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Value Chain Analysis of Farmed Shrimp in Navsari District of Gujarat

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ABSTRACT

The study emphasizes analysis of value chain identification, actors involved and their processes, value addition at each stage and prevailing constraints or problems in the value chain of farmed shrimp in Gujarat. The findings of the study will help in motivating shrimp farmers for use of the most efficient value chain. A total of 110 respondents were interviewed to collect relevant information for the study. The collected data was analyzed using appropriate tools to achieve the objectives of the present study. Farmers, commission agents, processors and export agents were the four main actors who contributed directly to shrimp production and influenced the economic value. Other actors like seed supplier, feed supplier, medicine supplier, equipment supplier, transporters etc., impacted indirectly to the shrimp production as well as the value chain. The flow of Volume of produce in the chain started from farmers and about 92.6 percent, 0.07 percent and 7.33 percent of total volume shrimp flows to shrimp commission agent, farm consumption, and domestic market, respectively. The processor exported 82.6 percent volume of shrimp through an export agent and 10 percent was waste which further sold to fishmeal plants. Value addition in the chain was Rs.389/kg (P. monodon) and Rs.253/kg (L. vannamei) at a farming level which was maximum share in profit and cost in the chain. Second highest cost contributed by processors Rs.55.8/kg and Rs.46.2/kg in the value chain of P. monodon and L. vannamei, respectively. The shrimp culture in Gujarat is facing various problems and threats and is struggling for sustainability. Lack of availability of quality seed, high feed cost is some of other problems facing the farmers. So the study on various issues and problems in shrimp farming is very important to create awareness among the farmers to sustain the culture. Implementing Better Management Practices (BMPs) in field level and following strict bio-security measures are very important for sustainable farming in the State.

Key words: *Shrimp, P. monodon and L. vannamei, Lack*

INTRODUCTION

The value is something for which customers pay. The value chain describes the full range of activities which are required to bring a product or service from conception, through the different 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[5,10]. Shrimps are called the "Pinkish Gold" of the sea because of its universal appeal, unique taste, high unit value realization and increasing demand in the world market.

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Shrimp culture is one of the immersing industries and contributes significantly to export and foreign exchange earnings. India is the 4th largest exporter of shrimp in Asia with a 2.5 percent share in the world seafood market[7,8]. The cultured shrimp contributed about 73.31 percent of the total shrimp export from India and *L. vannamei* alone accounted for about 84.8 percent of total cultured shrimp export from India which was US $ 1.99 billion during 2013-14. Export of Black tiger shrimp was mere US $ 0.44 billion during the same year. About 44.59 percent of total *L. vannamei* shrimp was exported to USA followed by 17.07 percent to EU, 16.54 percent to South East Asian countries and 4.01 percent to Japan[6,7].

Gujarat is one of the emerging shrimp producer states of India which has 1600 km long coastline and owns rich brackish water resources, a large suitable shrimp farming area, freezing plants, peeling sheds etc. Gujarat contributes about 2.80 percent of national shrimp production, in spite of having 2nd largest brackish water area only after West Bengal[6,9]. The area under shrimp aquaculture in Gujarat was 2059 hectare from which it produced 6064 MT of shrimp during the year 2011-12[2,8]. Production of cultured shrimp can be increased by making best utilization of the existing inland resources through improved package of practices of shrimp culture. Successful and sustainable shrimp culture also depends on an effective distribution system. However, despite the fact that the shrimp aquaculture sector in Gujarat is now mature, having developed over a period of more than 20 years, the financial and social performance of the sector are not well understood or documented. Since shrimp production in Gujarat is increasing, its disposal pattern is very important as growers, wholesalers, retailers and consumers- all are affected due to value addition in the marketing process. For the sustainability of these stakeholders' problem at different levels which can be rectified and benefited to farmers as well ultimate consumers.

MATERIALS AND METHODOLOGY

In spite of large suitable brackish water area for shrimp culture and good infrastructure for export of fish and fish production, its potential in shrimp production has not been exploited till date. This may be due to certain prevailing constraints in this particular sector. Navsari district of Gujarat state was selected purposively for the study as the district accounts for the largest shrimp farming area (1522.44 ha) in the state. Two blocks namely Jalalpore and Gandevi having highest shrimp production in the district were selected for the study. From each of the sampled block, 2 clusters of villages were selected based on area under shrimp culture. After selection of villages, a list of all the shrimp farmers in the villages was prepared with the help of key informants in the villages. A sample of 20 shrimp farmers from each of the selected cluster of villages was selected randomly. Thus the total 80 farmers were selected for the study. Mapping a value chain means constituting a visual illustration of the connections between the industries in value chains as well as other market players[1].

Besides simple statistical tools such as average and percentage, the tools of value chain mapping with diagram, farm business analysis, share of different actors in shrimp value chain in total value realized of shrimp, were used to meet the objective of the study[3].

RESULT AND DISCUSSION

Mapping of actors involved in farmed shrimp value chain

Different actors engaged in farmed shrimp value chain in Navsari district of Gujarat were identified and mapped as in Fig.2. It can be seen that the actors engaged in the value chain were input suppliers, dealers, farmers, commission agents, processors and export agents. All these actors have formed a chain and perform as elements of the farmed shrimp value chain. It can be explained that farmer culture shrimp in the coastal areas after sourcing shrimp seed from shrimp hatcheries, feed and other inputs from dealers located in the local market. After harvesting shrimp,

farmers largely depended on Commission agents or processor to sell their products. The commission agents were made a deal for the shrimp with farmers for selling it to processors. In processing firms, raw shrimp were processed and made ready for export. Here, export agents were played a crucial role in selling processed material of different processing firms and earned commission over it.

Mapping volume of product in the value chain of farmed shrimp

Mapping volume of product in the value chain has been depicted in Fig.2. The flow of shrimp started from farmers and about 92.6 percent, 0.07 percent and 7.33 percent of total volume shrimp flows to shrimp commission agent, farm consumption, and domestic market, respectively. Commission agent sold entire volume to processors and processor after processing them exported about 82.6 percent of the same through an export agent and rest 10 percent was a waste in processing which was sold to other companies in the domestic market for further processing into different byproducts.

Mapping of value addition throughout the value chain

In the value chain, the farmers culturing *P. monodon* absorbed Rs.389/ kg and those culturing *L. vannamei* absorbed Rs.253/kg the maximum value addition in the chain. The farmers contributed the larger share to profit and cost. Second highest cost contributed by processors Rs.55.8/kg and Rs.46.2/kg in the value chain of *P. monodon* and *L. vannamei*, respectively.

Cost and return in shrimp farming on sample farms:

Cost, yield and income in shrimp culture were estimated and also presented in the same table. Perusal of the table revealed that total cost of shrimp production in *P. monodon* (Rs.683951/ha) was substantially lower than that in *L. vannamei* (Rs.9,53981/ha) culture. It was also observed that total variable cost and fixed cost were substantially higher in case of *L. vannamei* farming than that of *P. monodon* farming. Gross Income in *L. vannamei* (Rs.21, 16125/ha/year) was substantially higher than that in *P. monodon* (Rs.16,12,426/ha/year). Benefit cost ratio (B-C ratio) was 2.35 in *P. monodon* farming and 2.2 in *L. vannamei* farming. This indicates that although farming of both *P. monodon* and *L. vannamei* were economically viable as their B-C ratios were more than unity, return over investment was more in *P. monodon* than that in *L. vannamei*. Since, overall shrimp yield was more in *L. vannamei* in comparison to *P. monodon* culture,it became more profitable than *P. monodon* farming (Table 2).

Cost and Return Analysis of Commission Agent:

Income and benefit cost ratio for both the black tiger and white legged shrimp were estimated and are presented in table 2. Perusal of the table revealed that gross income in black tiger shrimp was Rs.7.4 lakh/annum which was lower than that in case of white legged shrimp (Rs.8.1 lakh/annum). Benefit cost ratio (B-C ratio) was 1.05 in case of dealing with Black tiger shrimp and while 1.15 in case of White legged shrimp. This indicates that dealing in black tiger is more beneficial for the commission agent than that of white legged shrimp.

Cost and Return Analysis of Processor:

It will be pertinent to discuss economics of processing for both the species of shrimp i.e. Black tiger shrimp and White legged shrimp for the purpose of comparing between them. For the purpose, gross income, net income and benefit cost ratio was worked out and has been presented in table 3. Perusal of the table revealed that total cost of processing for shrimp was Rs.28.73/kg which upon adding of price of raw material provide the cost of processed black tiger shrimp Rs.678.7/kg and for white legged shrimp was Rs.495/kg. The B-C ratio in case of black tiger was 1.06 while that in case of white legged shrimp was 1.14 which shows better return in processing of white legged shrimp in comparison to black tiger shrimp.

Cost and Return Analysis of Export Agent:

The table revealed that export agent incurred total cost of Rs.5.49/kg and earned a

commision of Rs.14/kg in case of Black tiger shrimp and Rs. 11/ kg in case of L. vannamie export. In this way the B: C ratio of the export agent was worked out to be 2.5 in export of Black tiger shrimp and 2.0 in that of White legged shrimp. This indicates that dealing in both the species of shrimp was beneficial but dealing in white legged shrimp was less beneficial in comparison to dealing in Black tiger shrimp.

Share of Profit, Added cost and margin in Farmed shrimp value chain:

In case of Black tiger shrimp value chain, the farmers absorbed 86.9 percent of profit, 77.5 percent of cost and 88.14 percent of margin and white legged shrimp could contribute 76.31 percent of profit, 77.7 percent of cost and 57.71 percent of margin from per kg shrimp produced and exported to foreign market. The farmers contributed the largest share to profit and cost. The commission agent on the other hand absorbed 1.71 percent, 1.58 percent, of profit and cost in black tiger shrimp value chain. The processor contributed 9.41 percent profit and 19.03 percent cost from shrimp value chain. The L. vannamei farmers contributed the largest share to profit and cost. The commission agent, on the other hand absorbed 1.31 percent and 1.83 percent, of profit and cost in white legged shrimp value chain. The processor contributed 20.72 percent profit, 18.25 percent cost and 15.88 percent margin from shrimp value chain.

Fig. 1: Detail of core processes in farmed shrimp value chain

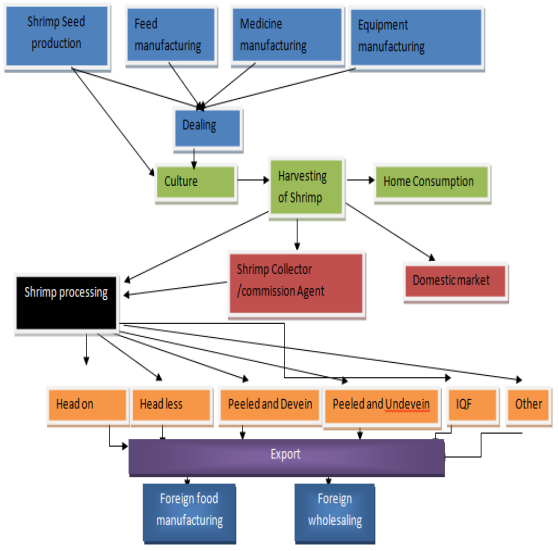

Fig. 2: Diagrammatic presentation of actors involved in farmed shrimp Value chain

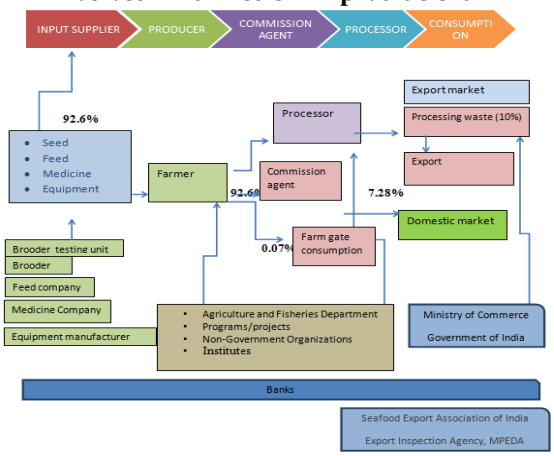

Fig. 3: Map of value addition throughout the chain (Rs/kg)

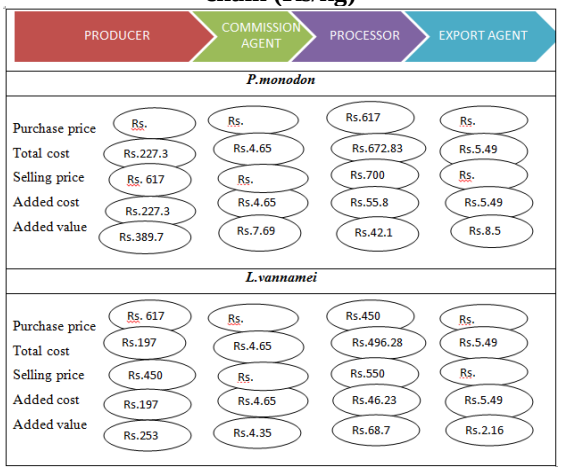

Table 1: Cost and return in shrimp culture on sample farms

Particulars	*L. vannamei*	*P. monodon*
Total cost (Rs./ha)	938255.34	600135.94
Area of culture (ha)	6.19	4
Yield (kg/ha)	4,750	2639.73
Average price	617	450
Gross income	2930750	1187878.5
Commission charges	29307.5	11878.78
Gross income excluding commission charges	2901442.5	1175999.71
Net income	1963187.16	575863.78
Net income*(year)	3926374.32	575859.78
B:C ratio	3.09	1.95

*Note: * since L. vannamei mature in short duration and 2 crop is taken in a year whereas for P. monodon only one crop is taken and hence net income from L. vannamei crop has been multiplied by 2 to obtain net income per year for comparing with P. monodon.*

Table 2: Cost and return of commission agent

	Particulars	*L. vannamei*	*P. monodon*
1	Total cost (Rs./annum)	6,98,615.7	6,98,615.7
2	Quantity handled (kg/annum)	90000	60000
3	Price of shrimp/kg	450	617
4	Gross value transacted (Rs.)	4,05,00,000	37020000
5	Gross income Commission earned (Rs.)	8,10,000	7,40,400
6	Net income (Rs./annum)	1,11,384.3	41,784.3
7	B:C ratio	1.15	1.05

Table 3: Cost and return in shrimp processing

	Particular	*L. vannamei*	*P. monodon*
1	Raw material required (kg)	1.1	1.1
2	Price of raw material (Rs./kg)	617	450
3	Cost of raw material (Rs.)	678.7	495
4	Cost of processing of shrimp (Rs./kg)	28.73	28.73
5	Commission to commission agent (Rs./kg)	6.7	4.9
6	Commission to export agent (Rs./kg)	7	5.5
7	Total cost (a+b+c+d+e) (Rs./kg)	721.13	534.13
8	Export subsidy (Rs./kg)	48.3	37.9
9	Total cost after subsidy	672.83	496.23
10	Export price of processed product (Rs./kg)	700	550
11	Income generated by sale of by-product@ Rs.150/kg	15	15
12	Gross income	715	565
13	Net income	42.17	68.77
14	B-C Ratio	1.06	1.14

Table 4: Cost and return of export agent (Rs./kg)

	Particulars	*Black tiger shrimp*	*White legged shrimp*
1	Total cost of export agent (Rs./kg)	5.49	5.49
2	Average commission (Rs./kg)	14	11
3	Quantity handled (kg)	40000.0	63333.3
4	Gross income (Rs./kg)	14	11
5	Net income	8.51	5.51
6	B-C ratio	2.5	2.00

Table 5: Profit, Added cost, Margin per kg shrimp (Rs/kg)

Actors	Purchasing Price	Total Cost	Selling Price	Profit		Added Cost		Margin	
				Abs. Value	%	Abs. Value	%	Abs. Value	%
P.monodon									
Farmer	..	227.3	617	389.7	86.9	227.3	77.5	617	**88.14**
Commission Agent	…	4.65		7.69	1.71	4.65	1.58		
Processor	617	672.83	700	42.17	9.41	55.83	19.03	83	**11.85**
Export Agent		5.49		8.5	1.89	5.49	1.87		
Total				448.06	100	293.27		700	**100**
L.vannamei									
Actors	**Purchasing Price**	**Total Cost**	**Selling Price**	**Profit**		**Added Cost**		**Margin**	
				Abs. Value	**%**	**Abs. Value**	**%**	**Abs. Value**	**%**
Farmer	…	197	450	253	76.31	197	77.7	450	**84.1**
Commission Agent		4.65		4.35	1.31	4.65	1.83		
Processor	450	496.23	550	68.7	20.72	46.23	18.25	100	**15.88**
Export Agent		5.49		5.5	1.65	5.49	2.16		
Total				331.5	100	253.3	100	535	**100**

CONCLUSION

It was noticed that the value chain analysis of farmed shrimp involves the actors like input suppliers, shrimp farmer, middlemen/agent, dealer, processor and export agents etc., who engaged with different processes at respective stage mentioned in fig.1. The flow of shrimp started from farmers and about 92.6 percent, 0.07 percent and 7.33 percent of total volume shrimp flows to shrimp commission agent, farm consumption, and domestic market, respectively. The processor exported 82.6 percent volume of shrimp through an export agent and 10 percent was waste which further sold to fishmeal plants. The farmers were the largest contributors to value addition and cost and it was followed by processor mentioned in fig.3.

In black tiger shrimp value chain, the farmers had accounted for 85.09 percent of profit, 80.81 percent of cost and 88.14 percent of margin from shrimp produced and exported to foreign market. The farmers contributed the largest share to profit and cost. The commission agent on the other hand absorbed 1.82 percent, 1.45 percent, of profit and cost in black tiger shrimp value chain. The processor contributed 11.78 percent profit, 15.10 percent cost and 11.85 percent margin from shrimp. In white legged shrimp value chain, the farmers absorbed 75.28percent of profit, 79.14percent of cost and 84.1 percent of margin from

shrimp produced and exported to foreign market. The farmers contributed the larger share to profit and cost. The commission agent, on the other hand absorbed 1.29percent and1.86percent, of profit and cost in white legged shrimp value chain. The processor contributed 22.67 percent profit, 15.5percent cost and 15.88 percent margin from shrimp production and sale.

The study revealed that shrimp farming (*P. monodon*& *L. vannamei*) was highly profitable venture and farmers contributed major share in profit in the chain however presence of intermediaries in chain between farmers and processors made price of shrimp high till it reaches to ultimate consumer. The value chain of shrimp was divided into the stages of farming, procurement, processing, and export. During farming, farmers incur several expenses like seed, feed, medicines, labour and other costs. The farmer could sustain because of increasing price of shrimp as well as increasing their total revenue. In addition, the farmers lease the lands for 5 years and it was advantageous to them for not increasing the lease value of land. The farmers achieved profit of 86.8percent in case of black tiger and 77.9percent in case of white legged shrimp. Though percent of profit was quite good, shrimp farming is highly risky business and chances of loss are very high. The profit may not be sustainable because sometime markets are not stable and so farmers have to incur losses. At the procurement stage, commission agents need to use ice, transport, cool-storage and others. At the processing stage, fixed overhead and variable costs are needed. This study also analyzes the distribution of revenue, cost and profit along the chain. The *P. monodon* culture was relatively less profitable over *L. vennamei* as it was cultured two crop in year and with high stocking density.

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