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# KNOWLEDGE LEVEL OF SHRIMP FARMERS IN MAHARASHTRA TOWARDS BETTER MANAGEMENT PRACTICES (BMPS) IN SHRIMP FARMING

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***Abstract:*** Aquaculture is recognized as the best alternative to meet the world's protein demand. Persistent growth of aquaculture sector in recent years would contribute to reducing the fishing pressure on capture fisheries. But, poor farm management by the aqua farmers resulted in low production at farmers' door. Hence, knowledge about Better Management Practices (BMPs) in shrimp farming is a prerequisite for prevention of outbreak of diseases and to get better yield. Hence present investigation was conducted costal districts of Maharashtra to study the knowledge level of shrimp farmers about Better Management Practices. Better Management Practices (BMPs) about brackishwater shrimp farming given by Coastal Aquaculture Authority (CAA) were taken as a base to test the knowledge of shrimp farmers. Data were collected from 151 shrimp farmers with the help of structured interview schedule. The study revealed that over half of the shrimp farmers (69.54%) had medium level of knowledge about BMPs in shrimp farming followed by 15.89% had high level of knowledge and 14.57% had low level of knowledge. It is suggested to implement location specific on-field trainings on BMPs for to enhance the knowledge level and skill sets of shrimp by involving extension agencies and farmer associations.

***Keywords:*** BMPs, Knowledge, Maharashtra, shrimp farmers

## INTRODUCTION

Shrimp aquaculture is playing a vital role in exports and obtaining foreign currency, which is very important to the country to develop economically. Improved technologies are supporting more production within the confined area. Shrimp culture industry has seen many ups and downs during last two decades. Shrimp farming industry was at its peak around 1994 throughout India, but has been collapsed due to White Spot Syndrome Virus (WSSV) after 1995 (Patil *et al*., 2019). In 2008, Indian Government permitted use of Specific Pathogen Free (SPF) stock of *L. vannamei* for culture. Changing the cultured species from *Penaeus monodon* to *Litopenaeus vannamei* resulted in revival of shrimp culture along the coast of Maharashtra, Andhra Pradesh as well as other coastal states. Development of shrimp farming in India grew at a phenomenal rate in the last decade, especially after introduction of *Litopenaeus vannamei* which favoured mushrooming growth of shrimp farming in the country. Because of its high stocking densities and less prone to crowding stress, farmers are stocking the PL (Post Larvae) at very high rate, which leads to stress followed by disease outbreak. Several studies indicate that better knowledge leads to greater adoption of a technology (Pathak & Sasmal, 1992; Sanoria and Sharma, 1983, Somasundaram and Singh, 1978). Therefore, high priority should be given for the dissemination of adequate knowledge about Better Management Practices (BMPs) in shrimp farming so as to ensure sustainable

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shrimp production for the future. Implementing the Better Management Practices (BMPs) can be the better way to get rid of the diseases from the shrimp aquaculture. So, knowledge plays a preliminary role in the adoption of BMPs. Keeping these facts in view the study was conducted to know knowledge level of the shrimp farmers about BMPs.

## METHODOLOGY

The present study was carried out in four coastal districts (Thane-Palghar, Raigad, Ratnagiri and Sindhudurg) of Maharashtra state of India. A structured interview schedule was developed and pre-tested in a non-sampling area to collect information from shrimp framers. Data was collected from randomly selected 151 shrimp farmers. With reference to knowledge, Better Management Practices (BMPs) about brackishwater shrimp farming given by Coastal Aquaculture Authority (CAA) were taken as a base to test the knowledge of shrimp farmers. All the BMPs were listed in consultation with experts. Expert group was formed in such a way which is diverse and had knowledge of shrimp farming. Expert group consisted of academicians (5), extension officers (5), aqua input industry representatives (5), government officials (5) and progressive shrimp farmers (5). A total no. of 23 BMPs was selected based on judgment of experts. The knowledge of each BMPs by shrimp farmers was measured on three-point scale *viz*., two score for complete knowledge, one score for partial knowledge and zero score for no knowledge.

The nature of the study demanded that the respondents should be the persons engaged in *L. vannamei* farming and the priority given to those have at least one year of experience. Every effort was made to elucidate the questions by using translated questionnaire in the local language (Marathi) to get accurate and authentic data from the selected shrimp farmers. Descriptive statistics was employed to interpret the results. Shrimp farmers are classified into three categories as low, medium and high knowledge using mean and standard deviation as measure of check.

## RESULT AND DISCUSSION

### Knowledge level of shrimp farmers about individual BMPs

The results pertaining to knowledge of shrimp farmers according to BMPs in shrimp farming is given in Table 1.

**Table 1: Knowledge level of shrimp farmers about BMPs**

| *BMPs* | *Complete* | | *Partial* | | *No* | |
|---|---|---|---|---|---|---|
| | *No.* | *%* | *No.* | *%* | *No.* | *%* |
| Site selection and pond construction | 58 | 38.19 | 63 | 41.72 | 30 | 20.09 |
| Soil type for construction | 32 | 21.19 | 59 | 39.07 | 60 | 39.74 |
| Soil pH | 32 | 21.19 | 100 | 66.23 | 19 | 12.58 |
| Pond shape | 109 | 72.19 | 30 | 19.87 | 12 | 7.95 |
| Pond preparation | 61 | 40.40 | 77 | **51.21** | **13** | **8.39** |
| Stages of pond bottom preparation | 41 | 27.15 | 97 | 64.24 | 13 | 8.61 |
| Chemical used for correcting soil & water pH | 84 | 55.63 | 54 | 35.76 | 13 | 8.61 |
| Optimal soil pH | 58 | 38.41 | 81 | 53.64 | 12 | 7.95 |
| Water quality management: | 83 | **54.97** | **62** | **40.89** | **6** | **4.14** |
| Minimum water depth | 76 | 50.33 | 75 | 49.67 | 0 | 0.00 |
| Optimal water pH | 76 | 50.33 | 65 | 43.05 | 10 | 6.62 |
| Optimal Salinity | 94 | 62.25 | 44 | 29.14 | 13 | 8.61 |
| Optimal DO | 86 | 56.95 | 63 | 41.72 | 2 | 1.32 |
| Seed selection and stocking: | **52** | **34.44** | **68** | **44.70** | **32** | **20.86** |
| Hatchery for seed purchase | 85 | 56.29 | 37 | 24.50 | 29 | 19.21 |
| Ideal seed size for stocking | 42 | 27.81 | 62 | 41.06 | 47 | 31.13 |
| Test to check health status | 48 | 31.79 | 82 | 54.30 | 21 | 13.91 |
| Stocking density of PL | 33 | 21.85 | 89 | 58.94 | 29 | 19.21 |
| Feed and feed management: | 95 | 62.91 | 45 | 29.58 | 11 | 7.51 |

| *BMPs* | *Complete* | | *Partial* | | *No* | |
|---|---|---|---|---|---|---|
| | *No.* | *%* | *No.* | *%* | *No.* | *%* |
| Method for estimation of feed consumption | 126 | 83.44 | 25 | 16.56 | 0 | 0.00 |
| Daily feeding frequency | 79 | 52.32 | 65 | 43.05 | 7 | 4.64 |
| Feeding trays for 1 ha area | 80 | 52.98 | 44 | 29.14 | 27 | 17.88 |
| Health and Bio-security measures: | **45** | **29.58** | **62** | **41.28** | **44** | **29.14** |
| Method for monitoring shrimp growth | 59 | 39.07 | 79 | 52.32 | 13 | 8.61 |
| Mandatory farm area for ETS | 31 | 20.53 | 30 | 19.87 | 90 | 59.60 |
| Biosecurity measure for bird prevention | 44 | 29.14 | 78 | 51.66 | 29 | 19.21 |
| Harvesting and post-harvest management: | **32** | **21.41** | **63** | **41.50** | **56** | **37.09** |
| Hrs to stop feeding prior harvesting | 40 | 26.49 | 70 | 46.36 | 41 | 27.15 |
| Ice and shrimp proportions | 29 | 19.21 | 72 | 47.68 | 50 | 33.11 |
| Things for deciding harvesting | 28 | 18.54 | 46 | 30.46 | 77 | 50.99 |

The results revealed that in site selection and pond construction, 41.72% of shrimp farmers had partial knowledge while 38.91% had complete knowledge. Among site selection and pond construction, 72.91% shrimp farmers found with complete knowledge regarding ideal shape of pond followed by 66.23% farmers with partial knowledge of soil pH.

Under pond preparation, 51.21% shrimp farmers had partial knowledge while 40.40% had complete knowledge. In this section, 64.24% farmers were with partial knowledge regarding stages of pond bottom preparation. Around 55.63% shrimp farmers were with complete knowledge about type of chemical used for correcting soil pH, while 53.64% shrimp farmers with optimal knowledge about optimal pH.

Around more than half of shrimp farmers (54.97%) had complete knowledge in BMP of water quality management followed by 49.80% had partial knowledge. In this BMP, 62.25% shrimp farmers were having complete knowledge about optimum level of salinity to be maintained in pond.

Under seed selection and stocking, 44.70% shrimp farmers had partial knowledge followed by 34.44% farmers had complete knowledge. A total of 58.94% shrimp farmers were having partial knowledge regarding stocking density of post larvae to be maintained in culture pond.

The results revealed that, 62.91% shrimp farmers had complete knowledge about feed and feeding management while 29.58% shrimp farmers had partial knowledge. In this section, 83.44% shrimp farmers were having complete knowledge about method to be used for estimation of feed consumption by shrimps.

In health and biosecurity measures, 41.58% shrimp farmers had partial knowledge, while 29.58% shrimp farmers had complete knowledge. Under this BMP, 52.32% shrimp farmers were having partial knowledge about method to be used for monitoring growth and health of shrimp. Around 59.60% shrimp farmers were unaware about establishment of ETS.

Results revealed that, 33.77% shrimp farmers had partial knowledge about harvest and post-harvest management while 44.59% shrimp farmers had no knowledge on harvesting and post-harvest management. Under this section, 60.26% shrimp farmers were having no knowledge regarding things to taken in to consideration while deciding harvesting.

The classification of shrimp farmers according to knowledge about BMPs in shrimp farming is given in Table 2. It was observed that a total of 69.54% of shrimp farmers had medium knowledge about BMPs in shrimp farming whereas, 15.89% had high level of knowledge followed by 14.57% with low level of knowledge.

**Table 2: Classification of shrimp farmers according to knowledge categories**

| *Knowledge categories* | *Nos* | *%* |
|---|---|---|
| Low | 22 | 14.57 |
| Medium | 105 | 69.54 |
| High | **24** | **15.89** |

The results revealed that, majority of shrimp farmers (69.54%) in Maharashtra had medium knowledge about the recommended BMP

practices. Maiti *et al*. (2016) in his study in West Bengal reported that maximum number of shrimp farmers (75.00%) were in medium knowledge group. On the contrary, Salunkhe (2018) while studying shrimp farmers of North Konkan region (Thane, Palghar and Raigad districts) reported that maximum number of shrimp farmers (83.02%) were in high knowledge group. Mohite (2007) has also reported that 89.48% of shrimp farmers in Raigad district, Maharashtra were with high knowledge. The results of present study are in accordance with results reported by Maiti *et al*. (2016). Similarly results reported by Rawool (2005), Sathe (2008) as well as Kappen and Thomson (2009) are also in accordance with results recorded in the present study.

It seems that shrimp farmers from the North Konkan region were with high knowledge (Mohite, 2007; Salunkhe, 2018), while shrimp farmers from South Konkan region with medium knowledge (Rawool, 2005). The present study encompasses shrimp farmers from whole Konkan region and therefore the results recorded in the present study as shrimp farmers with medium knowledge seems to be correct.

The maximum number of shrimp farmers knowledge about BMPs in shrimp farming was medium. The reason behind medium knowledge about such BMPs may be due to the fact that maximum numbers of shrimp farmers were unaware of the BMPs used during shrimp farming as their level of participation in different training programmes may be less.

## CONCLUSIONS

The results of the study indicated that majority of the shrimp farmers had medium level of knowledge. Knowledge is an important input for the adoption of technology by the aqua farmers. The study has indicated that shrimp farmers need to enhance their capacities on BMPs of *L. vannamei* farming. The state Department of Fisheries (DoF) and farmer associations should involve central and state research institutions, fisheries colleges to implement location specific on-field trainings on BMPs in shrimp farming for shrimp farmers as well as field level fisheries extension workers to enhance the knowledge level and skill sets of farmers.

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