



EMERGENCE OF SHRIMP FARMING AND PROFILE OF SHRIMP FARMERS IN PALGHAR DISTRICT, MAHARASHTRA

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Abstract: *There are discussions on reshaping public narrative of aquaculture. Concerns are being raised on bringing a balance between business, ethics, social equity, and sustainability. It is difficult to forecast if these discussions will bring paradigm shifts in shrimp farming. But it will become more and more important to have information on the source from where the shrimps are coming from, who are the shrimp farmers and whether sustainable farming systems are being adopted by farmers. In this paper, we select Palghar district, in Maharashtra and present how shrimp farming emerged here, which farming systems are practiced and who are the farmers who have adopted shrimp farming. Amongst coastal districts of Maharashtra, Palghar ranks first in shrimp production and number of shrimp farms. Information was collected from 55 shrimp farmers with semi-structured interview schedule. The emergence of shrimp farming happened with a pilot brackish water shrimp farm established by Department of Fisheries (DoF) in 1981. In 1989-90, three aquaculture farms were established. During 1990's, *Penaeus monodon* was the favoured species but because of White Spot Syndrome Virus (WSSV) in 1994-95, farming collapsed. After 2008, with use of *Litopenaeus vannamei* new farms were established. After a discussion on the emergence of shrimp farming, farming systems practiced and profile of shrimp farmers is discussed.*

Keywords: *Emergence, Profile, Shrimp farmers, Palghar, Maharashtra.*

Introduction:

In the Global Aquaculture Alliance held on February 26, 2018 many prominent voices have said that aquaculture must reshape its public narrative in order for the blue revolution to transpire. The talk is more about creating a balance between business, ethics and sustainability. India is also not behind and in a bid to ensure that shrimp and other exportable varieties of fish are free from any trace of banned and unwanted substances, Marine Products Export Development Authority (MPEDA) has developed a GPS-based database of export-oriented aquaculture farms in the country for their traceability as well as to secure interests of end-consumer. With demand for aquatic food increasing in recent years this becomes all the more important. China rank first while India stands at fifth position with production of 4,87,470 lakh tons. There is a robust demand for frozen shrimp and fish in international markets. India is

exporting 11,34,948 MT of seafood which is all time high with a worth of Rs. 37,879 crores in 2016-17. MPEDA (2017)

In India, shrimp farming provides direct employment to about 0.3 million people and ancillary units provide employment for 0.6 to 0.7 million people. It is necessary to know the profile of shrimp farmers involved in this activity as it becomes authentic information of target group and impediments in the successful implementation of developmental policies.

Review on this area has revealed that several micro and macro level socio-economic surveys were conducted by various research workers and agencies in different regions of our country to study the issues faced by aqua farmers like Swathilekshmi *et.al* (2005), Sadafule *et. al* (2013), Vadher and Manoj (2013) and Tandel *et.al.* (2016). These studies have focused on constraints faced by shrimp farmers. As no studies

have been reported for Palghar district of Maharashtra which ranks first in shrimp production as well as number of shrimp farms this study is an attempt to examine the emergence of shrimp farming and profile of shrimp farmers in Palghar district, Maharashtra.

Materials and Methods:

Maharashtra state has about 52,001 hectare of potential brackish water area all along its coastline and adjacent creeks suitable for shrimp farming. Out of this area, 10,400 ha is reported to be suitable for shrimp farming in the five coastal districts i.e., Palghar, Thane, Raigad, Ratnagiri and Sindhudurg as per survey conducted by Government of Maharashtra in 2008. Among these, Palghar district ranks first in shrimp farming area (733 ha) and total shrimp production (2710 tons). So this study focuses on Palghar. To achieve the objectives of the study, information was collected about emergence of shrimp farming, farming systems practiced and profile of farmers who have adopted shrimp farming. Emergence of shrimp farming includes timeline of shrimp farms since 1980's onwards, journey from *P. monodon* to *Litopenaeus vannamei*. To collect this information, a semi-structured interview schedule was used to elicit information from farmers along with discussion. Out of 65 shrimp farmers in Palghar district, information was collected from 55 shrimp farmers.

Results and Discussion:

Emergence of shrimp farming in Palghar district started with a pilot brackish water shrimp farm which was established by Department of Fisheries (DoF) in 1981. Shrimp hatchery for *Penaeus monodon* was developed by DoF at Badapokharan village in Palghar which was in Thane district at that time. Palghar was declared a separate district in 2014. However, in the present times, both the hatchery and pilot shrimp farm are not functional. Later in 1989-90, Shakti, Pancham and Ruia Aquaculture were three farms established at Saphale village, Palghar. These were the first farms established in Maharashtra. In Maharashtra, most farms were

constructed in Palghar as this district which is in north Konkan area had an advantage of more brackish water land availability while southern coastal district i.e. Ratnagiri and Sindhudurg have narrow strip of brackish water between the Western Ghat and the Arabian Sea. During 1990's, *Penaeus monodon* was the favoured species because of the availability of hatchery-produced post larvae which were procured from other states like Andhra Pradesh, Tamil Nadu and Karnataka and also because of *P. monodon's* ability to grow fast under semi-intensive conditions. Shrimp farming started as an extensive farming system but slowly this was replaced by modified extensive to semi-intensive farming system with stocking densities ranged from 5-10 PL/m². Higher stocking densities led to some negative factors like White Spot Syndrome Virus (WSSV) during 1994-95. Shrimp farming industry was at its peak around 1994 throughout India, but saw its decline mainly due to the White Spot Syndrome Virus (WSSV) disease. This was the most significant shrimp disease outbreak in history, ending the expansion of *P. monodon* farming. Due to this, shrimp farming declined in most farms in Palghar district also. Policy regulations like Best Management Practices (BMPs), Coastal Aquaculture Authority (CAA) guidelines came into picture from year 2000 onwards. Since, 2005 after establishment of CAA guidelines and because of the Coastal Regulation Zone (CRZ) regulations, shrimp farming became difficult. No new farms were established. But after 2008, Government of India permitted use of Specific Pathogen Free (SPF) stock of *Litopenaeus vannamei* for culture and new farms were established. Thus, introduction of SPF species showed ray of light for the development of shrimp farming. This resulted in revival of shrimp farming along the coast of Maharashtra and also Palghar. With reference to the farming systems practiced, information is presented below.

Brackish water land leasing policy: Land is allotted for brackish water shrimp culture on a lease basis for 30 years by the Government of

Maharashtra. Lease rent amount is raised after every 5 years as decided by DoF. As far as land allotment authority is concerned, 20 ha land allotment authority is with District Collector, 20-50 ha with Divisional Commissioner while more than 50 ha land allotment authority is with DoF. As per new lease rent policy, traditional fishermen/individual beneficiary has to pay one time amount of Rs. 5000 with annual lease rent of Rs. 1000/ha/yr. Premium amount for fisheries cooperative society is Rs. 10,000/- with annual rent is Rs. 1500/ha/yr. while company/partnership firms has to pay a premium of Rs. 25,000/- with annual lease rent of Rs. 2,000/ha./yr as per information available on website of DoF, Maharashtra. Lease rent amount is raised after every 5 years as decided by DoF. As far as selection of individual beneficiaries is concerned, priority is given to applicant of village from where land is to be allotted and next priority is given to applicant of district from where land is to be allotted. Land allotment criteria are 5 ha for individual, 30 ha for co-operative society/company and entrepreneur while 5 ha additional land for combined projects. DoF (2016).

Ownership of pond: Many management decisions related to shrimp farming are influenced by the type of ownership involved. A total of 52.73 % of the shrimp farmers had their own ponds and 47.27 per cent farmers had taken ponds on lease basis in Palghar explained above.

Shrimp farming area: Farm area is an important determinant of fish productivity as it provides living space for shrimps. In the present study, it was found that most of the shrimp farmers were having farm area in between 2-5 ha (40.00%), 32.73% of farmers were having farm size up to 2 ha, 14.55% of shrimp farmers had farm area between 5-10 ha. and 12.75% farmers had above 10 ha of farm area. The maximum shrimp farming area in Palghar district is 40 ha and minimum farming area is 0.4 ha.

Species cultured: All shrimp farmers reported that they culture *Litopenaeus vannamei* which is less risky

species as compared to *Penaeus monodon* also reported by. FAO (2004).

Number of crops per year: It was observed that, majority (94.55%) of shrimp farmers was taking two crops/year and only 5.45% farmers took one crop/year. In vannamei sector, the trend is now for year round culture with no distinct crop season but it is better to take two crops to provide the shrimp with a clean pond bottom and good, stable water quality.

Stocking density: The maximum numbers of farmers (47.27%) were maintaining stocking density between 16-25 nos./m² followed by stocking density between 26-50 nos./m² (34.55%). Nearly 10.91% shrimp farmers were doing farming by maintaining stocking density up to 15 nos./m² and 7.27% farmers were keeping stocking density above 51 nos./m². The stocking density of shrimps is one of the vital zoo-technical factors that directly influence the survival, growth, health, feeding, yield and profit. Manilal *et.al.* (2010)

Effluent Treatment System (ETS) in shrimp farms: Only few farmers above 5 ha area are having a provision of ETS for treating the effluent.

Loan and insurance: In Maharashtra 83% of shrimp farmers have less than 5 ha of shrimp farming area. In Palghar 72.73% farmers have farms which are less than 5 ha. Despite its significant contribution in export earnings cultured shrimp production does not attract insurance sector.

Hatcheries: Even now shrimp farmers of Maharashtra procure shrimp seeds from Tamil Nadu, Andhra Pradesh and Karnataka through air and truck transport. Due to this, cost of seed increases beyond the reach of marginal and small farmers. As it involves long duration transport, seeds undergo stress, leading to poor survival percentage.

Feed and other inputs: Most shrimp farms in Palghar use high-quality, high-protein feed. The annual feed consumption is estimated to be about 4050 tonnes with an average feed conversion ratio of about 1:1.8. The companies that have a presence in fish feed market in Maharashtra as well as Palghar are

Avanti, Growel, C.P. aquaculture, Water base, BMR, Sonac, and Godrej.

Antibiotics: No banned antibiotics as listed by Marine Products Export Development Authority (MPEDA) were being used.

Domestic market: Per kg production cost of shrimp is more than Rs. 275 per kg and the price of inputs like seed, feed and electricity charges are increasing. In the international markets prices of shrimps keep fluctuating. Domestic market for shrimp farming is not well developed. Most shrimp is taken by the processing units.

Biosecurity: Majority farmers of Palghar district have less knowledge about importance of biosecurity in sustainable shrimp farming.

Probiotics: The use of probiotics, mainly *Bacillus* and *Lactobacillus*, has led to better shrimp production. Palghar district farmers reported that they started using probiotics from year 2000 onwards from different companies.

Automatic Feeders: Only one farm i.e., ADG shrimp farm at Ratnagiri use automatic feeder for feeding shrimp farm. No shrimp farmers in Palghar district were using automatic feeder for feeding the shrimp.

Biofloc technology (BFT): Though biofloc based farming is widely practiced by shrimp farmers across the world, it has not gained momentum among farmers of Maharashtra. But with awareness, shrimp farmers are having a positive attitude towards adopting biofloc technology in shrimp farming.

Organic shrimp farming: At present there was no farm in Palghar district doing organic shrimp farming.

Profile of shrimp farmers:

Age: It was found that, 52.73% of shrimp farmers were in middle (36-45) age group, 27.27% farmers were in young age group (Upto 35) and 20% farmers belong to old age group (Above 45). The reason may be that, young age persons were seeking jobs in other sector rather than shrimp farming business. This finding is in line with the findings of Pandey and

Upadhayay, 2012 who reported that higher proportion of fish farmers were middle age group.

Educational status: Education is an important socioeconomic factor, which has bearing with understanding and adopting the shrimp culture technologies by shrimp farmers. With regard to educational status of shrimp farmers, it was observed that highest numbers of shrimp farmers (50.91%) were graduate, 29.09% shrimp farmers were with education up to higher secondary level, 16.36% were educated up to secondary level and only 3.64% shrimp farmers had primary education. It was interesting to note that graduates are actively involved in shrimp culture activity.

Experience in shrimp farming (years): It is reported that, shrimp farmers who have acquired knowledge on shrimp culture were more likely to adopt it than those who had not acquired knowledge. The study revealed that higher percentages of shrimp farmers (54.55%) were with experience between six to ten years, which was followed by farmers with 5 years of experience (41.82%) and only 3.64% shrimp were observed with experience above 11 years. Similar findings have been reported in a study done by Dona *et al.* (2016) in Kerala.

Income status: Income is one of the important factor in determining the standard of living of people. Analysis of monthly income levels of the shrimp farmers was done. It was found that, average monthly income of shrimp farmers is Rs. 45000/-. The income levels showed that shrimp farmers were generating higher income than the per capita income of the state as well as India's per capita income. Economic survey (2016). As shrimp farmers are earning more income from this activity, their living conditions improved due to shrimp farming.

Majority of shrimp farmers (85.45%) reported that aqua-company technicians were the main source of information. Fisheries institutions like ICAR-CIFE, MPEDA and College of Fisheries is the second major source of information (56.36%) followed by seminar/workshops organized by feed companies for 54.55% of the sources of information

for 23.64, 20 and 14.55% of the farmers respectively. Printed literature from feed companies and internet/books/articles were the sources of information for 10.91% and 7.21% of shrimp farmers respectively.

Most of the feed technicians were graduates in fisheries science and by virtue of their hands on experience were the major source of information on all technical matters like stocking of seed, feed management, water quality management, health management etc. Fisheries institutions like ICAR-CIFE College of Fisheries and MPEDA are providing technical assistance.

To know about export markets shrimp farmers can use the facility of INFOFISH/MPEDA. Shrimps price is decided by export markets now shrimp farmers can access information of international prices at major markets such as Japan, USA and the EU for two varieties of shrimps over SMS by sending a missed call. The price information to farmers will provide them the current market trends enabling them to take informed decisions on harvest of their produce and this facility is free of charge.

The major risks in shrimp farming reported by shrimp farmers were disease outbreaks, low survival rates, increases in production costs, inconsistent harvest, crop losses etc. Shrimp farmers reported that the motivation to start shrimp farming was by seeing

the success of other shrimp farmers. Additional income from shrimp farming was also a big motivation. However, due to risk involved in shrimp farming business, children do not want to enter in shrimp farming business.

Conclusions:

In order to have a sustainable blue revolution, farmers and the farming systems adopted by them have to be documented and brought into focus. This will help in reshaping the public narrative of aquaculture and also help in designing training and other developmental programmes. The concerns voiced about shrimp aquaculture are many and having transparent business documentations will help in better practices leading to responsible farming thus bringing a balance between business, ethics, social equity and sustainability. Shrimp farmers of Palghar are educated and experienced. With higher percentages of shrimps produced here being exported, this is a right time to make the farmers aware of modern developments in shrimp farming. All farmers use mobile phones for communication and for social networking. But they do not use the apps which are designed for shrimp farming. Farmers are educated and motivated to adopt innovative technologies. Shrimp farmers have obstacles like low survival rates, disease outbreaks, increases in production costs, inconsistent harvest, crop losses on one hand and opportunities on the other.

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