

THE VALUE CHAIN OF YELLOWFIN TUNA IN SRI LANKA

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ABSTRACT

The fishing industry is particularly important for Sri Lankans for the domestic supply but there is also a small but growing export market for high value products. The potential for economic development lies there with yellowfin tuna as the most important specie. In this research the efficiency and productivity of the yellowfin tuna value chain in Sri Lanka was studied. The main method emphasis was on interviews with value chain actors (primary data) but secondary data analysis was also used when available. The lack of reliable secondary data from Sri Lanka fisheries made the use of primary data necessary. Interviews were conducted from late 2007 until July 2008. The conclusion is that two different value chains are characteristic for the Sri Lankan yellowfin tuna industry; the domestic market value chain and the export market value chain. The local market is highly regulated and price oriented with low emphasis on quality. The export market is characterized by demand for quality and high prices. It relies heavily on the landings of foreign vessels. Additional emphasis on the export market could increase revenues of the sector but for that structural changes are essential. The local vessels are generally too small and poorly equipped to meet the quality requirements of the export market. For the local fleet there are considerable opportunities for improving quality and reducing costs. Main obstacles are the lack of knowledge and unstructured flow of information between fishermen and processors/exporters, as well as the lack of trust between actors.

Keywords:

Value Chain, Fishing industry, Sri Lanka and Yellowfin Tuna

INTRODUCTION

This paper summarizes the results of the research conducted for the M.Sc. dissertation of Gunnar Thordarson and the then further studies of his dissertation supervisors, Gestsson and Knútsson. More detailed results can partly be found in the M.Sc. dissertation (Thordarson, 2008).

The fisheries sector in Sri Lanka accounts for 1.7% of the Gross Domestic Production (GDP) in 2009 from which 1.5% comes from marine fishing. The contribution of tuna to total fish exports was 45.8% of US\$ 183 million (MFAR, 2010). The sector provides direct employment for 150,000 individuals and indirect employment to about 250,000 people (Arunatilake et al., 2008). It provides sustenance to at least 2.4 million people in 140,000 fishing households throughout the country, or around 12% of the population (GoSL, 2006; MFAR, 2010).

Fish is of high nutritional importance for Sri Lanka with more than 65% of animal protein consumption coming from fish or around 31.9 kg per person a year. However, the annual domestic supply per capita in 2009 was only 16.7 kg, making imported fish a substantial part of the domestic fish supply (Samaratunga, 2009; MFAR, 2010). Despite the importance of the sector a number of reports estimate post harvest losses to be around 25% in Sri Lanka but scarcity of data precludes supporting this assertion, but the waste in terms of deteriorating quality, value and safety is obvious to anybody investigating fish handling, especially of yellowfin tuna (*Thunnus albacares*).

In table 1 changes in the marine and inland fish production subsectors are shown for the years 2006/2007 and 2008/2009 respectively (MFAR, 2010).

Table 1. Fish production in tons in Sri Lanka 2006 – 2009

<i>Fish Production-tons</i>	2006	2007	2008	2009	2007-2008 Change (%)	2008-2009 Change (%)
Off shore/Deep Sea	94,620	102,520	109,310	112,760	6.6%	3.2%
Coastal	121,360	150,110	165,320	180,410	10.1%	9.1%
Total Marine	215,980	252,630	274,630	293,170	8.7%	6.8%
Inland Capture	29,640	30,200	37,170	39,030	23.1%	5.0%
Inland Culture	3,170	4,600	5,100	3,980	10.9%	-22.0%
Shrimp Farms	2,480	3,580	2,220	3,550	-38.0%	59.9%
Total Inland	35,290	38,380	44,490	46,560	15.9%	4.7%
Total	251,270	291,010	319,120	339,730	9.7%	6.5%

Transactions in fisheries are multiplex phenomena and to understand its activity and process, the concept of “value chain” is used in the study. To understand better the complex collaboration between sellers and buyers and their transactions, the “value chain” concept is used to describe the sum activity of all members from harvesting the yellowfin tuna until it is received by the consumer at the local market and to the export for the export market. The total value chain for Sri Lankan fisheries displays the value of the activities and margins made within it. These activities of physical and technological distinction work are building blocks for creating a valuable product for the consumer (Porter, 1985). Figure 1 displays the Sri Lankan Marine Fisheries Map drawn up by Arunatilake et al. (2008).

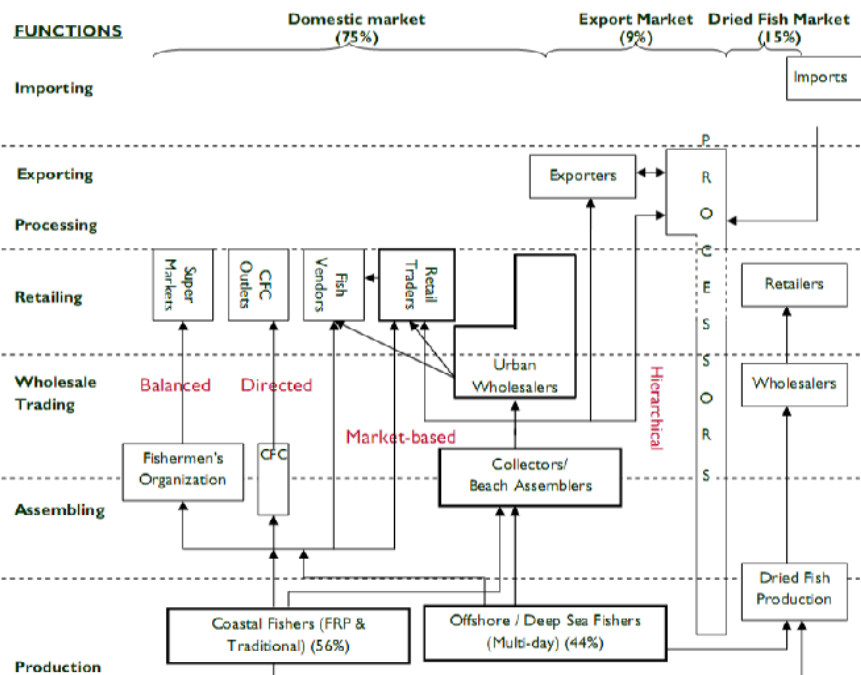


Figure 1. The Sri Lankan marine fisheries value chain map. Source: Arunatilake et al. (2008)

The picture provides a clear impression of the structure and functioning of the fisheries industry’s value chain in Sri Lanka showing both the actors and their connection. Percentages show production or market

share and the governance structure of different marketing channels in marked red. yellowfin tuna goes through all the channels of the value chain. It is dried on-board the fishing vessels and on shore, sold fresh locally and exported fresh or frozen to foreign markets. The yellowfin tuna fishing and processing is here used as a core to study the different value chains in Sri Lankan fisheries.

Yellow fin tuna is an important species in the Sri Lankan fisheries with a total production of 45,440 tons in 2009 or around 15.5% of the total marine catch in the country (MFAR, 2010). Figure 2 shows that even as the global yellowfin catches have been decreasing from 2003 Sri Lanka has been increasing its relative catch of the species (FAO, n.d.).

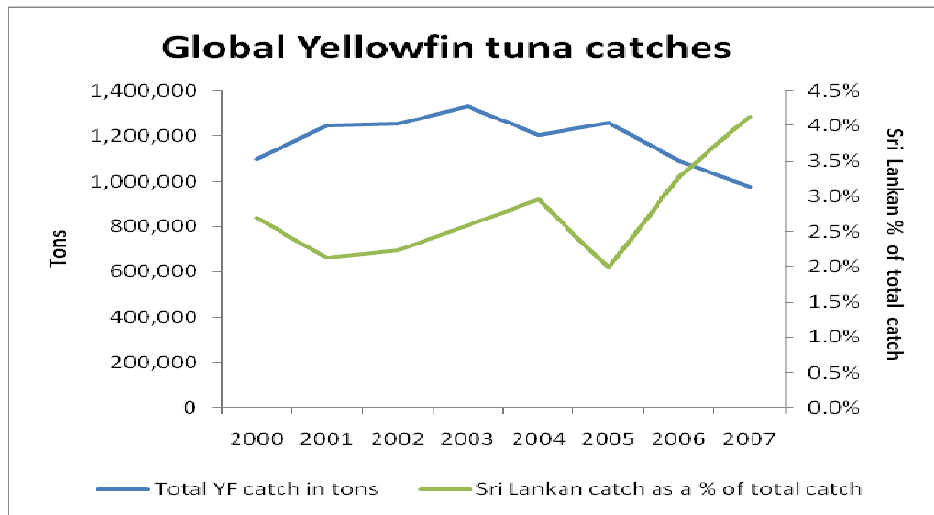


Figure 2. Global and Sri Lankan yellowfin tuna catch. Source: FAO (n.d.)

An efficient value chain with constructive flow of information and knowledge including trust and reasonable bargaining power for the players is vital to avoid losses and to maximize profit within the industry. As fish is highly perishable it is important to use the shortest possible distribution channels, with minimum involvement of intermediaries.

The main export markets for Sri Lankan processed tuna products are according to De Silva and Yamao (2006) the UK, France Germany as the affluent markets processed and semi processed products and Japan for fresh and frozen products. Up until July 2010 Sri Lanka had a GPS+ tariff agreement with the EU. In 2007 yellowfin tuna made up around 60% of EU imports of frozen whole round tuna. Most fresh tuna in the UK is yellowfin tuna from the Indian Ocean where the yellowfin tuna catch had decreased from around 390,000 tonnes in 2006 to 311,000 tons in 2007. In the UK the majority of the fresh or chilled tuna is air freighted from Sri Lanka or the Maldives through a small number of processors to many retailers (Garret and Brown, 2009). Gillnets or a combination of gillnet and other contributed around 95% of the total fishing effort but recently larger vessels over 39 feet use mostly long line targeting tuna for export markets (Dissanayake, 2005; Amaralal, 2010).

THEORETICAL BACKGROUND

Kaplinsky and Morris (2000) write that “the value chain describes full range of activities which are required to bring a product or service from conception, through the intermediary phase of production, delivery to final consumers, and final disposal after use”. In similar way Kogut (1985) talks about the value-added chain and describes it as the “Value added chain is process by which technology is combined with material and labour inputs, and then processed inputs are assembled, marketed, and distributed. A single firm may consist of only one link in this process; or it may extensively vertical integrated...”. Porter (1980) also put great emphasis on the strategic position of companies in what he calls the value system, which is the embedded value chain from suppliers to buyers.

The way information and knowledge are distributed through the chain is essential for efficiency and productivity of a value chain and therefore a very important part of actor’s relationships and cooperation. Information from upstream actors on product matters needs to flow down the value chain to the market, and from the market to the downstream actors. Information also needs to flow the other way, from the market to the suppliers, for instant specification and information on how to satisfy the customer with unique (Galbraith & Kazanjian, 1986).

Information and the ability to learn are essential to capture this knowledge and how it is distributed from the market to the upstream part of the value chain. This distribution of information is crucial within the value chain; with the possibility of one actor misusing information control from others in the system. Having information gives power and can be used to manipulate the transactions with personal interest in mind, but everybody will gain more collectively by distributing it with free flow through the value chain (Pitta, et al., 2004). Everyone in the value chain has to understand the overall cost and profit margin and be able to identify it, since the end user is ultimately paying the total value added (Shank and Govindarjan, 1992).

Power distribution can affect transaction costs between firms. Trust in business can enable efficient transactions with more speed through the value chain, especially if the business is complex with an emphasis on quality and requires delicate interaction between supplier and customer (Tveterås and Kvaløy, 2006). For a long term cooperation trust and commitment is essential, but power is also important and the way it is distributed through the value chain. Power distribution does not have to be even, as long as all actors within the chain are benefiting from a plus-sum game cooperation. But in a zero-sum game where one is gaining at the expense of another using his bargaining power without collaboration, can cause uncertainty and distrust in transactions (Gummerson 2002 cited in Pitta, et al., 2004).

Transaction cost is cost associated with reaching and enforcing agreements between actors in the value chain, including associated costs like those of planning, adapting and monitoring economic activities. The degree of asset specificity in exchange relationship between seller and buyer can affect the transaction cost. Firms have to decide if a free market situation with suppliers and customers or a close collaboration with them is more appropriate for their business. The complexity of the transaction and the product requirement can affect this situation and have to be carefully considered (Tveterås and Kvaløy, 2006).

Part of transaction cost is a wrong quality or product at a wrong place and time of delivery, where nobody gains from the mistake and everybody lose (Tveterås & Kvaløy, 2006). It can therefore be essential for firms to look at the whole value chain, but not gaze at each firm in isolation from others. A large part of a firm’s product value addition is made outside the firm, by its suppliers and customers, who therefore have a large impact on the total cost of the product, influencing the total margin made within the value chain (Kaplinski & Morris, 2000).

Globalization is important for the fish business, especially in developing countries, where market situation changes from local market paying low prices for products to world market paying high prices. More fish will be captured for the export market; less supply will be on the local market affecting local people. But normally the whole society will be better off, but some may lose, like local consumers. But the most important matter is that without resource management the danger of over fishing is great (Gudmundsson et al., 2006).

RESEARCH METHOD

Due to lack of previous studies and knowledge about activities within the value chain of Sri Lankan fisheries preliminary data gathering was necessary. It was considered necessary to start the research by on-site visits to harbours, wholesale markets and retail markets. Also visiting relevant firms and institutions in order to perceive the process and interview knowledgeable people within the value chain. These interviews were conducted by Thordarson, one of the authors, from November 2007 to January 2008.

The main emphasis of the research was on experience surveys (primary data) but secondary data analysis was also used when available. The lack of reliable secondary data from Sri Lanka fisheries made the use of primary surveys more appropriate using unstructured interviews were carried out alongside the study to gather relevant information from knowledgeable people about the subject.

Semi structured interviews, focus group method, was used with five General Managers representing processors and exporters, accompanied by a Quality Control expert from the DFAR (Abeyratne, Fernando, R., Weerasinghe, Weeratunga, and Wickremasinghe, July 21st 2008). These processors/exporters represent a broad sample of processors and exporters in Sri Lanka. They are General Managers of companies which are both partly owned by foreign customers (wholesalers in Britain) and solely owned by Sri Lankans. Some of the companies are operating their own fishing vessels but others are only in the processing and export business. This group was thought to be able to give valuable information as the individuals are assumed to have a broad knowledge on tuna fisheries in Sri Lanka.

Foreign vessels supply only a small fraction of yellowfin tuna for the domestic market but their importance for the export market is however not to be underestimated, as they supply up to 50% of the raw material for the processing and export of yellowfin tuna from Sri Lanka. However, due to the difficulty of reaching these groups it was decided to rely on processors/exporters when gathering information about foreign raw material supply. This method is thought to be reliable and adequate, because of the close collaboration between the foreign suppliers and processors/exporters, and broad knowledge base of the latter about the foreign supply of yellowfin tuna into Sri Lanka.

Structured interviews were used with groups with an adequate number of participants, like a) assemblers, b) export assemblers, c) wholesalers/commission agents and d) retailers.

Over 30 volunteer vessel owners from four large fishing harbours on the west coast of Sri Lanka, Kalpitiya, Chilaw, Negombo and Beruwala, targeting yellowfin tuna using tuna long line, were interviewed. Twenty one vessel owners and twenty seven captains from this list participated in the present study.

The interviewees selected were participants in the value chain of yellowfin tuna in Sri Lanka. Included were;

- owners of long-liners targeting yellowfin tuna
- captains on MDBs

- local assemblers
- export assemblers
- wholesalers/commission agents
- retailers
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Some important information was thought to be missing for the study so extra interviews were constructed in September 2008, using list of structured questionnaires for MDB owners from Trincomalee and Negombo.

An important outcome of the study is to describe how the market transactions are made in the yellowfin tuna value chain. More specifically how sellers and buyers meet and agree on quality and prices.

All prices used for the study are in US dollars and data in rupees have been converted to dollars (Oanda, 2008). For studies made in 2008 the exchange rate in July 2008 of US dollars against Sri Lankan Rupees are used. For prices in previous years rates on 31st of December was used for the appropriate year.

The framework introduced in the theoretical discussion was used to guide the making of questionnaires used in the study and to structure the presentation of the findings. The two main research questions were:

- How efficient and productive is the value chain of yellowfin tuna in Sri Lanka?
- What structural changes can be suggested for improving profits in the value chain?

The framework used in this research looked at four key factors affecting the value chain of Sri Lankan fisheries affecting the two research questions in mind were found out to be;

1. The structure of the value chain and the main actors and activity
 - a. The value addition in the value chain
 - b. Key actors
 - c. Main activity
2. Relationship within the value chain
 - a. Collaboration between actors
 - b. Flow of information and knowledge
 - c. Power and trust
 - d. Governance
3. The strategic position within the value chain
 - a. Driving forces within the industry
 - b. Competitive advantage
4. External forces on the value chain
 - a. Value chain in fisheries
 - b. Government intervention

The first topic deals with the structure of the value chain and the actors and activities within the system. This could include explaining the capacity, quantity and prices of the product, including the value adding in the value chain. In topic two the relationship within the value chain is the target, how the collaboration between the actors are, if plus-sum game or zero-sum game is used in their relations. Power and trust is important in this relationship and also to explain the governance of the value chain, who decides what to produce, how and when. Transaction costs were analyzed and discussed if a free market or more close collaboration is appropriate for the Sri Lankan yellowfin tuna value chain.

The driving forces of the industry were sought to be identified and analyzed. Also external matters like the uniqueness of the fisheries and the importance of government intervention for the industry were studied.

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Figure 3 shows the overall value chain of fisheries in Sri Lanka. For the yellowfin tuna fisheries the overall value chain in Sri Lankan fisheries is split up into four steps and two sub-value chains. The two sub-value chains are the local market- and the export market value chain and the steps are; supply (I), primary distributors (II), secondary distributors (III) and retail/export/processing (IV).

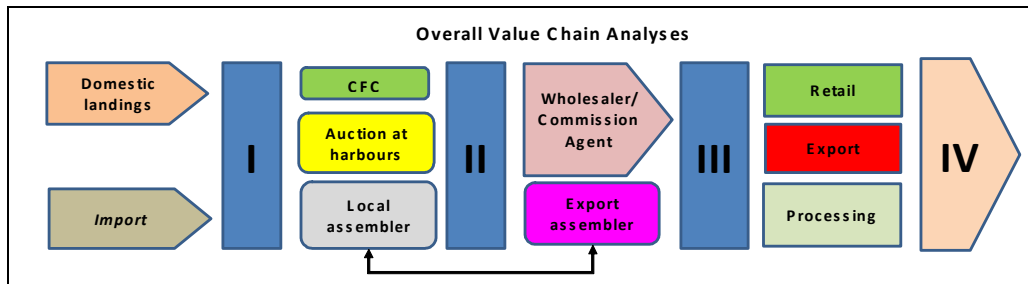


Figure 3. The value chain in Sri Lankan fisheries

The local value chain, starting with domestic landings, is rather rigid with three middlemen between harvesting and consumer, adding without any processing value of more than 60% to the farm-gate price. This value addition is mainly due to selection, transport and sale. The general flow is from fishermen to auction market, local assembler, wholesaler and retailer. Price determination is mostly built on a free marketing system in auction markets but with some exceptions. The exception here is the Ceylon Fisheries Corporation, a state owned company established to stabilize the local fish market and keep prices low for the local consumers (Fernando J., 2007).

Auction markets are operated at eight major fishing harbours in Sri Lanka, where price determination for sellers and buyers can be obtained. These auction markets have many different market segments and customers with various needs. The costs of those transformations are integrated into the fish prices and are ultimately reflected in the price the consumer is willing to pay (Morven et al., 2004).

The assembler is the first middleman in the value chain and can have multiple functions within it (Amaralal, 1999);

- collector of fish from fishermen
- boat owner
- money lender
- supplier of goods and raw materials

The wholesaler/commission agent acts as an intermediary between the assembler and the retail market. Wholesalers purchase fish from assemblers and re-sell it to retailers. Wholesalers maintain sales outlets and sometimes provide financial assistance to assemblers or fishermen (Amaralal, 2004). In some instances the wholesaler provides supplies to boat owners such as groceries, fuel and nets (Amaralal, 2002). The commission agent sells it on behalf of the assembler for an 8–10% commission and therefore does not take any risks on inventory, sale or spoilage (Amaralal, 2004).

Retailers purchase fish from auction markets, assemblers or wholesalers and re-sell to consumers. Their value addition to the system is to purchase large quantities from wholesaler and offer a wide range of variety in small portions for consumer convenience of purchasing small amount for their households. A retailer sometimes brings the fish to residential areas for customer's convenience and often serves customers on a long term basis. Fish is normally sold whole without any processing with the exception of supermarkets selling sliced or filleted fish and CFC selling frozen and sliced fish.

A large number of retailers in the fish trade operate all over the country and can be categorized into five main groups;

- supermarkets
- retail outlets
- motor-bike retailers
- bicycle retailers
- food peddlers

The export market value chain is supplied approximately by half from local MDB, aiming for better prices from the export market, and foreign vessels contracted by processors and exporters. The local supply for the export market comes from vessels owned by processors/exporters, or contracted by them, but mainly channelled through auction markets or export assemblers on a free market bases.

The export market is characterized by high demand for quality and good prices and relies heavily on landings of foreign vessels (SL Custom 2008). At any rate, the major potential for further growth of exports depends on increasing contribution from local vessels. The local vessels are generally too small and poorly equipped to meet the quality requirements of the exporters. There is considerable scope to improve quality and reduce costs for the local fleet, improving profits and increasing the overall value of the fishery and its contribution to the national economy but lack of knowledge and flow of information between fishermen and processors/exporters is an obstacle.

All these activities in the value chain is adding up a value and cost, from fishermen to retail or export, but it is not the direct transaction cost in the market that affects efficiency the most, but rather the deterioration of quality throughout the value chain. Fishermen stay out at sea too long with limited amount of ice to preserve the catch and fish are often spoiled before being brought to shore. When landing the fish, fishermen wash the tuna with contaminated harbour sea-water before displaying it on the dock side in 30°C and sunshine, sometimes for hours before being iced and transported to the market. This lack of quality awareness and hygiene causes a lot of waste in the value chain, lowering the value of the product. Lack of collaboration between actors within the export business and flow of information and knowledge seem to be major cause for quality problems as well as distrust and conflicts between fishermen and processors/exporters.

The total value addition through the export market is considerably higher than through the domestic market, estimated in this study to be 4,1 USD/kg (MFAR, 2008) for the local retail price but 14,5 USD/kg (Weerasinghe, pers. comm. Feb. 28th 2008) for FOB¹ for the export market. The export market pays much higher prices for raw material than the local market, up to 7,5 US\$/kg for the sashimi market and 4,6 US\$/kg to the EU market compared to an average farm-gate price for the local market is around 1,8 US\$ pr/kg and dry-fish processors are paying less than 1 US\$/kg. If extra 10.000 tons of yellowfin tuna were to be channelled through export instead of the local market given supply of the same quality and no change to market prices, the economic gains could be around 30 million US\$ a year. This is a considerable amount of money but cost of production has not been taken in to account. Still this increase in the export of yellowfin tuna would create foreign currency and valuable jobs.

If only the gain of the MDBs is taken into account with 10.000 tons going to export instead of local market it would be extra revenue of 11 million US\$ according to prediction in the study. The cost of renovating the fleet has not been taken in to account but it looks like this extra revenue could produce extra margin within the value chain of yellowfin tuna. Such changes would of course impact the supply of fish for local consumption and call for increased fishing, imports of fish, substitution to other proteins or a mix of this.

¹ Free On Board, before airfreight and insurance cost

One of the biggest problems to gain extra value by channelling fish currently going to the local market to the export market is the lack of quality awareness and hygiene among the actors of the chain. To gain efficiency and productivity, fishermen need to understand the demands of the export market and how to meet them through changing practices in fishing and post harvest handling of fish. Passing this knowledge from the market up the value chain to fishermen is fundamental to increasing efficiency and minimizing waste within the value chain of yellowfin tuna in Sri Lanka. Free flow of information running up and down the value chain, from fishermen to the market and from the market to fishermen is essential for positive result. Processors argue that the most important incentive for improving quality of local MDBs targeting the export business is linking quality and prices in fishermen mindset and use it as motivation to improve quality.

In the last few years supply for the export market has been around half from foreign vessels and the other half from local MDBs. The processors/exporters have been using production contracts with foreign vessels owners, with most of the risk taken by the lessee. But these vessels have been successful in fishing and supplying good quality tuna for the export business. Competition has been escalating in the Indian Ocean on contracting these vessels and if the 18% tax-break for Sri Lankan exporters for importing to EU will not continue after mid-2009, Sri Lankan competitiveness for these vessels will weaken. The local MDBs will than become even more important to the processing and export than previously. Processors believe the local MDBs will be their main supply of raw material in the near future. Some processors are vertically integrated in fishing, owning their own fishing vessels and some are using processing contracts.

But the main supply has been through the open market, were seller and buyer using an auction for price determination. The main problem with using the auction system seems to be lack of communication and cooperation between buyers and sellers with insufficient collaboration between them.

Processors/exporters are using export assemblers as intermediaries between them and the fishermen, which are not likely to improve the biggest problem in this business, lack of quality and hygiene. Roshan Fernando, the General Manager of the large processing and export company, Tropical Frozen Food, believes that the lack of trust between fishermen and processors is the biggest problem in the value chain of yellow-fin tuna (Fernando, R., 2008).

First and foremost there is a conflict of interest for the export assembler using information as a tool to gain bargaining power and defending his position within the value chain. The export assembler prefers his own interest over the interest of the value chain as a whole. This is a clear example of a zero-sum game where an actor in the chain uses his bargaining power without considering the possibility of a plus-sum game were everybody in the value chain can benefit from collaboration. This bottleneck in communication is causing many problems and hindering necessary development in the business and is a clear draw-back of efficiency in the export value chain and blocking free flow of much needed information between seller and buyer.

In general the quality awareness in Sri Lankan fisheries is unsatisfactory with lack of hygiene and knowledge in post harvest handling. It seems quite obvious to anybody walking the fishing harbours watching fish being handled in the auction markets with fishermen unloading fish from their boats, throwing the fish onto the harbour deck in 30°C and leaving it there for a long time through transaction activity until finally iced before transported to the fish markets. This seems to be one of most serious problems for quality and prices of tuna, whether or not it is channelled through the export- or the local market. Experiencing totally different working procedure by vessels with processing contracts with processors indicates that using contracts instead of free market system could improve quality and quantity of the export supply.

But the lack of quality is not the only issue affecting efficiency in the Sri Lankan yellowfin tuna fishery. MDBs targeting the export market need to adopt a different fishing method with higher capital investment and different post-harvest handling using QMS methods demanding considerable knowledge for such an operation. Sri Lankan fishermen need to adopt collective fishing like their foreign colleagues. Collective fishing is more efficient and productive with less time spent on finding good fishing ground. Such collaboration in fishing will lead to increased efficiency and productivity in harvesting and producing more value for the whole value chain.

There is also government interference interrupting the value chain of the export market. The extra cost for processors of yellowfin tuna by CFC monopoly increases transaction cost in the export value chain, weakening their competitiveness against their rivals around the Indian Ocean. The foreign tuna import has been extremely important for the processors, being the back bone of the supply through the years. The extra cost for the transaction could reduce this important raw material supply affecting earnings in this industry and adding cost to the value chain without any value addition to the consumer. There is strong evidence for connection between quality and price on the local markets. On SJM the best fish is sold first for the highest price. Also the rejects from the export markets are sold for considerable better prices than the average local supply.

With the local markets only handling the overflow from the export market and taking what is not suitable for exporting, there is still a need to improve efficiency and productivity by lowering cost and increasing rent to the society.

CONCLUSION

The main conclusion from this study is there are two main sub value chains of yellowfin tuna in Sri Lanka. There is a domestic market where everything is sold fresh with little or no processing other than drying, flowing mainly through fishermen, assembler, wholesaler/commission agent and retailer to consumer. Then there is an export market with domestic- and foreign supply of raw material. The flow through the value chain for local supply is from fishermen, export assembler, processor and exporter. The foreign supply is from foreign vessels, shipping companies, CFC, processors and exporters. The export market has three different pathways; the whole fish exported to the sashimi market in Japan, the fresh and filleted tuna exported mainly to Europe and America for the streak market and the filleted and frozen tuna for the same market (Garret and Brown, 2009).

It is not the direct transaction cost in the value chain for the domestic market affecting the efficiency the most, but the quality waste throughout the value system. Fishermen are staying at sea for too long time with limited amount of ice for preservations and spoiling the product before landed. This lack of quality awareness and hygiene are causing a lot of waste in the value chain and lowering the value of the product. These quality related problems causing waste of values in the process is a large set-back for efficiency in the value chain of yellowfin tuna.

There is a bigger catch in the local value chain for yellowfin tuna in Sri Lanka. The total value addition through the export market is considerable higher than through the local market, estimated in this study to be US\$ 2.4 pr/kg for the local market but US\$ 14.5 pr/kg for the export market. The export market is also paying much higher prices for raw material than the local market, up to US\$ 7.5 pr/kg for the sashimi market and 4.6 pr/kg to the EU market but average farm-gate price for the local market is around US\$ 1.8 pr/kg and dry-fish processors are paying less than US\$ 1 pr/kg for wet weight². As much as possible of the total domestic production of yellowfin tuna should be channelled through the export market thus giving much more value and paying much higher prices for raw material. Prediction of extra 10,000 tons

² Calculated weight after considering yield loss in processing

of yellowfin tuna channelled through exporting instead of the local market would net give the economy a US\$ 19 million a year, adding substantially to Sri Lankan GDP creating foreign currency and creating valuable jobs. One of the main drawbacks in efficiency of the export market is lack of communication and cooperation between buyers and sellers of raw material and insufficient collaboration between these actors of the value chain. Processors/exporters using export assemblers as intermediates in communication between seller and buyer of the raw material is not likely to improve quality procedures on board the fishing vessels. There is a conflict of interest by the export assembler using this information as a tool for his bargaining power defending his position within the value chain, preferring his own interest over the total gain of the value chain. This is a clear example of a “zero-sum game” where an actor in the chain uses his bargaining power without considering the possibility of a “win-win game” where everybody in the value chain can benefit from collaboration. This bottleneck in communication is causing many problems and hindering necessary development and is a clear draw-back of efficiency in the export value chain blocking the free flow of much needed information between seller and buyer.

But there is more than this mechanism affecting efficiency in Sri Lankan yellowfin tuna fishery. MDBs targeting the export market require a change in fishing methods that calls for increased investment capital and also a completely different post-harvest handling of the fish, using QMS methods that demand considerable knowledge. Sri Lankan fishermen need to decrease their individual fishing methods in favour of collective fishing strategies as their foreign competitors do. A collective fishing strategy in the value chain can be more efficient and productive with less time used for finding the tuna, giving better catches by spending more time on the fishing activity. Such collaboration in fishing produces more value for the whole value system and can thus be a substantial incentive for higher efficiency and productivity in harvesting.

There is a need to further study the cost and effort of reconstructing the Sri Lankan MDB fleet and the ways how the government could influence this process. One of the findings is that the biggest problem for the quality awareness of the fishermen is the imperfect cooperation between fishermen and the processors/exporters. There is a need to study this closer in order to find the reasons for this and ways to rectify it.

For the good of the industry is necessary to involve the Sri Lankan government in a programme that both reconstructs the MDB fleet and also educates fishermen in using improved fishing techniques, better fish-handling and quality concern matters and hygiene. This will improve the total margin within the value system with benefit for all actors in the industry and for the society as a whole.

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