

Constraints faced by farmers and processors in farmed shrimp value chain in Gujarat

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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 to final consumers, and final disposal after use. Based on this definition, a simple value chain entails the range of activities carried out in a business organization to produce a certain product. This might include the design and product development stage, the production stage, the marketing and distribution activities and consumption and recycling. Value-chain analysis looks at every step a business goes through, from raw materials to the eventual end-user with a goal to maximise value at the least possible total cost.

Key words: Farmers, *Litopenaeus vannamei*, Processors, Shrimp, Value chain

FARMED shrimp is one of the immersing industries in India which is mainly exported to earn foreign exchange. India is the fourth largest exporter of shrimp in Asia with a 2.5 % share in the world seafood market. The farmed shrimp contributed about 73.31 % of the total shrimp export from India and *Litopenaeus vannamei* alone accounted for about 84.8% of total cultured shrimp export from India which was US \$ 1.99 billion during 2013-14. Out of total 44.59 % of total *Litopenaeus vannamei* shrimp was exported to USA followed by 17.07% to European Union, 16.54 % to South-East Asian countries and 4.01% to Japan. Although shrimp export from India has increased in recent past, it has not reached its potential. Exporters are facing a number of challenges in further increasing it, out of which, competition from other shrimp exporters is one of the major challenge. Thus improvement in competitiveness of Indian shrimp is required to increase its export. Export competitiveness of farmed can be increased by improving the value realization from entire shrimp value chain. Analysis of farmed shrimp value chain is required to understand

the constraints experienced by the actors involved at every stage in the chain and suggest suitable measures to overcome them for improving value realization in the chain.

Gujarat is one of the emerging shrimp producing states in India which has large brackishwater area suitable for shrimp farming and other required infrastructures like freezing plants, peeling sheds etc. It contributes only about 7% of national shrimp production, in spite of having second largest brackishwater area only after West Bengal. The area under shrimp aquaculture in Gujarat was 4426.18 ha/ from which it produced 30156.82 million tonne of shrimp during 2014-15. The present study was undertaken to analyse the farmed shrimp value chain to identify constraints experienced by actors at different stages and suggest suitable measures for improving the value realization in farmed shrimp industry in Gujarat.

The study is based on primary data collected from the selected sample stakeholders using personal interview method with the help of pre-tested schedule specially designed for the study. The data collected for the study pertained to 2013-14. For

the study, Navsari district of Gujarat was selected purposively as the district accounts for the largest shrimp farming area 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 a total of 80 farmers were selected for the study. For the purpose a total of 5 processors/exporters were also selected for the study. Rank-based Quotient was used to quantify the data collected by preferential ranking technique by first ranking the parameters and then calculating the Rank-based Quotient (RBQ) given by Sabarathnam (1988), which is as follows:

$$R.B.Q = \frac{\sum f_i (n+1-i) \times 100}{N \times n}$$

where in,

f_i , number of fishers reporting a particular problem under i^{th} rank

N , number of fishers

n , number of problems identified

Core processes and actors involved in farmed shrimp value chain

The core processes in value chain enable the smooth and economically effective flow of produce from point of production to ultimate consumer. It dealt with proper harvesting, maintenance of hygiene, assembling, handling, loading-unloading, transportation, processing, frozen storage, shipment, export etc. The actors engaged in the value chain for producing the end products for consumers 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 made a deal for the shrimp with farmers for selling it to processors. In processing firms, raw shrimp are processed and made ready for export. Here, export agents play a crucial role in selling processed material of different processing firms and earned commission over it.

Constraints faced by shrimp farmers

Shrimp farmers were facing a number of constraints in shrimp farming. The major constraints experienced by them were ranked on the basis of their RBQ score Table 1. The most critical constraint experienced by shrimp farmers was outbreak of disease (WSSV) which got highest RBQ score of 92.25 and ranked first among all the constraints followed by scarcity of skilled-labour for aquaculture operations which got RBQ score of 63.16, Table 1. Likewise third ranked constraint was shrimp farming being capital intensive, require high capital cost which got RBQ score of 62.78. The fourth most important constraints was unavailability of easy credit. A total of 10 constraints faced by shrimp farmers were identified and RBQ was estimated for them and ranked accordingly.

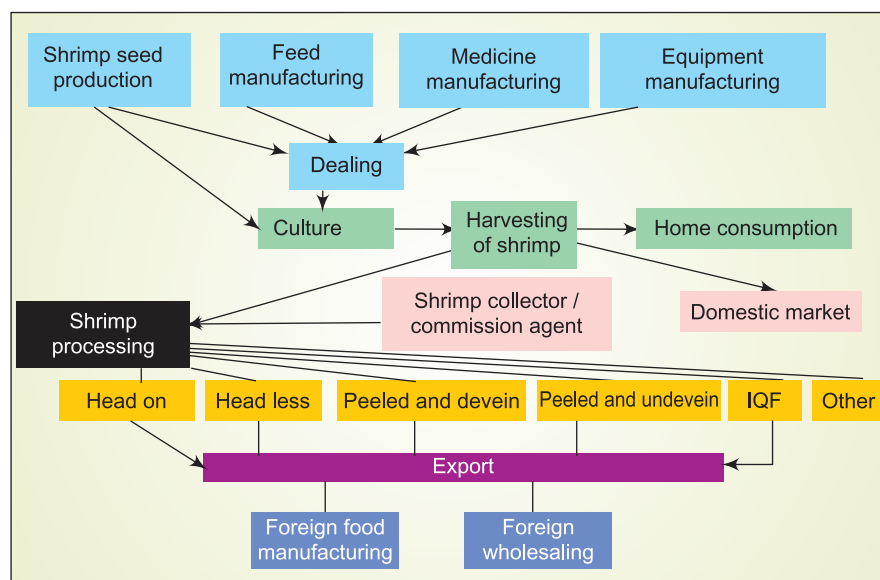


Fig. 1. Core processes in farmed shrimp value chain

Table 1. Constraints experienced by shrimp farmers

Constraints	RBQ	Rank
Outbreak of diseases	92.25	I
Unavailability of skilled-labour	63.16	II
Capital intensive farming	62.78	III
Unavailability of credit	55.79	IV
Perishability of produce	45.75	V
High rate of mortality	44.02	VI
High fluctuation in shrimp price	40.99	VII
Poor quality seed	31.27	VIII
Leasing in of Shrimp farm	29.79	IX
Lack of knowledge of scientific shrimp farming	19.5	X

The state is bestowed with a large area suitable for brackish water, aquaculture. However, leasing of land for aquaculture is slow due to which the state as well as country is not able to harness the potential of this resource. Therefore, leasing of such land needs to be speeded up which will provide opportunity for livelihood and employment to rural poor in the sector.

Keeping in view the good profitability, some of shrimp farmers had constructed shrimp farms illegally on government land. They are neither aware nor following biosecurity measures properly on their farms and hence adding to the risk of disease outbreak in the area.

Most of the farms do not have effluent treatment plant or system on their farms and directly discharging pond water into the sea through creek, the water source for all the shrimp farms. Therefore, all the

farmers of the area hurriedly harvest their shrimp irrespective of the stage of their crop which is causing losses in shrimp yield. Thus there is need to strictly enforce the ETS as well as reservoir at every farm.

High mortality is one of the major problems in shrimp farming which is mainly due to improper transport of seed, and poor technical and scientific management of seed production. Shrimp is highly disease susceptible crop and needs proper hygiene to avoid any contamination. Therefore, shrimp farming area should be kept safe from animals, birds and other unwanted interventions which can be carrier of diseases. Farmers need to be made aware about the benefit of adopting such measures and losses of not adopting the same. Also, CAA need to be more vigilant in ensuring the adoption of bio-safety measures in shrimp farming to avoid any major outbreak of disease in the country.

There is huge shortage of skilled-labour in shrimp farming. There is a need to arrange training and skill development programmes to enhance availability of skilled-farm labour for shrimp culture. This will not only improve the efficiency of work in shrimp culture but also improve the quality of produced shrimp.

Fluctuation in shrimp prices put farmers at great risk. There is a need to develop some mechanism to compensate farmers in case of loss due to low prices to avoid the risk of low prices. This is possible by

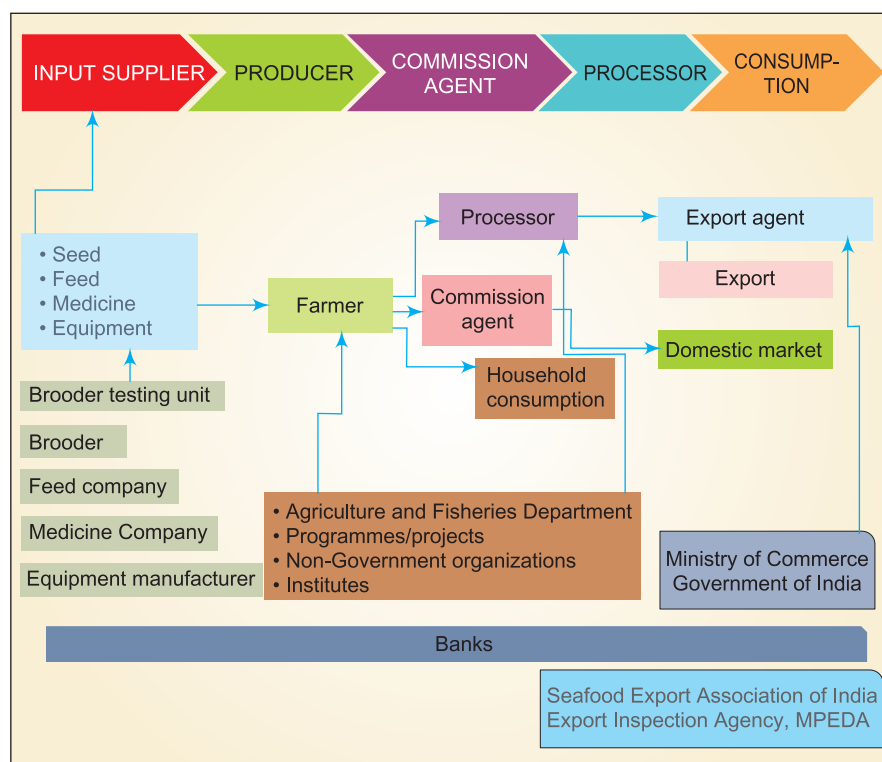


Fig. 2. Actors involved in farmed shrimp value chain.

collecting some taxes during high price period and compensating with same money during low price period. This will help shrimp farmers in taking appropriate decision in shrimp farming without fear of making loss.

Shrimp is highly perishable food item hence requires proper storage (low temperature storage) facility to keep it fresh for long time. This facility can be created near shrimp farming area which will reduce risk of spoilage and ensure sufficient raw material on time to Sprocessing plants. Establishment of processing plants near farming area will also help in ensuring proper quality of raw material.

Unavailability of credit is one of the major problems of shrimp farmer. Due to high investment requirement in shrimp farming, farmers require credit from financial institutions. Farmers are facing lot of problem in getting loan from banks and other financial institutions due to which farmers turn toward private money lenders who charges very high interest rate. This increases the cost of shrimp farming. Thus there is need to ease the process of getting loan from banks to facilitate shrimp farming.

Most of the shrimp farmers

acquire inputs from dealer on credit. When a farmer purchase on credit they lose 5 to 10% rebate in comparison to cash purchase which is very huge amount and causing dent in their profit. Due to unavailability of institutional credit they are forced to depend on the dealers. To avoid this situation in shrimp farming, credit limit in Kisan Credit Card for shrimp farmers should be increased commensurate with their requirement. This will improve their profitability.

The shrimp farmers of the area are dependent on unqualified consultants due to which they are using more inputs which are draining their profit. Therefore, there is need to improve the technical capacity of shrimp farmers as well as their skills in marketing through capacity building programme from time to time.

Shrimp seed producers in Gujarat are facing unavailability of sufficient quantity of quality brooders. Even in quarantined brooders there was complain of necrosis. Thus there is need to establish multiplication centres for rearing brood stocks in Gujarat which will reduce the cost of brood stocks as imported ones are very costly. Similarly, live feed availability particularly artemia

should be improved and local technology should be developed to reduce the dependence on imported one which is costly.

Aerators play a very crucial role in deciding the intensity of shrimp farming and hence the yield and profitability. Therefore, farmers should be encouraged to use more aerator by providing subsidy on electricity bills and purchase of aerator. Considering the importance aerator Government of Gujarat has rightly provided subsidy on purchase of aerator for shrimp farming but this subsidy is available for limited number of aerator per ponds. Aerator, industry is facing tough competition in international market as well as from cheaper import in domestic market. Therefore, they felt that excise duty on aerator should be reduced and DPP should be increased to 5% to improve its international competitiveness.

Constraints faced by shrimp processor

Shrimp processing plants accounts major share of cost and profit in shrimp value chain and face a number of constraints/problems in efficient conduct of their business among which tough competition in market got highest RBQ score of 70 and ranked first (Table 2). This constraint is followed by high price of shrimp with 66.66 RBQ and perishability of shrimps' which occupy second rank with 40 RBQ score.

There were 5 other constraints like unavailability of sufficient raw material (38.35), poor quality of raw material (36.44), scarcity of skilled-labour (34.44), lack of proper storage (28.88) and lack of proper transportation (8.33) metioned by processors during the survey which

Table 2. Constraints faced by processor

Constraints	RBQ	Rank
Cut throat competition in international market	70	I
High Price of shrimp	66.66	II
Perishability of shrimp	40	III
Unavailability of sufficient raw material round the year	38.35	IV
Poor quality of raw material	36.44	V
Scarcity of skilled labour	34.44	VI
Lack of sufficient storage	28.88	VII
Poor transportation facility	8.33	VIII

were ranked on the basis of RBQ scores. Processors are facing problem of deterioration in quality of harvested shrimp due to which preparation of 'Head on', a premium product that fetch 20% premium over other products, get limited to 55% of total shrimp. To ensure better quality of raw material harvesting need to be mechanized. For mechanization, all the ponds require connection with motorable roads that to at the point of outlet. Because harvester can be used at the out-let only hence pond design also requires

modification in future.

It was also felt that infrastructure for Frozen Food Park should be either developed in shrimp producing area or near port to reduce the transport cost and time which will ultimately add to the competitiveness of shrimp in international market.

SUMMARY

Shrimp farming is highly profitable venture in the state and both the farmers and processors are earning substantial profit and contributing to the value as per their

contribution in the cost. In spite of good profit, actors are facing above mentioned constraints in improving value at their stage. Addressing those constraints will help in improving the functioning of farmed shrimp value chain which will ultimately improve the value addition and competitiveness of shrimp in international market.

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Sodic soil reclamation improved livelihoods of resource poor farmers

Land degradation due to the accumulation of salts in the soil is an alarming threat to agricultural productivity and sustainability, particularly in arid and semiarid regions of the world. In India, about 6.73 million ha soils are salt affected which represents 2.1% of the geographical area of the country. Out of these, 2.8 million ha are sodic and mainly occur in the alluvial soils of the Indo-Gangetic plains (IGP) and a large proportion of these soils are cultivated by smallholder farmers, who rely on that piece of land to satisfy their food and feed needs.

Santaraha village in Hardoi district of Uttar Pradesh was selected for farmer's participatory sodic soil reclamation programme by ICAR-Central Soil Salinity Research Institute, Karnal. The average size of land holding was 0.62 ha and the majority of the farmers belong to marginal category. Crop production was an important activity contributing 68% of the total household income in the area.

The farmers were apprised about the role and responsibilities to be shared by them. After collecting all the basic information, the reclamation process started in April 2011. Proper reclamation protocol was followed. On-farm development works like bunding, field drains, irrigation channels, levelling and construction of link drain were initiated in farmers participatory mode. Land owners were asked to collect soil samples from each plot after training by the CSSRI, Scientists and Staff. To ensure water availability for leaching of salts as well as irrigating crops, one tube well was established at each 4 ha land stretch. The soil analysis results revealed that the pH ranges 8.5 to 10.1 and the gypsum requirement (GR) from 8.2 to 14.8 Mg per ha. Based on the results of laboratory analysis, gypsum was provided to the farmers @ 25% of estimated GR value. Agriculture grade mineral gypsum containing S (16.1%), Ca (18.3%), Mg (0.04%), and Na (0.18%) was applied in June 2012 and mixed uniformly in the top soil (0-15cm).

After application and mixing of gypsum, fields were ponded about 10 cm water for at least 10 days to displace the reaction product of Ca-Na exchange down to the root zone. After proper leaching of salts, pressmud collected from sugar company containing S (0.23%), Ca (11%), Mg (1.65%), total C (26%), total N (1.33%), total P (1.08%) and total K (0.53%) was broadcast uniformly @ 10 t ha⁻¹ and mixed in to the top soil. During this reclamation process farmers share substantial amount of cost. All the initial pre-reclamation activities were managed by the farmers on their own cost. They also shared the cost of amendments and inputs. Seed of salt tolerant variety of rice 'CSR 36' was provided by the ICAR-Central Soil Salinity Research Institute (CSSRI), Regional Research Station, Lucknow. Thirty-day-old seedlings of the salt tolerant rice variety 'CSR 36' was transplanted in July and improved management practices developed for sodic soils were followed.

Wheat yield loss during pre reclamation in slightly sodic and moderately sodic soils were 22.74 and 61.09%, respectively whereas, at sodic and severely sodic soils there was no crop. After post reclamation, yield loss at slightly sodic, moderately sodic, sodic and severely sodic soils reduced to the levels of 10.87, 21.84, 34.21 and 50.92% over the normal soils.

A large part of agricultural land is abandoned in India due to severe sodicity related problems. These lands need to be reclaimed through farmer's participatory approach following integration of gypsum, pressmud and salt tolerant varieties a cost effective technology for a faster and sustainable reclamation and to improve land productivity and farm income of resource poor farmers. The technology has the potential to reduce the reclamation cost remarkably, making it easier for resource poor farmer to adopt the practice. This would save the amount of chemical amendments needed that can further contribute to reclaim an even larger area. It is also concluded that the participatory reclamation and management approach is highly relevant and effective to ensure sustainable reclamation of sodic soils.