Marine Fisheries Value Chain Management – A Research Study Synopsis

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Abstract

Fish as a food item is relished by more than sixty percent of the people of India. It is just not a food item for internal consumption but also it is a commodity that can earn foreign exchange. Marine fisheries generate good employment and incomes for a large section of backward and economically weaker sections of the coastal community. Consuming fresh fish is the cheapest proposition. Any processing and value addition is going to add cost. Value added products could be prepared from those varieties, which are being wasted and from underutilized varieties, which are downgraded due to lack of infrastructure facility. The market value of these varieties of fish/shrimp is very low and marine fisheries sector in Andhra Pradesh state is underperforming. So it is proposed to study value chain analysis of marine fisheries. Value Chain Management is a process of creating a value in each phase right from processing of material, production, marketing, distribution and retailing. The specific objectives of the study are to identify the different Value Chain Actors and analyzing their Socio -Economic Characteristics and to map the key processes and flows in the value chain of Marine Fisheries in respect to the local market, regional markets and the international market. An empirical research is conducted in coastal districts of Andhra Pradesh to study the marine fisheries value chain.

Introduction

Fish as a food item is relished by more than sixty percent of the people of India. It is just not a food item for internal consumption but also it is a commodity that can earn foreign exchange. Marine fisheries generate good employment and incomes for a large section of backward and economically weaker sections of the coastal community.

Before 1960, the markets of Indian marine products dominated by dried items were largely confined to neighboring countries like Sri Lanka, Myanmar (formerly Burma), Singapore etc. This situation changed with the development of technology/modernisation; dried products gave way to canned and frozen items. The product shift also resulted in market shift. More sophisticated and affluent markets viz. Japan, USA, Europe, Australia, etc. became important importers. Several Seafood processing units with modern machinery for freezing and production of value added products were set up at all important centers in the country for processing, mainly for exports.

India with a long coastline of 8129 km, two million sq. km of Exclusive Economic Zone and 1.2 million hectares of brackish water bodies, offers a vast potential for development of fisheries. Against an estimated fishery potential of 3.9 million tonnes from marine sector, only 3.1 million tones are tapped. Fishing efforts are largely confined to the inshore waters through artisanal, traditional, mechanised sectors. About 90% of the present production from the marine sector is from within a depth range of 50 to 70 meters and remaining 10% from depths extending up to 200 meters. While 93% of the production is contributed by artisanal, mechanised and motorised sector, the remaining 7% is contributed by deep-sea fishing fleets, confining their operation mainly to the shrimp grounds along the upper East Coast.

India exports more than Rs. 8000 crore worth of seafood every year, of which Andhra Pradesh accounts for 25% to 30%. Japan and the US are the major importers, especially of tiger shrimp and scampi (fresh water prawn) from Andhra Pradesh. In Andhra Pradesh, Aquaculture is currently considered the sunrise industry in the state. The state not only lends itself naturally towards the growth of the industry, but some of the phenomenal successes of the early players in this area have also contributed in large measure in attracting growing number of entrepreneurs to the industry. Big business houses of Food Processing

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Industry like Tata, ITC, Liberty, HLL, ECMP and many other existing companies and 30 prospective companies are making good money in this very promising industry. This seems very bright where the established names are already operating in Andhra Pradesh and there are so many others, not known so well, are also coming up fast. This rush of companies going into Aqua because today foreign markets are evincing keen interest in importing seafood from India. One of the major reasons for this seems to be new ultra modern processing units that are coming up in Andhra Pradesh that match the international standards in hygiene and other areas. Earlier Andhra Pradesh was only into commodity marketing where the shrimp was frozen into blocks and exported with prompt attention being paid to other parameters like fungal, infection not only helped the standards in exporting raw material improve but also the processed export quality going up.

Value chain management:

The Value is something for which a customer is paying money. Any company must have to deliver value in order to sustain in this competitive market. Value Chain Management is a process of creating a value in each phase right from processing of material, production, marketing, distribution and retailing. The term 'Value Chain' was used by Michael Porter in his book "Competitive Advantage: Creating and sustaining superior Performance" (1985). The value chain analysis describes the activities the organization performs and links them to the organizations competitive position.

The Value Chain framework of Porter (1990) is "an interdependent system or network of activities, connected by linkages". When the system is managed carefully, the linkages can be a vital source of competitive advantage (Pathania-Jain, 2001). The Value Chain analysis essentially entails the linkage of two areas. Firstly, the value chain links the value of the organizations' activities with its main functional parts. Then the assessment of the contribution of each part in the overall added value of the business is made (Lynch, 2003). The Value Chain describes the full range of activities, which are required to bring a product or service from conception, through the intermediary phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

Michael Porter suggested that the organization is split into 'primary activities' and 'support activities'. These activities can be classified generally as either primary or support activities that all businesses must undertake in some forms. The basic idea is that a firm's activities can be divided into nine generic types, which are linked to each other and to the activities of its suppliers, channels and buyers. Five activities are the primary activities, which are directly concerned with the activities that create the products, market them, deliver them and customer service, each of these primary activities has a linkage with support activities that can be useful to raise their effectiveness or efficiency. Porter (1985) hints the term "Margin" means that firms realize a profit margin that depends on their ability to manage the linkage between all activities in the value chain. In other words, the organization is able to deliver a product / service for which the customer is willing to pay more than the sum of the costs of all activities in the value chain.

Value chain management in marine fisheries sector:

The value chain in the fishery sector can be defined as the movements of the product (fish) from the landing centers to the final consumer taking into consideration the entire gamut of service providers at the various levels of the chain, the value addition done, the service provided or the subsequent value added to the product before consumption in lieu of the profit from the operations undertaken by them.

The value chain in fishery is distinct for the product segments and market segments. These segments can be associated to the specific species. Again if we understand the nature of the product, the availability of the species are specific in terms of depth of water, micro climate of

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shallow and deep water, food availability of fishes, etc. Hence the product can be related to the type of fishing gears and in turn normally with the size of operation. The coastal species are different from the species found in the deep sea. The availability of the catch is different for the fisherman using different type of fishing gears. Here to bring in contention is the association of the mode of operation used for fishing with the product, which becomes specific and hence varied value chain can be demonstrated for the various categories of the fisherman.

Need for the study:

Among the Bay of Bengal States of India, Andhra Pradesh occupies the first position in owning a good number of fishing vessels, freezing plants and peeling sheds. But in terms of availability of infrastructure facilities per landing center, Andhra Pradesh occupies the last position except in regard to the availability of ice plants per landing center. This shows that there is a need for the development of infrastructure facilities per landing center particularly facilities like fishing vessels, cold storage and freezing plants for the development of the fishing industry. Andhra Pradesh occupies the second rank in landing centres in India and occupies the second place in availability of infrastructure facilities in Bay of Bengal Region. But in respect of production per kilometer of coastline, it stands in the position at 11th rank among the Bay of Bengal States. As discussed earlier, against an estimated fishery potential of 39 lakh tonnes from marine sector, only 31 lakh tonnes are tapped, leaving 8 lakh tonnes yet to be tapped. So this study is taken up to find out the reasons for underperformance of Andhra Pradesh Seafood sector.

The value chain approach helps strategy-makers gain a better understanding of how Marine Fisheries sector can contribute to national socioeconomic development by using exports as a tool for development. It gives an overview of how the sector is addressing the issues of employment creation, skills development, geographic diversification of industry and sustainable development issues. This can feed into the strategy design process, helping the strategy team determine priorities, both in terms of action for the sector under review and for the sector's relevance to national export strategy. By helping to explain the distribution of benefits, particularly income, to those participating in the global economy, value chain analysis makes it easier to identify the policies that can be implemented for individual producers and countries to increase their share of these gains.

Objectives of the study:

The study entitled "Marine fisheries value chain management" has been structured to capture the essence of the processes and flow of the value chain in Marine fisheries. The framework of the study helps understand the different levels of the value chain – its role and importance, the cost of operation, the barriers to entry, mobility and exit, the economy of scale, the effect of market forces viz. the demand and supply forces, etc.

The specific objectives of the study are:

➢   To identify the different Value Chain Actors and analyzing their Socio -Economic Characteristics

➢   The study is designed to map the key processes and flows in the value chain of Marine Fisheries in respect to the local market, regional markets and the international market.

➢   It also gives a detail description of the various players involved, their roles and responsibilities, the cost of operation and the barriers to entry, mobility and exit at various points of the value chain.

➢   To study the impact of different institutional policies on this sector.

➢   To suggest the suitable value chains to the local markets, regional markets and the international market to attain the competitive advantage.

Methodology of the Study

The study is mainly an empirical one and the variables used are both quantitative and qualitative in nature. In this methodology section an attempt is made to explain the methods used in the project to study the different value chains and their cost benefit analysis of seafood products in coastal Andhra Pradesh.

The study has adopted various tools and techniques for collection of information on various aspects. Some of them are detailed below.

➢ Secondary Research

➢ Primary survey through structured questionnaire of the key stakeholders

➢ Personal interviews of the key respondent

➢ Group discussions

➢ Observation method

a) Secondary Research: Under secondary research, a thorough desk review is required to develop insights into the key areas that needs to be focused during the primary research and discussions were held with various knowledgeable persons in the Marine Fisheries sector to collect information related to the issue on hand. Collection of Secondary Data from various sources i.e., Census of India, Statistics and Planning Board, CMFRI (Central Marine Fisheries Research Institute), CIFT (Central Institute of Fisheries Technology), CIFRI (Central Inland Fisheries Research Institute), NIO (National Institute of Oceanography), MPEDA (Marine Products Export Development Authority), Bureau of Economics and Statistics, Publications of various agencies like Centre for Development Studies, studies conducted by institutions, journals, books and publications and collected from coastal district head quarters i.e., Srikakulam to Nellore.

b) Primary Research: Primary research is conducted in nine Coastal Districts of Andhra Pradesh covering 974 Kms of coastline from Srikakulam to Nellore (From Major Fish Landing Centers) to collect first hand information on the specific parameters developed on the basis of objectives of the study. In the primary research, both qualitative and quantitative approach has been adopted.

c) In-depth Interview: In depth interviews technique is used to obtain information from the key respondents on the issues and concerns of the value chain of fishery in the study area. Different semi structured questionnaires were prepared for the purpose.

d) Group Discussions: Various Group Discussion Technique used among the fishermen as well as the different players of the value chain. These discussions were useful in finding out the different aspects of various value chains for fishery. It also helped in validating the information collected by the individual investigators through face-to-face interviews with individuals or otherwise. Instruction moderating schedules were used as tools for the purpose.

e) Observation Technique: Observation Technique is used during the course of group discussions and it is penned. While interviewing the respondents, observations were gathered from their reactions. The investigators' impression from their own experience during the course of investigation was also taken as part of observation. Thus observation was quasi-participant type. Operations of the activities, the manner of functioning of various players of the value chain at different levels was keenly observed. These observations formed an essential part of the entire fieldwork.

f) Study area: The study is conducted according to the preferential sampling of the researcher. The selection of the study area is on the basis of importance of the Marine Fish Landing Centers among the nine Coastal Districts of Andhra Pradesh covering 974 kms of coastline from Srikakulam to Nellore, the number of fisherman at the landing center, the

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volume of trade generated, etc. The regional markets were selected on the basis of the size of operation, number of forward and backward linkages, the volume of daily trade, etc. The major regional market for fishery was covered during the study to develop a good understanding of the marine fishery value chain.

g) Sampling: The study sampling is done to incorporate all the stakeholders' i.e. fishermen, cycle carrier, head loader, retailers, middlemen, Processors and Exporters in the study and to produce a complete picture of the Sea Food Value Chain in Andhra Pradesh. It can be seen from table 1 in which the details about study area and sample size are mentioned with different respondents. Quota Sampling Technique was adopted to collect data from their respective coastal districts. Purposive Sampling Technique was adopted to collect data within a district. In case of exporters, Convenience Sampling Technique was used to collect data from exporter companies as the total universe is about 90 in Andhra Pradesh and most of the marine fish processing are being closed their plants.

Table 1: Sampling according to Study Area										
Respondent	**Coastal Districts of Andhra Pradesh**									**TOTAL**
	Srikakulam	**Vizianagaram**	**Visakhapatnam**	**East Godavari**	**West Godavari**	**Krishna**	**Guntur**	**Nellore**	**Prakasham**	
Fishermen	50	50	50	50	50	50	50	50	50	450
Middlemen	2	2	2	2	2	2	2	2	2	18
Retailers	3	3	3	3	3	3	3	3	3	27
Exporters										18
Total										513

h) **Methods Used**: The following statistical methods are used in the analysis.

Tabular Analysis: Simple tabular analysis is used to analyze Socio-economic characteristics, Supply Chain Operations and Value Chain Operations of fishermen and information received from the fish exporting companies and corporate processors. Bi-variate tables are used to explain the association between certain variables.

Chi-Square test: Using the information provided in bi-variate table's Chi-square test is used to identify association between the variables under consideration.

Means and proportions: Most of the analysis is simple and relied on comparing means (average) and proportion. Test for equality of proportions is also used and explained in the analysis.

Standard Deviation: useful for observing the variables affected by variations of sampling.

Coefficient of Variation: Standard deviation helps us to calculate coefficient of variation. From coefficient of variation one can say for which proposition consistency is more and for which it is less. This also helps us to explain the variation in ranks of the average level of perceptions.

Multiple Regressions: Multiple regression method is used to explain the variation in the dependent variable, given a set of independent variables.

Summary of findings:

Findings of Exporters/Corporate fish processing companies:

In detailed Interviews with Exporters in Costal Andhra Pradesh, it was found that the emerging Andhra Pradesh Seafood Sector is suffering from the following problems.

a)   Lack of Infrastructure: The Exporters are facing problems with lack of Continuous and Quality Electrical Power for their Processing / Storage Units. Shortage of Cold Storage chain is making the product perishable quickly. Lack of proper Transport and Cargo facilities are increasing the cost of exporting.

b)   Export Barriers: For an Exporter, Registration under Import Export policy and MPEDA is getting difficult. If registered, getting an IE code number (Import Export Code) from the licensing authority, JDGFT (Joint Director General of Foreign Trade) is delaying. The ban on new trading units from Export Processing Zone (EPZs), lack of integration among concerned authorities, antidumping Tax etc are other export barriers for fish exporters.

c)   Environmental problems: The Environmental aspects like pollution throughout the coastal area of Andhra Pradesh, existence of crude oil and natural gas companies in coastal areas, establishment of chemical industries in coastal areas, releasing urban drainage waters into sea are causing viral diseases to the marine products. These viral effected products are treated as less quality products, which may be rejected by export authorities. So products are required to use high dose of Anti-Viral Chemicals and Antibiotics. If the stock is not delivered in time, customer may reject the product because of usage of Chemicals.

d)   Economic problems: The Impact of recent Global Economic Meltdown is high on Indian Fish Exports. Many of the overseas organizational consumers, either they stopped their imports or they decreased their imports from India whereas the individual overseas consumers decreased their fish consumption rate in major fish markets of India.

e)   Financial problems: The exporters are facing problems in getting adequate finance and insurance coverage for their exports. There are tough financial constraints from the bankers like market surety, credit history, past performance etc.

f)   Marketing problems: Majority of fish exporters are concentrating on the same old products dealing with the same market. Exporters are not finding untapped potential market in other countries where the demand is more for the available products.

g)   Technological problems: Technology obsolescence is another major problem faced by the exporters. Urban fish exporting areas like Visakhapatnam are facing the problem of surplus of processing units whereas South Coastal areas like Guntur, Prakasham are facing the problem of deficit of processing units.

h)   R&D problems: Lack of proper research and development work in this sector is another problem that made business-process incompetent and product-processing technology outdated.

i)   Service problems: Lack of extension services like storage facility at beach from where the product is brought, at port where the product is exported, in shipment etc.

Major Findings of Analysis of Supply Chain Management in marine fisheries sector:

a)   It is found that out of total sample of 450 fishermen, 359 (80 percent) fishermen are availing intermediary services whereas 91 (20 percent) fishermen are not availing intermediary services by practicing direct marketing. It was also found that only good quality fish is sold away in direct marketing whereas in intermediary marketing not- a-good-quality fish also moves at appropriate price offer.

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b)   It is observed that majority of fisherman selling the fish to middleman (67 percent) because of prompt payment. Majority of Agents to fish company (29 percent) is getting fish from fisherman because of offered high price and being a creditor to fisherman. Majority of Cycle carriers and head loaders (23 percent) are getting fish for their honesty in price offer. Fishermen are selling fish to retailer because of prompt payment and creditor to them. It is also observed those majority of fishermen are forced to sell their fish to the intermediaries who were creditor to them. Next to that, prompt payment and high price offer are motivating the fisherman to sell fish to a particular intermediary.

c)   It is observed that majority of fishermen selling the fish to customer (16 percent) because of high price offer. Company is getting fish from fishermen because of being offered high price (46 percent) and prompt payment (9 percent) to fishermen. It is also observed fishermen are selling their fish through direct marketing because of high price offer and prompt payment.

d)   The control over the entire supply chain is in the hands of few large players i.e. traders and exporters. There are large numbers of "intermediaries" within the supply chain who add to the prices of the species without adding "value" to the extent of the final price realized by end consumers.

e)   The payment system adopted at the regional market is twofold - cash intermingled with credit. The credit is dependent on the relationship that the buyer in these regional markets enjoys with the sellers. There is enough scope for any player from the landing centre to tie up with leading wholesalers in the regional market.

Major Findings of Analysis of Value Chain Management in Seafood Sector:

a)   It is found that in sample fishermen, 16 percent fishermen are not performing any value addition activities and straight away selling fish catch to either middlemen or retailer whereas 84 percent fishermen are performing value added operations ranging from two or three to six or seven different value addition processes.

b)   The most used value added activities for fresh fish are cleaning, grading, separating, washing, weighing, icing, packaging etc.

c)   The most used value added activities for sundried fish are cleaning, washing, sun drying, preservatives mixing, packaging etc.

d)   The most used value added activities for salted fish are cleaning, washing, salt mixing, preservatives mixing, sun drying, packaging etc.

e)   The value addition operations by different people like fishermen, middlemen, retailer, head loader, cycle carrier, and exporter are analysed and it is found that on an average 12 percent value is being added to fish if they perform value addition processes.

f)   Exporter value chain, The Exporter buys the raw fish at the rate i.e. the Average product (fish) cost per KG is Rs.350/-. The Average Transportation cost per KG is Rs. 0.18/-. The Average Labour cost per KG is Rs.0.08/-. Now, the product is available in Export Processing Plant. Now a fish has to be undergone various Value Addition (Price Improvement) Processing Stages like Washing & Icing (Rs 0.5/-), Sorting & Grading (Rs 4.07/-), Freezing (Rs 5.5/-), Glazing & Hardening (Rs 2.5/-), Weighing & Packing (Rs 4/-), Metal Detecting (Rs 1/-), Packing & Marking (Rs 5.07/-), Frozen Storage (Rs 5.28/-) and finally Shipment (Rs 25/-). A raw fish Average Cost per KG is Rs.350.26/-. After Value Chain Management process, the product will be selling at Average Price of Rs. 427 / KG.

Major policy recommendations:

a)   Establishment of transparent and streamlined auction mechanism under supervision of a committee consisting of fishermen representative, trade representative and government officials can improve the business performance of the fisheries sector.

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b)   The exporters have to build a good supply chain right from the fisherman transporters, shipment, distributors and retailers at abroad. A good supply chain can deliver products, money, and information from various stakeholders in the chain.

c)   Strengthening the infrastructure facilities in existing market yards can result in increased customer delivered value specially basic amenities for women players

d)   Exporters have to educate fisherman in areas like temporary storage of fish of the fish in much demand, usage of materials like get, bait etc.

e)   Fisheries sector can leverage its national and international presence for establishing marketing tie-ups in these markets.

f)   On a contract basis, exporter can hire a trained marketer who would initially establish the market linkages and supervise the trade on behalf of entire seafood sector.

g)   The Government has to create proper infrastructure in terms of good transport from beach to processing unit location, creation of extension services like storage units at beach, at port etc.

h)   In the changing technology and opening of the new markets under globalization scenario, the developing economies must focus their attention on the promotion of select species and market diversification.   Fish be treated in hygienic conditions and preserved properly by constructing Modern Fish Market Complexes with all these facilities Indian fishermen can compete with other advanced nations and earn good prices.   In this context government should promote subsidized cold storage and ice plants and training for fisher women in peeling and other processing activities.

i)   Seafood sector needs to explore opportunities with movement under its various schemes, donors – national and international, NABARD etc to work out a mechanism of soft loans cum grant for setting up of village level cold chains within coastal area.

j)   All the exporters in Andhra Pradesh have to come together and have a common platform or association which enables them to exchange information regarding market, product, financial sources, supply chain, technology and infrastructure. The common platform can solve the problem of surplus and deficit processing/storage centers in some areas. The common platform enables the exporters to concentrate on research and development so that the costs as well as the benefits can be shared among the members.

k)   The export license procedure must be simplified and there should be proper coordination and communication between concerned authorities so that the perishable products can be exported in time.

l)   Seafood sector needs to invest and train the fishermen on quality assurance practices mainly on hygiene and sanitation issue, which have a strong linage to the quality of the product. This would not only ensure better quality of the product but also increased shelf life.

m)   The exporters have to educate overseas customers in terms of usage, providing feedback, informing about their needs, wants and expectations from the providers so that new product and marketing strategies need to be adopted.

n)   In marine fisheries sector Non-governmental organizations should be strengthened to implement various development programmes. These agencies should convince the public sector banks in providing finance for both Fishermen community and boat operators and arrange market facility for   development of fish and fishery products.   It is also desirable to establish a National Fisheries Development Bank.

As a human food item, fish is considered very valuable from the nutritional point. As an economic commodity, fish can earn foreign exchange to the country. Sea Food Sector is an important sector of the Indian as well as Andhra Pradesh economy. India is now the third

largest producer of marine fish and second largest producer of fresh water fish in the world. Such an important sector is facing lot many problems for various reasons. Prices of shrimp continue low in market and the exports from India are deceasing year on year. If this situation continues, the economy, the society, the trade, the exporter and the consumer has to suffer. So all the stakeholders of this sector like fishermen, consumers, exporters, employees, government, traders, distributors, retailers has to play their role in creating a healthy business environment for human healthy product fish.

Limitations and future scope of the study:

The study of marine fisheries value chain management is organised in coastal area of the Andhra Pradesh state. It is not extended to other parts of the state or country. The study concentrates on value chain of marine fisheries only but it can be extended to inland fisheries and can also be extended to other marine products like crab, shrimp etc.

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