

Supply Chain Management of Marine Fish- A Case Study on Bangladeshi Fishing Trawler Company

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Abstract: Supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management activities. It is well known that supply chain management is an integral part of most businesses and is essential to organization success and customer satisfaction. The coastal and marine environment of Bangladesh is blessed with a warm tropical climate and heavy rainfall, enriched with nutrients from the land, creating one of the world's richest ecosystems with high productivity. But in marine fish distribution system are involved in different levels or channels of market from the captured process to the final buyer i.e. consumer, which is a lengthy process. As a result, price of fish varies in a greater scale from primary to consumers market. Because of various intermediaries the supply chain of marine fish is expensive. In this study, I showed the actual scenery of marine fish supply chain which consists of various intermediaries. If it is possible to reduce these intermediaries, the consumer will get the fresh and qualityful marine fish in a short period with low cost.

Key Words: Supply Chain, Marine Fish, Industrial Fishing Fleet, Fishing Trawler, Exclusive Economic Zone (EEZ), Bay of Bengal.

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I. Introduction

The fisheries sector in Bangladesh plays an important role in nutrition, employment, foreign exchange earnings, contributes 60% of the total national demand for animal protein and about 1.4 million people are directly employed by the fisheries sector (according to Banglapedia). There are three categories of fisheries resources of Bangladesh. These are inland capture, inland culture and marine capture. Marine captures are divided into two sectors. One is artisanal fleet and another is industrial fleet. Marine fisheries contribution to food security and economic development of Bangladesh is extremely important and undeniable. In the coastal and exclusive economic zone (EEZ) of Bay of Bengal, 2.70 lac people are engaged in fishing (according to the report of Marine Fisheries Department). In Bangladesh, supply of fresh water fish is decreasing day by day and hence marine fish is considered to be an important alternative of fresh water fish. Bangladesh has coast line of 710 km along the north and north-east part of Bay of Bengal. It has internal estuarine water area of 25124 sq. km, continental shelf of 8505.15 sq. km and Exclusive Economic Zone (EEZ) 140763.10 sq. km under national and jurisdiction. All these areas of Bay of Bengal offer potential sources specially fishes and shrimp for the country. The contribution of marine fisheries has been continuously increasing over the years in Bangladesh. According to the progress report on Marine Fisheries Office (published in Sept'2016), 600000 tons marine fish captured in the year of 2014-2015 and which is 16.28% (approx) of total produced and captured (3684000 tons) fish. In Bangladesh, the marine fish is considered to be an important source of protein. Due to the increased demand and high price of fishes both in domestic and export market, Bangladesh has great potentiality to gain huge foreign exchange by exporting marine fishes. The marketing aspect of marine fisheries in Bangladesh is very important. Marine fish distribution channels in Bangladesh is facing a number of problems like long supply chain, rough handling, insufficient and poor transportation facility and excessive cost, and inadequate storage facilities, shortage of capital, market limitation etc.

Objective of the Study: The objectives of the Research "Supply Chain Management of Marine Fish" are as follow-

To know how the captured marine fish are processing in the fishing trawler?

To determine how the various distribution channel get the fishes and marketing these fishes?

To know the how the final buyer gets the marine fishes through several intermediaries or distribution channel?

II. Methodology

A preliminary survey was made to get first hand information and then a survey was conducted to have detailed information about supply chain of marine fish in industrial fishing trawler companies. However, data were collected both primary and secondary sources.

Primary Sources: Following are the primary sources-

I collected data by face to face communication with office management, vessel crew, officer & Skipper, wholesaler or Fish party and discuss with them about the capturing, processing, freezing, storing, tendering, unloading, transporting and selling of fishes.

Beside this, telephone discussion with office management and fish party for confirming the doubtful information.

Secondary Sources: Following are the secondary sources-

Internet, journals, websites etc.

Literature Review

According to Sunil Chopra "A supply chain consists of all parties involved directly or indirectly in fulfilling a customer request". According to W. J. Stevenson "Supply chain is a sequence of organization, their facilities, function and activities that involved in producing and delivering a product or service". Supply chain management as an integration of all business process across the supply chain (Kenneth Lyons & Brain Ferrington). According to Copper "Supply chain management is an integration philosophy to manage the total of the distribution channel from supplier to ultimate users.

Steps of Supply Chain-



In fishing trawler, supplier includes fishing gear, materials, mechanical, electrical and electronics suppliers; manufacturer indicates vessel on board personnel and distributor indicates fish party, and retailer indicates aratdar, vendors who all are engaged in buying of marine fish for the purpose of selling.

Trawl net is large nets, conical in shape, designed to be towed in the sea. The activity of pulling the trawl through the water is called trawling. The trawl is pulled through the water by the vessel is called trawlers. According to International Regulation for preventing Collision at Sea in 1972, the term vessel engaged in fishing means any vessel fishing with nets, lines, trawls or other fishing apparatus which restrict manoeuvrability, but does not includes a vessel fishing with trolling lines or other fishing apparatus which do not restrict manoeuvrability. According to STCW-F in 1995 (International Convention on Standards of Training, certification and Watchkeeping for Fishing Vessel Personnel), Fishing vessel" means any vessel used commercially for catching fish or other living resources of the sea.

The Bangladeshi part of the Bay of Bengal has four well defined and identified fishing grounds. There is the biggest fishing ground of Bay of Bengal in Bangladeshi parts named 'Middle Ground' covering the Exclusive Economic Zone area of about 4600 km². Another three fishing grounds are 'South of the South Patches' of an area of about 2538 km², 'South Patches' area of about 3662 km² and 'Swatch of no Ground' area of about 3800 km² (according to the progress report on Marine Fisheries Office, Sept'2016).

The supply chain explains the overall activities which are required to bring a product from producer to the final buyer through the various stages of production and supply process. In Bangladesh, two types of trawlers are using to catch marine fish. One is Shrimp Fish trawlers which are engaged for catching shrimp. Another is White or fin Fish (other than shrimp) Trawlers. White Fish Trawlers are two types. One is Mid water trawler which are engaged for catching Pelagic fish (The fish live in the pelagic zone of sea being neither close to the bottom nor near the surface). Pelagic fishes are ranges from small sizes such as sardines, to large apex oceanic fishes, such as tuna and oceanic sharks. Many pelagic fish swim in schools weighing more than 50 tons which sometimes drift passively with ocean currents. These fishes are migrated fishes). Another is Bottom trawler which are engaged for catching Demersal fish (This fishes live and feed on or near the bottom of seas). They occupy the sea beds, which usually consist of mud, sand, gravel or rocks. And 80% of the bottom trawlers are wooden hull. These wooden hull vessels have no freezing facilities. The total numbers of bottom trawler are 60 (sixty). These wooden hull trawlers are also called ice trawler. Because these vessels are preserving fish by icing. These are the old type vessels. Modern navigation system, standard safety equipments and modern fishing technology & methods are totally absent in these types of vessel. Average engine Horse Power of these vessels are 350 to 850 BHP (brake horse power). The average length of bottom trawler are 24 to 40 meter.

Mid water trawlers are the modern fishing trawler of Bangladesh. The total number of mid water trawlers are 112 (one hundred and twelve). These vessels are equipped with modern navigation system, safety equipment, and using modern fishing technology and equipment as like sonar, trawl eye etc. Average Horse Power of modern fishing trawlers are 850 to 1850 BHP (brake horse power). The average length of mid water trawler are 28 to 52 meter. The length of ground rope and head rope of mid water net are 70 to 110 meter. The vertical opening of this net may be up to 30 meter.

Shrimp trawlers are engaged for two types of fishing program. One is mother program that is catching or collecting alive mother/female shrimp from the Bay of Bengal and supply these shrimp to shrimp hatchery. Another is commercial fishing that means catching all types of shrimp. The trawling period (trawl duration) of these vessel are very short. In some cases, half an hour or one hour. These vessels get fin or white fish also. Most of the shrimp trawlers company are directly involve for exporting fish to abroad. The total numbers of shrimp trawlers are 37. The average length of shrimp trawlers are 24 to 38 meter. Average engine Horse Power of shrimp trawlers are 350 to 850 BHP (brake horse power).

Organization Profile:

For this research, I considered the Sea Resources Ltd. This organization is the pioneer of the business of deep-sea fishing in Bangladesh. Products of Sea Resources Ltd. acts as the alternative source of protein for the nation. Sea Resources Ltd has three sister concern fishing company namely Sea Fishers Ltd, Deep Sea Fishers Ltd. and Agro Food Service Ltd. Sea Resources Ltd incorporate in 1982 and engaged in deep sea fishing in the Bay of Bengal. It has full fledged radio facility for undisturbed communication with trawlers. The group has also established a joint venture with Danish partner for production of trawls and other equipments for fishing trawlers. Beside this, I collected data from Amuse Deep Sea Fishing Ltd. and FMC Trawl Ltd.

Vision of Sea Resources Ltd: The Company undertake the rigorous task to explore the hidden treasures of high sea, a challenging task for reward. Since inception the company pioneered the vast responsibility to give a shape of this industry in Bangladesh as it is now, it also strive hard to keep it environment friendly. Company places topmost priority on quality of products ranging from processing, packing, storing, preservation etc to commensurate with the ultimate satisfaction of the consumers both at home and abroad. In pursuance to that, cleanliness of man and materials and personal hygiene are also given equal importance under strict regulatory management of qualified personnel in various field. The Company undertook a very noble yet difficult task to protein distribution in the country having scarcity of dietary resources. A country with vast population where food of the people is a vital and scaring issue. Over the years, Company has succeeded people to be motivated on the alternative diet availability in seafood – enriched with protein and mineral contents. Company is destined to create employment opportunity directly and assist backward linkage to grow to widen the horizon of employment generation. A disciplined, efficient yet friendly working environment created by the company both at base and vessels has inculcated the feeling in each and everyone's heart that "The company is mine & quality is my motto".

III. Analysis of Findings:

Normally a mid water trawler and Shrimp trawler get the sailing permission (issued by Marine Fisheries Department) for 30 days, and Ice or Wooden hull vessel get 14 to 30 days. No vessel is allowed to stay at sea after ending sailing permission. The vessels come back at harbour either expiring sailing permission or completing the voyage or any other mechanical problem. A mid water trawler pulling the trawl i.e. trawling duration (after completing shooting to starting hauling period) normally 4 hours or less (depends up to fish school). When hauling completed that means catch on the deck, crews started to sorting the fish according to their species and sizes. Then properly wash the fish. After that, packing the fishes according to their species and sizes. Normally a packet (called fish block) contains 18 to 22 kilograms fish. When packing completed, store the fish into the fish hold (hatch) for freezing. After that when freezing temperature reach at -25° centigrade to -35° centigrade, then separate the frozen fish packet for final storing. This freezing process normally takes 36 to 48 hours. This period varies freezing compressor performance and species of fishes. This is a continuous process and it is going on until completing the voyage. A vessel of more than 200 GRT, it takes 3 to 5 days to complete the fish cargo unload process. Sea Resources Ltd. is exporting the fish to Thailand, China and Denmark. So this organization is marketing two types of fish. One is for domestic market and another for global market. A short description of supply chain intermediaries of fishing trawler has given below-

Wholesaler or 1st Fish Party: They are the first intermediaries or channels after owner of supply chain of marine fish. After completing a voyage, when a fishing trawler comes at harbour, vessel Skipper gives a catch report to the office. Then office management sends the message to the enlisted parties of the company and arrange a tender for selling the fish. The Fish party who has deposited security money to the office can attend the tender. Without security money no party will be allowed to join the tender. Normally 4 to 10 parties attend the tender. The number of party depends on the quality and volume of the fish. The party who gives the

maximum rate, get the tender. This rate of fish is variable. Different types of fish have different rates on different time. Fish party gives the rate by justifying the dailies market rate. They buy the large volume of fish from a vessel. In some cases, it may be near about 250 tons or more. After getting the proprietary right, they started to unload the fish through the boat. These boats are the special boat which engaged only unloading the fish and these boats can carry 12 to 14 tons of fish. Then they store the fish at the cold storage. Sometimes, during unloading time, they sell some species of fish to the 2nd party. Storing duration at the cold storage depends on the market price. If they think, market price will increase few days later, then they stored for specific period. Otherwise, they sell to the retailer through aratdar. Only the first fish party or wholesalers are directly drilling with the fishing trawler management. Beside this types of fish party, some organizations have contractual or fixed fish party. They made a written agreement by paying security money with trawler owner or management to buy the fish at fixed rate for the period of one year. The whole year fish rate remains constant for the both parties i.e fish party and owner. They settle the fish rate before the agreement. After one year, if they want to continue they renew their agreement or otherwise cancel the agreement.

2nd Fish Party: They are often acts as a middle man of wholesaler and retailer. They are comparatively financially weaker than wholesaler or main fish party. They have willingness to buy the whole fish of the vessel but no ability. They buy the fish from the main fish party. After that they store the fish at the cold storage or sell the fish to the retailer through aratdar.

Cold Storage: After unloading the fish from the vessel, normally the first or second fish party store the fish at the cold storage. The first or second fish party uses the cold storage as distribution centre. The party who are engaged for exporting fish to abroad, they first store specific fish at the cold storage until their desired volume. After ensuring the clearance of quality controller, these fishes are directly sends to the port for exporting.

Aratdar (Agent or Broker): The aratdar is a commission agent who has a fixed establishment and helps the 1st or 2nd fish party to sell their fishes. They hire labors and other persons for performing various functions such as loading, unloading, weighing, grading, etc. The first or second fish party sell their fish to the retailer through the aratdar.

Retailer: They buy fish from the first fish party and 2nd fish party through *aratdars*. They sell their fish to the consumer at various local markets.

Consumer: This is the last stage of the supply chain system of marine fish. Consumers buy the fish from the retailer. Due to this long supply chain, consumers are getting the product at a higher price. Sometimes consumers receive the less quality product due to these intermediaries rough handling procedure, insufficient and poor transportation facilities, insufficient cold storage etc.

Some species of white/fin fish which is captured in large volume at a time. In some cases up to 40 tons.

SI No	Species	Fish
1	Sardin	Chapila, Colombo
2	Mackerel	Aila
3	Hilsha	Hilsha

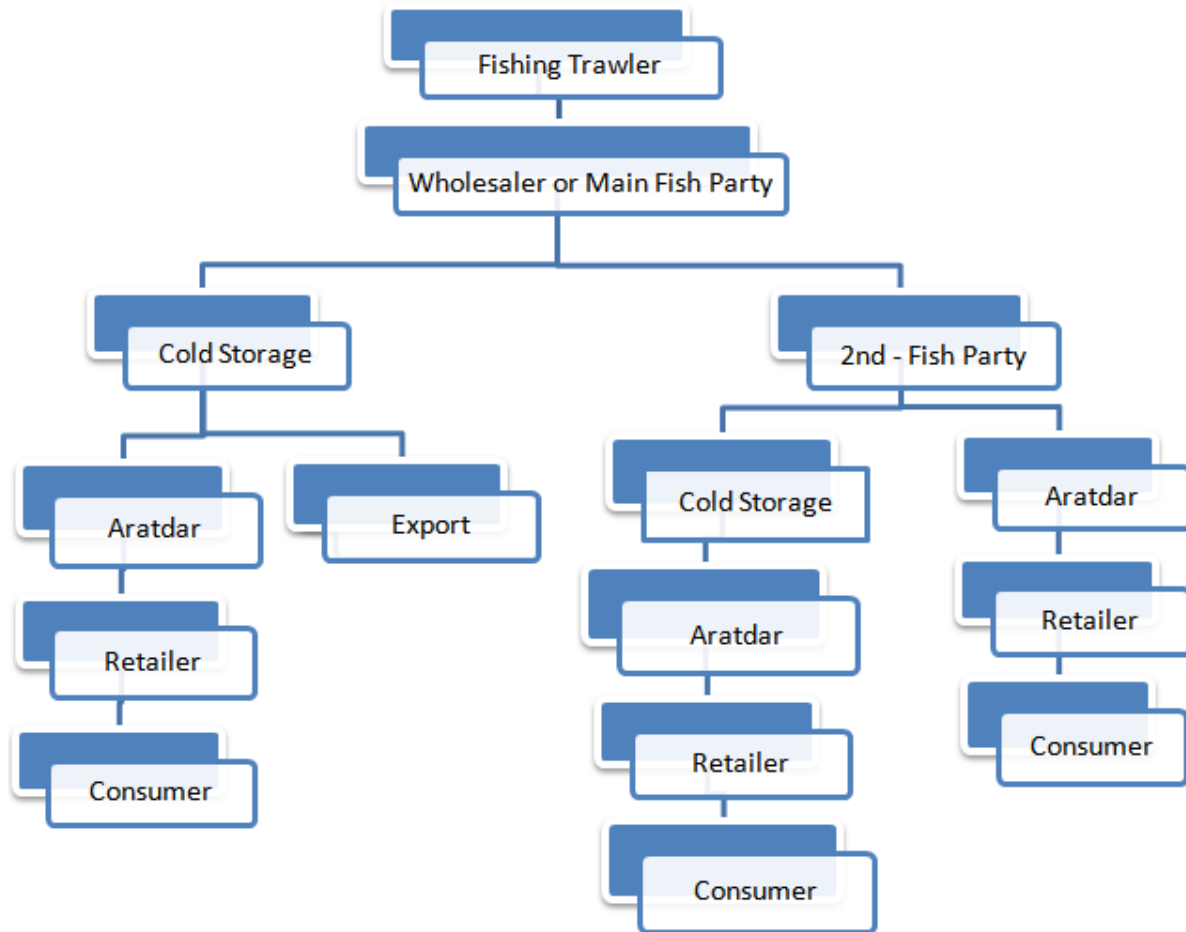
Some other marine fishes in the exclusive economic zone of Bangladesh are-

SI No	Species	Fish
1	Crocker	Jew, Red Jew, White Jew, Spotted Jew etc.
2	Scads	Hardtail, Mackerel Big Eye, Yellow Queen, Black Pomfret etc.
3	Shrimp	Tiger, White, Brown, Lobstar.
4	Others	Bombay duck, Cat, Grunter, Ribbon, Red Snapper, Eel, String Rays, White Pomfret, Red Fish, Rupban, Tongue sole, Cuttle, Squid, Lizard, Indian Salmon, Big Eye etc.

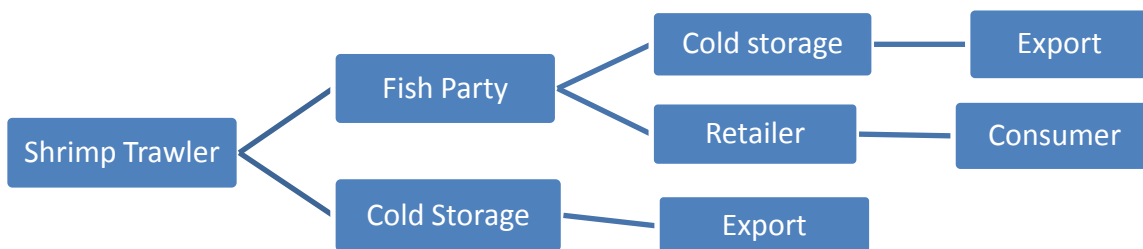
Hilsha is the only species which is supplied, marketed and consumed all over the Bangladesh. But for other species, marketing system is not yet widened and most of these fish species are distributed to specific districts fish market and consumed by small number of consumers. Lack of transportation facilities, excessive transportation cost and insufficient cold storage facilities all over the country are also responsible for the immature of marketing systems of these marine fish.

Fishing trawler owner specially shrimp trawler, and fish party whose have exporting license, only they can export these fish to abroad. Onboard personnel of trawler are making export fish packet at sea with scrupulously . After unloading these fish from the trawler, trawler owner or fish party store these fish at cold storage until their desired volume. After getting the clearance or certify by the quality controller, trawler owner or fish party send their required volume of fish to port for exporting.

Supply Chain of a White/Fin Fish Trawler-



Supply Chain of a Shrimp Trawler:



IV. Conclusion & Recommendations

Due to the geographical position, weather condition and long sea area of Bangladesh has great opportunity to become one of the big producer of marine fish all over the world. After fulfilling national demand, exporting marine fish to abroad brings the foreign currency and enhances our economy. Present supply chain of marine fish is an old process and it is going on since many years. This distribution system is to be developed for the quickest delivery of the marine fish to the consumers and ensuring the better quality.

1. In order to deliver the product in a short time to the consumer, transportation facilities to be increased.
2. Consumer didn't get the fresh sea fish from a fishing trawler due to the several intermediaries of supply chain. It is necessary to reduce the existing number of supply chain intermediaries.
3. Number of cold storage to be increased in various regions in the country in order to ensure the best quality and developing the marketing system.
4. 1st & 2nd fish party stored the fish in the cold storage due to the expectation of more profit. As a result, final buyer i.e. consumer didn't get the fresh fish and purchased by higher price. So respective government organization should monitor and interfere to the fish parties syndicated activities.

5. Hygienic situation to be ensured in the fish market in order to maintain the quality and attract the consumer.
6. Government should encourage the fishing trawler company to increase the export fish to the abroad in order to earn foreign currency which can contribute in our national economy.
7. All species of marine fish except Hilsa are scarcely available and yet not popular in rural areas of Bangladesh because of underdeveloped marketing system. So the marketing system of marine fish should be developed.

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