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Constraints faced by shrimp farmers in compliance to CAA act, rules and guidelines: A study from North Konkan, Maharashtra

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Abstract

The Coastal Aquaculture Authority (CAA) act, rules and guidelines promote sustainable coastal aquaculture practices to safeguard the livelihoods of coastal communities. The act, rules and guidelines given by CAA was used as base frame to know the constraint faced by shrimp farmers in compliance to CAA. Information was collected randomly from 108 shrimp farmers with help of well-structured interview schedule. Descriptive statistics were used to analyse the constraint faced by shrimp farmers. Results indicated that the major constraint faced by cent percent shrimp farmers in compliance to CAA guidelines include use of aerator only during emergency and last two month of culture, less knowledge regarding required HP aerator per hectare and application of excess cow dung leads to more algal bloom. The study provides insights into the prevailing conditions of brackishwater shrimp farming in the North Konkan region of Maharashtra. Conclusively, urgent preventive measures are imperative to ensure the sustainability of shrimp culture in North Konkan region of Maharashtra.

Keywords: Constraint, shrimp farmers, compliance, CAA guidelines, Maharashtra

Introduction

Aquaculture is the fastest growing food production sector in the world. Brackishwater aquaculture sector in India is largely focused on shrimp farming, which is a major economic driver for the industry. The world's total cultured shrimp production is 6.52 million tons (FAO, 2022), ^[1] and China is at top position (13.50 lakhs tons), while India stands at second position with production of 10,16,717 MT (MPEDA, 2022) ^[2].

Among all the coastal states, Andhra Pradesh ranks first with a total production of 7,88,708 MT followed by West Bengal with total production of 69,595 MT (MPEDA, 2022) ^[2]. Maharashtra ranked sixth in terms of cultured shrimp production with production of 4,777 MT during 2021-22 (MPEDA, 2022) ^[2].

Shrimp farming is a promising and one of the important economic activities. 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 collapsed due to White Spot Syndrome Virus (WSSV) after 1995. The giant tiger shrimp, *Penaeus monodon*, has been the most farmed shrimp across the world until 1995. In 2009-10, 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 coastal states in India.

L. vannamei farming has several risks due to poor farm management. Unless the production risks are identified, ably prevented and managed efficiently at the initial stages, the sustainability of *L. vannamei* farming will be at stake. Farmers are also encountering challenges due to lack of quality seeds, inbred brood stock, seeds from unregistered hatcheries, expensive feed, banned antibiotics, container rejections, traceability issues, unregistered farming, and fluctuations in international market prices (Srinivas *et al.*, 2019) ^[6].

The Coastal Aquaculture Authority (CAA) in India oversees and establishing Act, Rules and guidelines for shrimp farming in coastal regions. These Act, Rules and guidelines promote responsible coastal aquaculture practices to safeguard the livelihoods of coastal communities. Sustainable shrimp farming requires compliance about CAA Act 2005, CAA Rules and CAA guidelines.

In this backdrop, the present study aims at exploring the constraints faced by the shrimp farmers in compliance of CAA Act 2005, CAA Rules and CAA Guidelines. Understanding these constraints holds significant

importance in the development and refinement of technology for the shrimp farming sector (Swathilekshmi *et al.*, 2008) [7].

The current research aids shrimp farmers and policymakers in tackling constraints comprehensively, enabling them to implement prompt preventive measures for the sustainable management of shrimp farming.

Materials and Methods

Maharashtra is one of the important coastal state contributing significantly in fisheries sector along the west coast of India. The state of Maharashtra includes seven coastal districts viz. Palghar, Thane, Greater Mumbai, Mumbai suburban, Raigad, Ratnagiri and Sindhudurg popularly known as 'Konkan region'. In this investigation, North Konkan region comprising Palghar and Raigad district was selected for the study as these districts contribute significantly in shrimp production.

North Konkan region (Palghar and Raigad district) has 198 registered shrimp farms. From this registered shrimp farms, 108 shrimp farms were randomly selected for the study. Out of that, 58 shrimp farms from Palghar and 50 shrimp farms

from Raigad district were selected randomly.

Constraints faced by shrimp farmers in compliance to CAA Act, 2005, CAA Rules, 2005 and Guidelines

Under this section, constraint faced by shrimp farmers in compliance of CAA Act, 2005, CAA Rules, 2005 and Guidelines were recorded by using open ended questions. The constraints were then categorized into three sub heads viz., constraint in compliance of CAA Act, 2005, constraint in compliance of CAA Rules, 2005 and constraint in compliance of Guidelines given by CAA. The constraints were ranked by using percentage analysis.

Results and Discussions

Constraints faced by shrimp farmers of North Konkan Region in compliance of Act, Rules and Guidelines given by CAA

This section covers the constraint faced by shrimp farmers in North Konkan region (i.e., Raigad and Palghar district), Maharashtra for compliance of CAA Act, 2005, CAA Rules, 2005 and Guidelines given by Coastal Aquaculture Authority.

Table 1: Constraints faced by shrimp farmers in compliance of Act, Rules and Guidelines given by CAA (N = 108)

Sr. No.	Constraint faced by shrimp farmers	Percentage (%)
A Constraint faced by shrimp farmers in compliance of CAA Act, 2005		
1	More pumping cost is required to maintain the distance (200 mtr.) between farm and high tide line	94.44
2	Exact period of sending application for renewal of farm registration after expiry of registration is not known	56.48
3	Shrimp farm registration process is time consuming	33.33
4	Seeking permission for culture of <i>Litopenaeus vannamei</i> farming is time consuming process	33.33
B Constraint faced by shrimp farmers in compliance of CAA Rule, 2005		
1	Shrimp farms are already constructed near to mangrove areas	81.48
C Constraint faced by shrimp farmers in compliance of Guidelines		
1	Use of aerator only during emergency and last two month of culture results in less growth and survival. There is need of continuous supply of aeration.	100
2	Less knowledge regarding required HP aerator per hectare	100
3	Application of excess cow dung leads to more algal bloom	100
4	Shrimp farmers directly storing shrimps in ice without beheading.	100
5	More area and cost are required for construction of ETS	91.67
6	Zero water exchange system not known to shrimp farmers	85.19
7	Shrimp farmers using drag net for partial harvesting only and not for complete harvesting as it is time consuming process.	85.19
8	Organic biodegradable piscicides permitted to kill unwanted organism from pond is not known to shrimp farmers	79.63
9	Not retaining harvested water for three days for settlement of suspended particle of waste as it is time consuming process	74.07
10	Not able to maintain required water spread area to total area of farm and less space will remain for pond construction	54.63
11	Higher cost for implementation biosecurity measures. Shrimp farmers only implementing crab fencing for shrimp farm	53.70
12	Shrimp farmers not doing PCR testing to know the health of shrimp	35.19
13	Shrimp farmers not treating water during filling of water in pond	34.26
14	More cost is required to construct separate inlet and outlet structure for permitting control of water filling and draining	22.22
15	Not following strict disease treatment to restrict the spread of disease	16.67
16	Two shrimp farms are adjacent to each other (less than 20 mtr distance between two adjacent shrimp farm)	12.04

Constraint faced by shrimp farmers in compliance of CAA Act, 2005

Result revealed that, more pumping costs incurred to maintain specific distance (200 meter) between the farm and the high tide line was the major constraint faced by majority of shrimp farmers for compliance of CAA Act, 2005. This was followed by exact period of sending application for renewal of farm registration after expiry of registration is not known to majority of shrimp farmers (56.48%). Around, 33.33% of shrimp farmers reported that, shrimp farm registration process is time consuming as well as obtaining

permission for culture of *Litopenaeus vannamei* is also time-consuming process.

Salunkhe (2018) [5] found that 67.92% of shrimp farmers lacked technical knowledge in shrimp farming and 66.04% faced the challenge of high initial investment. Patil and Sharma (2020) [4] identified that the primary financial constraint for shrimp farmers was the limited availability of credit facilities. According to Naik *et al.* (2020) [3], the absence of a minimum support price was a significant marketing constraint in shrimp farming. Tank *et al.* (2019) [8] reported that 66.05% of respondents encountered credit-

related issues, while 79.53% experienced a lack of financial support. The high cost of some items required in farming and insufficient knowledge about CAA Act may be the constraints for compliance with the CAA Act, 2005 in the shrimp farming.

Constraint faced by shrimp farmers in compliance of CAA Rule, 2005

The results revealed that, shrimp farms had already constructed near to mangrove areas was the constraint faced by majority of shrimp farmers (81.48%) for compliance of CAA Rule, 2005.

Naik *et al.* (2020) ^[3] reported that mangrove degradation was one of the environmental constraints faced by shrimp farmers. Tank *et al.* (2019) ^[8] found that the non-availability of land near the seashore was a major management constraint, with 89.30% of respondents facing this issue. Salunkhe (2018) ^[5] reported that 71.70% of respondents faced constraints in establishing shrimp farms. Less availability of cultivable land for farming and some challenges in establishing shrimp farms contribute significantly to the compliance with the CAA Rule, 2005.

Constraint faced by shrimp farmers in compliance of guidelines

Major constraint faced by cent percent shrimp farmers in compliance of guidelines were use of aerator only during emergency and last two month of culture results in less growth and survival, less knowledge regarding required HP aerator per hectare, application of excess cow dung leads to more algal bloom and practice of directly storing shrimps in ice without beheading for saving time. A higher percentage of shrimp farmers (91.67%) reported constraints related to the non-construction of ETS, as it required more area and cost. Around, 85.19% shrimp farmers had constraint of no knowledge about zero water exchange system and more time requirement for harvesting by using drag net. Almost 79.63% of shrimp farmers faced constraints due to less knowledge about use of organic biodegradable piscicides to kill unwanted organism from pond. Almost, 74.07% shrimp farmers had constraints related to the time-consuming process for retaining harvested water for settling suspended particles. Unable to maintain required water spread area to total farm area as less space for pond construction as reported by 54.63% shrimp farmers. Around 53.70% of shrimp farmers had constraint regarding higher maintenance cost for biosecurity implementation. Other constraints faced by shrimp farmers in compliance of guidelines were less knowledge about PCR testing to know shrimp health, unaware about treating water during filling water in pond, requirement of more cost for construction of separate inlet and outlet, less knowledge about strict disease treatment to restrict spread of diseases and less knowledge about maintaining 20 meter distance two adjacent farms.

Tank *et al.* (2019) ^[8] identified the lack of a disease diagnosis lab (97.21%) as the foremost infrastructural constraint in shrimp farming. Additionally, a high rate of chemicals and medicines, putting a financial burden on 82.33% of shrimp farmers, was noted as a significant economic constraint, with 46.05% of the farmers also encountering biosecurity issues as an environmental constraint. Naik *et al.* (2020) ^[3] reported that the failure to

follow biosecurity measures was a constraint in production. Salunkhe (2018) ^[5] reported that 66.04% of farmers experienced challenges due to the high rates of chemicals and medicines.

Conclusions

The study highlighted the constraint faced by brackishwater shrimp farmers in the North Konkan region of Maharashtra, resulting in substantial economic losses. Study suggested to address the major constraint faced by cent percent shrimp farmers in compliance of guidelines such as use of aerator only during emergency and last two month of culture, less knowledge regarding required HP aerator per hectare and application of excess cow dung leads to more algal bloom. Effectively navigating constraints necessitates comprehensive examination across all dimensions of the challenge, underscoring the imperative of integrated methodologies in crafting best solution on them. Incorporating these considerations into policy-making is crucial for fostering a holistic approach that aligns with the diverse needs in the shrimp farming sector.

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