21 CONTRIBUTING FACTORS FOR SHRIMP YIELD IN ANDHRA PRADESH

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Abstract

The farmers have undertaken shrimp farming enterprise with great zeal in coastal regions, in view of its high profitability in short period of time. A study was conducted during June 1998 in the Prakasam District of Andhra Pradesh to ascertain various factors contributing to high shrimp yield. The coastline of the district is 102 km spread over 10 mandals. The clayey soils constitute about 41% of the District. Area found suitable for shrimp farming in 6000 ha. The total brackishwater area brought into culture in Prakasam District was 5105.04 ha of which 4084.03 ha was the water spread area. The 1707 shrimp farmers own a total of 5042 shrimp ponds in the district. Extensive type of farming using creek water with *P. monodon* as a major species is the predominant system in the district.

A sample of 20 respondents were contacted for investigation in nine coastal mandals of Prakasam District. The correlation analysis revealed that the type of farming, feed intake, stocking rate, educational level of farmers and application of lime have significant influence on shrimp yield. It is also found that occupation of the respondents is negatively correlated with shrimp yield indicating that the farmers may not be engaged in aquaculture as a primary occupation. The regression analysis was also carried out. The R^2 value is 0.91, which indicates that the model explains 91 percent of variation is dependent on variable viz. Shrimp yield. The educational status of respondents was found to be the major influential factor in obtaining high yielding shrimp farming practices. It was also found that there was a need for better utilization of shrimp feed for optimum output.

Introduction

The shrimp being a significant contributor of nutritional security, employment generation and foreign exchange, the farmers have undertaken this enterprise with great zeal in the coastal region of the maritime States in view of its high profitability in short period of time. The proportion of fish eating population of India is likely to increase from 39.7 percent(1996-97) to at least 50 percent by the year 2020 for the population of 650 millions (Ninawe, 1999). The coastal wastelands are being very effectively utilised in States like Andhra Pradesh, Tamil Nadu, Gujarat, Maharashtra, etc., for shrimp farming activities which will ultimately result in poverty alleviation and contribute substantially to rural development in the country.

The area and production under brackishwater aquaculture in India registered a phenomenal growth from 65100 hectares in 1991 to 1,41,591 hectares in 1997-98 with

production increasing from 35,500 to 66,868 metric tonnes of shrimp during the same period of time. The share of aquaculture shrimps in the Indian shrimp exports went up from 33.72 per cent in 1989-90 to 43.04 per cent in 1997.98.

The shrimp farming continues to receive wide attention from the Andhra Pradesh farmers due to its export orientation and shorter culture period. Area under brackishwater aquaculture increased from 6000 hectares to 66,290 hectares and production from 7350 to 34,075 tonnes in Andhra Pradesh during 1991 to 1998. A study was conducted during June 1998 in the Prakasam District of Andhra Pradesh to ascertain various factors contributing to levels of yield under the project in Extension, Economics and Information Division of CIBA.

Shrimp farming in Prakasam District

There are 56 mandals in the district out of which 10 are coastal based. The sea breeze of the coastal mandals renders the climate moderate both in winter and summer in the coastal area of the district. The maximum and minimum temperatures are 38.2° C and 19.7° C respectively. The normal rainfall of the district is 750.99 mm and clayey soils constitute about 41.00% of the district. The coastline of the district is 102 km.

The Buckingham Canal is connecting several rivers which drains into Bay of Bengal providing extensive brackishwater area of 6000 ha. The total brackishwater area brought into culture in Prakasam District was 5105.04 ha of which 4804.03 ha was the water spread area. The 1707 shrimp farmers own a total of 5042 shrimp ponds in the district. There are 14 working hatcheries, one feed mill and 2 processing plants in the district.

Extent: Of the 10 coastal mandals in the district, shrimp farming is going on in 9 mandals (Fig.1). The details regarding number of farmers holding the extent of above 5 ha land and below 5 ha land are presented in Table 1.

TABLE 1. *Farm size-wise distribution of shrimp farmers*

Name of the mandals	No. of farmers (<5 ha)	Total farm area (in ha)	No. of farmers (>5 ha)	Total farm area (in ha)
Gudluru	41	66.76	8	105.80
Ulavapadu	17	51.10	10	189.92
Tangutur	30	84.40	27	610.00
Singarayakonda	18	48.50	5	57.50
Kothapatnam	188	220.74	19	644.80
Ongole	333	355.06	23	477.00
Naguluppaladu	75	91.80	15	319.00
Chinaganjam	715	766.22	69	672.00
Vetapalem	31	84.01	21	244.87
Total	1516	1768.59	191	3336.45

Source : Office of Assistant Director of Fisheries, Ongole, Prakasam District, A.P.(1998).

Table 1 shows that there are 1707 shrimp farmers in the district. About 35 per cent of total brackishwater land is possessed by small farmers who constitute 89 per cent of total shrimp farmers and remaining 65 percent of land is held by 11 per cent of shrimp farmers. Similar trends in Tamil Nadu were reported by Nagoor Meeran (1999) that 86 per cent of shrimp farmers operated farms of sizes ranging from 0.4 ha to 4.0 ha and for 58.0 per cent of respondents, the farm size ranged from 0.4 ha to 2.0 ha only. It is observed that big shrimp farmers expanded their activities and covered the major portion of shrimp farming area which may be due to economics of scale, high rate of return and short crop period. Rastogi (1995) revealed that 80.0% of shrimp culture was undertaken by small farmers owning farms with an extent of 2.0 to 5.0 ha.

Culture

Sixty five per cent of shrimp farms surveyed were of extensive type of farming and remaining were of semi-intensive type. The creeks were the major water source. Small farmers followed extensive/modified extensive method with stocking density of 40,000 to 50,000 numbers per hectare of *Panaeus monodon.* The corporate and big farmers who undertook semi-intensive culture stocked 1,50,000 to 2,00,000 seeds/ha. On an average the farmers supplemented with 800 kg of feed/ha for semi-intensive farming with the frequency of feeding ranging from 2-4 times per day. The farmers harvested a yield of 600 kilograms to 2.5 tonnes/ha depending upon the type of culture and fetched

the price range of Rs.320 to 480 per kg depending on the count and season.

Research methodology

The study was conducted in 9 coastal mandals of Prakasam District of Andhra Pradesh. Twenty shrimp farmers were selected for investigation. The major objective of the study was to find out the factors, which contribute for shrimp yield in the district. The shrimp yield (y) was identified as the dependent variable and stocking rate of species (X1), level of consumption of feed (X2), application of lime (X3), educational status of shrimp farmers (X4), type of farming (X5) and occupation of farmers (X6) were used as independent variables. The correlation and regression analyses were carried out to study the contributing factors.

Relationship of shrimp yield with other variables

The correlation analysis was carried out to find out the linear relationship between different variables. The correlation results are presented in Table 2.

TABLE 2. *Matrix of Correlation between different variables*

Variables	Y	X1	X2	X3	X4	X5	X6
Y	1						
X1	0.883191	1					
X2	0.909447	0.969994	1				
X3	0.696412	0.675924	0.704873	1			
X4	0.858723	0.790804	0.791935	0.472638	1		
X5	0.922305	0.952514	0.994159	0.696969	0.797366	1	
X6	-0.40285	-0.38148	-0.42612	-0.53812	-0.29277	-0.42366	1

The type of farming, level of consumption of feed, stocking rate, educational status of respondents and application of lime have strong correlation with shrimp yield (Table 2). It is also found that occupation of the respondents is negatively correlated with shrimp yield indicating that the farmers may not be engaged in aquaculture as a primary occupation. They are found to be engaged in other economic activities also. All the

variables (Table 2) showed the positive correlation among them except occupation of shrimp farmers. In fact high stocking density requires high input and labour for obtaining high shrimp yield. The innovative nature of the occupation and high degrees of risks and uncertainties involved in it might be reasons for small proportion of the respondents considering shrimp farming as their sole occupation. This concurs with the reports by Sultana (1994) and Nagoor Meeran (1999).

Regression Analysis

The regression analysis was carried out to find out statistical relationship of shrimp yield with other socio-economic variables. The results are presented in Table 3.

TABLE 3 Regression analysis of independent variables and dependent variable

Independent variables	Regression Coefficient	't' value
Intercept	328.5901	0.594145
X1	0.002056	0.521114
X2	-0.64097	-1.11741
X3	0.270646	1.525306
X4	349.1691	2.567345
X5	1819.095	1.747682
X6	11.92902	0.092863

R^2 = 0.915221 'F' Value = 23.39004

It could be observed that the coefficient of regression namely R^2 was 0.915221 and was highly significant. It implies that independent variables explained 91.52 per cent of the variation in shrimp yield the dependent variable.

From the 't' values, it could be seen that the independent variables educational status of respondents and type of farming were significant at 95.00% level of probability. Higher education and improved farming system management are expected to contribute to increased shrimp yield.

It has been proved that educational status of the farmer has direct significant influence over his awareness and knowledge on scientific shrimp farming practices and subsequently contributes for increased shrimp yield. Hence it is suggested that

more extension education programmes need to be organised with the effective utilisation of available communication channels for educating shrimp farmers in scientific shrimp farming and related aspects. Diversified nature of occupation of respondents strengthened risk-bearing ability of shrimp farmers. The study also revealed that there is a need for optimum utilisation of feed for producing higher shrimp yield.

Problems faced by shrimp farmers

The apparent wide spread prevalence of white-spot disease, the need for improved financial supports services from banking institutions, the need for uninterrupted power supply, the need for better understanding of the different culture methods, high salinity during summer, price fluctuations of shrimp were considered to be the major problems perceived by the shrimp farmers. Other problems reported by them are need for proper laboratory facilities in the vicinity of farms for testing disease symptoms, soil and water quality etc., quality of chemicals and feeds and poor coordination with scientific organisations.

Possible remedies and future prospects

Proper management approaches can be suggested to avoid the incidence of white-spot disease. Early disposal of legal cases might help the farmers to concentrate in a more judicious manner on shrimp farming activities. Timely information on price can be made available to the shrimp farmers by effectively utilising the mass media. Improved coordination between different organisations helps smooth functioning of shrimp farming sector. More research can be focussed on developing low cost feed probiotics. Proper assessment and refinement of existing technologies will pave the for sustainable aquaculture in the long run. Efforts can be made to start a separate organisation for financing the aquacultural activities. The effective extension service at the field level will go a long way for sustainable shrimp and fish farming in the Prakasam District of A.P.

Acknowledgement

The authors are grateful to Dr. G.K.M. Rao Director, CIBA for the encouragement given to carryout this work under institute's Extension Project.

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