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Factors Influencing the Extent of Adoption of Shrimp Culture Technologies

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ABSTRACT

Fisheries sector occupying a unique status in India as it provides employment, food and nutritional security and foreign exchange. Shrimp farming is an integral activity of the fisheries sector. Shrimp culture on commercial scale begun very recently in India. Among the various factors which determines the adoption of shrimp farming governmental policies and market in wake of post WTO era is most important. Some of the environmental issues are also associated with the shrimp farming. So, the present study is an attempt to study the policies responsible for adoption of shrimp culture in the Nellore district of Andhra Pradesh. The study showed that the legal and environmental policies influenced the adoption of shrimp culture technologies.

Shrimp culture in India has begun on a commercial scale only during the last decade. About 1.2 million hectares of land has been identified as suitable for brackish water aquaculture, of which only about 0.10 million hectares are under cultivation (Rajagopal, 2002). Liberalisation of economy, high proftability and good international markets are the factors, which have given impetus to shrimp culture boom in India. The investment required for rising a single crop of Shrimp per hectare is quite high often running to the tune of few lakhs of rupees. Nevertheless it is a highly profit oriented business and attract a number of farmers and entrepreneurs to this field. Hence cost is a crucial factor influencing the extent of adoption of shrimp culture technologies. Commercial shrimp culture has also earned the wrath of environmentalists and ecologists for the so-called "ecological destruction. In this context, the government has formulated some policies to regulate and streamline the growth of this expanding industry on scientific lines ensuring little damage to environment. With these considerations in mind, a study was undertaken with the following objectives:

I. To study the policies responsible for adoption of Shrimp culture technologies as perceived by Shrimp farmers.

II. To determine the costs responsible for adoption of Shrimp culture technologies as perceived by Shrimp farmers.

METHODOLOGY

Sixty shrimp farmers drawn randomly from six villages belonging to three blocks of Nellore district of Andhra Pradesh State formed the sample for the study. The sampling method followed was the multistage random sampling.

For measurement of the perception of the shrimp farmers towards the policy issues affecting shrimp farming, a group of policy issues which secured the first 11 ranks were selected based on judges ranking, and the shrimp farmers were asked to express their degree of favourableness towards the policy statements on five points continuum ranging from highly favourable to least favourable for which score ranging of 5-1 were given. The adoption behaviour of shrimp farmers was studied by selecting 12 practices/recommendations, starting from pond preparation to harvest based on judges ranking and measured by using the adoption quotient developed by Balasubramaniam (1988). Cost was operationalised as the expenditure incurred for each of the shrimp culture technologies adopted by the individual respondent. Cost was measured based on a scoring procedure developed for the study. Thus for every 50,000 Rupees a score of one was assigned.

The data were collected using structured interview schedule and analysed by using factor analysis. In this study, factor analysis was used to group the variables into factors based on the commonalties observed, and to find out the relative importance of each factor in accounting for the particular set of variables being analysed. The method of factor analysis used for the study was principal component analysis and the rotation method used was vari max rotation.

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RESULTS AND DISCUSSION

Factor loadings of perception of policies with respect to extent of adoption of shrimp culture technologies.

An observation of Table-1 revealed the factor loadings, commonalties, eigen values and the percentage of variance explained by the factors. Out of the eleven policies, four factors have been extracted and these four factors together explained the total variance of these policies to the extent of 72.36 per cent.

Table 1: Factor loading of perception of policies With respect to extent of adoption of shrimp culture Technologies (N=60)

Policies No.	Policies	Factors 1	2	3	4	Comm-onalties
1.	Guidelines of the AAI with respect to effluent treatment system	0.787	-0.240	0.119	0.129	0.708
2.	Decision of the supreme court to allow only improved extensive method of shrimp culture	0.824	-0.117	0.106	0.132	0.739
3.	Registration of shrimp farms with AAI	0.527	0.660	0.031	0.134	0.733
4.	Role of MPEDA in providing farm subsidies	0.809	0.298	0.193	-0.188	0.817
5.	Non existence of quality control measure	0.297	0.614	-0.354	0.382	0.737
6.	Supreme courts order against conversion of agricultural and salt pans to Shrimp farms	0.713	0.391	-0.041	-0.190	0.699
7.	Impact of supreme court verdict on shrimp exports from India	-0.465	-0.452	-0.450	0.404	0.787
8.	Quality control norms of European Union and U.S.	-0.055	0.251	-0.436	-0.714	0.765
9.	Antidumping duty of U.S. Govt.	-0.375	0.302	0.582	0.305	0.765
10.	Govt. efforts to strengthen infrastructure facilities in processing plants.	-0.405	0.523	0.509	-0.324	0.663
11.	Delay in passing AA Bill in parliament.	0.256	-0.651	-0.113	0.099	0.512
	Eigen values	3.416	2.200	1.194	1.150	7.960
	% of variation explained	31.059	20.002	10.854	10.452	72.367
	Cumulative % variation explained	31.059	51.061	61.915	72.366	

The factors were rotated for meaningful interpretation and the results are presented in the vari max rotation matrix in Table 2.

Table 2: Rotated factor (Vari max) matrix of eleven policies

Policies	Factors 1	2	3	4
1	0.642	-0.463	-0.186	-0.216
2	0.694	-0.444	-0.138	-0.201
3	0.700	0.204	0.448	-0.022
4	0.894	0.013	-0.057	0.079
5	0.365	-0.058	0.777	-0.046
6	0.791	-0.010	0.135	0.233
7	-0.405	0.149	0.775	0.017
8	0.012	0.140	0.021	0.863
9	-0.135	0.600	0.048	-0.531
10	-0.039	0.887	-0.108	0.047
11	-0.030	-0.634	-0.306	-0.120
Higher values	3.136	2.044	1.588	1.192
% variation explained	28.509	18.582	14.437	10.838
Cumulative % variation explained	28.509	47.091	61.529	72.366

An analysis of Table 2 showed the interpretation of the rotated factors in the vari max matrix. A total of four factors were identified as having maximum percentage variance. Each factor column was scanned for identifying a few policies with significantly high loadings. Thus from each factor column, the policies having a factor of more than 0.5 were selected factor loading from each factor was grouped and presented in Table 3.

Table 3: Policies with factor loadings under different factors

FACTOR	POLICIES	FACTOR LOADINGS
FACTOR I	1	0.642
	2	0.649
	3	0.700
	4	0.894
	6	0.791
FACTOR II	9	0.600
	10	0.887
	11	0.634
FACTOR III	5	0.777
	7	0.775
FACTOR IV	8	0.863

Factor I

The first factor accounted for 31.60 per cent of the total variance, and it could be noted that were five policies which had significant loading on factor 1. They were the policy number 4 i.e. role of MPEDA (Marine products Export Development Authority) in providing subsidies and technical assistance for Shrimp farms (0.894), policy number 6 i.e. Order of the, Supreme Court of India against conversion of agricultural land, salt pans to Shrimp farms (0.791), policy number. 3 i.e. registration of Shrimp farms with the agriculture Authority of India (AAI) (0.700), Policy number 2 i.e. Decision of the Supreme Court to allow only improved extensive method of Shrimp culture. and Policy number 1 i.e. guidelines of the AAI with respect to effluent treatment system (0.642). Since most of the policies deal with legal issue the factor is termed "Legal" factor.

Table 4: Factor loadings of perception of cost with respect to extent of adoption of shrimp culture technologies.

Cost of Technologies	Factor I	Commonalties
Cost of pond bottom conditioning	0.993	0.986
Cost of pond bottom sterilization	0.995	0.991
Cost of measurement of soil pH	0.380	0.144
Cost of lime application	0.995	0.991
Cost of predator eradication	0.996	0.991
Cost of manures and fertilizers	0.993	0.987
Cost of acclimatization and stocking of fry	0.931	0.866
Cost of water management	0.950	0.902
Cost of soil management	0.996	0.991
Cost of feed management	0.995	0.991
Cost of health management	0.931	0.866
Cost of Harvesting	0.995	0.991
Eigen Values	10.697	10.697
% of variation explained	89.143	89.143
Cumulative % variation explained	89.143	89.143

Factor II

The second factor accounted for 20.00 per cent of the total variance in the policies. Under factor II there were three policies which had significant factor loadings. They were policy number nine i.e. Antidumping duty to be lived by the U.S. Government on Indian shrimp exports (0.600), Policy number 10 i.e. government efforts to strengthen infrastructural facilities in processing plants (0.887). Since the policy of the government to strengthen infrastructure facilities in processing plants has obtained the highest factor loading of 0.0887, this factor is termed as "Processing" factor.

Factor III

Policy number 5 namely the non existence of a body monitor quality control measures (0.777) and policy number 7, i.e. the impact of Supreme Court verdict on Shrimp exports from India (0.775) accounted for 10.85 per cent of the total variance, and since these two policies are directly related to Shrimp exports the factor was labelled as "Export" factor.

Factor IV

Policy number 8, i.e. Quality control norms imposed by shrimp importing nations like the United States (U.S) and the European Union (E.U.) accounted for 10.45 per cent of the total variance, Since the polity is directly related to the importing norms it was termed as "Import" factor.

Factor loadings of perception of cost with respect to extent of adoption of shrimp culture technologies.

An observation of Table 4 revealed the factor loadings, commonalties, eigen values and the percentage of variance explained by the factors. Out of the costs of the 12 technologies considered, one factor has been extracted and this single factor explained the total variance of the cost of technologies to the extent of 89.14 percent. Since only one factor has been extracted, formation of var. max matrix does not arise. Besides this single factor extracted was labelled as "Cost of culture, Nellore" factor.

CONCLUSION

Environmental issues have always been the focus of debate in shrimp farm development in the recent past. As could be inferred from the study, the policies pertaining to the legal issues such as supreme courts order against conversion of agricultural land to shrimp farms, registration of shrimp farms with the Aquaculture Authority of India, decision of the Supreme Court to allow only improved extensive method of shrimp culture are found to have higher factor loadings. Hence these factors have to be taken care of while planning and implementing scientific shrimp culture programmes among the target farmers.

The factor explaining the cost of all the 12 technologies were observed to be interrelated and together explained 89.14 per cent of the variation in the extent of adoption of shrimp culture technologies. Shrimp farming being a capital intensive venture, efforts should be undertaken by the research system for the production of cost effective technologies, so that more number of Shrimp farmers are motivated to undertake shrimp farming which contributes to71 per cent of the total sea food exports.

REFERENCES

Rajagopal. A. (2002). Balancing Upstream Agriculture Security with Aquaculture Prosperity - Some reflections from India, Paper presented at the "Stockholm International Water institute "CSIW: "World Water Week 2002".

Balasubramaniam, S. (1988). Analysis of Technology Transfer Effectiveness in Inland Fish Farming, Unpub. Ph. D. Thesis, TNAU, Coimbatore.