalers and retailers, and small and medium-sized businesses play a significant role as secondary processors producing value-added goods in the Puttalam district. Shamusuddoha, 2007 study of Supply and value chain analysis in the marketing of marine dried fish in Bangladesh and Rosales et al., 2017 on value chain analysis and small-scale fisheries management indicate the different roles, functions, and responsibilities of value chain actors which tallied with this study findings.

Cost-plus pricing methods and competition-based prices were identified as the major pricing strategies which used by dried fish value chain actors for all observed dried fish verities. According to the study by Nurhaliza, 2022, on pricing methods in determining the selling price of dried lomek products and Faith, 2018 on the study of a review of the effect of pricing strategies on the purchase of consumer goods the usage of different pricing strategies when determining product price which tallied with these findings.

Most of the dried fish value chain actors mainly use information from traders in the region and other traders outside the region to identify the current market price of dried fish. According to the Chang and Su, 2022 and Adenegan and Bolarinwa, 2010 indicate the impact of different sources when determining price of products as well as Sambuo, 2021 indicates different techniques when using fish price confirmations as mentioned in this study.

Conclusion

This study aims to identify diverse value chains, roles and main functions of value chain actors, different pricing strategies, and market price information sources of dried fish value chains especially on skipjack tuna, sprats, and smoothbelly sardinella. The findings indicate four distinct value chains at different levels of complexity. Accordingly, value chain (I) starts with the input supplier, processor, wholesaler (inside), retailer, and consumer. This is the main type of value chain for skipjack tuna and sprats, 37% and 30% respectively. Value chain (VI) also begins with the input supplier, processor, regional wholesaler, distributors, collectors (outside), distributors (outside), retailer

and consumer. This value chain is common for smoothbelly sardinella (38%). A competition-based pricing strategy is practiced by the Sprats and skipjacktuna dried fish processors and wholesalers.

In contrast, a cost-plus-based strategy is used by smoothbelly sardinella processors and wholesalers. Generally, retailers use the cost plus pricing method for all three value chains. Skipjack tuna and Smoothbelly sardinella dried fish processors obtain information through companions within the region. However, wholesalers and retailers access to information from traders outside the region. Sprats value chain actors mainly gather price information from traders outside the region.

The strategic positioning of each actor along the value chain is determined by their roles and functions. Skipjack tuna and sprats exhibit similar value chain types in the Matara and Jaffna districts. In contrast, a distinctive feature was observed with respect to smoothbelly sardinella than the other two varieties. A specific regional wholesaler and regional retailer markets were observed in Puttalam district. Besides, small and medium-scale companies play a major role as secondary processors with value-added products. Predominantly value chains in Jaffna and Matara district value chains are shorter within proximity within the region. However, the Predominant value chain in the Puttalam district is mainly used to distribute dried fish within long distances out of the region.

Therefore, national pricing strategies and policies should be implemented by focusing on cost-plus pricing and competition based pricing for observed dried fish varieties. Awareness of other observed pricing strategies should be improved among selected dried fish value chain actors through national plan. Formal price information gathering methods should be implemented to determine reasonable price for the observed dried fish products through selected dried fish value chains. Necessary policies should be implemented to share the market power among value chain actors fairly.

Author Contributions

WPSSL, KDN and SAL conceptualized and designed the study. WPSSL and KDN performed the experiments. WPSSL, KDN, and SAL analyzed and interpreted the data. WPSSL and KDN contributed to drafting the manuscript and WPSSL, KDN, and SAL critically revised the manuscript.

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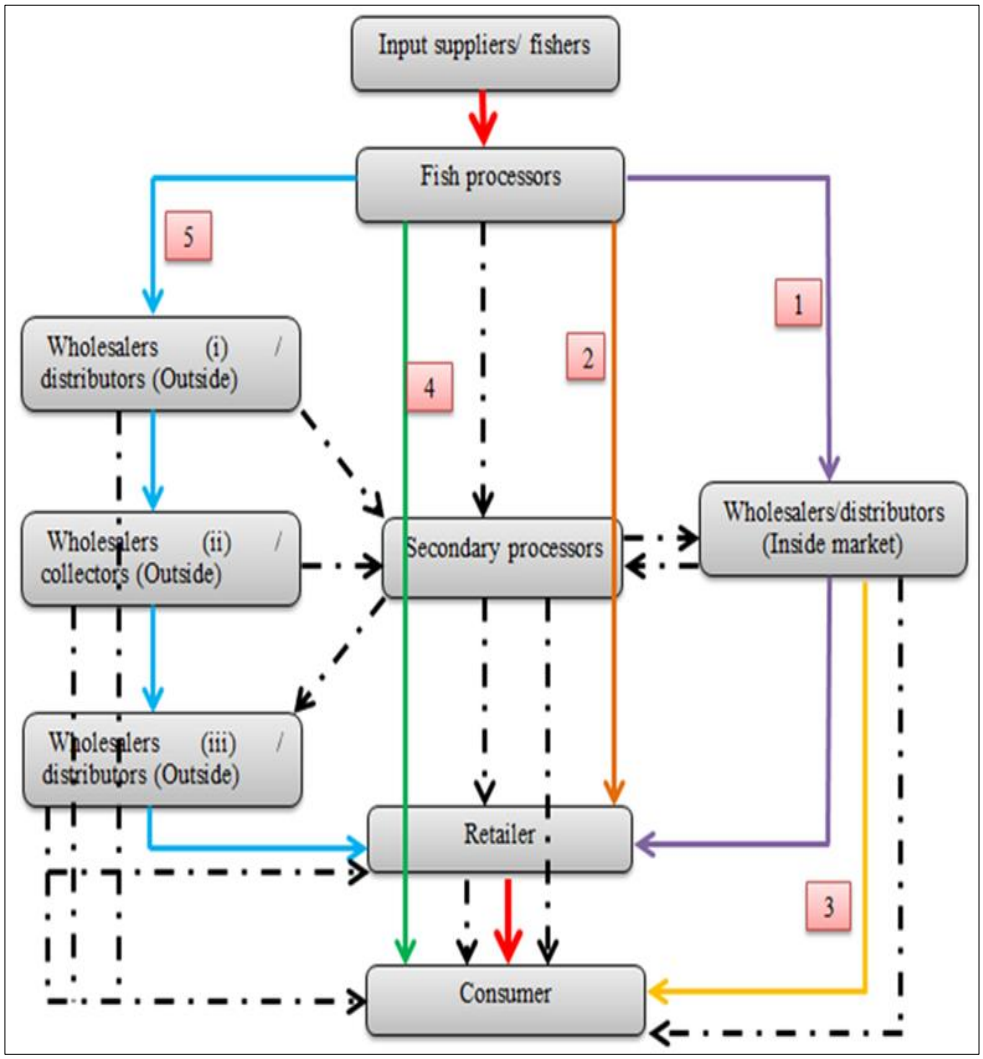
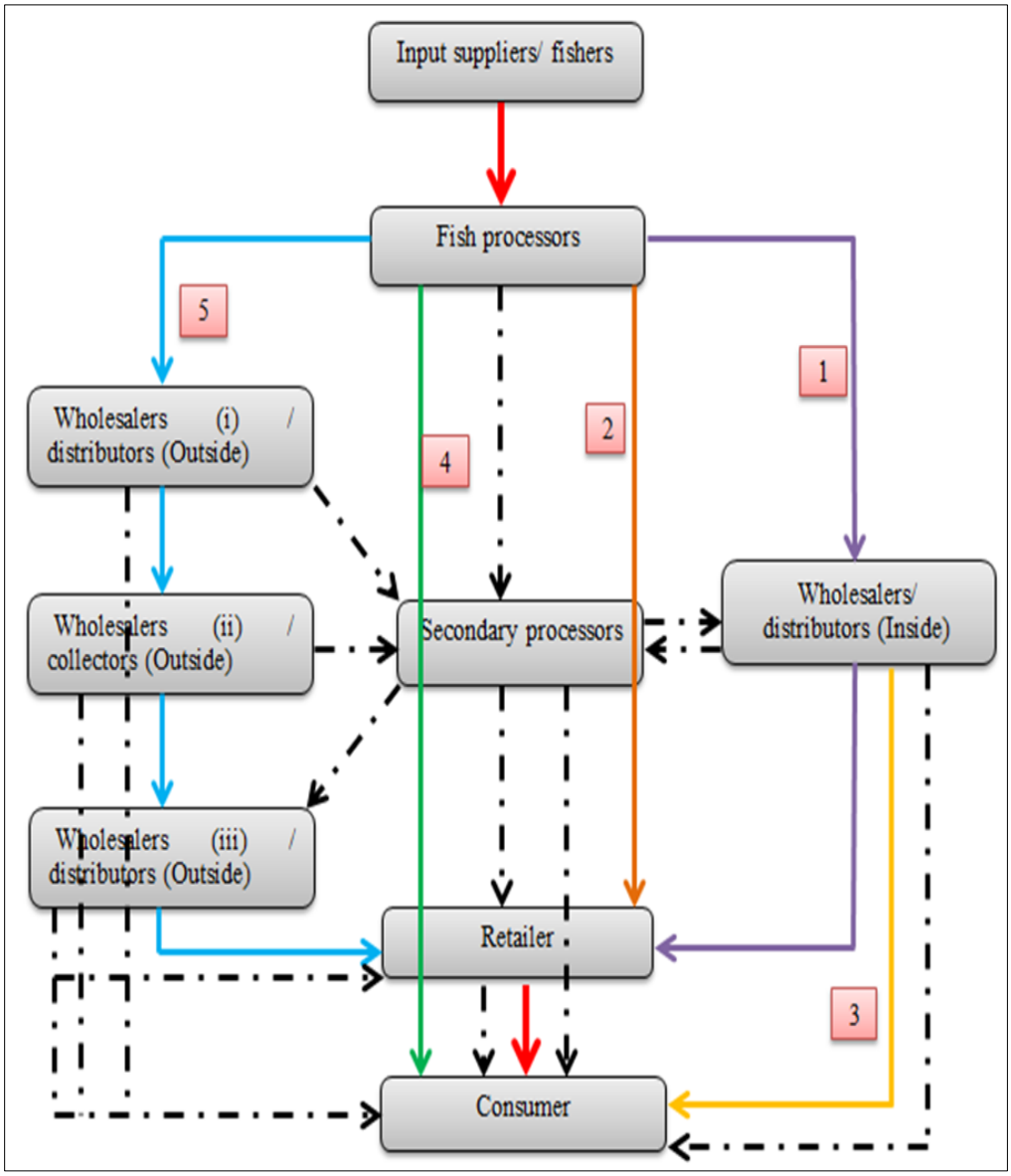
Figures and Tables

Figure 1 Skipjack tuna dried fish value chain in Matara



Source: Survey data

Figure 2: Smoothbelly sardinella dried fish value chain in Puttalam



Source: Survey data

Table 1: Different pricing mechanisms used by dried fish value chain actors

Methods	Dried fish	Processors		Wholesalers		Retailers	
		Mean	P	Mean	P	Mean	P
Cost plus pricing	Skipjack tuna	4.12	0.00	4.45	0.01	4.78	0.00
	Sprats	3.98	0.00	3.55	0.00	4.48	0.03
	Smoothbelly sardinella	4.75	0.01	3.72	0.05	4.12	0.00
Competition based pricing	Skipjack tuna	4.32	0.00	4.82	0.00	4.75	0.00
	Sprats	4.82	0.00	4.55	0.00	4.08	0.05
	Smoothbelly sardinella	4.68	0.04	4.08	0.00	3.89	0.00
Dynamic pricing	Skipjack tuna	3.52	0.00	2.89	0.01	3.12	0.00
	Sprats	3.12	0.05	3.25	0.02	3.28	0.05
	Smoothbelly sardinella	2.98	0.00	2.87	0.00	3.81	0.00
Discount pricing	Skipjack tuna	2.89	0.01	3.14	0.00	2.58	0.05
	Sprats	2.51	0.00	3.54	0.01	2.98	0.05
	Smoothbelly sardinella	2.68	0.00	2.18	0.00	2.54	0.01
Geographic pricing	Skipjack tuna	1.15	0.05	1.00	0.00	1.04	0.00
	Sprats	1.46	0.01	1.18	0.00	1.05	0.00
	Smoothbelly sardinella	1.24	0.00	1.06	0.00	1.08	0.02
Other	Skipjack tuna	1.10	0.01	1.15	0.00	1.20	0.00
	Sprats	1.23	0.05	1.12	0.01	1.19	0.00
	Smoothbelly sardinella	1.05	0.01	1.00	0.05	1.18	0.05

Source: Survey data, Significant level 0.05, two tailed

Table 2: Current market price information gathering sources of each dried fish value chain actors

Methods	**Dried fish**	**Processors**		**Wholesalers**		**Retailers**	
		Mean	P	Mean	P	Mean	P
From dried fish association	Skipjack tuna	3.45	0.01	3.19	0.00	3.18	0.01
	Sprats	3.48	0.00	2.95	0.05	3.72	0.00
	Smoothbelly sardinella	4.15	0.05	3.98	0.00	2.89	0.05
Another trader in the region	Skipjack tuna	5.75	0.00	5.17	0.00	4.98	0.00
	Sprats	4.98	0.00	5.82	0.01	4.98	0.00
	Smoothbelly sardinella	5.65	0.00	4.95	0.00	4.85	0.05
Another trader outside the region	Skipjack tuna	4.85	0.01	5.55	0.02	5.48	0.00
	Sprats	5.72	0.00	4.92	0.00	5.68	0.01
	Smoothbelly sardinella	5.12	0.00	5.92	0.04	5.74	0.00
Colombo or other market	Skipjack tuna	4.12	0.02	3.89	0.00	3.58	0.01
	Sprats	4.35	0.00	4.55	0.01	3.98	0.00
	Smoothbelly sardinella	4.26	0.01	4.12	0.00	3.18	0.00
Social media	Skipjack tuna	3.58	0.00	3.98	0.00	3.97	0.00
	Sprats	2.95	0.05	3.55	0.05	2.99	0.02
	Smoothbelly sardinella	3.48	0.00	2.98	0.00	3.78	0.00
Other	Skipjack tuna	1.25	0.00	1.00	0.00	1.14	0.00
	Sprats	1.56	0.02	1.08	0.02	1.15	0.01
	Smoothbelly sardinella	1.34	0.04	1.16	0.00	1.18	0.00

Source: Survey data, Significant level 0.05, two-tailed

Table 3: Roles and function of value chain actors

Key stage	Agent	Roles	Main function
Input supply	Input suppliers	Fishers	Supplying raw fish/ Sorting fish/ Grading fish
		Salt supplier	Supplying salt/ Grading salt/Packing
		Other equipment supplier	Supplying necessary equipment
		Instructors	Advisory services/Training program/Arrange subsidies/ Business registration/Link government and actors
Producing	Producers	Processors	Preparing dried fish/ Produce value-added products/by-products/ Sorting/ Grading/ Packing/ Selling/ Storage
		Secondary processors	Purchasing dried fish from processor or wholesaler/ Produce value-added products
Wholesaling	Inside wholesalers (In southern province)	Wholesalers (Inside)	Purchase dried fish mainly from produces/ Distribution/ Resell/ Sort and grading
	Regional wholesalers	Wholesalers	Purchase dried fish mainly from produces/ Distribution/ Resell/ Sort and grading
	Outside wholesalers (Outside of southern province)	Wholesalers i (Distributors/ transporters)	Purchase dried fish mainly from producer/ Distribution/ Resell
		Wholesalers ii (Collectors at central market)	Purchase dried fish mainly from distributors/ Collecting/ Resell/ Sorting and grading/ Storage

		Wholesalers iii (Distributors/ transporters)	Purchase dried fish from collectors/ Distribution/ Resell/ Sorting and grading
Retailing	Retailers	-Local sellers (Roadside/mobile sellers) -Supermarket -Other shops	Purchasing dried fish mainly from wholesalers/ Selling/ Packing
	Regional retailers	-Regional retailers in Puttalam	Purchasing dried fish mainly from wholesalers/ Selling/ Packing
Consumption	Consumer	-Local consumers -Hotels and restaurants	Preparation and consumption

Source: Survey data

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