Constraints Faced and Test of Agreement Among Shrimp Farmers of Palghar District in Maharshtra

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ABSTRACT

A study was undertaken to analyse the constraints faced by shrimp farmers in Palghar district which has highest shrimp production (2908t) in Maharashtra. The district has 796 ha brackishwater area under shrimp culture. Out of 65 registered shrimp farmers, information was collected from 55 shrimp farmers. List of constraints was prepared through focused group discussions with key informant famers. These constraints were then classified into five categories *viz.* extension, financial, production, marketing and infrastructural. Shrimp farmers were asked to provide their level of agreement towards these constraints on a five point Likert scale. Weighted average (WA) scores were calculated to rank constraints. Study revealed that Palghar has not been able to exploit its full potential due to various constraints. Out of this, production and extension constraints ranked high. Few remedial measures for disease had highest WA (19.4) followed by high cost of feed (17.9), less availability of quality seed (17.8) and shrimp price fluctuation (17.6). Less credit facility, insurance and market price information also had high WA. Value of Kendall's coefficient of concordance (*W*) was 0.85 suggesting overall agreement among shrimp farmers. It was suggested to set up Aqua One Centres (AOCs) to provide complete services for sustainability of shrimp farming.

Key Words: Constraints, Maharashtra, Palghar, Shrimp farmers, Weighted average.

INTRODUCTION

The potential brackishwater area in Maharashtra state is 52,001 ha. Out of total potential brackishwater area, only 10,400 ha is considered suitable for brackishwater aquaculture, but presently 1,539 (14.79%) ha area is under shrimp farming. As far as shrimp production in India is concerned, Maharashtra stands at 6th position (6118 tons). Out of seven coastal districts, shrimp farming is carried out in five coastal districts *viz.*, Palghar, Thane, Raigad, Ratnagiri and Sindhudurg districts. Among these, Palghar has highest shrimp production (2908) which is the focus of this study (Patil and Sharma, 2018). Singh *et al* (2020) concluded that although shrimp farming is developing very fast in salt affected areas of inland states like Punjab, Haryana and Rajasthan, but its sustainable development

in these areas is a collective responsibility of the farming community and R & D agencies/institutes. The farmers need to follow stringent bio-security protocols; stock SPF or Specific Pathogen Resistant (SPR) seed from CAA approved hatcheries only. In addition to obtaining the certificate of screening from hatcheries, the farmers were also advised to get the seed tested at their own level for diseases/ pathogens. The stocking density should not be higher than 60 post larvae (PL)/m2.

The potential area available for farming in Palghar district is 4972 ha and under shrimp farming at present is 796 ha. This shows that only 16 per cent of potential area has been developed. Hence, it was necessary to explore why only 16% of the area has been utilized for shrimp farming. Obviously, there are some constraints being faced by shrimp

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Table 1. Constraints perceived by shrimp farmers of Palghar district, Maharashtra.

Sr. No.	Category wise constraint	Weighted average value	Rank
1.	Production	15.35	1
2.	Extension	15.13	2
3.	Financial	14.96	3
4.	Marketing	13.68	4
5.	Infrastructure	12.32	5

farmers which need to be computed and also tested for agreement among those who are already doing shrimp farming and so this was the objective of the present study.

MATERIALS AND METHODS

Locale of the study was Palghar which is the 36th new district of Maharashtra. Shrimp farms are operational in Palghar, Thane, Raigad, Ratnagiri and Sindhudurg. There are 65 registered shrimp farms in Palghar district (www.fisheries.maharashtra.gov.in). Out of registered farms, information was collected from 84.60% (55) shrimp farms while remaining farms were non-operational during data collection.

List of constraints faced by shrimp farmers was developed by conducting focused group discussion with 10 key informant shrimp farmers. A number of constraints were listed which were further categorized under five subcategories i.e., production constraints, extension constraints, financial constraints, marketing constraints and infrastructural.

The test-retest method was used to test the reliability of scale. Test-retest reliability coefficient value was 0.79 indicated that scale is reliable. After this an interview schedule was prepared and all constraints were listed. Shrimp farmers were asked to provide their agreement towards these constraints on a five point scale with weights as 4 for strongly agree, 3 for agree, 2 for neither agree nor disagree, 1 for disagree and 0 for strongly disagree.

In order to rank various constraints faced by shrimp farmers, Weighted Average (WA) technique was used. Maximum and minimum score a constraint could attain were 22 and 0. Weighted average was calculated by as given below:

Weighted average = Sum $(X_1.W_1 + X_2.W_2 + X_3.W_3 + X_4.W_4 + X_5.W_5)$ / Sum $(W_1 + W_2 + W_3 + W_4 + W_5)$

Where,

X_1, X_2, X_3, X_4, X_5 = Frequency of the respective constraints and

W_1, W_2, W_3, W_4, W_5 = Weighted values i.e., 0, 1, 2, 3 and 4

Kendall's coefficient of concordance (W) the non-parametric statistic was calculated to assess agreement regarding constraints among shrimp farmers. Kendall's W was found to be 0.80 which showed agreement among experts. The information related to constraints faced by shrimp farmers was collected, tabulated and analyzed with help of SPSS 16 software.

RESULTS AND DISCUSSION

Constraints faced by shrimp farmers

It was clear from table 1 that the production and extension constraints ranked high followed by financial and marketing constraint.

Production constraints

The data (Table 2) depict that, few remedial measures for disease ranked first among different production constraints. Kumar *et al* (2016) in their study in Gujarat state reported that disease is the most burning and threatening issue for shrimp farming communities. High stocking densities, poor water quality management and poor maintenance of BMP's may be the reasons behind the prevalence of diseases in shrimp farming. Shrimp farming

Table 2. Production constraints faced by shrimp farmers of Palghar district.

Sr. No.	Production constraint	Weighted average	Rank
1.	Few remedial measures for disease	19.4	1
2.	High cost of feed	17.9	2
3.	Less availability of quality seed	17.8	3
4.	Poor quality medicines, chemicals & feed	17.1	4
5.	High cost of seed	16.2	5
6.	Lack of feed manufacturing units	13.6	6
7.	Low production and productivity	11.9	7
8.	Unskilled and untrained labour	9.1	8
9.	Natural disaster (flood)	8.7	9

industry was flourishing in India up to 1994, but collapsed there after mainly due to incidence of White Spot Syndrome Virus (WSSV). The tiger shrimp (Penaeus monodon) had become popular the world over but then WSSV disease wiped out the entire crop leading to huge magnitude of losses which is cited as a case of environmental costs of unbridled avarice. It is necessary to give stress on health management in order to make shrimp farming sustainable. It is suggested to set up Aqua One Centres (AOCs) to provide services like health and disease diagnosis, water quality etc.

High cost of feed was second ranked constraint. Shrimp farmers reported that shrimp feed is procured from various feed manufacturing companies. The average shrimp feed cost is Rs. 80/kg. High cost of shrimp feed is big challenge. Presently, production costs are high as average shrimp feed cost has been increased in last ten years from Rs. 45/kg. to Rs. 90/kg.

Shrimp farmers suggested that high quality, low priced shrimp feed with long shelf life is their need. As the supplementary feed plays a major role in shrimp farming, efforts have to be made by the Government to made available supplementary feed at subsidized rate to shrimp farmers and government should establish feed mill plant in state.

Disease as well as availability and quality of inputs were found to be major production constraints and the findings are in agreement with the study by Koteswari *et al* (2014). Thus, present study emphasizes the importance of supply of good quality, low priced shrimp feed as well as good quality medicines and chemicals.

Extension constraints

Knowledge of modern aquaculture techniques is very much essential for adoption of scientific culture practices. Besides knowledge, shrimp farmers also expect training and extension support from government organizations / institutions in performing farming activities in a better way. Various extension constraints faced by shrimp farmers of Palghar district is presented in table 3.

Lack of regular training programmes was the first ranked constraint. This finding was similar to the study done by Chittem and Kunda (2017) who reported that Prakasam district, Andhra Pradesh lack of regular training programmes was a major extension constraint. It is suggested to organize Farmer Field School (FFS) at each stage of shrimp farming as well as training on BMPs in shrimp farming.

Less extension and technical support were ranked second by farmers. Study done in Raigad district of Maharashtra by Mohite (2007) and study by Gawade *et al* (2009) in South Konkan region of Maharashtra also report similar findings. Similar type of constraint was reported by Sawant and

Table 3. Extension constraints perceived by shrimp farmers of Palghar district.

Sr. No.	Extension constraint	Weighted average	Rank
1.	Lack of regular training programmes	16.3	1
2.	Less extension and technical support	16.1	2
3.	Poor cooperation among farmers	15.6	3
4.	Inadequate govt. support	15.3	4

Sawant (2003), Swathilekshmi *et al* (2008), Sahu *et al* (2014), Rajarajan (2017), Chittem and Kunda (2017). Lack of government support and inadequate extension contact were major extension constraint reported by Salam *et al* (2020).

Department of Fisheries (DoF) and Fisheries Institutions should provide extension and technical support to shrimp farmers. This would help the shrimp farmers to prevent them from the various risks and uncertainties. In the study area, DoF has not played much role of providing extension services to shrimp famers, rather it has more been a regulatory body. DoF officials also need to be updated with scientific knowledge of shrimp farming.

Financial constraints

Shrimp farming is high capital-intensive farming activity so less availability of credit facilities was found as the first ranked constraint. Studies done by Srinivas and Venkatrayalu (2016) and Koteswari *et al* (2014) in Andhra Pradesh and in Tamil Nadu by Rajarajan (2017) have also reported inadequate credit from banks as a financial constraint. It is suggested that production credit should be made available by the financial institutions as well as by State Government with subsidies which would give

the needed thrust to shrimp farming.

Crop insurance support for shrimp farming was found to be nonexistent in Maharashtra so this was ranked as a second constraint. Due to high risks in shrimp farming, insurance companies are not ready to venture in this field. In other states also insurance has been stated as a hinderance like in the studies by Chittem and Kunda (2017), Srinivas and Venkatrayalu (2016) in Andhra Pradesh. Naik *et al* (2020) reported that crop insurance facilities should be introduced by government to shrimp farming sector in similar lines as that of agriculture sector.

Institutional credit, crop insurance facility and treating aquaculture at par with agriculture for power tariff are necessary for developing shrimp farming.

Marketing constraints

Shrimp price fluctuation was the first and foremost marketing constraints faced by shrimp farmers. Though a good market is available at global level for good shrimp count, shrimp farmers face immense problems due to fluctuation of market prices. In other states also this has been reported as constraints like the studies done by Sahu *et al* (2014) and Rajarajan (2017). In Thane district of

Table 4. Financial constraints perceived by shrimp farmers of Palghar district.

Sr. No.	Financial constraint	Weighted average	Rank
1.	Less availability of credit facilities	17.5	1
2.	Non availability of crop insurance	17.3	2
3.	High interest rate for loan	16.1	3
4.	High cost of electricity tariff	15.7	4
5.	Lack of financial support	15	5
6.	High transportation cost	14	6

Table 5. Marketing constraints perceived by shrimp farmers of Palghar district.

Sr. No.	Marketing constraint	Weighted average	Rank
1	Shrimp price fluctuations	17.6	1
2	Unavailability of information on market price	17.3	2
3	Lack of minimum support price system	17.1	3
4	Lack of storage facility at pond site	16.8	4
5	Less demand in domestic market	15.7	5

Maharashtra Rawool (2005) and Salunkhe's (2018) study in select district of Maharashtra have also state this. It is suggested to follow demand based harvesting pattern.

Unavailability of information on market price as second ranked constraints. Similar constraints were documented in studies done in other states by Mohamed *et al* (2013), Koteswari *et al* (2014) and Jagadeesh (2015). Koteswari *et al* (2014). Lack of information on market prices as a major constraint faced by shrimp farmers (61.61%) of Andhra Pradesh reported by Swathilekshmi *et al* (2008). Chittem and Kunda (2017) in their study in Andhra Pradesh also reported lack of information on market price as major marketing constraint perceived by 80% shrimp farmers.

It is suggested to disseminate price information through the mass media like newspapers, television and radio as well as through WhatsApp during shrimp harvesting would help the shrimp farmers to get good price for their produced shrimps.

It is necessary to provide adequate information regarding shrimp prices at regular intervals by the Govt., is the need of the hour so as to minimize the crop losses as reported by Naik *et al* (2020). Fish Exchange Portal of Marine Product Export Development Authority (MPEDA) gives state wise average farm gate price of *L. vannamei* shrimp.

During investigation, shrimp farmers of Palghar district, Maharashtra suggested that they should get minimum support price as that in agriculture.

Infrastructure constraints

It can be inferred from table 6 that non availability of hatchery facility was first ranked constraint. Vimala *et al* (2006) reported the constraints encountered by shrimp farmers in Tamil Nadu was inadequate supply of hatchery seeds and mortality of seeds during transportation. All the shrimp farmers were depending on hatchery produced seeds as it is a main input in shrimp farming. A steady supply of quality shrimp seeds in large quantities is essential for expansion of brackishwater shrimp farming. Seed production centers (hatcheries) are the source for the supply of quality seeds for shrimp farmers. It is suggested to establish government owned shrimp hatcheries for adequate seed supply.

Inadequate/erratic supply of electricity facility due to power cuts was second ranked constraint. Similar observations were reported by Swathilekshmi *et al* (2008), Sahu (2014), Koteswari *et al* (2014), Srinivas and Venkatrayalu (2016) and Chittem and Kunda (2017). Regular electricity supply is necessary in shrimp farming, for operating pumps, aerators, lighting facilities. State Government has to ensure that the electricity should be given to the shrimp farmers at lower tariff rates or at subsidized rates on similar lines as that of agriculture sector.

CONCLUSION

This study has revealed that Palghar has highest shrimp production in Maharashtra but it has not been able to exploit the full potential due to various constraints out of which production and extension

Table 6. Infrastructure constraints perceived by shrimp farmers of Palghar district.

No.	Infrastructural constraint	Weighted average	Rank
1	Non availability of hatchery facility	15.9	1
2	Erratic electricity facility due to power cuts	13.1	2
3	Lack of good roads	12.2	3
4	Low speed of internet communication facilities	11.1	4
5	Lack of good transportation facility	10.1	5
6	Non availability of cold storage facility	6	6

constraints are ranked higher as per the WA scores. Few remedial measures for disease had highest WA (19.4) followed by high cost of feed (17.9), less availability of quality seed (17.8) and shrimp price fluctuation (17.6). Less credit facility, insurance and market price information also had high WA.

It is suggested that farmers use Best Management Practices (BMP) in order to have few occurrences of disease. More training programmes on BMPs are suggested to be organized by training providing organizations and DoF. Research institutes need to develop low cost feed so that the input cost comes down. A hatchery can be established for good quality seeds along with seed certifications. It is suggested to set up Aqua One Centres (AOCs) to provide services like water quality, health and disease diagnosis, ICT enabled advisory services related to inputs, better management practices and technologies, pond and fish health management, training.

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