Fishery Technology 51 (2014) : 130 - 135

Impact of Aqua Societies on Shrimp Farming in Andhra Pradesh, India

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Abstract

This paper examines the impact of aqua societies on shrimp farmers in Andhra Pradesh, India. The study utilized primary data obtained from 180 shrimp farmers residing in six districts and examined the impact of aqua societies on shrimp farmers. The impact of aqua societies was analysed in terms of enhanced yield, reduced disease occurrences, increased income, employment, education, standard of living and reduced health risks. Analysis showed significant differences in the impact of aqua societies on shrimp farmers after formation of aqua societies in six districts. Lack of good quality seed, marketability and cold storage facilities were some of the constraints faced by the farmers. This paper highlights the need for broad stakeholder involvement and for providing the right incentives to producers such as reduced costs, improved production, access to information and diagnostic services and higher market price for BMP (Best Management Practices) products. This aqua society model is good to overcome the risk factors in shrimp farming and the model could be made sustainable with government support in future.

Keywords: Shrimp farmers, aqua society, social impact, economic impact, technical impact

Received 11 August 2013; Revised 28 February 2014; Accepted 01 March 2014

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Introduction

Shrimp industry is a key sector in India's economy, owing to its significant contribution to export earnings and gainful employment. Cultured shrimps in the country contribute to 50% of the total shrimp exports from India. It also has immense potential as a foreign exchange earner. Among all the states of India, Andhra Pradesh ranks first in culture shrimp production with a production of 39 537 Mt (MPEDA, 2011). The potential area available for brackishwater aquaculture in Andhra Pradesh is around 0.15 million ha with a network of 172 brackishwater bodies in nine coastal districts (Anon, 2012) accounting for 12.6% of the total potential area in the country (1.2 million ha). Out of the total potential area, around 59 000 ha (56.63%) has been developed for shrimp farming (MPEDA, 2011) in Andhra Pradesh. During the year 2010-11, India's shrimp production was estimated to be around 95 918.89 Mt from an area of 1 02 259.98 ha (MPEDA, 2011). The value of shrimp produced during the year is estimated as Rs. 23.98 billion, which has registered an increase of Rs. 6.88 billion over the previous year (2010-2011) (MPEDA, 2011). Still a lot of scope exists to increase the shrimp production by adopting Best Management Practices (BMPs).

Indian shrimp farming industry has been facing challenges like, environmental, social and disease outbreaks. Outbreaks of shrimp diseases *viz.*, White Spot Disease, Yellow Head Disease, and Taura Syndrome have caused devastating economic damage to the sector worldwide. Since commercial shrimp farming began in early 1980s, small-scale farmers found it difficult to produce a profitable crop because of disease related losses and the slump in market price. They struggle hard to meet the quality and safety requirements of international markets. So to overcome these problems, it is very essential to adopt BMPs for eco-friendly and sustainable shrimp farming. So in this regard, the Marine Products Export Development Authority (MPEDA), in association with the Network of Aquaculture Centers in Asia-Pacific (NACA), Bangkok, Thailand, an intergovernmental organization, has been implementing the aqua societies for

the last six years to support shrimp farmers in India to adopt BMPs for disease control, coastal management and sustainable farming (Corsin et al., 2008). The MPEDA/ NACA project was started during 2001 in Andhra Pradesh. The main objectives were to find the important risk factors for shrimp disease outbreaks and to develop BMPs in order to control diseases and encourage farmers to form aqua societies to implement BMPs at village cluster level. In 2002, demonstrations were conducted in five selected private farms, of two villages in West Godavari and Nellore districts of Andhra Pradesh. In 2004, 130 farmers with 254 ponds were assisted to organize into seven aqua clubs in Andhra Pradesh and BMPs were promoted at cluster levels (Umesh, 2007). The project has made significant progress, with the number of farmers adopting the cluster management approach farming grown exponentially from five farmers in 2002 (covering 7 ha in 1 coastal state) to 7 402 farmers in 312 societies (covering 8 616 ha in four other coastal states). During 2002-04, the shrimp production increased from 4 to 160 t under the NACA project (Muralidhar et al., 2010). By considering the above positive signs after formation of aqua societies, individual impact on farmers after formation of aqua societies has not been studied so far. Thus the present study is an attempt to assess the impact of aqua societies on shrimp farmers in Andhra Pradesh.

Materials and Methods

The present study was carried out in six selected coastal districts in Andhra Pradesh during 2011-12. Since these districts are having more area under shrimp production, a purposive sampling was done for the selection of locale. From each of the selected districts, thirty respondents were selected such that a total sample size of 180 respondents were selected for the study. Majority of the respondents selected were small scale farmers having one to two ha of culture area. Scores were given to each category of impacts studied based on the score obtained by individual farmer. The statistical tests like, mean, percentage analysis and paired't' test using SPSS software were used to analyse the data. Cumulative perception index (CPI) developed by Paulpandi (2000) was used to identify the major constraints faced by aqua farmers. Impact of aqua society on shrimp farmers was analysed under three major headings viz., technical, social and economic impacts. Various parameters were included under the major headings after pre-testing by experts in relevant field. The constraints were ranked based on a cumulative index CPI, which was worked out by finding out the ratio of cumulative score of each items to the total number of responses (Paulpandi, 2000).

Results and Discussion

The socio-personal profile of the respondents is given in Table 1. About 41.67% of the farmers belonged to the age group of 36-45 years with mean age of 39.83 followed by 32.77% belonging to above 45 years (47.62±2.73). About 51.11% of the farmer respondents had primary education in the study area while Swathilekshmi et al. (2005) reported that only 30% of shrimp farmers had primary education in Andhra Pradesh. Half of (52.78%) them had an experience of 11 to 20 years (14.15±2.06). Most of the farmers in the study areas had nuclear family (77.78%). Cyril et al. (2013) documented that 68% of the shrimp farmers had nuclear family. About 66.67% respondents had small family consisting of less than five members. All the farmers in the society were members of the association. Each society consists of 20-25 farmers and all the members had to register their farms with the Coastal Aquaculture Authority and the members contribute an admission fee of Rs. 1,000. The details of aqua societies are given in Table 2, which indicates among all districts, Krishna district has maximum number of societies as well as culture ponds.

All the farmers reported that the frequency of disease occurrences decreased (100%) after becoming member in the aqua society (Table 3). It may be due to the adoption of BMPs in cluster basis by following the similar crop calendar, but before becoming member, they were not used to follow the BMPs, which is very much essential in shrimp farming to get profitable crop. Majority (91.66%) of the respondents reported that they did not adopt any scientific method of farming before becoming the member, but afterwards, all of them have used the scientific technologies. Majority (85%) of the respondents reported that before becoming member they did not participate in any of the social activities where they can share the farming related information but later they joined the societies and discussing about the culture practices, so they were getting timely information related to farming. These findings are in line with the findings of Perumal et al. (1992). Majority (83.33%) of them reported that their knowledge level increased after becoming member

Table 1. Profile of the respondents

Parameters	Category	Frequency	Mean ± Standard Deviation (SD)
Age (in years)	Below 25	3 (1.67)	22.66±1.56
	26-35	43 (23.89)	29.65±2.50
	36-45	75 (41.67)	39.83±2.81
	Above 45	59 (32.77)	47.62±2.73
Education	Primary	92 (51.11)	-
	Middle	45 (25)	-
	High school	29(16.11)	-
	Higher secondary	10 (5.56)	-
	Collegiate	4 (2.22)	-
Experience (in years)	Up to 10	70 (38.89)	5.95±2.67
	11-20	95 (52.78)	14.15±2.06
	Above 20	15 (8.33)	23.33±1.63
Family type	Nuclear	140 (77.78)	-
	Joint	40 (22.22)	-
Family size	Small family	120 (66.67)	-
	Big family	60 (33.33)	-

(Figures in paranthesis indicate percentages)

Table 2. Basic data of aqua societies in Andhra Pradesh

District	Societies (No.)	Ponds (No.)	Farmers (No.)	Area (ha)
Sri Kakulam	15	303	236	270.1
East Godavari	119	3201	2471	2577.5
West Godavari	118	2782	2143	1878
Krishna	150	5633	3615	3851.4
Guntur	78	2907	1743	1600.5
Prakasam	20	736	574	512.7
Nellore	55	2037	1291	1041.6
AP Total	555	17599	12073	11731.8

(Source- MPEDA, NaCSA, 2010)

and 73.88% stated that the adoption of farm equipments such as aerators, water kit analysis and bag feeding increased, due to adoption of BMPs which require sophisticated inputs to carry out the culture practices.

About 91.66% of the farmers reported that there was increasing cooperation among farmers (Table 4), may be due to the reason that, BMPs will be of much use only if it is done on co-operative basis (or) in cluster basis, but before formation of aqua society, the cooperation among farmers was very low, may be due to internal conflicts. After becoming member, they participated in many of the social participation activities. More than 70% of the respondents stated that they had more social infrastructure facilities like extension agency contact, social participation

Table 3. Technical impact of aqua societies on shrimp farmers

Parameter	After becoming member of aqua society		
	I	D	N
Frequency of disease occurrences	-	180 (100)	-
Implementation of science based plans	170 (94.44)	-	10 (5.55)
Information on cultural practices	160 (88.88)	-	20 (11.11)
Knowledge regarding farming	150 (83.33)	-	30 (16.66)
Adoption of farm equipments	133 (73.88)	47 (26.1)	-

(I=Increased, D=Decreased, N=No change; Figures in parentheses indicate the percentage)

Table 4. Social impact of aqua society on shrimp farmers

Social parameters	After becoming member of aqua society		
	I	D	N
Decision making	163 (90.55)	-	17 (9.44)
Co-operation	165 (91.66)	-	15 (8.33)
Social infrastructure facilities	133 (73.88)	-	47 (26.11)
Social participation	151 (83.88)		29 (16.11)
Extension agency contact	134 (74.44)		46 (25.55)
Leadership	73 (40.55)	-	97 (53.88)
Litigation	-	170 (94.44)	10 (5.55)
Labour availability	75 (41.66)	63 (35)	42 (23.33)
Standard of living	88 (48.88)	-	92 (51.11)

(I=Increased, D=Decreased, N=No change; Figures in parentheses indicate the percentage)

etc after becoming member in the aqua society. About 48.88% of them opined that their standard of living had improved after becoming member in the society in terms of income. Whereas no one has reported that standard of living has decreased after becoming member, which is a positive outcome after formation of aqua societies. Before formation of societies, majority (86.11%) of the farmers reported that there were some litigation on the resource use of land and water, but later it had decreased since adoption of BMPs should be done in cluster basis. So every farmers work in group with good understanding by following similar crop calendar, hence farmers reported, formation of these aqua societies has erased all the internal conflicts.

All the farmers reported increase in production after becoming member in the society (Table 5). More than 90% reported that their annual income has increased. Majority (88.33%) of them reported that quality of product has increased, but before, the quality was very low such that farmers cannot sell their products. There was increase in land utilization pattern (66.66%) and financial assistance (88.33%). After becoming members of the society, the farmers had mostly adopted the BMPs which lead to increase in production. Since the production has increased, this would have lead to an increase in annual income. These results are in line with Tanmoyee (2009) where the nominal income of the group members has increased after joining the Self

Table 5. Economic impact of aqua societies on shrimp farmers

Economic parameters	After becoming member of aqua society		
	I	D	N
Production	180 (100)	-	-
Total annual income	168 (93.33)	12 (6.66)	-
Product quality	159 (88.33)		21 (11.66)
Land utilisation	120 (66.66)	33 (18.33)	27 (15)
Financial assistance	159 (88.33)	-	21 (11.66)
Market pattern	-	-	180 (100)
Family expenditure	155 (86.11)	25 (13.88)	-
Savings	138 (76.66)	-	-
Food security	83 (46.11)	67 (37.22)	30 (16.66)
Loan repayment	-	-	180 (100)

(I=Increased, D=Decreased, N=No change ; Figures in parentheses indicate the percentage)

Help Groups (SHGs) and that has increased their real income also. As the farmers had adopted regular feeding schedule and other water quality parameters, the quality of product would have improved. The increase in production might lead to utilization of more land for shrimp culture. As there is a lack of credit facility for shrimp farming, they would not have reported any change in loan repayment. All farmers reported that there was no change in market pattern before and after formation of aqua society. Farmers were producing tonnes of shrimp but there is price fluctuation in the market for the produce which affects their income. This was the major constraint faced by farmers, which needs to be improved.

Table 6. Constraints encountered in farmer's perspectives

Sl. No.	Constraints	Cumulative perception index	Rank
1	Lack of good quality seed	2.8	1
2	Lack of cold storage facilities	2.31	2
3	Cost of feed is high	2.29	3
4	Marketability	2.26	4
5	Price fluctuation	2.25	5
6	No subsidy for electricity	2.10	6
7	No crop insurance	1.82	7
8	Less financial assistance	1.79	8

Table 6 indicates the constraints faced by farmers. The most important constraint from the farmers' perspective was lack of good quality seed and the same was reported by Das et al. (2014). The farmers perceived that lack of cold storage facilities was the second important constraint in shrimp aquaculture due to which the farmers were not getting proper price for their produce. The third and fourth ranked constraints were high cost of feed and marketability respectively, whereas Das et al. (2014) ranked high cost of feed as the fifth important constraint and ranked marketability as the first constraint. Lack of financial assistance was ranked as the eighth constraint while Das et al. (2014) ranked it as the second constraint.

The small scale farmers are innovative and productive, but because of poor organization and less cooperation among farmers, they are vulnerable to the numerous risks and hazards that affect their livelihoods and farm productivity (Cyril et al., 2013). Hence, the farmers were grouped together through cluster approach to overcome the issues of poor production skills, market access etc and these clusters are institutionalised in the form of aqua societies. The present study suggested the need for broad stakeholder involvement and incentives to farmers for quality seed procurement, improved cold chain management, minimizing production cost, access to market, policy intervention for stabilizing shrimp price and institutional support for technology dissemination and credit support.

Acknowledgements

The authors are deeply grateful to the Central Institute of Fisheries Education, Mumbai for providing financial support for this research, and also thankful to MPEDA officials and farmers for giving the accurate information about aqua societies which helped to bring acceptable results.

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