Economic Viability of Inland Fisheries in Jharkhand – A Case of Ranchi

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Abstract- ***Post-2000 economic surveys show a revolutionary change in the consumption pattern of Indian household. It has changed consumer's preference from cereals to commodities such as eggs, meat, milk and fish. The diverse food basket is now voluntarily substituted with the expensive and poorer animal product for calorie-rich cereals.***

In India, Fishery has been one of the fastest-growing food production systems during the last four decades. On comparing the fish production in the country, it seems India's marine fish production has already reached a plateau and can only forecast a marginal increase in the future. However, inland fish production has depicted rapid growth due to untapped water and fish resources and thriving investments. Hence one has to rely heavily on the inland sector for future demands. Jharkhand, a land-locked state is situated in the Deccan Plateau. Fish production in Jharkhand has gained momentum ever since its inception in 2000. The physical features and the climatic condition have helped boost up fisheries in the state, which in turn has contributed towards livelihood, food security and employment.

The study was conducted on Inland Fisheries of Ranchi district in Jharkhand. Primary data was collected from October 2019 – January 2020. A simple random sampling technique was used to select 100 fisher folks from the district. Data collected were analysed using trend analysis, budgeting technique and profitability ratios. The first part of the paper attempts to assess the trend of Indian and Jharkhand's fisheries sector. The other part deals with, examining the scope of Inland Fisheries in Ranchi. The result of the budgeting technique shows that gross margin and net farm income of fish production units are positive. The profitability ratio revealed a benefit-cost ratio of 21.4, rate of return of 20.4, gross revenue ratio of 0.5 and expense structure ratio of 0.7. This indicated that fish production was profitable and viable in the study area. Unavailability of the proper market, high cost of fish feed, high cost of transportation and lack of funds were some major constraints among the fisherfolk.

Indexed Terms- ***Inland fishery, economic viability, constraints to inland fishery***

I. INTRODUCTION

Inland fishery refers to the production of fishes in fresh or sweet water in a non-coastal area. It may involve the capture or culture of fishes. Fishes are captured from natural resources like reservoirs, irrigation channels, river etc. while culture fishery involves raising fishes in tanks and ponds constructed for it. Fish culture involves raising and harvesting of fishes in a controlled environment.

According to the National Sample Survey on Consumption (2012) "Consumption pattern of Indian households have shifted from cereals to commodities such as eggs, meat, milk and fish over the period 1999-2010, the rural household consuming more than the urban households". This revolutionary change is due to the diversification of the food basket in favour of non-cereal food as a result of higher income levels and secondly, the consumer's changing preference which is due to the availability of a wide variety of food items. The trends of increasing food expenditure and nutrient intake depict that the consumers have voluntarily substituted expensive and poorer- animal products for calorie-rich cereal (Bhatta, 2001). Change in food habits of the people, change in lifestyle, urbanization is other reasons for the change in the composition of food demand across commodities. Eventually, dairy, meat and fish consumption has increased while direct per capita consumption of cereal as food has declined (Praduman Kumar, 2016). Fishing has transformed ever since the early civilization to a full-fledged fishing sector. With the

change in consumption pattern, evolving technology and infrastructure, the fishery sector has become a supplementary sector in the economy. In the seventh five-year plan (1985-1990) Blue Revolution had a pioneering impact on the fisheries sector. It aimed at a rapid increase in fish and marine products using package programme. It was popularized by the Fisherfolk Development Agency (FFDA) in India.

In the 1990s fish production underwent substantial changes, which resulted in a drastic increase in inland fisheries with a 56% increase in 1990-00 (Table1). This was due to the decelerated growth in marine fish production and inclination of policies in favour of inland fisheries. Within a decade the inland fish production (of 2.85 million-tonne) surpassed marine fish production (of 2.76 million-tonne).

Table: 1 India Fish Production

Period	Marine (in million tonne)	Inland (in million tonne)	Total (in million tonne)
1950-51	0.530	0.210	0.740
1960-61	0.880	0.280	1.160
1970-71	1.086	0.673	1.759
1980-81	1.551	0.895	2.446
1990-91	2.190	1.610	3.800
2000-01	2.762	2.847	5.609
2010-11	3.282	5.193	8.474
2017-18	3.688	8.902	12.590

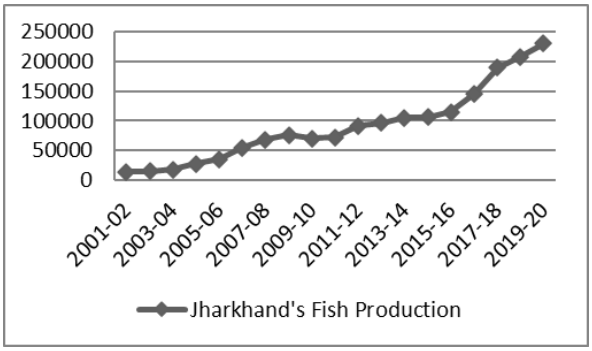
Source: Handbook on Fisheries Statistics (2018)

According to the fisheries Census 2018, India's fish production rose from 3.80million-tonne in 1990 to 12.59 million-tonne in 2017-18. The total production comprises 3.68 million-tonne from marine and 8.9 million-ton from the inland source. On comparing the fish production in the country, it seems India's marine fish production has already reached a plateau and can only forecast a marginal increase in the future. However, inland fish production has depicted rapid growth due to untapped water and fish resources and thriving investments. India's per capita consumption has been gradually shooting from an average of 7 kg in the 1970s to 12.5 kg in 2010. Hence one has to rely heavily on the inland sector for future demands.

Jharkhand, a land-locked state is situated in the Deccan Plateau. Fish production in Jharkhand has gained momentum ever since its inception in 2000. The physical features and the climatic condition have boosted up fisheries in the state, which in turn has contributed towards livelihood, food security and employment.

Jharkhand has immense water resource of private tanks, government tanks, reservoirs, check dams and ahars, coal pits and mines, rivers etc approximately covering an area of 228,935 hectares (Directorate of Fisheries, Government of Jharkhand). The state has ample institutional establishments for seed production, hatcheries and rearing grounds to reduce the mortality of fishes and supply quality fish seeds. The government of India has recognized the state Jharkhand as one of the 20 states for `promotion of Mission Fingerlings'. (Department of Fisheries, 2020) Production of fishes in Jharkhand popularized with the intensification of the Blue Revolution in the form of 'Neeli Kranti'. The production has been increasing steadily from 14,000 MT in 2001-02 to 71,886MT in 2010-11 and reaching 230,000MT in 2019-20 (Figure1).

Figure1: Fish Production in Jharkhand



Source: Directorate of Fisheries, Government of Jharkhand

II. OBJECTIVE

The main objective is to examine the viability of fish production in the study area. And the specific objectives are:

1. Determine the costs and returns of fish production in Ranchi
2. Determine the profitability ratio of the fish production

3. Identify the constraints in the fish production in Ranchi

III. METHODOLOGY

The study was conducted in the district Ranchi of the state Jharkhand. Primary data was collected from 100 respondents from October 2019 to January 2020 using a structured interview schedule. The data were directly collected from fisher-folk and co-operative heads. As the business operation was on a small-scale no rigorous economic model was used in the analysis. Instead, descriptive statistics (mean, frequency and percentage) budgeting technique and profitability ratios are used to access the viability of the fish production. Combinations of various analytical tools are used to study the economic viability of the study are as follows:

Budgeting Technique such as:
Net Farm Income (NFI) = TR-TC
Where TR is total revenue and TC is total cost
Gross Margin (GM) = TR – TVC
Where TR is total revenue and TVC is total variable cost

Profitability ratios such as:
Benefit-Cost Ratio (BCR) = TR/TC
Where TR is total revenue and TC is Total cost
Rate of Return (RRT) = NR/TC
Where NR is net return
Expense Structure Ratio (ESR) = FC/VC
Where FC is fixed cost and VC is variable cost
Gross Revenue Ratio (GRR) = TE/GI
Where TE is total expense and GI is gross income

IV. RESULT AND DISCUSSION

- Economic analysis of Fish Production in the Study Area.

The fisherfolk incurred several costs in the course of fish production. These costs also known as operating costs include both variable cost and fixed cost of production in the short run. Table 2 gives the picture of the variable and fixed cost, where the costs and return from fishing are estimated using average cost and yield by the respondents in the production cycle.

Table 2: Estimated cost and return structure fish production

Item	Average Cost	Percentage
Variable Cost		
Annual rent	16700	2.6
Cost on seed	101230.96	15.8
Cost on feed	185770	29
Cost on fertilizer	9966.45	1.6
Cost on electricity	100	0.02
Cost on fuel	33869	5.3
Cost on transportation	119170	18.7
Cost on medicine	45248	7.1
Cost of cleaning	34338	5.4
Cost of maintenance	77490	12.1
Labour charges	592	0.1
Other expenses	14516.7	2.3
Total Variable Cost	638,991	100
Initial fixed cash (signing amount)	16100	3.8
Cost of generator	3180	0.8
Cost of building / shed	28939	6.9
Cost of equipments and tools	25624	6.1
Cost of plumbing	348235	82
Cost of bore well digging	1500	0.4
Total Fixed Cost	423,578	100
Total Cost	1,062,569	
Total Revenue	22,777,732	
Gross Margin	22,138,741	
Net Farm Income	21,715,163	

Source: Field Survey, 2019

The table shows that the total variable cost (TVC) of Rs. 638991.11 constitutes 60.14 per cent of the total cost (TC). The TVC includes cost on fish feed (29%), transportation of the catch (18.7%), fish seed (15.8%), maintenance of the farm (12.1%), medicines for the fishes (7.1%), cleaning of the waterbody (5.4%), fuel for generators (5.3%), Annual rent of the waterbody (2.6%), liming and fertilization for the waterbody (1.6%), Labour charges (0.1%) use of electricity (0.02%). Going with the available literature, a major

share of cost is incurred on fish feed, fish seed and transportation. The government initiatives of free distribution and subsidized fish seed and fish feed is supporting the fisher folks to reduce the cost. Though, the quality of fish seed remains in question. The lack of a ready market and location of fish farms adds to the expense of transportation.

The total fixed cost (TFC) sums up to Rs. 432,578 that is 39.86 per cent of the TC. The total cost includes the cost of plumbing (82%), Building and shed (6.9%), equipment and tools used (6.1%), the initial amount paid at the time of signing the lease (3.8%), purchase of generator (0.8%), digging of borewell (0.4%). Most of the fisherfolk have hatcheries and nursery along with their fish farm, which requires the circulation of water through an intricate network of plumbed pipes in a fixed interval. The installation of such cages and water trough with water pipes accounts for huge plumbing cost (here, 82%). Artificial fishing tanks and cage culture incur heavy cost on plumbing. Yet there were other costs like insurance, depreciation charged, amortization payment (for repayment of borrowed money) which are not recorded in the study. This is since most of the farmers do not keep any record of the fixed cost.

Total revenue (TR) of Rs. 22,777,732 is realized from the sale of stocked fish. Profit is the most important return which is determined by subtracting the total cost of production from the amount received from the stock sold.

- Budgeting analysis for fish production in the study area:

The budgeting analysis is employed to determine the profitability of fish production in the study area. The fish production in the study area generated Rs. 22,138,741 gross margin (GM) and Rs. 21,715,163 net farm income (NFI) during the production period indicated in table 2. Net farm income gives overall profitability by considering both fixed cost and variable cost and subtracting it from total revenue (Olukosi & Erhabor, 1988). A positive NFI indicates that the enterprise is profitable and worth continuing. While a negative NFI reveals loss and thus the venture requires total restructuring. Thus, NFI in the study is a positive and profitable one.

- Profitability and Viability Estimates for fish production in the study area:

The result of profitability analysis for the fish production in the study area is presented in Table 3

Table 3: Profitability ratios

Ratios	Values
Benefit Cost Ratio (BCR)	21.4
Rate of Return (ROR)	20.4
Expense Structure Ratio (ESR)	0.7
Gross Revenue Ratio (GRR)	0.5

Source: Field Survey, 2019

Benefit-Cost Ratio (BCR) is one of the concepts of the discount method of project evaluation, and as a thumb rule, any venture with BCR greater than one indicates profit, equal to one indicates break-even and less than one as a loss. Since the analysis ratio shows that BCR is 21.4 in the study area, the venture is profitable and viable. With the increase in capital and proper inputs, there is a possibility to have a higher value of BCR. Emokaro & Ekunwe (2009) adjudged the efficiency of resource-use among fisher-folk to be viable.

Rate of Return (ROR) on investment or rate of return on operating cost in the study area is 20.4. This implies that for every rupee invested, rupee 20.4 is gained by the respondent. Hence fish production is profitable enough.

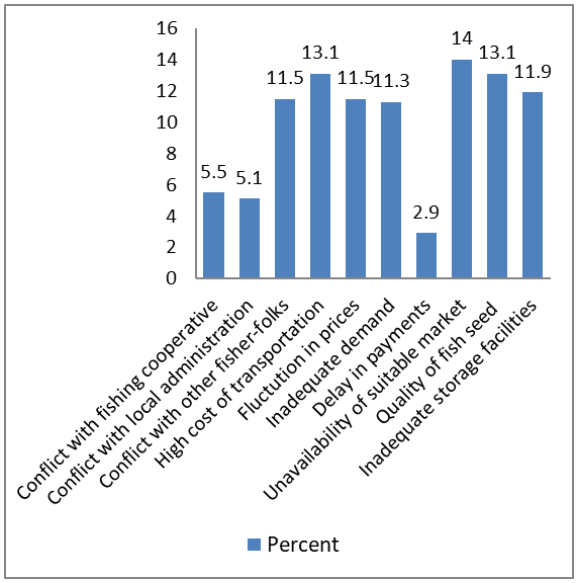
Expense Structure Ratio (ESR) is 0.7 which implies that about 7% is the fixed cost component of the total cost of production. This makes the business worthy since the increase in variable cost of the product will increase the total revenue leaving the fixed cost unchanged.

Gross Revenue Ratio (GRR) of 0.5 implies that for every rupee of return to the fish farm, rupee 0.5 is spent. The finding is similar to the study made by Olaoye, et al. (2013) Olaoye, et al. (2014).

Constraints of fish production in the study area

The survey revealed the constraints hindering efficient fish production in the study area. Figure 2 represents the information on problems encountered.

Figure 2: Constraints encountered by fisher-folk in fish production



Source: Field Survey, 2019

The fisher-folk witness many constraints in management, infrastructure, marketing and preservation in fish production. The constraints like unavailability of the suitable market (14%), quality of fish seed (13.1%), high cost of transportation (13.1%), inadequate storage facility (11.9%), fluctuation in prices (11.5%), conflict with other fisher-folks (11.5%), inadequate demand (11.3%), conflict with fishing cooperatives (5.5%), conflict with local administration (5.1%) and delay in payment (2.9%). Problems encountered most by the respondents were of unavailability of a suitable market to sell off the catch, scarcity of quality of fish seed and high cost of transportation of the catch. These cases were witnessed in cost and return analysis, where transportation and fish seed constituted a considerable proportion of the total cost.

There were other problems elicited in the field visit of the study area. The ph level of water rises during the rainy season due to improper drainage of rainwater. This in turn makes the water toxic for the breeding fishes and increases diseases, sometimes even lead to a high rate of mortality. Poaching settlements in nursing ponds, hatcheries and breeding ponds. Inadequate supply of water during the summer season forces the fisher-folk to harvest and sell the catch at throwaway prices. Insurance of the catch and inadequacy of timely and sufficient funds (capital and credit) was another important common constraint among fisher-folk.

CONCLUSION AND RECOMMENDATION

Inland fisheries have several positive impacts on the ecosystem like it reduces the pressure on the available wild stock that are already overexploited, boosts depleted stock which has limited reproductive success, ponds can substitute destructive land –use pattern like slash-burn farming etc. Since inland fish production is flourishing it has added advantage to India's GDP and export earnings.

As the findings are in favour of fish production a deep dive into government initiatives will help to get a clear picture of the subsidies and grants given to the fisherfolk. Promotion of integrated fish farming methods like paddy-cum-fish culture, poultry/pig/cattle/ duck-cum-fish farming, which will cut down the prices for feed and will provide added income

The burden of fishery development needs to be addressed by the government, research scientists, fisheries department and extension officers, administrators, financial institutions and fish-folks. It will further help to promote fish farming, organized markets and liquid funds for fish production in the study area.

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