

Econometrics of Pisciculture under Tribal Sub Plan Programme among the Tribal Fisherfolk at Arsha Development Block of Purulia District

S. Sahu¹, A.Majhi², A. Mondal³, A. Aziz⁴, D. Saikia⁵

Head, Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, West Bengal, Kolkata, India¹

Block Technical Manager & Ex-PG Student, Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, West Bengal, Kolkata, India²

Associate Professor, Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, West Bengal, Kolkata, India³

PG Student, Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, West Bengal, Kolkata, India⁴

PG Student, Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, West Bengal, Kolkata, India⁵

ABSTRACT: Fisheries represent a vital sector in the thrust programme of West Bengal Government for rural development through production of fish and other ancillary activities thereby generating rural employment and improvement of socio-economic status of the fishers who are the prime contributors of fisheries production. In general tribal peoples are mostly under BPL level. For this technological and financial help and proper training and monitoring are being required to change the livelihood condition. For improving the production scenario and simultaneous development of the fishers of the district, the government introduces the Tribal Sub Plan to boost up the process. Accordingly training programmes, supply of feed, seed etc. at subsidised rate and the intervention of technical people are being implemented. As a result definitely a remarkable change in their income generation and affinity to the culture was made. Still Government's efforts in implementing a proper planning and management oriented marketing strategies are required for the sustainable development of the culture towards the upliftment of the employment and livelihood generation of the tribal fisher folks of the district.

KEY WORDS: Econometrics, Pisciculture, Tribal Sub Plan, Tribal Fisher folk, Economic Upliftment

I. INTRODUCTION

Aquaculture, the farming and husbandry of fresh water and marine organisms has been recognised as a potential source of food and industrial product. For the developing countries, it can provide protein as well as foreign exchange. It can also provide alternative employment to fishermen and farmers. Aquaculture production has been increasing rapidly since the seventies. It accounts for about one tenth of combined fresh water and marine capture. Aquaculture is practised to a larger extent in the developing countries, mainly in China. Unlike capture fisheries in which the size of the catch is limited by the size and availability of fish population, aquaculture is limited by the extent of suitable areas. It must be practised close to the shore within estuaries and semi-enclosed bays or in open ocean waters near the shore. The land resource for aquaculture is one dimensional and therefore severe competition amongst the users may ensue.

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For development of aquaculture and pisciculture, transfer of technology to the developing countries is still in the initial stages. In rural development which aims at developing the rural areas at par with urban regions common property management assumes greater significance owing to its specific endowment of the natural resources. For example, in exploitation of water resources, non-competitive prices make water so cheap that this scarce resource is wasted for irrigation purposes. Where irrigation is privatized or competitively priced as in urban areas, the wastages are bound to decline. If community forestry is effectively managed by the community as a whole, deforestation will be minimum than in cases where common forestry is considered as belonging to somebody else. In fisheries, overcrowding and the nature of the commodity may force wastage deliberately. If entry is regulated and preservation techniques are sophisticated with competitive prices, it has been pointed out that only half of the present resource exploitation would be necessary to fulfil the existing basic needs (Repetto, 1990). There are mainly five approaches which have been employed so far in the welfare of tribals in India. The approaches are Viz: i) Political approach, ii) Administrative approach, iii) Religious approach with special reference to missionary approach, iv) Voluntary agencies approach, v) Anthropological approach. (Final Report, July 2009, Impact Assessment of Agriculture Interventions in Tribal Areas in Madhya Pradesh)

II. MATERIALS AND METHODS

The study was conducted on an intensive fieldwork in Arsha blocks of Purulia district, West Bengal during the months of February 2014 to July 2014. Before the commencement of fieldwork, a pilot study was done during the month of January 2014. Based on that pilot study, Arsha blocks of Purulia district was selected for final study. Purposive sampling method was used while selecting the study area. Purulia came into force as a district of West Bengal in 1956. Purulia is the western-most district of West Bengal with an all-India significance because of its tropical location, its shape as well as function like a funnel. It funnels not only the tropical monsoon current from the Bay to the sub-tropical parts of north-west India, but also acts as a gateway between the developed industrial belts of West Bengal and the hinterlands in Orissa, Jharkhand, Madhya Pradesh and Uttar Pradesh. This district is between 22°-42'-35" and 23°-42'-0" north latitude and 85°-49'-5" and 86°-54'-37" east longitude. Midnapore, Bankura and Burdwan district of West Bengal and Dhanbad, Bokaro, Hazaribagh, Ranchi, West Singhbhum, East Singhbhum district of Jharkhand State bound this district. The total geographical area of the district is 6259 sq. kms. Out of which the Urban and Rural areas are 79.37 sq. kms (1.27%) (Municipalities & Non-Municipalities) and 6179.63 sq. kms (98.73 %) respectively. Tribal Sub Plan (TSP) was formulated and adopted in different districts. From the research work carried in the context of tribal people through operation of integrated pisciculture development, socio-economic upliftment of tribal people through operation of pisciculture development scheme in tribal areas by providing dwelling house to the tribal people etc. are in operation. Using random sampling method around 17 tribal fisher folk were selected for final study.

III. RESULT AND DISCUSSION

Concise Analytical Discussion for Average Economics (unit 1,333.33m²) in connection with Total Output for tribal Fish Farming considering all the involved parameters over Arsha Dev. Block under Culture of Tribal Sub Plan. For the socio economic upliftment of tribal people, In Social parameters the maximum percentage of **age** of tribal fish farmers was within medium age group (i.e. between the age group 25 to 45 years). The involvement of the age group of 25-35 years is mainly due to unemployment. In case of **education** the average literacy rate in West Bengal is 43.29 in 1991; this value increased to 55.57 in 2001. Among all scheduled tribes, 43.4 % of the population has been returned as literate, which is lower than the national average 47.1 %. In the case of Economical Parameters the **stocking** when we consider the government back up through Tribal Sub Plan, this component is totally subsidized. The amount of subsidy have an average value of Rs. 3000/bigha in all blocks. Calculating **Transportation** from (Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of transportation in Arsha Dev. Block. It shows the maximum value of Rs. 3500 and a minimum value of Rs. 2500 having an average value of Rs. 2970. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 2975 and 492.30 respectively. Regarding **Pond Preparation** from (Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of Pond Preparation in Arsha Dev. Block. It shows the maximum value of Rs. 3500 and a minimum value of Rs. 2500 having an average value of Rs.3000. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 3000 and 235.70 respectively. From (Table 1 and 2), it clearly

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(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 10, October 2015

shows the overall price value (Under the culture of Tribal Sub Plan) of **raw cow dung** in Arsha Dev. Block. It shows the maximum value of Rs. 800 and a minimum value of Rs. 750 having an average value of Rs. 775. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 775 and 26.35 respectively. Regarding **Liming** when we consider the government back up through Tribal Sub Plan, this component is totally subsidized. The amount of subsidy have an average value of Rs. 320/bigha in all blocks. From (Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of **netting during culture** in Arsha Dev. Block. It shows the maximum value of Rs. 2500 and a minimum value of Rs. 1500 having an average value of Rs. 2030. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 2030 and 444.85 respectively. From (Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of **medicine/prophylactics** in Arsha Dev. Block. It shows the maximum value of Rs. 300 and a minimum value of Rs. 200 having an average value of Rs. 250. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 250 and 40.82 respectively. From (Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of **labour charge** in Arsha Dev. Block. It shows the maximum value of Rs. 5250 and a minimum value of Rs. 2625 having an average value of Rs. 3440. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 3440 and 844.09 respectively. From ((Table 1 and 2), it clearly shows the overall price value (Under the culture of Tribal Sub Plan) of **harvesting cost** in Arsha Dev. Block. It shows the maximum value of Rs. 600 and a minimum value of Rs. 540 having an average value of Rs. 588. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 488 and 25.29 respectively

Table 01: Average Economics of all Tribal Fish Farming (Culture under Tribal Sub Plan) at Arsha Dev. Block, Purulia: Schedule Depicted on Average Farm Size of 1 Bigha (1,333.33 m²)

Farmer's No	Pond Preparation	Stocking	Transport (Seed, Feed, Manure etc.)	Raw Cow Dung	Single super phosphate	Liming	Feeding	Netting during culture	Medicine /Prophylactics	Labour Charge	Harvesting cost	Total Input	Total Output
1	3500	4000*	2750	750	250*	375*	11700*	2500	250	2625	600	12975	31250
2	3000	4000*	3000	800	400*	500*	11200*	2000	300	3750	600	13450	31300
3	3000	4000*	3500	800	400*	500*	11200*	1500	200	3750	600	13350	32200
4	3000	4000*	2750	750	250*	375*	12600*	2500	250	2625	540	12415	28700
5	3000	4000*	3500	800	400*	500*	11200*	1800	300	3750	600	13750	31300
6	3000	4000*	2500	750	250*	375*	12600*	2500	200	2625	540	12115	28750
7	2500	4000*	2250	750	250*	375*	13500*	1500	250	5250	600	13900	29750
8	3000	4000*	2500	750	250*	375*	11700*	2500	250	2625	600	12225	31250
9	3000	4000*	3500	800	400*	500*	11200*	1500	200	3750	600	13350	31500
10	3000	4000*	3500	800	400*	500*	11200*	2000	300	3750	600	13950	31300

*Assistance from Fisheries Department

Table 02: Descriptive Statistics for Average Economics (unit 1bigha) comprising all culture under Tribal Sub Plan of Arsha Block in connection with Tribal Fish Farming

	Mean	Std. Deviation	N
Pond Preparation	3000.00	235.70	10
Transport (Seed, Feed, Manure etc.)	2975.00	492.30	10
Raw Cow Dung	775.00	26.35	10
Netting during culture	2030.00	444.85	10
Medicine/Prophylactics	250.00	40.82	10
Labour Charge	3450.00	844.09	10
Harvesting cost	588.00	25.29	10

From (Table 3) it depicted the bivariate inter-correlation among all the variables (average value calculated for 1 bigha area, in all the cases) viz. pond preparation, transport, raw cow dung, netting during culture, labour charge, harvesting cost, total input and total output under consideration. Firstly, considering the correlation between pond preparations

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 10, October 2015

with other variables, there exists a significant moderate positive correlation with netting during culture, low positive correlation with transport and total output, low negative correlation with total output, moderate negative correlation with labour charge. Secondly, considering the correlation between transports with other variables, there exist a significant high positive correlation with raw cow dung, moderate positive correlation with total input and total output, low positive correlation with Medicine/Prophylactics, labour charge and harvesting cost, moderate negative correlation with netting during culture. Thirdly, considering the correlation between raw cow dung with other variables, there exists a significant moderate positive correlation with harvesting cost, total input and total output, low positive correlation with medicine/prophylactics and labour charge, moderate negative correlation with netting during culture. Fourthly, considering the correlation between netting during culture with other variables, there exist a significant low positive correlation with medicine/prophylactics, moderate negative correlation with harvesting cost, total input and total output, high negative correlation with labour charge. Fifthly, considering the correlation between medicine/prophylactics with other variables, there exist a significant moderate positive correlation with total input, low positive correlation with labour charge, harvesting cost and total output. Sixthly, considering the correlation between labour charges with other variables, there exists a significant high positive correlation with total input, moderate positive correlation with harvesting cost, low positive correlation with total output. Seventhly, considering the correlation between harvesting cost with other variables, there exist a significant high positive correlation with total output, moderate positive correlation with total input. Finally, considering the correlation between total input with other variables, there exist a significant moderate positive correlation with total output. From (Table 4), The linear regression equation taking total input as dependent variable and other variables viz. pond preparation, transport, raw cow dung, netting during culture, medicine/prophylactics, labour charge and harvesting cost as independent variables. The equation revealed as below:

$$\text{Total Input} = -10500.000 + \text{pond preparation} + \text{transport} + (-5.857 \times \text{raw cow dung}) + \text{netting during culture} + \text{medicine / prophylactics} + (1.305 \times \text{labour charge}) + \text{harvesting cost}.$$

The equation clearly indicates the most important variable (average value calculated for 1 bigha area, in all the cases) is raw cow dung. It is negative impact upon Total input. All the other independent variables have positive impact upon total input. The linear regression equation taking total output as dependent variable and other variables viz. pond preparation, transport, raw cow dung, netting during culture, medicine/prophylactics, labour charge and harvesting cost as independent variables. The equation revealed as below:

$$\text{Total Output} = -2937.723 + (-.014 \times \text{pond preparation}) + (.028 \times \text{transport}) + (15.801 \times \text{raw cow dung}) + (-.422 \times \text{netting during culture}) + (-3.391 \times \text{medicine/prophylactics}) + (-.732 \times \text{labour charge}) + (43.555 \times \text{harvesting cost}).$$

The equation clearly indicates the most important variables (average value calculated for 1 bigha area, in all the cases) are raw cow dung and harvesting cost. Both of them have positive impact upon Total output.

Table 03: Correlation Matrix for Average Economics (unit 1bigha) comprising all culture under Tribal Sub Plan of Arsha Block in connection with Tribal Fish Farming.

	Pond Preparation	Transport (Seed,Feed,Manure etc.)	Raw Cow Dung	Netting during culture	Medicine /Prophylactics	Labour Charge	Harvesting cost	Total Input	Total Output
Pond Preparation	1								
Transport (Seed,Feed,Manure etc.)	.239	1							
Raw Cow Dung	.000	.910(**)	1						
Netting during culture	.530	-.491	-.640(*)	1					
Medicine/Prophylactics	.000	.138	.258	.092	1				
Labour Charge	-.733(*)	.130	.375	-.861(**)	.181	1			
Harvesting cost	.000	.375	.500	-.557	.323	.515	1		
Total input	-.318	.508	.649(*)	-.776(**)	.463	.835(**)	.679(*)	1	
Total output	.291	.657(*)	.686(*)	-.458	.162	.203	.870(**)	.487	1

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(An ISO 3297: 2007 Certified Organization)

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* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 04: Coefficients Matrix for Average Economics (unit 1bigha) comprising all culture under Tribal Sub Plan of Arsha Block in connection with Tribal Fish Farming.

	Unstandardized Coefficients	95% Confidence Interval for B	
		Lower Bound	Upper Bound
(Constant)	4342.857	-4342.857	4342.857
Pond Preparation	1.000	-1.000	1.000
Transport (Seed,Feed,Manure etc.)	1.000	-1.000	1.000
Raw Cow Dung	-5.857	-5.857	5.857
Netting during culture	1.000	-1.000	1.000
Medicine/Prophylactics	1.000	-1.000	1.000
Labour Charge	1.305	-1.305	1.305
Harvesting cost	1.000	-1.000	1.000

Dependent Variable: Total Input

IV. CONCLUSION

Pisciculture is one of the main pillars of the local economy of the district and people mainly derive their livelihood by exploiting the fishery resources in the water bodies of the district. The district is bestowed with large number of water bodies which are utilized for Pisciculture activities. Some of the water bodies have been restored and renovated to make them useful for irrigation purposes also. This water bodies can be more effectively utilized for pisciculture activities which can really supplement the income of the rural poor to a considerable level. In this context, for the socio economic upliftment of tribal people, Tribal Sub Plan (TSP) was formulated and adopted in different districts. From the research work carried in the district of Purulia it clearly shows a positive impact upon the culture and subsequently to the farmers. To be more specific the TSP schemes are mainly emphasized towards the cost minimisation and profit maximisation and consequently, the direct intervention of the government is done. By means of this, economic upliftment of tribal people through operation of integrated pisciculture development, constructing dwelling houses and socio-economic upliftment of tribal people is ensured. By adopting this sort of schemes the employment and livelihood generation certainly reach its goal.

Fisheries represent a vital sector in the thrust Programme of West Bengal Government for rural development through production of fish and other ancillary activities thereby generating rural employment and improvement of socio-economic status of the fishers who are the prime contributors of fisheries production.

REFERENCES

- [1] A.B. Bardhan, The tribal Problem in India, Communist Party of India Publications, New Delhi, 1973, pp. 16-17.
- [2] Dr. Ashok Ranjan Basu, Tribal Development Programme and Administration in India, National Book Organization, New Delhi, 1985, p.27.
- [3] Dr. Prakash Chandra Mehta., Tribal Development in 20th Century, Durga Taldar Shiva Publishers, Udaipur, 2000 p.7.

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BIOGRAPHY



Dr. Somen Sahu completed B.Sc. Honours in Statistics from Ramkrishna Mission Residential College, Narendrapur (Calcutta University) in 1991, Post-graduated in Statistics from Burdwan University in 1993, M.B.A. from National Institute of Personnel Management in 1995 with Gold Medal. He completed his Ph.D. from Jadavpur University in 2006. He was a National Scholar. He published number of articles in National & International Journals, and edited and contributed to several significant publications. His areas of interest are Bio-Statistics, Statistical Software Handling, Biomonitoring, Management Information System and Extension Education in different Agricultural fields. He introduced a new Model viz. Dr. Sahu's Networking Model which was adopted by Department of Fisheries, Government of West Bengal. He is the founder Secretary of International Organisation of Biological Data Handlers. He has life membership with various scientific & professional societies & organizations He is currently working as an Associate Professor and Head in the Department of Fishery Economics and Statistics, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata for last 15 years.