

Statistical Modeling of Traditional Pisciculture among the Tribal Fisherfolk at Baghmundi Block of Purulia District during 2014

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Abstract: *Pisciculture is one of the base of the rural economy of Purulia district. Most of the tribal people uses the fishery resources in the water bodies as an essential part of their daily life pattern. A statistical modelling of the involved parameters of the culture as input variables indicate the problems and pattern hidden within. The methodology indicates the point of importance. After the study, the following problems are being identified, viz. small and medium water-bodies get dried up due to prevalent draught situations and early withdrawal of rainy seasons make the prospect of fisheries bleak. In general tribal peoples are mostly under BPL level. For this, technological and financial help along with proper training and monitoring are being required to accelerate the income process by means of which the livelihood condition will be changed. Government's intervention not only from fisheries, but also from other like departments is necessary in implementing a proper planning and management oriented marketing strategies in a cohesive manner. This will then lead towards the sustainable development of the culture and at the same time the upliftment of the tribals will be materialised*

Keywords: Traditional Pisciculture, Tribal Fisherfolk, Training, Sustainable development, Upliftment of tribals

1. Introduction

The population of the developing world is still more rural than urban: some 3.1 billion people, or 55 per cent of the total population, live in rural areas. However between 2020 and 2025, the total rural population will peak and then start to decline, and the developing worlds urban population will overtake its rural population. The livelihoods of poor rural households are diverse across regions and countries, and within countries. Livelihoods are derived, to varying degrees, from smallholder farming – including livestock production and artisanal fisheries – agricultural wage labour, wage or self-employment in the rural non-farm economy and migration. While some households rely primarily on one type of activity, most seek to diversify their livelihood base as a way to reduce risk. Agriculture plays a vital role in most countries – over 80 per cent of rural households farm to some extent, and typically it is the poorest households that rely most on farming and agricultural labour. However, non-farm income sources are increasingly important across regions, and income gains at the household level are generally associated with a shift towards more non-agricultural wages and self-employment income. 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). For the process of development of the tribal people, it require management of land base, forest, fisheries, water resources, etc, where open access is there inefficient utilisation has resulted in faster depletion of these resources, less sustainment and as a result, environment degradation. It is evident that even if a ten percent higher efficient utilization is effected by and through avoidance of wastages, a substantial proportion of these resources can be sustainably conserved. Too much crowding for resource exploitation and lack of competitive prices have resulted in an uneconomical infrastructure, superfluous competitions misidentification of priorities lack of appropriate technologization, underplay of local interest and several other problems. Proper management of the commons imply more opportunities for the poor and better distribution of power. This is also essential to really decentrali the overall decision making process and avoid over concentration of various interests. The government by its different departments try to develop the situation. In this context income generation through fisheries plays a crucial role. The traditional fish farming is still being adopted by most of the farmers in the country. Though many advances have been made in aquaculture, an investment based fish farming industry could not be developed. It is obvious that we need to evolve a satisfactory, feasible, viable, adoptable and successful technology which can ensure a sustained high fish production in the ponds. The important facets of successful fish culture include selection of site, proper designing and construction of ponds, selection of fish species, judicious stocking of fish, seed management and maintenance of water quality, nutritive food and feeding etc. Efficient fish farm management entails special preparation of ponds to receive fish seed to new environment. For the proper, designing of fish pond/farm one should have information regarding species, stage, population and life cycles of fish for which pond is to be made. Depending upon this the depth, volume, size etc. have to be decided. For

operational convenience grow-our ponds, meant for raising table size fish should be rectangular, preferably having length: breadth as 3:1, if possible. Small ponds are preferable as they facilitate effective control of environment. Drying up of such water bodies in summer months help mineralization, removal of excess organic matter and automatic destruction of predators, minnows etc., that usually abound in perennial ponds. Keeping these in view a calendar of operation is proposed (subject to change in different agro climatic zones of India). 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) Political approach, ii) Administrative approach, iii) Religious approach with special reference to missionary approach, iv) Voluntary agencies approach, v) Anthropological approach. [1].

2. Materials and methods

Baghmundi (Community) Development Block, under Purulia Sadar West Subdivision of the Purulia District is one of the remotest administrative divisions in the state of West Bengal. The present administrative territory consists of 8 nos. of Gram Panchayats (viz. Ajodhya, Baghmundi, Birgram, Burda-Kalimati, Serengdi, Sindri, Matha and Tunturi-Suisa) and 1 no. of Police Station (Baghmundi Police Station). Baghmundi Development Block has an area of 445.05 sq. km. (171.8 mile²). In area it is the largest block of Purulia district having 142 nos. of Mouzas and 199 nos. of Villages. Being a part of the Chhota Nagpur Plateau the general scenario of this area is undulating land with scattered low hills and dales. Northern and eastern portion was wholly covered with dense deciduous (dry) forest. Whole Matha and Ajodhya, and some portion of Burda-Kalimati, Baghmundi and Sindri Gram Panchayats are covered by the jungle. Topographically north side of the Block is sepereted by east-west water divider of Ajodhya Range from other Blocks like Arsha, Balarampur and Jhalda. River Subarnarekha separates the block from the Jharkhand State in the west and 'Sakha' river separates it from Balarampur Block in the east. Baghmundi Block had a total population of 1,12,448 as per census 2001 with a decadal growth rate of 13.64% less than that of the State (17.84%). One fourth of the total population was Scheduled Tribe and Scheduled Caste people formed one tenth of the total population. Projected population for Census 2011 is about 1,35,000. Santhal, Munda, Oraon, Birhor, Bhumij etc are the main sub-caste of the Scheduled Tribe people lives at Baghmundi Block area, of which peoples of Birhor tribe are most primitive and very poor in nos., live at Bhupatipalli village. Whereas Dhoba, Muchi, Shuri, Ghasi etc are the main sub-caste of Scheduled Caste people live in this block. 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 25 tribal fisher folk were selected for final study.

3. Result and Discussion

Tribal people lives mainly in the hilly area earns minimum need of livelihood by collecting and selling forest products like fuel-wood, honey, flowers, medicinal plants, etc. Hunting is also a common means of livelihood among primitive tribal groups like Birhors. Other way of earnings for the inhabitants of this area includes Ranching of cattle, ship, chicken etc, pisciculture, smale scale and house hold industry. As the cultivation of the area is mono cropped one of the supplimentary occupation of the local people is main worker. During slack season a large no. of people migrate to the side by districts like Bardhaman, Purba Medinipur, Hooghly etc for working as agricultural labour.

In connection with the Social Parameters, the following findings are being accumulated:

Considering Age, it depicts that the young generation invested money from their parental sources viz. retirement benefits of their gurdians, the amount received from the in law's family or other sources and invested the money in this sector to generate their income and upgrading the social level. Historically, in case of Education Purulia is one of the moderately literate districts in West Bengal. The male literacy rate of 57.4 % and female of 29.2%, show a gender disparity in literacy.

In connection with the Economical Parameters, the following findings are being accumulated:

Considering **Stocking**, it clearly shows the overall price value (Traditional culture) of stocking in Bagmundi Dev. Block. It shows the maximum value of Rs. 2000 and a minimum value of Rs. 1500 having an average value of Rs. 1671.42. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 1671.43 and 228.87 respectively. In case of **Transportation** from, it clearly shows the overall price value (Traditional culture) of transportation in Bagmundi Dev. Block. It shows the maximum value of Rs. 6000 and a minimum value of Rs. 1750 having an average value of Rs. 3642.85. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 3642.85 and 1553.60 respectively. Regarding Pond preparation, It shows the maximum value of Rs. 4000 and a minimum value of Rs. 2000 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 577.35 respectively. Moreover, the overall price value (Traditional culture) of **raw cow dung** in Bagmundi Dev. Block. It shows the maximum value of Rs. 600 and a minimum value of Rs. 200 having an average value of Rs. 257.14. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 257.14 and 214.92 respectively. The overall price value (Traditional culture) of **liming** in Bagmundi Dev. Block. It shows the maximum value of Rs. 500 and a minimum value of Rs. 200 having an average value of Rs. 221.42. Similarly, in the case of descriptive statistics of said block, the value of mean and standard

deviation are 221.43 and 177.62 respectively. The overall price value (Traditional culture) of **feeding** in Bagmundi Dev. Block. It shows the maximum value of Rs. 4200 and a minimum value of Rs. 1500 having an average value of Rs. 2557.14. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 2557.14 and 1567.22 respectively. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 307.14 and 67.26 respectively. The overall price value (Traditional culture) of **labour charge** in Bagmundi Dev. Block shows the maximum value of Rs. 4500 and a minimum value of Rs. 1875 having an average value of Rs. 2807.14. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 2807.14 and 885.14 respectively. The overall price value (Traditional culture) of **Harvesting** cost in Bagmundi Dev. Block. It shows the maximum value of Rs. 360 and a minimum value of Rs. 270 having an average value of Rs. 315.64. Similarly, in the case of descriptive statistics of said block, the value of mean and standard deviation are 315.64 and 39.61 respectively.

From (Table 2) it depicted the bivariate inter-correlation among all the variables (average value calculated for 1 bigha area, in all the cases) viz. stocking, transport, raw cow dung, liming, feeding, labour charge, harvesting cost, total input and total output under consideration. Firstly, considering the correlation between stocking with other variables, there exist a significant high positive correlation with transport, moderate positive correlation with harvesting cost and total input, low positive correlation with labour charge and total output, moderate negative correlation with feeding, low negative correlation with raw cow dung and liming. Secondly, considering the correlation between transport with other variables, there exist a significant moderate positive correlation with harvesting cost, low positive correlation with total input and total output, moderate negative correlation with raw cow dung and feeding, low negative correlation with liming and labour charge. Thirdly, considering the correlation between raw cow dung with other variables, there exist a significant moderate positive correlation with liming and labour charge, low positive correlation with feeding, harvesting cost, total input and total output. Fourthly, considering the correlation between liming with other variables, there exist a significant low positive correlation with harvesting cost and total output, moderate negative correlation with total input, low negative correlation with feeding and labour charge. Fifthly, considering the correlation between feeding with other variables, there exist a significant low positive correlation with labour charge, moderate negative correlation with harvesting cost, low negative correlation with total input and total output. Sixthly, considering the correlation between labour charge with other variables, there exist a significant high positive correlation with total output, moderate positive correlation with harvesting cost and total input. 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, the correlation between total input with other variables, there exist a significant low positive correlation with total output.

The Statistical model taking total input as dependent variable and other variables viz. stocking, raw cow dung, liming, feeding, labour charge and harvesting cost as independent variables. The equation revealed as below:

$$\text{Total Input} = -71392.59 + (299.81 \times \text{Stocking}) + (-60.97 \times \text{Raw Cow Dung}) + (153.11 \times \text{Liming}) + (8.80 \times \text{Feeding}) + (59.97 \times \text{Labour charge}) + (-1996.19 \times \text{Harvesting cost}).$$

The equation clearly indicates the most important variables (average value calculated for 1 bigha area, in all the cases) are stocking and harvesting cost, where stocking has positive impact upon total input and harvesting cost has negative impact upon total input.

The Statistical model taking total output as dependent variable and other variables viz. stocking, raw cow dung, liming, feeding, labour charge and harvesting cost as independent variables. The equation revealed as below:

$$\text{Total Output} = 9724.046 + (-12.726 \times \text{Stocking}) + (.041 \times \text{Raw Cow Dung}) + (-2.835 \times \text{Liming}) + (-.119 \times \text{feeding}) + (-1.331 \times \text{Labour Charge}) + (105.147 \times \text{harvesting cost}).$$

The equation clearly indicates the most important variables (average value calculated for 1 bigha area, in all the cases) are stocking and harvesting cost, where harvesting cost is positive impact upon Total output and stocking is negative impact upon Total output.

4. Conclusion

The people of the study area mainly derive their livelihood by using the fishery resources in the water bodies of the district not in an effective manner but simply in a careless mood. Still the district is bestowed with large number of water bodies which could be utilized for Pisciculture activities in a business manner to generate an huge income. 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. Moreover, the following problems are being identified, viz. small and medium water-bodies get dried up due to prevalent draught situations and early withdrawal of rainy seasons make the prospect of fisheries bleak; Excessive usage of surface water for the irrigation purposes by the cultivators at the upper reaches, resulting in inadequate water for the tail reach of the canal system, which works as a potential hindrances for the fisheries; Due to deficiency of water volumes in the water bodies' fisheries has become largely a seasonal activity and thus renders the fishermen jobless for a larger part of the year.

References

- [1] Repetto, R. ed. The Global Possible, Resources, Development and the New Country, Affiliated East-West Press, New Delhi, 1990. Appendix p. 507.
- [2] Final Report, July 2009, Impact Assessment of Agriculture Interventions in Tribal Areas in Madhya Pradesh.

[3] <http://www.bdobaghmundi.in/> Official website
 Bagmundi Block Development office and Panchayat
 Samiti.

Appendix

Table 1: Descriptive Statistics for Average Economics (unit 1bigha) comprising all traditional culture of Bagmundi Block in connection with Tribal Fish Farming

Parameters	Mean	Std. Deviation
Stocking	1671.43	228.87
Transport (Seed,Feed,Manure etc.)	3642.85	1553.60
Raw Cow Dung	257.14	214.92
Liming	221.43	177.62
Feeding	2557.14	1567.22
Labour Charge	2807.14	885.14
Harvesting cost	315.64	39.61
Total Input	8715.64	5427.35
Total Output	16985.71	1455.87

Table 2: Correlation Matrix for Average Economics (unit 1bigha) comprising all traditional culture of Bagmundi Block in connection with Tribal Fish Farming

Parameter	Stocking	Transport (Seed, Feed, Manure etc.)	Raw Cow Dung	Liming	Feeding	Labour Charge	Harvesting cost	Total Input	Total Output
Stocking	1								
Transport (Seed,Feed,Manure etc.)	.904(**)	1							
Raw Cow Dung	-.300	-.640	1						
Liming	-.269	-.307	.530	1					
Feeding	-.627	-.688	.261	-.164	1				
Labour Charge	.141	-.024	.449	-.041	.016	1			
Harvesting cost	.780(*)	.629	.101	.003	-.456	.672	1		
Total Input	.440	.283	.032	-.536	-.033	.532	.475	1	
Total Output	.289	.201	.315	.259	-.134	.845(*)	.815(*)	.237	1

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

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

Author Profile



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

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