Mapping of marketing channels and value chain analysis of some commercially important shellfish species landings in the East Medinipur district, West Bengal

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West Bengal with a coastline of 158 km, two coastal districts, 171 marine fishing villages, 49 marine fish landing centres, 3.7 lakh fisher folk population (CMFRI Census, 2016) has contributed 2.6 lakh t of marine

fish landings during 2020 registering an increase of 4.6% compared to 2019. The marine landings during the period were dominated by pelagic resources with landings of 1.25 lakh t (49%) followed by demersal (82,000 t, 32%), crustacean resources (41,000 t, 16%) and molluscan resources (8,000 t, 3%). The major resources contributed to the total crustacean landings of the state during the period were penaeid shrimps (66%) followed by non-penaeid shrimps (21%), crabs (13%) and lobsters (<1%). Similarly the major resources contributed to the total molluscan landings were cuttlefishes (71%), followed by squids (28%). Octopus formed a meagre landing, contributing nearly 1% of the total molluscan landings of the state. The major gears contributing to the total marine landings of the state were mechanized multi-day trawlers (54%) followed by mechanized gill netters (12%) and inboard bag netters (7%). Other gears such as mechanized bag netters, inboard gill netters, hook and liners and shore seiners together contributed about 27% to the total marine fish landings of West Bengal (CMFRI, 2020).

This study reports the marketing systems with its value chain analysis of selected shell fish resources landings along the coast of West Bengal. Value chain which comprises full range of activities required to bring a product or service from the stage of conception, production and distribution to consumers. It is the preliminary step in the mapping of market (FAO, 2013) and can be used as a management tool to reduce processing costs, improve quality and productivity of the product and reduce distribution costs (Jeyanthi and Chandrasekar, 2017). This study mapped the various marketing channels and value chain analysis of some commercially important shell fishes landing in Purba, Medinipur.

Sankarpur landing centre, Digha Mohana auction point and 10 fish markets including wholesale cum retail, retail and terminal fish markets were covered under the study conducted during January to June, 2022. Value chain analysis was conducted by mapping the product value chain from the landing centre till the consumer. Sample survey was conducted among 45 fishermen, *beparis* and depot owners, 40 middlemen and marketing agents, and 35 retailers using personal interview method with semi structure questionnaires and combination of participatory, qualitative and quantitative methods for data collection. The interviews focused on channels of marine fish distribution, price spread and marketing constraints following a stakeholder meet and field visits made to fish landing centres, whole sale markets, fish salting and dry fish yards in Digha Mohana and Sankarpur.

A large number of stakeholders find employment in the fish marketing chain as fishermen, assemblers, processors, traders, wholesalers, retailers, transporters and loading and unloading workers. The market chain encompasses primary, secondary and retail markets with fishermen as the primary producers. The marine fish marketing operations were performed by a large number of intermediaries with good network on fish trade and other facilitating functions. The fish market channels have wholesalers buying fish in bulk quantities from auctioneers or from regional suppliers and selling it to retailers or other traders. The wholesalers imparted value addition in terms of sorting, grading, cleaning, icing and packing fish prior to sale. Subsequently, the retailers sold the fish directly to consumers over the counters or with the help of vendors. Retailers mostly bought fish from the wholesaler, but in several cases, groups of retailers also participated in the auction process for buying fish directly from the auctioneers. The sources of finance for various operations of the value chain came from the private sector, cooperative societies, fishermen associations, and also institutional finance.

There are two main fishing seasons for shellfishes, the peak and the lean season. Apart from the ban period (April–May), which is fixed, the concepts of 'lean' and 'peak' are subjective. On an average, the peak season lasts for about five months from October to February, and the lean season for about seven months from March to September, including the monsoon fishing ban period. The price changes across the channels for the selected resources of penaeid shrimps, lobsters, crabs and cephalopods are documented below.

Market chain mapping of giant tiger prawn *Penaeus monodon*

Once the landings from Sankarpur landing centre reaches the Digha Mohana auction centre, four marketing chains were found to be prominent in the *Penaeus monodon* marketing chain such as assemblers/ regional suppliers, wholesalers, retailers and export units. In the marketing chain, the giant tiger prawn reach the export market from fishermen through the channels *viz.,* landing centre, auction centre, regional suppliers and processing units.

Table 1. Commercially important shellfish species traded in the various markets

Name of the Market	Name of shellfish species traded	Quantity traded kg/ day	Daily market capitalization value (₹)
Old Digha Nehru Market	*Penaeus indicus*	40	26,000
	P. monodon	40	40,000
	P. japonicus	60	51,000
	Portunus sanguinolentus	160	16,000
	P. pelagicus	50	15,000
	Charybdis feriata	25	4,500
	Panulirus polyphagus	25	35,000
	Parapenaeopsis hardwickii	50	10,000
	P. stylifera	50	10,000
	Solenocera crassicornis	25	3,750
Digha Sabuj Market (New Digha)	*P. monodon*	60	60,000
	P. japonicus	40	34,000
	P. hardwickii	70	14,000
	P. stylifera	60	12,000
	P. polyphagus	10	14,000
	P. sanguinolentus	160	16,000
	P. pelagicus	50	15,000
	C. feriata	25	4,750
Ramnagar Mecho Bazar	*P. indicus*	15	5,250
	P. monodon	25	17,500
	P. sanguinolentus	35	5,600
	P. pelagicus	10	3,500
	S. crassicornis	20	3,200
	Acetes spp.	30	2,400
	P. sculptilis	20	4,000
	P. stylifera	20	4,000
	P. hardwickii	10	2,000
Deulihat Fish Market	*P. stylifera*	25	5,000
	Acetes spp.	30	2,400
	P. hardwickii	20	4,000
	S. crassicornis	25	4,000
Balisai Market	*P. sanguinolentus*	60	7,200
	P. pelagicus	20	7,000
	C. feriata	15	2,700
	S. crassicornis	75	12,000
	Acetes spp.	40	3,200
	P. stylifera	25	4,500
Kathi Nona Bazar	*S. crassicornis*	300	48,000
	P. sanguinolentus	450	58,500
	P. pelagicus	150	52,500
	P. indicus	150	67,500
	P. stylifera	350	63,000
	P. hardwickii	350	63,000
	P. monodon	150	2,25,000
	P. japonicas	60	48,000
Kathi Super Market	*P. stylifera*	35	6,300
	P. hardwickii	35	6,300
	P. monodon	30	36,000
	P. japonicus	25	22,500
Mukundapur Market	*P. stylifera*	25	3,750
	P. hardwickii	25	3,750
	S. crassicornis	35	4,200
	Acetes spp.	60	3,600
Hirapur Market	*P. sanguinolentus*	40	4,800
	Acetes spp.	60	3,600
	P. hardwickii	5	800
	P. stylifera	5	800
Gobra Market	*P. sanguinolentus*	25	3,500
	P. hardwickii	7	980
	P. stylifera	7	980
	Acetes spp.	60	3,600
	S. crassicornis	35	4,550

The commodity reaches the domestic consumers through local and distant markets via wholesaler and retailers. The price spread of *P. monodon* was found to be ₹400-1200 per kg at the auction centre level to ₹750-1600 per kg at the level of retailers.

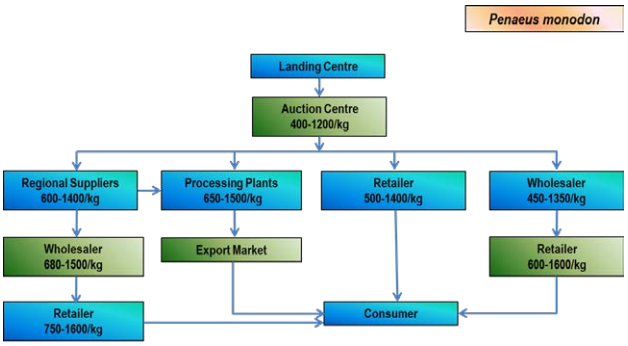

Fig. 1. Market chain mapping of *Penaeus monodon* in the areas surveyed

Market chain mapping of mud spiny lobster *Panulirus polyphagus*

Once the landings of mud spiny lobster reach the Digha Mohana auction centre, assemblers/ regional suppliers are found to be the predominant channel for distributing the commodity to distant domestic markets such as Chennai, Mumbai and Kolkata. The commodities reach the export markets through assemblers and processing units. The price spread was found to be ₹400-1300 per kg at the auction centre level to ₹850-2000 per kg at the level of retailers (Fig. 2).

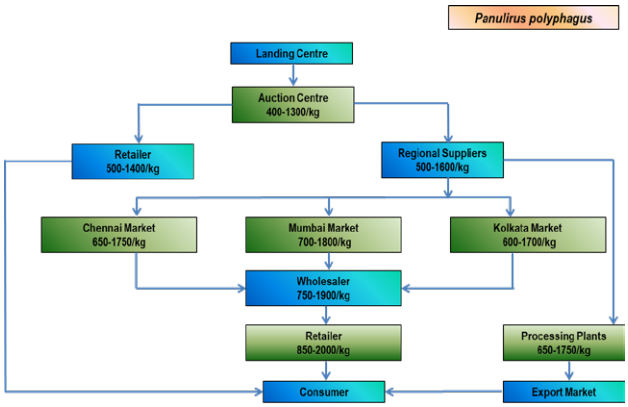

Fig. 2. Market chain mapping of *Panulirus polyphagus* in the areas surveyed

Market chain mapping of three spot swimming crab *Portunus sanguinolentus*

The marketing chain for *Portunus sanguinolentus* was found to be a simple chain with traditional actors such as wholesalers and retailers, as in any other market chain. The distant domestic market for this commodity was found to be Chennai and Bangalore markets, for which the regional suppliers/ assemblers play a major role in its distribution. The export market channel was not to be found for this three spot swimming crab from this coastal district. The price spread was found to be ₹50 -100 per kg at the auction centre level to ₹250-350 per kg at the level of retailers (Fig. 3).

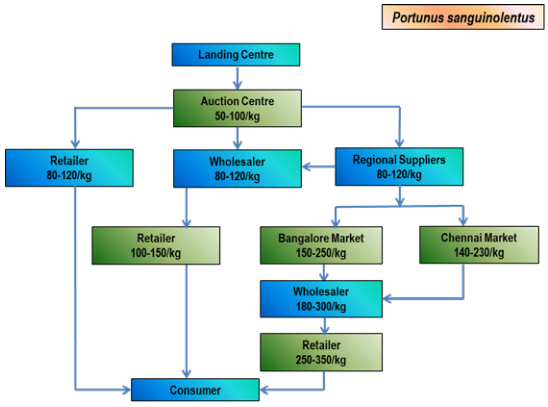

Fig. 3. Market chain mapping of *Portunus sanguinolentus* in the areas surveyed

Market chain mapping of Pharaoh cuttlefish *Sepia pharaonis*

Commission agents and assemblers/ regional suppliers are the predominant marketing channels found to play a major role in distributing these cephalopod landings from auction centre to export units. The major export market was found to be China, for this resource from West Bengal, and its distribution was found to be nil among the domestic markets. The price spread was found to be ₹200-250 per kg at the auction centre level to ₹240-350 per kg at the level of processing units (Fig. 4).

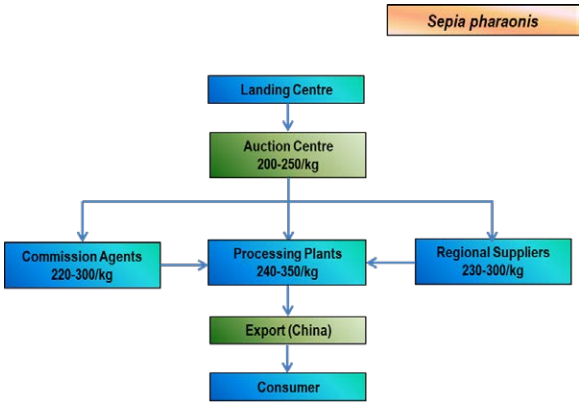

Fig. 4. Market chain mapping of *Sepia pharaonis* in the areas surveyed

The market chain analysis exposed the range of actors required to bring the product from landing centre through the different phases of distribution and delivery to final consumers. A large number of intermediaries are involved in the process of marketing from the landing centres to retail markets, and ultimately the consumers. The price depends on quality, size and weight, season, market structure, supply and demand, etc. Prices also vary from market to market. The marketing channels for different shellfish resources were different from each other. Some resources had the long marketing channel with more intermediaries and some had short marketing chain.

Perceived marketing constraints

In general, infrastructural facilities at landing centres, auction centres and fish markets were found to be inadequate including cold storage facilities. Proper approach roads and transport facilities are also generally inadequate, to bring the landings from landing jetties to auction centres. Further, standard operating procedures are also needed for various operations such as handling, washing, sorting, grading, cleaning and icing of fish. At the primary market level, the major constraint expressed by the fishermen was lack of bargaining power and inadequate market information. The major sources of finance for various operations along the value chain

are from private money lenders, hence improved access to institutional finance was also a perceived need. The problems related to distribution to export markets are long distance transportation, wherein the vehicles are often charged at several checkpoints during the transportation. During the stakeholder interfaces, it was reported that the immediate needs are cold chain and storage facilities, insulated vehicles and hygienic markets. Adequate infrastructural facilities in the fishing harbour is needed to minimize post-harvest losses (it was reported by fishermen respondents that on an average, a trawler is incurring a loss upto ₹20,000/trip due to inadequate infrastructural facilities pertaining to approach roads, insulated vehicles and other harbour facilities).

This study aimed to analyze the flow of selected shellfish landings on the value chain by mapping the selected shell fish value chain, and documenting the responses of value chain actors. It also explored the contributions of shellfish landings among value chain actors by exposing the price spread at various nodes which will be useful for stakeholders to streamline their operations in a cost effective way, increase earnings in the value chain actors and which have impacts on credit repayment processes.