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An Analysis on the Utilization Pattern of Reservoir Cage Farming in Khammam District of Telangana State, India

Shetty Shiva Shankar[1*], K. Veerabhadran[2], T. Umamaheswari[1], P. Padmavathy[3] and N. Veerabhadra Rao[1]

[1]*Department of Fisheries Extension, Economics & Statistics, Fisheries College and Research Institute, Tamil Nadu, Dr. J.Jayalalitha Fisheries University, Thoothukudi - 628008, India*
[2]*Kanyakumari Centre for Sustainable Aquaculture, Ganapathipuram, Kanyakumari District, India*
[3]*Department of Fisheries Aquatic Environment Management, Fisheries College and Research Institute, Tamil Nadu, Dr. J. Jayalalitha Fisheries University, Thoothukudi - 628008, India*
[4]*Fisheries Research Station, SVVU, Undi, West Godavari, Andhra Pradesh, India*

**Corresponding author*

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A B S T R A C T

The aim of this study was to determine the utilization of existing natural resources of reservoir cage farming practices for enhancing better production of fishes in a limited time. The present study was carried out to document the socio-economic profile, technology adoption practices and constraints faced by the reservoir cage farmers of Khammam district of Telangana state. A total of 120 progressive cage farmers were selected randomly from three reservoirs Palair, Wyra and Lankasagar reservoirs. Age (X_1), Experience in cage farming (X_6), Participation in trainings (X_{15}) showed significance at 1.00 per cent level and found to be positively correlated. Occupational status (X_3), Annual income (X_4), Information seeking behavior (X_5), Contact with extension agency (X_{12}), and Decision making behavior (X_{14}) had positive correlation at 5.00 per cent level of significance. The estimated R^2 value was 0.524 which clearly indicate that 52.40 per cent of the variations observed among the independent variables were explained in the extent of adoption of farming practices by the cage farmers. Constraints constitutes by cage farmers are less market price for pangasius (I), slow growth rate of fish (II) was the most significant constraints by 91.66 per cent, 90.00 per cent of the surveyed farmers.

Introduction

Cage culture is an innovative practice of rearing and culturing aquatic organisms in a short period from fry to fingerling and to marketable size, where fishes are enclosed under controlled conditions of environment with creating space within surrounding water body for free exchange of water and easy movement of fishes (Karnatak and Kumar, 2014). The production of aquatic animals in caged enclosures is the latest innovative concept of fish culture for transporting, shifting, carrying and

holding fishes for short distance has recorded two centuries ago (Pillay and Kutty, 2005). Due to globalization and urbanization across the globe, demand for aquatic and value added fish products has been increased and there is a tremendous growth observed during the past 20 years in fish culture and farming sector. According to the present records states that around 39.00 million population in fisheries sector and 20.50 million people were employed in aquaculture as a major occupation in the world. At present consumption of fish food products has been predicted to rise by 57 per cent, from 62.70 million metric tonnes (MMT) in 1997 to about 98.60 million in year 2020 (Delgado *et al.*, 2020). Around 15 states in the country have been adopted cage farming technology that gives good production and income with the fish production range of about 15:70 kg /m^3/year.

India ranks second in terms of aquaculture sector and third in fish production and contributing to total fisheries GDP of about 1.07 per cent and generates export in foreign earnings of ₹ 334.41 billion. In India, cage culture was attempted and noticed in the running water resource of Yamuna and Ganga rivers at Allahabad for the first time in 1970, using Indian major carps and in Karnataka state cage farming was observed in a static water body, using catla, silver carp, common carp, channa species and tilapia. The Central Inland Fisheries Research Institute, Barrackpore (CIFRI), also introduced the practice of air–breathing fishes in 1970s, but it did not succeed and lead to poor results. Reservoir resources exclusively comprises of about 3.42 million hectare (ha) with an average fish production potential in reservoirs that is estimated to a level of 100, 200 and 500 kilogram/ha/year in the form of large, medium and small reservoirs, respectively (Kumari *et al.*, 2017). Telangana is land of dams, reservoirs, lakes, tanks and canals. There are (4) large, (12) medium and (24) small reservoirs in the state, 2nd June, 2014 the new state Telangana came into existence as the 29th state in India. It has an area of about 1,14,840 sq.km. Fisheries occupation is one of the most traditional practice creating a livelihood status to around 5 lakh families in the state. Khammam district is a major key district in Telangana state for reservoir cage farming practices. It consists of 2 major and 1 minor reservoir viz., Palair, Wyra and Lankasagar reservoirs.

Materials and Methods

The study was conducted in Khammam district of Telangana state. The geographical location of Khammam district lies between 17.25 N 80.16 E latitude and longitude. It is the fourth largest city in Telangana state with an area of 93.45 km^2. Out of 215 cage fish farmers in the selected district, from three reservoirs Palair, Wyra and Lankasagar. Around 120 progressive respondents were selected randomly to collect the primary data as per the objectives of the study. To select the suitable independent variables for the study, a list of 32 independent variables was prepared and sent to 110 extension experts working in various departments viz., Fisheries, Agriculture and other academicians with the request to rank suitable independent variables in a five point continuum scale viz., most relevant, more relevant, less relevant and least relevant with the scores of 5,4,3,2 and 1, respectively. Out of 110 judges, 38 judges responded and sent their scoring sheet. The scores were calculated and the mean, standard deviations were worked out for all the variables. The variables with the score greater than the mean plus standard deviation value were considered for the study. Based on the envisaged objectives, adoption practices by reservoir cage farmers were considered as the basic component for this study. Out of 32 variables, 15 variables were selected based on five point continuum of experts' opinion. The collected data were analyzed using the appropriate statistical tools like correlation and multiple regression.

Results and Discussion

A recent result shows that 39.17 per cent of the respondents were of old age category, followed by young (30.83%) and middle (30.00%) age categories, this findings of the line suits for (Aura *et al.*, 2017; Alagappan and Kumaran, 2020). About 42.50 per cent of the cage farmers were illiterates, this line findings outcome report suits with Pandey

and Upadhayay (2012), 45.00 per cent of cage farmers had fisheries is their main occupation and (85.84%) of respondents were married, (51.67%) had realized an annual income of ₹3.0 lakhs.

About (54.16%) had 2 to 4 years of experience in cage farming and it is noteworthy to mention that medium level of information seeking behavior, social participation, mass media exposure, risk orientation, contact with extension agencies and scientific orientation were observed among 70.84 per cent, 65.84 per cent, 75.84 per cent, 58.34 per cent, 65.84 per cent and 67.50 percent respectively. Similarly the outcome finding of the results resembles with, Goswami and Samajdar (2011); Cyrill *et al.*, (2013); Pandey and Hijam (2013) and Maloth *et al.*, (2020).

In the process of adoption practices, use of anchors and bottom weights, farming technologies, fish seed quality and type of marketing practices were mainly adopted by 56.66 per cent, 53.33 per cent and 50.83 per cent of the reservoir cage farmers, respectively and along with periodic sampling and grading (58.33%), disease diagnosis (57.50%), water quality management (54.16%), use of minerals and chemicals (54.16%) and application of fish feed and organic manure (54.16%) were partially adopted. Age (X1) was negatively correlated, but showed significance at 1.00 per cent level; similarly though Experience in cage farming (X6) and Participation in trainings (X15) were significant at 1.00 per cent level, and found to be positively correlated. Among the identified variables, Occupational status (X3), Annual income (X4), Information seeking behavior (X5), Contact with extension agency (X12), and Decision making behavior (X14) had positive correlation at 5.00 per cent level of significance, and variables viz., Educational status (X2), Social participation (X9), Mass media exposure (X10) were negatively correlatedat5.00 level of significance.

Regression model stated the estimated R value as 0.678 and R^2 value as 0.524 which clearly indicate that 52.40 per cent of the variations observed among the independent variables were explained in the extent of adoption of farming practices (dependent variable) by the cage farmers.

Constraints among cage framers were less market price (I) was reported as the most significant constraint by 91.66 per cent of the cage farmers, followed by slow growth rate of fish (II) and lack of technical knowledge in cage farming (III) by 90.00 per cent, this findings of the line state with Kampayana *et al.*, (2006) and 89.16 per cent of the farmers, respectively. It was reported that lack of money for labour charge engaged during grading and harvesting of fish, damage of cage materials during high storms and natural calamities and lack of feed and net storage rooms were ranked fourth, fifth and sixth constraint by 87.5 per cent, 85.83 per cent and 83.33 per cent of the surveyed respondents, respectively.

Table.1 Taluk-wise distribution of selected respondents for the study(n=120)

SI.No.	Name of the village	Total number of cage farmers	Number of respondents selected
1	Palair	130	80
2	Wyra	45	20
3	Lankasagar	40	20
TOTAL		**215**	**120**

Table.2 Relationship between socio-economic characteristics and adoption of cage farming practices

Variable No.	Variable	Correlation co-efficient
X_1	Age	-0.457**
X_2	Educational status	-0.218*
X_3	Occupational status	0.246*
X_4	Marital status	-0.201NS
X_5	Annual income	0.223*
X_6	Experience in cage farming	0.308**
X_7	Family status	0.292NS
X_8	Information seeking behavior	0.211*
X_9	Social participation	-0.183*
X_{10}	Mass media exposure	-0.197*
X_{11}	Risk orientation	0.497NS
X_{12}	Contact with extension agency	0.218*
X_{13}	Scientific orientation	0.850NS
X_{14}	Decision making behavior	0.204*
X_{15}	Trainings participated	0.246**

***Significant at 5 percent level; **Significant at 1 percent level; NS–Non significant**

Similarly the findings of the line resembles with Okoronkwo and Ume (2013); Mantey *et al.,* (2020) and Aswathy Natarajan and Imelda Joseph (2020). Establishment of Aqua feed mills and shops on Public Private Partnership (PPP) and fish hatcheries and seed rearing centers and imparting Skill development training and awareness programs on cage farming practices and usage of ICT tools shall encourage the farmers to adopt the advanced cage farming practices intensively.

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