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MARKETING AND UTILIZATION OF MARINE BY CATCH: PROBLEMS AND PROSPECTS

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ABSTRACT

Sea food industry is a potential foreign exchange earner and source of livelihood for the vast majority of population in the coastal belt of India. Rapid economic growth coupled with expansion of the domestic retail sector in India created a huge demand for fish and a sharp rise in the prices of fresh as well as processed fish products. Target fishing and overfishing of high valued fishes beyond their sustainable levels resulted in dwindling catches and lower returns for many of the mechanized fishing units. The by catch once discarded by the trawlers are now brought to the shore and sold to increase the revenue and sustain the fishing operations. The by catch constitute low value food fish and trash fish with non-edible uses as fish meal, poultry feed and fertilizers. There exist immense potential for the development of value added products both for human consumption and non edible uses through the effective utilization of bycatch and discards. The paper presents a macro level analysis of price trends, marketing channels and the pattern of utilization of low value food fish and trash fish in India. The potential problems in the handling and marketing and the prospects for utilization both for edible and non-edible purposes are also discussed.

I. INTRODUCTION

Fish production in India increased from 0.5 million metric tonnes (mmt) in 1950-51 to 7.13 million metric tonnes (mmt) in 2008-09 in which the contribution of marine sector was 2.9 million tonnes. India has exported fish and fish products worth Rs.8,200 crore in 2008-09 (Economic survey, 2009-10). The gross earnings from marine fisheries at first sales in India increased from Rs.7,409 crore in 1995 to Rs.17,133 crores in 2008 (CMFRI, 2009). Percapita availability of fish to the fish eaters in the country is 11.58 kg (56 % of the population in the country are fish eaters). However the percapita consumption in the country is only 9.5 kg and the rest is accounted by non-edible uses like fish meal, poultry feed, fish manure and post harvest losses. The growing awareness on the nutritive value of fish and the subsequent shift in the dietary pattern has increased the demand for fish in the local markets. However the fishing industry in India is still totally depending on the export markets as 50% of the gross earnings at landing centre level is contributed by exportable items like crustaceans and cephalopods which hardly constitute about 20 % of the total landings.

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The marine fishery of India being multispecies, the occurrence of by-catch consisting of several species of fish is bound to face problems of storage, processing and marketing. By catch, other wise called trash fish often occurs during the operations of trawlers in the Indian coast. "Trash fish" can be defined as a fish resource having low market value. The fish resource may be of low value due to low demand for that particular species/size, too costly to handle and process compared to market value or the fish resource has been spoiled during transportation or handling (Simon *et al,* 2005). Low value fishes are categorized as low value food fishes and trash fishes used for non edible purposes like fish meal, manure and poultry feed. Discards denote that portion of the catch that is thrown overboard and wasted catch after landing that is neither sold nor directly consumed. The dwindling catch of most of the marine resources and the increasing demand for affordable fish protein by growing low and middle income population would worsen the fish demand supply situation in India. The marine bycatch constituting low value fishes are an important source of dietary protein to the low income people and occupy a significant role in ensuring the food security and bridging the demand supply gap. Hence an attempt is made in this paper to have a preliminary macro level analysis of the production trends, price behaviour and the problems associated with the marketing and utilization of marine bycatch. Appropriate suggestions were given for improving the marketing and utilization of bycatch for ensuring food security and ecosystem sustainability.

REVIEW OF PAST STUDIES

According to FAO's report (Alverson *et al,* 1994), it is estimated that 27 mmt, or approximately 27 per cent of the global catch are discarded annually and a crude estimate in 2008 suggest the global by-catch and discards at more than 20 mmt (FAO, 2008). The first estimation of the quantity of by-catch associated with shrimp trawling in India by the Central Marine Fisheries Research Institute (CMFRI), Cochin in 1979 showed that 79.18% (315,902 tonnes) of the total landings is represented as by-catch; the percentage of by-catch was maximum in Gujarat (92.58), followed by Tamil Nadu (91.04) and Pondicherry (86.52)(George, *et al,* 1981). Jayaraman(2000) estimated the low value or trash fish production in Indian coast as 2,71 000 tonnes, i.e, 10-20% of the Trawl landings. Chandrapal (2005) estimated the total landed non- shrimp catch as 1,300,000 tonnes annually-more than two-thirds of the non-shrimp catch. Combined with the shrimp catch of 450,000 tonnes, this would give a total landed trawl catch of 1,750,000 tonnes. The bycatch is found to be a good source of protein and minerals (Zynudheen *et al,* 2004). Many species landed in India as trawl by-catch could be effectively utilized for the production of value-added products (Gopakumar, K, 2002). Pickled fishery products hold promising prospects as substitutes for canned products for domestic and international markets and cheaper by-catches may be utilized for this method of preservation (Govindan, T. K, 1983).

II. METHODOLOGY

Data on estimated marine fish landings and landing centre and retail prices of low value food fishes and non edible items from trawl bycatch during the period 2000-2008 was obtained from publications of CMFRI. Compound Growth Rate (CGR), Fishermen's share in the consumer's rupee and Gross Marketing Margin (GMM) were used for analysing the trends in landings and studying the price behaviour. Price spread or Gross Marketing Margin is the difference between the net price received by the fishermen at landing centre (Price at first sales) and price paid by the consumer (Retail price or Price at last sales) for any given commodity at a particular point of time in a market.
Gross marketing margin (GMM) = Retail Price (RP) - Landing centre Price (LP)

$$\text{Fishermen's share in the consumer rupee} = \frac{LP \times 100}{RP}$$

Where Landing centre Price (LP) is the net price received by the fishermen at landing centre (first sales) after deducting the auction charges and RP is the price paid by the consumer, Major marketing channels of the low value bycatch and the problems in marketing and utilization were identified through field level observations in the coastal states of India.

III. RESULTS AND DISCUSSION

Bottom trawlers being non-selective fishing gears hauls up all the organisms dwelling at the sea bottom. The total catch obtained after each haul is sorted and economically valuable species are stored in refrigerated fish holds. Since the return from by-catch is poor compared to the valuable catch of shrimps, cephalopods and fin fishes, the trawler operators often tend to discard portions of by-catch into the sea. With the dwindling catch of shrimp from the capture sources, the by catch once discarded by the trawlers are now brought to the shore and sold to increase the revenue and sustain the fishing operations. The low value food fishes landed as by catch of shrimp trawlers mainly consisted of croakers, goat fishes, lizard fishes, silverbellies, threadfin breams and flat fishes. The trash fish used for non edible purposes mainly consisted of stomatopods, small crabs, silver bellies, small anchovies and ambassies and sea snakes which were often discarded. The amount of discards varied with fishing method, fish hold capacity of the vessel, fishing season, days of fishing and catch of targeted fishes.

Trends in the production of low value bycatch, analysis of growth trends of different low value food fishes in India during the period 2000-2008 showed a sharp increase in the catches of lizard fishes as indicated by the compound annual growth rate of more than seven per cent. In the case of flat fishes and stomatopods, the catches declined during the period with negative growth trends of -6.2 and -9.04 respectively.

TABLE - 1.
ESTIMATED LANDINGS OF MAJOR BYCATCH RESOURCES IN INDIA

Name of fish	2000	2005	2008	CGR (2000-2008)
	Quantity (in tonnes)			Percentage
Bombay duck	91655	122353	104827	1.36
Lizard fish	30055	30543	52439	7.99
Threadfin breams	90705	88367	126943	3.41
Goat fishes	10384	17053	22255	2.02
Silverbellies	60593	58846	70112	2.76
Flat fishes	41361	35959	39743	-6.2
Stomatopods	72342	21187	30532	-9.04

Price analysis of low value food fishes and trash fish

In India, the prices of low value fish species have not been stable for many reasons and the prices varied depending on species, seasons and abundance of other fish and fishery products. During glut seasons, many species earned a lower price and thus fell into the low value category. In the case of non edible trash fish, prices fluctuated with the demand for fish meal, feed or manure in the livestock and aquaculture industry.

The prices of many of the low value food fishes are likely to go up owing to the ever-widening gap between demand and supply. Prices for stomatopods and silverbellies were as low as Rs.3 and Rs.8 per kg at landing centre level in 2000, but increased to Rs.10 and Rs.19 per kg in 2008. There was a marked increase in the prices of some of the low value fishes owing to the export demand for value added products. Threadfin breams which were priced at Rs.14 per kg at landing centre level in the year 2000 now fetches a price of Rs.37 per kg (60 per cent growth at landing centre and retail levels) due to increased export demand for making fish paste (Table 2)

TABLE - 2
PRICE TRENDS OF LOW VALUE BYCATCH AT FIRST AND LAST SALES IN INDIA

Name of fish	Price(Rs/kg)					
	2000		2005		2008	
	At first sales	At last sales	At first sales	At last sales	At first sales	At last sales
Bombay duck	13	21	15	22	37	49
Lizard fish	9	19	14	27	28	50
Threadfin breams	14	24	20	32	37	60
Goat fishes	11	20	16	28	34	52
Silverbellies	8	18	11	23	19	39
Flat fishes	18	28	24	39	25	51
Stomatopods	3	7	6	10	10	17

Marketing Channels

The main marketing channels existing in India for low value food fishes and trash fishes are :

1. Fishermen - Auctioneer - Commission agents -- Wholesalers - Retailers - Consumers
2. Fishermen- Auctioneer- Local retailers/vendors-Consumers
3. Fishermen- Auctioneer- Commission agents-Processor (Fish meal plants)-Exporter

The number of intermediaries involved in each marketing channel varied depending on the quantum of landings, the effort involved in carrying out the marketing functions like assembling, sorting, grading and transportation which will determine the costs of marketing and ultimately the price spread.

The fishermen' share in the consumer's rupee was less than 60 per cent for most of the low value food fish items when compared to the high value items like seerfishes (75.55%), pomfrets (70%) and lobsters(82.68%). This was because of the increased consumer preference and more stable demand for these items both in the domestic and export sectors. Among the low value fishes, the Gross Marketing Margin was lowest for stomatopods at Rs.4 per kg and the highest for oilsardines at Rs.15 per kg (TABLE 3).

TABLE 3.
FISHERMEN'S SHARE IN CONSUMER'S RUPEE AND GROSS MARKETING MARGIN FOR DIFFERENT VARIETIES OF FISH (AVERAGE FOR THE PERIOD 2000-2008)

Name of fish	Fishermen's share in consumer's rupee (%)	Gross Marketing Margin (in Rs / kg of fish)
High value fishes		
Seer Fishes	75.55	43
Pomfrets	70	52
Lobsters	82.68	92
Low value fishes		
Bombay duck	56.10	11
Lizard fish	53	12
Threadfin breams	59.22	11
Goat fishes	57	11
Silverbellies	51	11
Flat fishes	62.62	13
Stomatopods	52.13	4

Problems in the marketing and utilization of marine bycatch

The problems in the marketing of low value food fishes and trash fishes were identified through field level observations and interactions with different stakeholders in marine fish marketing at landing centres, wholesale and retail markets in different coastal states. The following problems were encountered in the marketing and utilization of both edible and non-edible by catch.

1) Perishable nature of fish and lack of effective supply chain mechanisms: Since most of the by catch are low value fishes and are channelled in the domestic supply chain alone, the intrinsic problems affecting the domestic fish marketing like lack of infrastructure and basic amenities invariably affect the marketing of low value fishes. Producers and consumers bare the brunt of monopoly of big traders dominating at the point of first sales.

2) Low consumer demand and unstable prices: Low value fishes are mainly preferred by a narrow spectrum of low and middle income consumers and the demand often fluctuated with seasons and availability and prices of high value species.

3) The competition between interstate traders often resulted in distress sales in the wholesale markets

4) Low value fishes are mainly sold in local markets and street vendors and unhygienic handling and insufficient ice for preservation often results in post harvest losses

5) Lack of adequate methods for preventing post harvest spoilage : Sun drying is the only practice used to preserve low value fishes -which is mostly done in unhygenic conditions resulting in low consumer preference

6) Lack of value added products-variable quantities and species mix of by catch, results in products varying in texture and taste. Difficulties associated with promoting new products and getting consumer preference is another lacunae for developing value added products

7) Heavy expense involved in storing and bringing the by catch to the shore in a suitable condition by the multiday fishing units

8) The market for trash fish used for non-edible purpose is upcoming and their prices fluctuated with demand for fish meal in the livestock and aquaculture industry and the availability of other raw materials for fish feed or manure production.

IV. CONCLUSION AND SUGGESTIONS

The low value trash fishes are mainly caught during the operations of non -selective trawl gear in the Indian coast and it constitute nearly 10-20 per cent of the trawl catches in the country. Edible bycatches brought to shore fetch a lower price in the domestic market due to fluctuations in demand, poor quality, low consumer preference and competition between interstate traders. Since these fishes occupy a significant role for ensuring the food security of low and middle income people in the country, urgent steps need to be initiated for their effective utilization through preparation of value added products, protein rich fishery products and by-products of non edible use. Developing and promoting value added products and pharmaceutically important marine products from the low value fishes offer promising scope for receiving a premium price both in the domestic and export markets. Ensuring proper quality in the domestic marketing system through hygienic handling and packaging of fresh fish need to be undertaken for improving the consumer demand and acceptance in the urban markets. Storage facilities for bottom trawlers should be improved to make available the edible discards for human consumption and incentives for landing this by-catch also need to be given priority for ensuring the ecosystem sustainability. In addition, there is an urgent need for a comprehensive analysis and estimation of by catch and discards from all the coastal states in the country as there is no detailed published reports on the quantum of by-catch and discards available in the country for developing macro level policies.

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