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Shrimp farming sector in south Konkan region, Maharashtra: A constraint analysis

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Abstract

Brackishwater shrimp farming is playing a crucial role in the socio-economic development along the coastal part of India. Maharashtra state having two coastal regions one is North Konkan region and another is South Konkan region. A study was carried out in South Konkan region (Ratnagiri and Sindhudurg district) of Maharashtra to analyze the constraints faced by shrimp farmers. Out of 72 operational farms, information was collected from 59 shrimp farmers. The study was conducted based on face to face interaction aided with well-structured and pre-tested interview schedule consisting of four major group of constraint *viz* production, marketing financial and environmental constraints. Weighted mean (average) ranking technique was used for analyze the data and ranking the various constraints. The results showed that the major production constraints faced by shrimp farmers were high cost of feed (weighted average 34.67) and less availability of good quality seed (weighted average 31.67). Among marketing constraints, lack of minimum support price as well as unstable market price (weighted average 38.33) and emergency crop harvesting (weighted average 30.00) were major constraints. Non availability of crop insurance (weighted average 39.33) and shrimp price fluctuation (weighted average 39.00) were important financial constraints. Occurrences of the natural disaster (weighted average of 21.00) and nuisance from the surrounding people regarding the percolation of saltwater into well water (weighted average 9.33) was the major environmental constraint. Above findings reflecting the current status of brackishwater shrimp farming along the South Konkan region of Maharashtra. The study concluded that it is necessary to take immediate preventive steps to sustain the shrimp culture in South Konkan region of Maharashtra.

Keywords: Shrimp farming, constraint analysis, weighted ranking, south Konkan, Maharashtra

Introduction

Aquaculture is presently the fastest growing food producing sector in the world. Among various fish production enterprises, shrimp aquaculture has emerged as one of the fastest growing forms of aquaculture with total world production of shrimp, both capture and culture being around 7.5 million tons.

The world total cultured shrimp production is 3.3 million tons (FAO, 2018) ^[1]. Asian countries like China, Taiwan, Indonesia, Thailand and India have emerged as global leaders in shrimp production. Shrimp farms are being developed throughout the world to meet the growing demand. Shrimp aquaculture has gained enormous importance after introduction of *Litopenaeus vannamei* in culture systems.

Maharashtra is one of the major maritime states, offering vast scope for development of brackishwater shrimp aquaculture. Maharashtra state has about 52,001 ha of potential brackish water area all along its coastline and adjacent creeks. Out of this area, 10,400 ha are reported to be suitable for shrimp farming. However, only 1,356 ha are used for shrimp farming ^[2] and 9,044 ha area is left which can be utilized for shrimp farming. Shrimp productivity of Maharashtra is 4.70 tons/ha/year, whereas, national average is 6.87 tons /ha/year. Five coastal districts of Maharashtra *viz*. Palghar, Thane, Raigad, Ratnagiri and Sindhudurg contribute significantly to the shrimp production of Maharashtra. Brackish water shrimp farming is one of the important economic activity in Maharashtra. However, shrimp farmers are facing a lot of challenges mainly due to disease incidence and other several reasons and lead to crop losses.

In view of this background, the present study was aimed to study the constraints faced by the shrimp farmers of South Konkan region, Maharashtra.

Materials and Methods

Locale of study

The study was carried out in Southern coastal districts of Maharashtra viz. Ratnagiri and Sindhudurg district. The studied area started from the village Aronda which is located at the South tip of Konkan. Aronda is the border of Maharashtra and Goa and survey ends at the North tip of Mandangad tehsil of Ratnagiri district.

Population and Sampling

Out of nine tehsils in Ratnagiri district, five coastal tehsils were selected namely Rajapur, Ratnagiri, Dapoli, Guhagar and Mandangad. There are eight tehsils in Sindhudurg district, out of which four coastal tehsils namely Sawantwadi, Vengurla, Malvan, Deogad were selected.

Total 72 shrimp farms are operational along South Konkan districts of Maharashtra. Out of these 59 shrimp farms were randomly selected. Among the 59 shrimp farms 17 shrimp farms are in Ratnagiri district and 42 shrimp farms in Sindhudurg district.

In order to enlist the constraints faced by shrimp farmers a thorough review of literature was done and all possible constraints faced by shrimp farmers were listed. A total 23 constraints were then categorized under four sub heads i.e. production constraints, marketing constraints, financial constraints and environmental constraints.

A three-point continuum scale was used to test the level of agreement of shrimp farmers towards the respective constraints. This scale was 0 to 2, where, 0 - disagree, 1- neither agree nor disagree and 2 - agree.

Statistical tools used

Weighted average technique

Weighted average technique (Kant *et al.* (2015)^[3], Shehrawat *et al.* (2016)^[4], Yadav *et al.* (2017)^[5] and Patil and Sharma, (2020)^[6] was used to analyze and rank various constraints faced by shrimp farmers of South Konkan region of Maharashtra. The weighted average for each constraint was calculated by multiplying frequency of each constraint with respective weight/score. The weighted values taken for calculating weighted average were 0 - disagree, 1 - neither agree nor disagree and 2 - agree.

The formula for weighted average is as follows:

$$\text{Weighted average} = \frac{\text{Sum}(X_1.W_1 + X_2.W_2 + X_3.W_3)}{\text{Sum}(W_1+W_2+W_3)}$$

Where

X_1, X_2, X_3 , = Frequency of the respective constraints

W_1, W_2, W_3 , = Weighted values i.e. 0, 1, 2

Results and Discussion

Constraints faced by the shrimp farmers

Constraints faced by shrimp farmers along the South Konkan region of Maharashtra are sub divided into four major groups i.e. production constraint, marketing constraint, financial constraint and environmental constraints.

Production constraints

The production constraint faced by shrimp farmers in the South Konkan region is given in Table 1.

Table 1: Production constraint faced by shrimp farmers

No.	Production constraints	Weighted Average	Rank
1	High cost of feed	34.67	1
2	Less availability of good quality seed	31.67	2
3	Prevalence of disease outbreak	31.33	3
4	High cost of seed	29.00	4
5	Lack of regular trainings	11.33	5
6	Less extension and technical support	11.33	5
7	Not following biosecurity measures	10.33	6
8	Lack of cold storage facilities	6.33	7

Results revealed that the high cost of feed (weighted average 34.67) was the first ranked production constraint faced by shrimp farmers. Less availability of good quality seed (weighted average 31.67) was the second-ranked production constraint. Lack of cold storage facilities was the least ranked production constraint faced by shrimp farmers of the South Konkan region with a weighted average of 6.33.

Patil and Sharma (2020)^[6] reported that high cost feed is one of the major constraints faced by shrimp farmers of Maharashtra, India. Rajaraman (2017)^[7] also reported high cost of supplementary feed as a constraint faced by shrimp

farmers in Nagapattinam district, Tamil Nadu. Koteswari *et al.* (2014)^[8] and Das *et al.* (2014)^[9] also ranked high cost of feed as major constraint. It was reported by shrimp farmers of South Konkan region that they spend approximately 65-70% towards supplementary feed cost. This may be the reason for reporting high feed cost as major constraint.

Marketing constraints

Number of marketing constraints faced by shrimp farmers is presented in Table 2.

Table 2: Marketing constraints faced by shrimp farmers

No.	Marketing constraints	Weighted Average	Rank
1	Lack of minimum support price	38.33	1
2	Unstable market price	38.33	1
3	Emergency crop harvesting	30.00	2
4	Less demand in domestic market	28.00	3
5	Problem of direct selling to the buyer	28.00	3

It is observed that lack of minimum support price and unstable market price with a weighted average of 38.33 was

the first ranked marketing constraint. Emergency crop harvesting (weighted average 30.00) was the second major

marketing constraint faced by shrimp farmers. Less demand in the domestic market as well as the problem of direct selling to the buyer was the least ranked marketing constraint with a weighted score of 28.

Salunkhe (2018) ^[10] while studying marketing constraints of shrimp farmers of North Konkan region, Maharashtra reported unstable market price (67.92%) and lack of minimum support price (69.8%) was the major constraint. Similar results were reported by Patil and Sharma (2020) ^[6] while studying marketing constraints faced by shrimp farmers of Maharashtra. Providing minimum support price and supply of adequate information regarding shrimp prices to shrimp farmers at regular intervals by the Govt., is the need of the hour so as to minimize the crop losses.

Financial constraints

The financial constraints faced by shrimp farmers of the South Konkan region are presented in Table 3.

Table 3: Financial constraints faced by shrimp farmers

No.	Financial constraints	Weighted Average	Rank
1	Non availability of crop insurance	39.33	1
2	Shrimp price fluctuation	39.00	2
3	High interest rate on loan	38.67	3
4	Unavailability of credit facility	33.00	4
5	High cost of electricity tariff	25.00	5

Table 4: Environment related constraints faced by the farmers

No.	Environmental constraints	Weighted Average	Rank
1	Occurrence of natural disaster	21.00	1
2	Social nuisance	9.33	2
3	Bindings of CRZ	4.00	3
4	Impact of shrimp culture on surrounding	0	4
5	Mangrove degradation	0	4

Results revealed that the occurrence of the natural disaster was the first ranked environment related constraints faced by shrimp farmers with a weighted average of 21.00. Nuisance from the surrounding people regarding the percolation of salt water into well water (weighted average 9.33) was the second-ranked environmental constraint. Impact of shrimp culture on surrounding horticulture crops like coconut and mangrove degradation was the least ranked environmental constraint faced by shrimp farmers facing with weighted score are of 4.00.

Sahu *et al.* (2014) ^[14] reported that natural disaster was the constraints faced by shrimp farmers of Balasore (38.33%) and Puri (20%) district of Odisha. Similar observation was reported by Salunkhe (2018) ^[10] in Maharashtra and Swathilekshmi *et al.* (2008) ^[15] in Kerala. The reason behind this constraint may be the frequent occurrences of disasters like flood.

Conclusion

The current study concludes that brackishwater shrimp farming in South Konkan region, Maharashtra is receiving severe setbacks due to several constraints and fetching huge economic losses. Study suggested to address the major identified constraints like less availability of good quality of seed, high cost of feed, minimum support price and non-availability of crop insurance. It is also necessary that immediate preventive measures to be taken to sustain the brackishwater shrimp farming sector in South Konkan region, Maharashtra.

Non-availability crop insurance (weighted average 39.33) was the first ranked financial constraint faced by shrimp farmers of the South Konkan region, Maharashtra. Shrimp price fluctuation with a weighted average of 39.00 was the second-ranked financial constraint. The high cost of electricity tariff was the least faced constraint (weighted average 25.00) and was ranked fifth by shrimp farmers in a financial constraint.

Non availability of crop insurance scheme to the shrimp farmers of Maharashtra was major constraint as reported by Patil and Sharma (2020) ^[6]. Salunkhe (2018) ^[10] while studying financial constraints reported that lack of crop insurance was the major constraints (79.25%) faced by shrimp farmers of North Konkan region, Maharashtra. Similar constraint was also reported by Srinath (1996) ^[11] in Ernakulum district of Kerala and Nayak *et al.* (2001) ^[12] in Balasore district of Odisha. Srinivas and Venkatrayalu (2016) ^[13] also observed lack of insurance scheme as one of the constraints faced by shrimp farmers of Andhra Pradesh. It was reported by shrimp farmers that crop insurance support for shrimp farming is non-existent in Maharashtra. Despite its significant contribution in export earnings, cultured shrimp production does not attract insurance sector.

Environmental constraints

The environment related constraints faced by the farmers is presented in Table 4.

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