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Fish production in Manipur- an economic analysis

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ABSTRACT

The present study was carried out in Manipur state to study the cost and returns of fish production under different farm categories and to find out the constraints of fish production. For this purpose, multistage random sampling procedure was adopted for the selection of the ultimate unit of samples. The data was collected from 100 selected fish farmers of Imphal-west district of Manipur during the period 2010-11. The fish farmers were classified into two categories i.e. category I (e" 1hectare) and category II (Â 1hectare) according to their allocation of area under fish farming. The study revealed that overall the average cost of fish production per hectare was Rs 99107.9. *Comparatively higher per hectare cost was observed in category I, Rs 109902.32 followed by category II, Rs 93036.04. .The total fixed investments per hectare have been highest on category II (small farms), followed by category I (large farms). On an overall average, Net Income per hectare was observed as Rs 27940.77. Comparatively, higher per hectare Net Income was observed in category II Rs 36963.96 followed by category I Rs 18917.58. The Benefit-Cost ratio has been found profitable in both the farm categories, it being higher in category II (1.4) than category I (1.17). The lack of training facilities relating to new technology, non-availability of good quality fingerlings, lack of storage facilities, financial problems and price fluctuation are some of the major constraints faced by the fish farmers.*

Keywords **:** Benefit-Cost ratio, constraints, cost and returns, fish, net returns.

Fishery sector occupies a very important place in the socio-economic development of the country. Fisheries are next to agriculture in terms of providing employment and food supply. In India, increased production of proteinaceous food is very necessary. The World Bank estimates that India is one of the highest ranking countries in the world for the number of children suffering from malnutrition. The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub-Saharan Africa with dire consequences for mobility, mortality, productivity and economic growth. The 2011 Global Hunger Index (GHI) Report ranked India 15th, amongst leading countries with hunger situation (IFPRI,2013). In the recent year, the development of fisheries has become an important activity because it has been recognized as a rich source of cheap nutritious food and as a powerful income and employment generator. About 35% of Indian population is fish eaters and the per capita availability of fish is 9.8 kg against the recommended 13g by W.H.O for nutritional security (CSO-MFS-2011). For the year 2009, the world total production of fish was 144.6 million tonnes and India ranks second in the world with the production of 7.85 million tonnes (Anonymous 2009). The percentage share of India is 5.43 % to the global total production. From the North-East India, Manipur is the third largest Inland fish producer (22,200 tones, 2011-2012), though the state has no marine fishery. During 2011-2012, out of the total fish production of Manipur, Imphal-West district only accounts 17.3%. Keeping all these aspects in view, an economic analysis of production of Inland fish in Imphal-West district, Manipur was done with the following objectives:

- To estimate the cost structures of fish production of Imphal-West district of Manipur in accordance with size of farming.
- To identify the important input factors in fish production process.
- To find out the returns of Inland fish production.
- To identify the problems faced by fish farmers in production of fish.

MATERIALS AND METHODS

Imphal-West district, Manipur was selected for the study purposively. Fish farming is confined in all the nine districts of Manipur but it is mostly concentrated in the four districts of valley region (i.e., Imphal-East, Imphal-West, Bishnupur and Thoubal) due to the availability of good marketing infrastructure and higher demand of fish of the mentioned districts. The study is based on both primary and secondary information. A list of blocks having fish farming was obtained from the District Statistical Office, Imphal-West. Only two blocks are there in Imphal-west district. These two blocks viz., Haorang and Wangoi blocks were selected for further selection of villages.

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By using simple random sampling, 12 fish farming villages were selected from each selected two blocks of the district. And by Proportional Allocation Method, 50 farmers were selected from the selected 12 villages of each Haorang Sabal block and Wangoi block. Thus a total of 100 sample fish farmers were selected. After collection of primary data the sample farmers were categorized in two groups according to their allocation of area under fish farming .The fish farmers is categorized as category I (having e"1 ha) and category II (having Â1ha). The primary data was collected by using structural questionnaires by adopting door to door survey method. Besides the above information, farmer perceptions of the problems faced by them were also enquired. The data referred to agricultural year 2010 -11.

Cost A_1 = 1. Value of hired labor (permanent and casual)
2. Value of hired machinery (Rs)
3. Value of manures (Rs)
4. Value of fingerlings (Rs)
5. Value of lime (Rs)
6. Value of fertilizers (Rs)
7. Depreciation on farm equipments
8. Interest on working capital
9. Land revenue
10. Other expenses

Cost A_2 = Cost A_1 +Rent paid for leased-in land.

Cost B = Cost A_2 + Imputed rental value of owned land + Imputed interest on fixed capital.

EVALUATION OF INPUTS

The procedures used for calculating the value of the different inputs are given below:

1. Hired human labour: The value of hired human labour was the actual wages paid in cash and kind. The human labour was hired for the supervision of fish, pond preparation, feeding, fertilizers, manuring, liming and harvesting of fishes.

2. Value of imputed family labour: It was worked out on the basis of hired labour charge.

3. Value of fingerlings: Fingerlings were valued on the basis of the prevailing market price. In case of home produced fingerlings, it was valued at the price prevailing in the locality.

4. Value of manures and fertilizer: The manures and fertilizers were valued by multiplying the physical quantities of different manures and fertilizers with their actual amount paid including transport charges. In case of farm produced manures, it was valued at the price prevailing in the market.

5. Value of lime: Lime is value on the basis of actual amount paid at the time of purchase and their transportation charge.

6. Land revenue :

Land revenue = (Total land revenue paid ℗ total area) × area under fishing

7. Depreciation for farm implements: Depreciation represents the amount or value by which a farm resource mostly the fixed capital or asset decreases in value as a result of cause other than a change in the general price of the item. The computation of depreciation would not be necessary if all items purchased were completely worn out by the end of each year. However, the items such as buildings, equipment and livestock, etc., are used up gradually over a long period of years and an important question arises about the determination of the cost of such articles for one specific year. Depreciation was calculated by using Straight line method (Kahlon and Singh, 1992).

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traight line method = (original cost – junk value) ℗ life span of the asset

8. Value of hired machinery: It was valued on the basis of actual amount paid.

9. Interest on working capital: It was charged at the rate of 12 % per annum. This rate of interest was charged by State Bank of India, Manipur.

10. Interest on fixed capital: It was charged at the rate of 10% per annum (R. JAYARAMAN, 1997).

11. Value of pond: Pond was valued by income capitalization method. This method is appropriate for the farm assets whose contribution to the income of the farm business can be measured and which have a long life like land/pond (Kahlon and Singh, 1992).

Value of pond = Average annual earnings of pond ℗ interest rate

FARM EFFICIENCY MEASURES

1. Gross farm income (GFI) = Gross value of fish (kg) × Price per kg of fish

2. Net farm income = GFI – Total cost

3. Family labour income = GFI – Cost B

4. Farm business income = GFI – Cost A1

5. Farm investment income = Net farm income + Interest on owned fixed capital + Rental value of owned land

6. Benefit – Cost Ratio = GFI ℗ Total cost

RESULTS AND DISCUSSIONS

General description of sample fish farmers

The total area of land holding in category-I large and category-II small were 52.75 ha and 39.75ha respectively in table-1. The overall total area was 92.50 ha. And the average farm size of category-I, category-II and overall were 1.46, 0.62 and 0.93 respectively.

Table 1: Average size of holding of sample fish farmers (in hectare)

Farm category	No. of farms	Total fish farming area (ha)	Average size of fish farm
Category-I	36	52.75	1.46
Category-II	64	39.75	0.62
Overall	100	92.50	0.93

It is evident from the table 2 that in category I and category II farms there is no leased-in land is taken in the total holding land area respectively. The proportion of cultivated owned land in category I is about 100 per cent of the total land holding of 52.75 ha. For category II the proportion for cultivated owned land is about 100 per cent of the total land holding area 39.75 ha.

The various expenses incurred in the production of fish among different categories of sample farms were collected from the fish farmers. The following tables show the cost of production of fish per hectare of all two categories of farmers.

Table 2: Land use pattern of fish sample farms

	Farm Category		
Particular	**Category I < 1 ha**	**Category II < 1 ha**	**Overalltotal**
1. Owned land	52.75 (100)	39.75 (100)	92.50 (100)
2. Leased-in land	0	0	0
3. Total fishing area	52.75 (100)	39.75 (100)	92.50 (100)

COST AND RETURNS OF FISH PRODUCTION

Table 3 shows the overall ha^{-1} average cost of fish production was observed as Rs 99107.9, 90.09% of which was variable cost and 9.9% fixed cost. Comparatively higher total cost of production was observed on category I (large farms) (Rs 109902.32) followed by category II (small farms) (Rs 93036.04) (Bera *et al*., 2006). The proportion of variable cost to total cost was higher in category I (92.73%) followed by category II (88.33%) which means that fish production was higher in category I farm by using more variable inputs. Of this, the paid out cost (cost A_1) was Rs 100139.8 for category I and Rs 76794.3 for category II which was relatively small. Since there was no leased in land, the value of Cost A_2 was same with Cost A_1 in both the farms category. And Cost B was Rs 106814 for category I and Rs 86097.17 for category II which was also relatively small. Among the variable cost, expenses on fingerlings constituted 31.72% to total cost for overall farm observing the most essential component of variable cost in all the farms. Comparatively higher expenses on fingerlings particularly in category II (40.2%) followed by category I (32.38%) . It further observed that overall, the average cost among the variable cost, manure, feed, hired labour and imputed value of family labour were important contributing 1.25, 25.11, 14.09 and 12.42% respectively. In all the farms, cost of manure, feed, hired labour and imputed value of family labour were the major cost items accounting for about 0.82, 25.42, 20.04 and 9.04% respectively in category I and 1.75, 24.74, 8.19 and 16.82% respectively in category II. But lime and fertilizer were not important inputs of expenditures in fish production for overall farm in this regards. However, the average cost incurred on lime was comparatively higher in category I (0.46%) than in category II (0.35%) and that of fertilizer was higher in category II (0.42%) than in category I (0.36%) (De, S. *et al*., 2014). Overall the average fixed cost of fish production was observed as 9.9% to total cost. The proportion of fixed cost to total cost was higher in category II (11.6%) than in category I (7.5%). The other essential component of fixed cost was imputed value of pond (6.47%) for overall farms.

Table 3: Variable and fixed cost of fish production for different categories of farms (Rs ha^{-1})

Sl.No	Items	Category I		Category II		Overall category	
A	**Variable cost**	**Rs**	**%**	**Rs**	**%**	**Rs**	**%**
1	Manure	900.39	0.82	1630.94	1.75	1367.942	1.38
2	Fertilizer	400.68	0.36	395.08	0.42	397.096	0.40
3	Lime	460.97	0.46	272.18	0.35	340.1444	0.34
4	Fingerling	32427	32.38	30875	40.2	31433.72	31.72
5	Feed	27148.19	25.42	21289.08	24.7	23398.36	23.61
6	Hired labour	25813.93	20.04	10645.28	8.19	16105.99	16.25
7	Imputed value of family labour	9052.28	9.04	12916.22	16.8	11525.2	11.63
8	Other expenses	460	2.43	240	0.65	319.2	0.32
9	Interest rate @ 6% for six months on working capital	5256.66	18.79	3920.85	7.8	4401.742	4.44
B	Total V.C	101920.1	92.73	82184.68	88.3	89289.4	90.09
C	Fixed cost:						
1	Imputed value of pond	5125.68	4.66	7142.18	7.68	6416.24	6.47
2	Land revenue	60.94	0.06	80	0.09	73.1384	0.07
3	Depreciation on farm Equipments	1247.16	1.25	1468.54	1.91	1388.843	1.40
4	Interest on fixed capital	1548.6	1.45	2160.69	2.51	1940.338	1.95
D	Total fixed cost	7982.38	7.5	10851.41	11.6	9818.559	9.9
	Total cost (B+D)	109902.32	100	93036.04	100	99107.9	100
	Cost A_1	100139.8		76794.3		88467.03	
	Cost A_2	100139.8		76794.3		88467.03	
	Cost B	106814		86097.17		96455.6	

Total cost = fixed cost + variable cost in table 3.

Table 4 presents comparative status of the two farm categories under consideration with respect to various farm efficiency measures. It is revealed from this Table that gross farm income on category-II farm was higher than the category-I farm. On an average, fish farmers were observed to earn a gross farm income of Rs 129575.2 ha^{-1}. The gross farm income was found higher in category II (Rs 130000.0) than category I (Rs 128819.9). Also the net farm income of category II (Rs 36963.96) was observed relatively large than category I (Rs 18917.58). For overall average farm, the Net Farm Income was calculated as Rs 30467.26 ha^{-1}. Besides the value of other farm efficiency yardsticks like farm business income, farm investment income, family labor income, etc for category II was observed higher than that of category I. The Table also reveals the Benefit-Cost ratio of category I and category II as 1.17 and 1.40 respectively. Since analysis of benefit-cost ratio is an important measure of efficiency, it is evident from Table that so far as inputs are concerned category-II farm with higher ratio seemed to have performed more efficiently than category-I farm. Similar findings were reported by Deepak Rathi, P.K. Awasthi and J.K. Gupta, 2004 and also by Rudrakant Chaudhary, P.K. Bisen, N.K. Raghuwanshi and S.Bakshi, 2004.

The farmers expressed numbers of problems faced in production of fish which are listed with their degree of constraints in ranks in Table 5 (Lakshmanan, *et al.* 1979). Main problems faced by majority of the fish farmers which affects on fish production were lack of drainage during rainy season, lack of training facilities relating to new technology, non-availability of funds from institutional source, scarcity and untimely availability of fingerlings and its high cost, manure, feed etc

For the foregoing study, it was concluded that the average total cost of production (ha^{-1}) was found higher on category I (Rs 109902.32) than that of category II (Rs 93036.04). Among the variable cost, expenses on fingerlings constituted 31.72% to total cost for overall farm observing the most essential component of variable cost in all the farms. The farmers of category-II scored over their counterparts

Table 4: Returns from fish farming for different category of sample farms (Rs ha^{-1})

	Particulars	Farm Category		Overall category
		Category-I	Category-II	
I	Gross farm income (GFI)	128819.9	130000.0	129575.2
II	Net farm income (NFI)	18917.58	36963.96	30467.26
III	Family labour income	27969.86	49880.18	41992.46
IV	Farm business income	28680.15	53206.00	44376.69
V	Farm investment income	25591.86	46266.83	38823.84
VI	Benefit-cost ratio	1.17	1.40	1.31

Table 5: Problems and constraints faced by the fish farmers in production of inland fish

Sl. No.	Constraint	Percentage of farmers reporting about the constraints.	Rank
1.	Lack of drainage during rainy season	90	I
2.	Lack of training facilities relating to new technology	85	II
3.	Non-availability of funds from institutional source	80	III
4.	Scarcity and untimely availability of good quality fingerlings and its high price	70	IV
5.	High price and shortage of manure, feed (oil cake and rice bran) and fertilizers	65	V
6	High wage rate of labour and high cost in other inputs such as tools and implements	60	VI
7	Lack of contact with competent fishery extension personnel	50	VII
8	Difficulties in technical operations	45	VIII

in category-I in respect of the efficiency yardsticks like net income, farm business income, farm investment income, etc including benefit-cost ratios. The difference in the productivity level between the two categories was due to the difference in the level of input used. The farmers should be given adequate training facilities relating to new advanced technology and recommended suitable package of practices. This is related to the contact of fishery extension personnel in large extent. Besides under water management programme, water should be controlled during flood by digging more cannals to drain out excess water. So government should take importance on certain schemes of proper irrigation and drainage system at village level.

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