Efficiency of domestic marine fish marketing in India - a macro analysis

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ABSTRACT

The rapid economic growth and expansion of domestic retail sector in India has created a significant market for fresh and processed fish and fishery products within the country. The increase in the prices of fresh as well as processed fish is very much higher than all other food products. A macro level analysis of the efficiency of domestic marine fish marketing in India during the period 2000-2008 showed that, lobsters (80.37%), sharks (77.12%), seerfish (75.22%) and mackerel (71.29%) earned comparatively higher share of the consumer rupee for fishermen than the other varieties. The prices of high value fishes like pomfrets, seer fishes, mullets and cephalopods are comparatively stable than the low value fishes like oilsardines, lizard fishes, rays, threadfins, croakers and silverbellies. Even though market expansion ensured better share for the producers in the consumer's rupee in most of the varieties, producers and consumers still bear the brunt of monopoly of big traders dominating at the point of first sales.

Keywords: Marketing efficiency, Price spread, Price stability, Trend

Introduction

Indian fisheries is an important sector of food production, providing nutritional and livelihood security to a vast majority of the population and contributes significantly to the foreign exchange earnings. India occupies third position in world fish production and second in aquaculture production. The fish production in the country in 2009 was 7.13 million tonnes, of which 3.2 million tonnes was contributed by the marine sector and the rest by inland sector. Fish and fish products accounted for approximately Rs. 8,200 crore towards country's exports, which constitutes 18% of the national agricultural exports (DAHD, 2009). Marine fisheries sector forms the source of livelihood for over 7 million traditional fishermen inhabiting about 3,600 coastal fishing villages situated along the country's coastal belt besides providing direct and indirect employment for several million people in fishing, processing, trading and ancillary activities. A significant proportion of the Indian population does not eat animal protein including fish (Dey *et al.,* 2001). Among the fish eaters in the country, except in the southern and western regions, all other states prefer inland fish than marine fish. Hence fish produced by one state is moved to other states. Almost 70% of the fish landed at different fisheries harbours and fish landing centres in the country is marketed afresh in and around the landing centres and the rest either goes to neighbouring states or is exported. The gross earnings realized at first sales increased from Rs. 10,364 crores in 2000 to Rs. 17,793 crores in 2008 (at current prices) recording an increase of 71.68% (CMFRI, 2010).

Globalization and promotion of private enterprises has far reaching impact on fish trade and consequent exploitation of marine fishery resources in India. Seafood industry is a potential foreign exchange earner and supports a vast majority of population in the coastal belt of India. Fisheries that had been the traditional avocation of coastal fishing communities in India, has now been transferred to the status of a multi-crore industry, consistently contributing about one percent of country's GDP. The increase in the prices of fresh as well as processed fish is very much higher than all other food products (Sathiadhas, 2006). Although there exist a well organized marketing channel for the export oriented varieties like shrimps, cephalopods and high value finfish, the domestic distribution channel still lack proper quality control and grading. The export front has become more competitive under the WTO regime and exclusive dependence on export market can cause serious repercussions in the event of any setback in exports. The rapid economic growth and expansion of domestic retail sector has created a significant market for fresh, processed and value-added fishery products within the country. In this context, a macro level analysis of the domestic marine fish marketing across the maritime states of India is conducted to assess the efficiency of domestic marine fish marketing in the country, to elucidate the problems in domestic fish trade and to suggest appropriate policy measures for re-engineering the sector.

Materials and methods

Data on average prices in the landing centre and retail prices of different species of marine fishes from all the maritime states of India, collected by the Socio-economic Evaluation and Technology Transfer Division of CMFRI, during the period 2000-2008 were utilised for the study. Weekly data on prices of different fish varieties were collected from the selected primary markets (landing centres) and retail markets (Table 1) in different coastal states. The prices of exportable varieties were collected at the primary market from where the commission agents purchase directly from the fishermen. From the weekly fish prices, monthly, quarterly and annual averages were worked out.

Gross marketing margin (GMM), percentage share of fishermen in the consumer's rupee, and coefficient of variation (CV) were used for studying the price behaviour. Price spread or gross marketing margin is the difference between the price received by the producer (landing centre price or 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)

Percentage share of fishermen in the consumer rupee (PSFCR) = (LP/RP)   x 100

The price stability was analysed using coefficient of variation (CV)

CV = (Standard deviation/ Mean) x100

The growth trend in marine fish prices at first and last sales were analysed using compound growth rate (CGR).

Major marketing channels, distribution pattern of marine fish and problems in marine fish marketing and utilization were identified through field level observations and discussions with fishermen, fish workers in the secondary sector, traders and consumers at monthly intervals in all the coastal states of India.

Results and discussion

The growth trend in nominal fish prices, price stability, price spread, distribution pattern and problems in domestic marketing were analysed for the period 2000-2008 and the results are presented below.

Growth trend in fish prices at landing centre and retail levels

The marine fish prices showed an average annual growth rate of 3 to 9% at all India level at the point of first sales, whereas the growth was comparatively less at the retail level (Table 2). The growth in prices was more for finfishes like threadfins, croakers, silverbellies, threadfin breams and mackerel which were once considered as low value items. The increase in the export of finfishes in recent

Table 1. List of sampled landing centres and retail markets

States	Landing centres (Point of first sales)	Retail Markets (Point of last sales)
Kerala	Vizhinjam, Neendakara, Valanjavazhi, Cochin FH, Munambam, Chavakkad, Calicut, Cannore	Thevara, Ernakulam market, Thoppumpady, Matsyafed, Varkey's supermarket
Karnataka	Mangalore, Malpe, Bhatkal, Karwar FH	Mangalore, Karwar
Goa	Malim, Cotbona, Betul, Candolim, Calangute, Chapora, Colva, Agonda,Vasco–da-Gama, Baga	Panaji, Betul, Vasco
Maharashtra	Versova, Newferry wharf, Ratnagiri, Sassoon dock, Chinch bundar, Satpati	Chatrapati Shivaji Mandi, Malad
Gujarat	Veravel, Gunajadh, CFPBR, Margrol, Rupam (Jamnagar), Bhidia (Gunajadh), Jaleswar, Malawrikar, Anjpura, Jodia, VRLOLH, Porbandar, Nawabunder	Kharakhuwa fish market (Veravel)
Tamil Nadu	Madras FH, Mahabalipuram, Kovalam, Tuticorin FH, Tuticorin South, Tuticorin North, Dhanushkodi, Chinnamuttam, Colachel, Mandapam Camp, Cuddalore FH, Nagapattinam, Puthukkottai	Chennai, VOC (Tuticorin), Township (Mandapam)
Puducherry	Karaikal	Karaikal
Andhra Pradesh	Vishakapatnam, Kakkinada FH, Palasa, Srikakulam, Machilipatanam, Ongole, Nellore, Narasapur,	Newhru bazaar, Vishakapatnam
Orissa	Puri, Gopalpur, Paradeep, Jambo	Puri, Choudary Bazar
West Bengal	Frazergunj FH, Sulthanpur FH, Diamond harbour, Digha, Junput, Haripur, Jaldha,	Howrah fish market

years and rise in the domestic demand might have resulted in a better price realization at landing centre level. Nikita Gopal *et al.* (2009) reported that the export of finfish from India has been rising over the past few years and during 2006-07, it contributed almost 44% of the total marine products exported from the country in terms of quantity. The annual growth was less both at landing centre and retail levels for penaeid shrimps. Since the prices of shrimps from capture fisheries is decided by the monopoly power of exporters, the price trend might have been affected by global phenomena like economic recession, competition from other countries and the availability of cultured shrimp. Production from cultured shrimp is supplementing the total shrimp exports from the country. Also, the data used for the study did not take into account the price changes due to size and species variations in the penaeid shrimps which might also have affected the growth trend.

Table 2. Growth trend of domestic fish prices at first and last sales in India (2000-2008)

Fish varieties	CGR (%)	
	At first sales	At retail level
Sharks	4.52*	3.71*
Oilsardine	6.56*	2.40*
Lizardfish	5.41*	4.89*
Threadfins	7.44*	6.30*
Croakers	8.24*	6.08*
Silverbellies	8.56*	4.22*
Threadfin breams	9.00*	4.43*
Pomfrets	4.57*	3.90*
Mackerel	8.23*	2.53*
Seerfish	3.81*	4.83*
Penaeid prawns	3.42*	1.87*

*Iindicate significance at 1% level

Distribution pattern of marine fish in the domestic market

In India, the fish eating population is estimated at about 56% of the total population (Planning commission, 2001). Growing awareness of the nutritive value of fish and the subsequent shift in the dietary pattern has increased the demand for fish in the local markets. With the introduction of refrigerated containers and development of infrastructural facilities like roads and acceptance of iced fish by domestic consumers has improved the internal marketing system, which are far away from the shore. Usually fresh fish is transported from different states after washing with water and icing. Plastic containers of nearly 50 kg are used for packing the fish and transported in ordinary or refrigerated trucks. The quantity of ice varied with the fish type. Fish is sold through auctioning the lots at the harbours and sale by weighing is very rare. In export marketing, the price is either fixed for a period through contract between boat owner's unions and exporter's agents or prices fixed daily based on auction rates. Marketing channel refers to the pathway through which the product passes from the producer to the ultimate consumer. Auctioneers, commission agents of wholesaler's within and outside the states, agents of exporters, local retailers and vendors are the common intermediaries in the marine fish trade in the country. The common marine fish marketing channels prevailing in the country are:

1. Fishermen-auctioneer-agents of freezing plants-exporters

2. Fishermen-auctioneer-processor (dry fish)-wholesaler-retailer-consumer

3. Fishermen-auctioneer- wholesaler (primary market) -wholesaler (retail market)-retailer-consumer

4. Fishermen-auctioneer-commission agents-wholesaler-retailer-consumer

5. Fishermen-auctioneer-retailer-consumer

6. Fishermen-auctioneer-consumer

The major portion of the internal marketing takes place through the 3-6 channels. The auctioneers of the primary market and the commission agents of the secondary market are also involved in the marketing process without taking possession of fish. Marine fish marketing in India is also characterized by the presence of many marketing channels for different varieties of fish. In each channel, the number of intermediaries between the primary producer, namely, the fishermen and the ultimate consumer varies depending upon the quantum of landings, the effort involved in carrying out the marketing functions like assembling, storing, grading and transportation.

Price spread (Gross marketing margin)

Price spread is the difference between the price received by the producer and the price paid by the consumer for any given commodity at a point of time in a market. A market can be graded as efficient, only when the price spread is minimum (Narayanakumar and Sathiadhas, 2006). The price spread, also referred to as gross marketing margin (GMM), is worked out for different varieties of fish marketed at national level as well as at the state level.

The average price spread at national level for different fish varieties during 2000-2008 ranged from Rs. 11 kg^{-1} for varieties like lizardfish, silverbellies, and half and full beaks to Rs. 185 kg^{-1} for prawns. A few varieties like lobsters (Rs. 110 kg^{-1}), seerfish (Rs. 49 kg^{-1}), pomfrets (Rs. 55 kg^{-1}) and cephalopods (Rs. 38 kg^{-1}) recorded a comparatively higher spread. This can be due to any additional cost for processing, freezing or value addition that is incurred in the post-harvest operations of these

varieties (Table 3). In the absence of any form of value addition, the minimum difference between the prices indicates the efficiency of the marketing system.

Percentage share of fishermen in the consumer rupee (PSFCR)

The percentage share of fishermen in the consumer rupee (PSFCR) is an important indicator of the marketing efficiency. It indicates that proportion of the rupee paid by the consumer, which reaches the primary producer. The higher the share to the fishermen, the more efficient is the marketing system due to the lesser involvement of the middlemen (Narayanakumar and Sathiadhas, 2005). The PSFCR has been calculated for the different varieties at both national and state levels.

At all India level, the PSFCR ranged from 48.04% for silverbellies to 80.37% for lobsters (Table 4). Varieties like

Table 3. Gross Marketing Margin (GMM) for different varieties of fish in India, 2000-2008 (Rs kg^{-1})

Varieties	West Bengal	Orissa	Andhra Pradesh	Tamil Nadu	Pondi Chery	Kerala	Karna-taka	Goa	Mahar-ashtra	Guja-rat	Average
Sharks	14	14	15	23	21	13	20	23	18	23	18
Rays	11	12	14	11	10	11	14	14	17	13	13
Oilsardines	12	12	14	21	19	14	26	26	6	-	17
Lizard fish	11	10	12	10	10	12	18	17	15	8	12
Half and full beaks	-	9	11	10	11	12	17	15	19	11	13
Threadfins	23	19	16	16	15	19	10	-	65	60	27
Croakers	28	21	13	21	19	25	21	21	39	43	25
Ribbon fish	14	13	16	21	20	19	21	22	15	11	17
Silverbellies	8	8	8	14	13	18	10	10	11	11	11
Big-Jawed jumper	24	19	13	17	16	16	25	25	27	16	20
Pomfrets	33	35	36	48	48	41	62	62	90	93	55
Mackerels	13	12	12	10	10	12	16	16	11	10	12
Seer fish	44	43	33	51	47	65	48	46	39	77	49
Tunnies	14	11	14	11	11	15	14	15	14	16	14
Barracudas	12	10	10	23	22	17	21	20	20	14	17
Mullets	23	21	17	21	21	28	17	17	19	10	19
Penaeid prawns	180	172	155	172	183	165	174	178	243	228	185
Lobsters	85	80	73	127	149	46	118	61	81	279	110
Cephalopods	41	37	39	28	37	34	30	32	30	76	38

Table 4. Percentage share of fishermen in consumer rupee (PSFCR) for different varieties of fish in India during 2000-08 (%)

Fish varieties	West Bengal	Orissa	Andhra Pradesh	Tamil Nadu	Pondi-chery	Kerala	Karna-taka	Goa	Mahar-ashtra	Guja-rat	Average
Sharks	72.20	70.98	75.60	79.93	81.20	86.07	77.65	73.33	79.47	74.80	77.12
Rays	63.13	55.06	55.49	67.38	66.84	70.40	56.70	59.26	55.95	50.26	60.05
Oilsardine	64.21	61.33	54.34	52.96	54.15	46.63	30.09	31.19	67.54	-	51.38
Lizard fish	47.86	50.00	58.22	59.46	59.46	55.03	37.58	40.00	50.00	43.96	50.16
Half and full beaks	-	98.02	64.97	73.16	71.79	66.98	53.43	54.86	49.75	67.03	66.67
Goat fishes	63.85	59.54	69.23	57.51	58.03	50.00	46.15	44.59	56.52	45.88	55.13
Threadfins	62.93	64.08	59.36	59.92	61.60	60.47	80.21	-	64.74	53.59	62.99
Croakers	56.06	56.36	59.47	50.39	53.52	52.00	53.41	54.17	58.91	49.18	54.35
Ribbon fish	55.68	51.33	51.35	48.29	50.00	56.03	43.58	42.20	57.48	60.61	51.66
Silverbellies	54.64	46.59	52.75	40.77	43.08	39.20	52.89	52.89	41.96	55.63	48.04
Big-Jawed jumper	47.72	60.92	65.89	65.96	67.13	68.63	65.11	65.57	57.40	70.52	63.49
Pomfrets	77.54	77.39	70.72	66.42	67.02	72.03	65.92	65.98	68.27	67.98	69.93
Mackerels	65.24	70.14	67.14	75.29	75.69	71.67	67.54	68.20	79.67	72.34	71.29
Seer fish	69.25	69.83	78.50	77.72	78.66	72.56	74.07	75.55	81.12	74.98	75.22
Tunnies	59.89	62.66	60.00	71.43	71.43	62.13	58.37	58.37	62.02	44.79	61.11
Barracudas	63.33	65.29	67.40	63.39	64.75	67.43	52.53	44.71	63.71	61.17	61.37
Mullets	68.47	69.23	66.34	65.60	65.60	62.24	61.78	60.23	55.29	71.70	64.65
Penaeid prawns	53.61	53.31	55.23	58.22	57.43	57.79	55.67	54.13	45.45	46.57	53.74
Lobsters	79.45	79.80	83.23	83.56	78.71	85.63	77.71	88.86	89.02	57.68	80.37
Cephalopods	65.24	65.63	65.35	67.24	68.10	70.56	30.62	72.90	73.14	56.27	63.51

sharks (77.12%), seerfish (75.22%) and mackerel (71.29%) earned comparatively higher share of the consumer rupee than that of the the other varieties. This can be attributed to the minimum involvement of middlemen in the marketing channel. It is important to note that the PSFCR for penaeid prawns was 53.74%, which indicates that nearly 50% of the share was taken as margin. Across the states also, their share is around 50% only. Being the main item in the export trade, the purchase price of penaeid prawns is fixed by the monopoly power of the exporters.

State-wise analysis showed that in Kerala and Maharahstra, the fishermen's share in the consumer's rupee is comparatively higher when compared to other states. Kerala has a comparatively well developed marketing system for marine fish, which could be attributed to the high share for the fishermen in the consumer rupee unlike the other states. In Kerala, it was maximum for sharks (86.07%), followed by lobsters (85.63%), rays (70.40%), seerfish (72.56%), mackerel (71.67%) and pomfrets (72.03%) during 2000-08. The minimum percentage share was recorded for silverbellies (39.20%). In Maharashtra, fishermen received the highest share in the consumer rupee was for lobsters (89.02%), followed by seerfish (81.12%), mackerel (79.67%), sharks (79.47%) and pomfrets (68.27%).

Price stability

The marine fish prices show spatial and temporal variations. Within the same season the price varies across the days and within a day the price varies between morning and evening. To study the price fluctuations of selected varieties of fish, the coefficient of variation (CV) was worked out based on the quarterly prices at the points of first and last sales across the country for the period 2000-08 (Table 5).

It is evident that, at the point of first sales, the high value fishes like sharks (8.69%), pomfrets (8.75%), mackerels (6.59%), seerfishes (7.02%), mullets (7.06%) and cephalopods (8.78%) had a CV of less than 10%. This indicated that their prices are comparatively stable than the other varieties during the period across the different seasons, whereas for low value fishes like oilsardines , lizardfishes, rays, threadfins, croakers and silverbellies, the coefficient of variation was 15% or more indicating a comparatively less stable demand at the points of first sales.

At the point of last sales, the varieties like sharks (CV = 9.57%), oilsardines (5.83%), half and full beaks (9.39%), pomfrets (9.94%), mackerels (5.71%), tunnies (9.87%), mullets (7.72%), peneaid prawns (7.76%) and cephalopods (7.46%) received comparatively stable price than the other varieties. The stability of prices is also influenced by factors like volume and composition of fish catch, consumer preference, interstate trade and marketing costs. Only a few high value fishes like sharks, mullets, pomfrets and cephalopods enjoyed comparatively stable prices in both the points of sales. A comparative analysis of the different marketing efficiency measures at all India level (Table 5) also indicates that the low value fishes like oilsardines, rays, croakers, silverbellies and lizard fishes

Table 5. Comparison of different marketing efficiency indicators at all India level (2000-2008)

Varieties	GMM (Rs. kg^{-1})	PSFCR (%)	Coefficient of variation (%)	
			Point of first sales	Point of last sales
Sharks	18	77.12	8.69	9.57
Rays	13	60.05	15.76	12.71
Oilsardine	17	51.38	13.89	5.83
Lizardfishes	12	50.16	14.84	12.90
Half and full beaks	13	66.67	10.37	9.39
Threadfins	27	62.99	17.42	16.57
Croakers	25	54.35	16.79	15.70
Ribbon fishes	17	51.66	13.03	10.02
Silverbellies	11	48.04	14.79	11.06
Big-Jawed jumper	20	63.49	13.46	11.54
Pomfrets	55	69.93	8.75	9.94
Mackerels	12	71.29	6.59	5.71
Seerfishes	49	75.22	7.02	10.91
Tunnies	14	61.11	10.36	9.87
Barracudas	17	61.37	11.86	11.57
Mullets	19	64.65	7.06	7.72
Penaeid prawns	185	53.74	11.39	7.76
Cephalopods	38	63.51	8.78	7.46

show high price fluctuations across the seasons and low percentage share for the fishermen in consumers' rupee. Considering the significant growth in prices over the years for these resources, it is essential to obtain a steady market through proper quality maintenance and preparation of value-added and protein rich fishery products so as to ensure the food security of low and middle income people in the country.

Problems in domestic marine fish marketing and need for policy interventions

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 varieties like crustaceans and cephalopods which hardly constitute about 20% of the total landings. Even though 80% of the marine fish landings are channelised in the domestic supply chain, the domestic fish marketing system in India is not well organized unlike that of agriculture, horticulture or livestock products. The infrastructure for marine fish marketing in India is principally oriented towards export market and suffers from drawbacks among others such as disorganized marketing structure, lack of adequate infrastructure, deterioration and wastage of fish during transportation and dominance of middlemen (Sathiadhas and Narayanakumar, 1994). Even though market expansion ensured better share for the producers in the consumer's rupee, producers and consumers still bare the brunt of monopoly of big traders dominating at the point of first sales. The prices of export oriented varieties are still decided by the exporters and greater emphasis on export trade for finfish has resulted in the scarcity for quality products in the internal marketing system (Sathiadhas and Narayanakumar, 2001).

Even though there is not much daily fluctuations in fish prices, especially within a season at the landing centres in the case of high quality fishes, the prices of low value fishes showed fluctuations both at first and last sale points. Low consumer demand and unstable prices and competition between interstate traders often results in distress sales in the wholesale markets in the case of low value fishes. Unhygienic handling and insufficient ice for preservation both at pre- and post-harvest sectors results in spoilage losses. Infrastructure facilities and basic amenities for hygienic handling, transport, preservation and sale of fish are still lacking even in the major fishing harbours and fish markets in the country. The selling of fishes in unhygienic conditions in the local markets and by street vendors and the non-availability of cleaned pre-cut fish are other problems associated with the domestic fish trade in India.

The rapid economic growth and the consequent expansion of the domestic retail sector has created a significant market for fresh, processed and value-added fishery products within the country and also new opportunities for trade in seafood. 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. In addition, supply chains in domestic marketing can be improved by enhancing private investment in value addition and transportation sectors. There is also need for developing institutional sales channels like cooperative marketing for supply of cleaned and hygienic fish for the domestic consumers.

Acknowledgements

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