Socio-Economic Individualities that Improve Income of Farmers in Gajapati District, Odisha, India

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ABSTRACT

Aquaculture and fisheries offer a vital contribution to the development in food security, nutrition and livelihoods of many people living in Odisha. Aquaculture is one of the major industries which is giving major contribution in the development of the State but there are many constraints that act as the barriers for the development in many rural and tribal areas. This study was aimed to evaluate the constraints observed in the development of the aquaculture farms in Gajapati district in Odisha. Blocks were selected according to the farmers list provided by the District Fisheries Department. A total of seven blocks were selected for this study, these are; Gosani, Gumma, Kashinagar, Nuagada, R.Udayagiri, Rayagada, Mohana. A total of 100 farmers' data was collected, out of which, 108 farmers' details were given by the District Fisheries Department. Collection of data was done through questionnaire, that contained all the farm information, farmers' profile and farming constraints, disasters experienced, after which these data were entered in an excel sheet for completing percentage analysis, correlation and regression. After making the percentage, correlation and regression of all collected data from the farmers it was observed that 50% farmers were between the age group of 40-50 and 85% males and 15% female farmers were farming fish. Out of the 100 respondents, Hindu (95%), Muslim (4%) and Christian (1%) were farming fish. 50% of the respondents belonged to the Other Class (OC) category. Above 60% of respondents had secondary level educational qualification. 99% of the respondents were married. The primary occupation of farmers were Agriculture (96%) and Fishery (4%). 46% of the farmers were investing between Rs. 3000-Rs.5000 monthly on primary occupation. Income from primary occupation of 72% of respondents was more than Rs. 5000. However. it is necessary to collect feedback from every farmer on how they are coping up with constraints and it is necessary to inform them on various Government schemes by the District Fishery Office.

Introduction

In India fishery is one the major factors that contribute to the development of the country, it can increase economic condition of the countries in a better way (Tacon, 2020). It may create a way to many opportunity for livelihood option, national income and it can give many opportunity for employability in India (Kumar and Shivani, 2014). Around 500 million individuals overall are monetarily reliant on fisheries. India currently occupies third in fisheries and second in aquaculture production in world. It provides globally 6.3% of the fish production (NFDB, 2020a). India has many resources in both

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inland and marine for the better development in the country.

Odisha state has many freshwater, marine water and brackish water resources for its development. The state is developing but not with its full potency. Odisha rank in both inland and marine fish production is 8th, in our country. Due to poor socio-economical condition of farmers in Odisha and lack of knowledge on the modern management practices, the development of the state is laggingas compared to other states.

Due to poorinfrastructure and majority of tribal people being poor in terms of money, a communication gap was observed between the tribal people living in Gajapati district in Odisha and the Government officials. They lack knowledge and training on aquaculture production and earn less monthly income from fish farms. The farmers living in different blocks in Gajapati district were using only net fishing technique to catch fish, they didn't have modern fish farm techniques. Such constraints were observed to directly affect the aquaculture development of the district.

Materials and Methods

Data collection of a total of 100 farmers was done with the support of District Fishery Department situated in Paralakhemundi. This study was carried out from 22nd March 2021 to 29th May 2021 with the School of Fisheries of Centurion University of Technology and Management, Odisha. A total of 108 farmers list was given by the Fishery Department, out of whichdata was collected from 100 active fish farmers.

A questionnaire was prepared to collect the total information of the farmer, like, how they managed their aquaculture farm and the difficulties they faced in farming of fish and the market problems. The questionnaire was prepared with the help of many review papers, discussion with subject experts and observation. The questionnaire has many sections like general information of the farmer and their family, farm information, market information, contact with resource persons and vulnerability of farmers to disaster. After the preparation of the questionnaire, it was tested by 15 persons, like, 3 faculties from Paralakhemundi campus, 2 faculties from the District Fisheries Department, Gajapati district and 10 students from different departments in Fisheries and Zoology.

After the testing, scoring of the questionnaire was done according to their ranks in the option part, with the reference of many review papers and through general knowledge. Scoring is required for doing correlation and regression to arrive at a perfect result; to correlate different variables to know how they impact development.

With the help of collected data from 100 farmers, percentage analysis was done with MSExcel. Percentage analysis was done with respect to profile of different farmers, farmers' family information, farmers' physical resources and constraints, farm profile, culture aspect of the farm, information on the pond particulars, information on other holdings, information on marketing information of the farmer, information on the communication with the resource persons and information on vulnerability to disaster. Farm related information and farmers profile were selected for doing correlation analysis.

Correlation table shows strong and weak relation between different variables (Table 1). The meaning of strong correlation coefficient between two variables is that, any changes in one variable has a direct and strong impact on other variable and the weak correlation coefficient variable shows that, any changes in one variable may give some effect to the other variable or may not give any effect to the other variable. The correlations which are showing strong correlation coefficient in (Table 1) were further selected for regression. The strong correlations were wage per month, Number of ponds, Other source of monthly income, Other source of income, fishing changes that happened in 5 years, Monthly income from fishing, reason for being a member of fishery association, type of labour, Whether a same amount of catch is obtained every day, every-day catch quantity (in kg), number of labourers employed, average catch every time (in kg), average income every-day and farmers' religion.

For regression analysis, the dependent variable used for the regression analysis is the monthly income from fishing. And the independent variables are listed in Table 1, that is, ranging from type of labour to religion, in the correlation table (Table 1). According to the Regression Table 2, multiple R is 97.8% relation between the variables under study (Table 2) and Adjusted R square is 93.8% is the changes in the dependent variable by the independent variable (Table 2). As the P value is less than 0.01 and t stat is >2, the 4 independent variables like fishing changes in 5 years, other source monthly in-

come, wages per month and number of ponds that are statistically significant with the dependent variable, that means any changes in these 4 independent variables have a direct effect on the dependent variable, that is, the monthly income from fishing.

Results and Discussion

Table 1. Percentage analysis on the Age of Farmer in Gajapati District (N=100).

Age	Percentage
30-40	6
40-50	50
Above 50	44

Table 1 shows the age of a total of 100 farmers in different blocks of Gajapati district. Maximum farmer, that is, about 44 % of the farmers of this study were above the age of 50 and 50% farmers were in between the age of 40-50 and 6% of farmers were in the age between 30-40.

Table 2. Gender of Different Farmers in Gajapati district (N=100).

Gender	Percentage
Male	85
Female	15

Table 2 shows that in this study, a maximum 85% of respondents were male and 15% were female farmers.

Table 3. Religion of farmers in Gajapati district (N=100).

Religion	Percentage
Hindu	95
Christian	1
Muslim	4

The Table 3 shows the religion followed by the farmers in this study. Majority percentage of farmers practiced Hindu religion and were involved in fishery followed by Muslims and then Christians.

Table 4. Caste of farmers in Gajapati district (N=100).

Caste	Percentage
OC	50
ST	42
SC	8

The above Table 4 shows the percentage of caste of the farmers. Majority of farmers of Gajapati district belonged to OC (Other Class) category.

Table 5. Educational qualification of the farmers in Gajapati district (N=100).

Educational qualification	Percentage
Illiterate	6
UP	19
Secondary	33
Higher Secondary	12
UG	3
Graduate	26

The above Table 5 shows that 33% of the farmers completed secondary education, they didn't have a proper idea on how to communicate with fishery agents and also 25% of people were coming under illiterate and under UP. So, they are facing a lot of problems to get the help from the Government. Also in the above table, graduates, under graduates and higher secondary qualified categories are there, but they expressed a need for training on fishery related activities.

Table 6. Marital status of the farmers in Gajapati district (N=100).

Marital Status	Percentage
Married	99
Widowed	1

The above tables show the marital status of the farmers. About 99% of the farmers are married and only 1% farmers are unmarried.

Table 7. Primary occupation of the farmer of Gajapati district (N=100).

Primary Occupation	Percentage
Agriculture	96
Fisheries	4

Table 7 shows that majority of farmers were involved in agriculture than fishery. About 4% of farmers' primary occupation was fisheries.

Tables 8. Farmers' investment on primary occupation in Gajapati district (N=100).

Monthly Investment (in Rs.)	Percentage
Rs.1000- Rs.3000	38
Rs.3000- Rs. 5000	46
More than Rs. 5000	16

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The above table shows the investment of farmer in their primary occupation. The investment was above Rs.1000 monthly and majority of farmers were investing in the range of Rs. 3000- Rs. 5000, about 46% of farmers were investing monthly in the range of Rs. 3000- Rs. 5000 rupees. Only 16% of farmers were investing in more than Rs. 5000.

Table 9. Farmers' income on primary occupation in Gajapati district (N=100).

Monthly income (in Rs.)	Percentage
Rs.3000- Rs. 5000	28
More than Rs. 5000	72

This table gives information on the income of farmers on their primary occupation. Primary occupation of farmers in Gajapati district was agriculture and the farmers were getting more income from their primary occupation that is more than Rs. 3000. About 72% of the farmers earned income above 5000 rupees monthly and 28% of the farmers in Gajapati

Table 11. Regression statistics

Regression Statistics	
Multiple R	**0.97821709**
R Square	0.95690867
Adjusted R Square	**0.93876696**
Standard Error	0.26879011
Observations	100

district earned in the range of Rs. 3000- Rs. 5000 on a monthly basis.

Table 12. ANOVA

ANOVA	df	SS	MS	F	Significance F
Regression	14	137.97	9.85	146.9	2.86E-53
Residual	86	6.21	0.07		
Total	100	144.19			

In the regression analysis the dependent variable is the monthly income from fishing and other variables are the independent variables (Table 13). So, the regression table is showing the relation between different independent variables to the dependent variable, that is, the monthly income. So, it is showing how any changes in the independent variables are affecting the monthly income from fishing of farmers.

With the help of results, it is clear that we have to make the following changes for the development of the district.

• Sustainable exploitation of resources may be encouraged. In the wake of climate change, efforts should be made to reduce the rise in temperature to mitigate the long-term effects that may affect food security

• Promote diversification of resources inorder to increase the monthly income. Various resources

Table 10. Correlation of different variables

	Type of labour	How many labour	Monthly income from fishing	Other source of income	Why A member of fishery association	Boat	Everyday quantity (in K.G)	Average catch every time (in K.G)
Type of labour	1							
Number of labourers	0.07	1						
Wage per month	0.50	0.54						
Number of ponds	0.54	0.50						
Other source of income	-0.02	-0.15	-0.38	1				
Other source income (monthly)	0.07	-0.03	-0.40	0.93				
Fishing changes in 5 years	0.04	0.21	0.52	0.25				
Reason for becoming a member of fishery association	0.34	-0.37	-0.15	0.13	1			
Boat number	-0.13	0.34	0.20	0.004	-0.76	1		
Catch the same quantity everyday	-0.41	0.40	0.50	-0.23	-0.71	0.56		
Everyday quantity (in K.G)	0.20	0.51	0.69	-0.38	-0.19	0.25	1	
Average catch every time (in K.G)	0.20	0.51	0.69	-0.38	-0.19	0.25	1	1
Average income after each marketing	-0.13	0.41	0.83	-0.36	-0.09	0.12	0.69	0.69
Religion	0.18	-0.25	-0.20	0.21	0.54	-0.40	-0.22	-0.22

Table 13. Regression of different Variables

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	40.29	3.79	10.61	2.55e-17	32.75	47.84	32.75	47.84
Fishing changes in 5 years	0.57	0.10	5.22	1.21e-06	0.35	0.78	0.35	0.78
Other sourceincome(monthly)	0.39	0.06	6.33	1.03e-08	0.27	0.52	0.27	0.52
Other source of income	-1.31	0.26	-5.001	2.97e-06	-1.83	-0.78	-1.83	-0.78
Boat	-0.19	0.21	-0.90	0.36	-0.61	0.23	-0.61	0.23
Everyday catching amount of fish	-8.76	0.79	-11.01	4.13e-18	-10.34	-7.17	-10.34	-7.17
Everyday quantity(in K.G)	-0.15	0.04	-3.89	0.00019	-0.24	-0.07	-0.24	-0.07
Average catch every time (in K.G)	0	0	.65535		0	0	0	0
Religion	0.03	0.08931584	0.44		-0.13	0.21	-0.13	0.21
Wage per month	0.49	0.03910032	12.62	2.79e-21	0.41	0.57	0.41	0.57
Number of pond	0.13	0.03	3.68	0.00039	0.06	0.21	0.06	0.21
Number of labour used by farmers	-0.62	0.05	-10.64	2.26e-17	-0.73	-0.50	-0.73	-0.50
Cause of joining fishery association	-9.69	0.96	-10.06	3.34e-16	-11.60	-7.77	-11.60	-7.77
Type of labour	-0.59	0.10	-5.71	1.52e-07	-0.80	-0.38	-0.80	-0.38
Average income aftereachmarketing	3.03	0.24	12.23	1.60e-20	2.54	3.53	2.54	3.53

other than fishing like agriculture, livestock and value addition of resources should be encouraged with the support of Department of fisheries.

- Wage distribution to the laborers employed in farm activities should be increased. A standardized wage plan should be adopted in the area.
- The number of ponds involved in active aquaculture should be increased and sufficient financial assistance can be acquired through NFDB.
- Proper guidance should be given to the farmers and to collect all the development information from the farmers for the betterment of their farm production.

Conclusion

Fishery sector provides a major contribution to the world for their development and provides livelihood, employment and nutrition to about 500 million people and give a major source of foreign exchange. However, policy makers and donor agencies are not giving any major importance to this sector. Frequently seen that, aquaculture is the low priority sector. As this sector is giving more development resources to the nation so it is necessary to give priority to every problematic situation faced by the farmers. so, attention is necessary for the rural areas because they are facing communication problem, lack of education and training. So, it is necessary for the Government to give proper attention to the rural and tribal areas for the development because according to our study they were facing many prob-

lems like communication problem, lack of education and training, Many farmers are under graduates, they have less knowledge on the management. They don't know schemes provided by government. Farmers were having small sized farm for culturing. They were getting less income and output from fish farms. Maximum farmer's everyday market income was bellow 10,000, proper management of their farm can increase their productivity. About half of the farmers were not able to take fingerlings from D.F.O because they don't know the benefits of D.F.O. They were facing transport problems. In our study all the farmers were a member of D.F.O but still some farmers are not satisfied with D.F.O because they didn't get any benefits from D.F.O. , because they don't know how to communicate. So, these problems from the farmers should be solved by the government departments for proper development of the state and country in fisheries.

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Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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