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RR Meera Raj
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

TP Lazarus
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

F Thasnimol
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

J Brigit
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

S Visveswaran
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

Corresponding Author:
RR Meera Raj
Kerala Agricultural University,
College of Agriculture, Vellayani,
Thiruvananthapuram, Kerala,
India

Economics of pond fish cultivation in Alappuzha district of Kerala

RR Meera Raj, TP Lazarus, F Thasnimol, J Brigit and S Visveswaran

Abstract

Fish is an important component of food basket especially in developing countries. In addition to the contribution towards a nutritional diet, fishing sector acts as an employment generator. Inland fish farming involves any activity conducted to extract the fish and other aquatic organisms from "inland waters". The term "inland waters" is used to refer to lakes, rivers, streams, ponds, inland canals, dams and other land-locked (usually freshwater) waters. Pond fish farming is an important division of inland fish farming where, pond which is utilized for rearing fish is an artificial ecosystem created by humans. In an expanding population, demand for fish outpaced availability. Even though, higher initial investment is a major constraint in pond fish production, pond fish farming is an economically feasible project.

Keywords: Economics of pond fish, fisheries, inland fish farming, pond fish farming

Introduction

Fisheries industry, while helping the farmers in doubling income, also aids in providing non-vegetarian protein to the major chunk of human population. Fisheries sector comprising of both marine and inland fish farming, is providing employment to a good proportion of the world population. Inland fisheries sub sector is gaining momentum due to vast fresh water and brackish water resources, paving way to higher contribution towards inland culture and capture fisheries. Pond fish farming is an important sector in inland fish farming, which comprises of an artificial ecosystem created by humans for rearing fish. Inland fish production constituted 71 percent of the total fish production in India during 2017-18 (Government of India, 2018) [3]. Inland fisheries can further be exploited and export markets can be widened by developing this sector. The total inland fish production in Kerala was 2,05,430 tonnes during 2019-20. From this; 50,131 tonnes of inland fish (24.4 percent) were contributed by Alappuzha district (Government of Kerala, 2020) [4].

Materials and Methods

Objective

To study the economics of pond fish farming in Alappuzha district of Kerala.

Methodology

The study was based on the primary data collected from Alappuzha, one of the major inland fish producing districts in Kerala. Economics of pond fish farming was studied using Benefit-Cost (BC) ratio concept. The data pertained to the year 2020-21.

Review of Literature

The importance of the fishing industry for the economy of Kerala lies not only in its contribution to foreign exchange earnings. Fish provides about three-fourths of the animal protein intake of the state's population and for the poor it was the main source of animal protein. Eight lakh people depended on the fisheries industry for their livelihood during 1980s (Meynen, 1989) [10].

Among the costs in culture fishing, harvesting charges accounted maximum with 32 percent of the total cost followed by maintenance, fingerlings and lease amount. The benefit cost ratio was 1.57 for fish production in major tanks and 1.14 for minor tanks. The average cost per kg of fish was worked out to be Rs. 5.85 in the case of reservoirs (Anil, 1994) [1].

Consumer reaction in many of the fishery studies had pointed out that fish was regarded as a healthy food compared to other non-vegetarian foods (Brunso, 2003; Gross, 2003) [2, 5].

In India, during 1985-2000, there was a five-and-half-fold increase in freshwater aquaculture fish production. It was due to the appropriate technologies, financial investments, and entrepreneurial enthusiasm in the fisheries sector in the period (Katiha *et al.*, 2005) [8].

Jayasankar assessed the situation with freshwater aquaculture in India during the year 2018. In his study, he proposed that it was apparent that the methodologies for expanding fish production from freshwater aquaculture should be focused towards vertical and horizontal development of the sector.

Kumar *et al.* (2013) [9] analysed the economics of fish production in Bharatpur district of Rajasthan. Benefit Cost Ratio (BCR) was higher in small owned ponds (2.34) when compared to small leased ponds (2.12). In the case of large sized ponds, it was higher in leased ponds (2.71) against owned ponds (2.00).

Halli in 2019 [6] calculated the total investment for establishing one acre of fish pond in the North Eastern Karnataka region and found out to be around Rs. 9,03,299.67 per acre. With regard to costs, total cost of cultivation was Rs. 1,69,373.85 per acre of fish pond. Variable cost constituted about 81 percent of the total cost (Rs. 1,38,071). Feed cost was the major item of variable cost which constituted 41.98 percent of the total cost. On an average, 4110.97 kg of fish was produced in one acre of pond and were sold at the price of Rs 98.45 per kg. The gross return and net return realised was Rs. 4,04,725.21 and Rs. 2,35,351.36 per acre respectively. The return per rupee investment was around Rs. 2.34 suggesting that the fish production in pond is an economically feasible option to enhance the income of the farmer.

Results and Discussions

1. Economics of pond fish farming

Investment involved in establishing the fish pond

The total investment required for establishing the fish pond in

one acre was estimated to be Rs 35,18,705. The detailed investment pattern is shown in table 1. In the establishment cost, the major investment item was tarpaulin which costed Rs. 11,56,015 and accounted for 33 percent of the total investment cost (figure 1). Farmers used high-quality tarpaulin which overweighed the cost of construction of ponds which is contradictory to that of other states such as West Bengal, Karnataka and Tamil Nadu where they do not use tarpaulin to line the ponds. Farmers spent around Rs. 45,000 for tarpaulin (more than 250 GSM) for 2 cents of pond area. Digging of pond also accounted for sizeable share in the total cost and it was 31 percent of total investment cost, followed by the cost of net (14%), cost of frame and cost of motor (8% each). Other items such as sand bags, input-output pipes, weighing balance, CCTV, utensils, etc. which were necessary for establishing of pond fish production unit shared the remaining 8 percent of the total investment cost.

Table 1: Investment pattern for establishing fish pond (Rs/acre)

Sl. No.	Particulars	Fixed Cost
1	Digging of pond	10,89,266
2	Farm building	45,833
3	Frame	2,74,399
4	Sand bags	25,612
5	Net	4,99,173
6	Tarpaulin	11,56,015
7	Input output pipes	40,270
8	Motor pump	2,65,500
9	Weighing balance	5,987
10	Name Board	375
11	CCTV	32,000
12	Utensils	1,789
13	Fishing net	32,892
14	Miscellaneous	49,594
15	Total	35,18,705

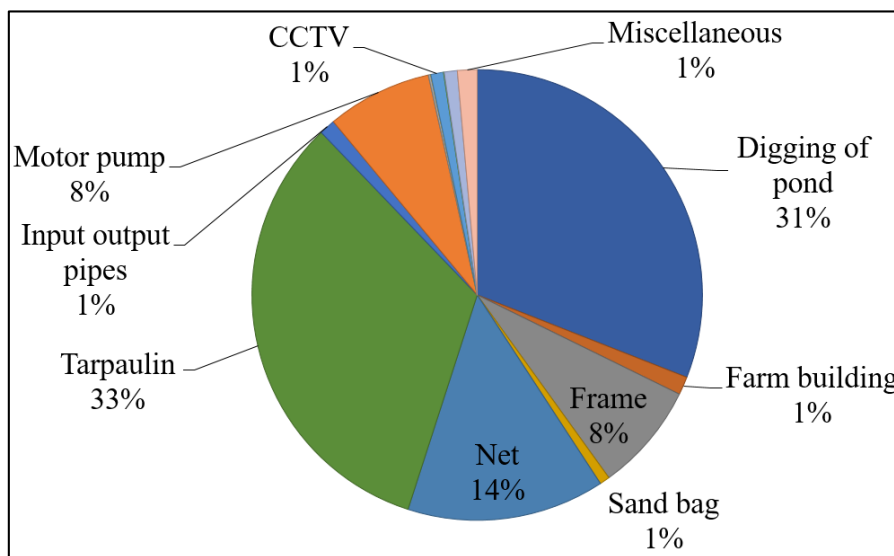


Fig 1: Pie chart showing the percent share of cost involved in the fixed cost.

Costs and returns of pond fish cultivation

The total annual cost incurred by the farmers for rearing fish in the pond was Rs. 16,85,631 per acre per year. The variable cost was Rs. 15,20,863 and it accounted for 90.22 percent of the total cost, while the fixed cost was Rs. 1,64,768 and it accounted for 9.7 percent of the total cost. Among the operational costs, the cost of feed was the major item of

expenditure which was worked out to be Rs. 6,49,675 and accounted for 38.54 percent of the total cost. The costs involved in pond fish cultivation are presented in table 2. Feed given to the fishes varied according to the stage of production. Initially, starter feed was given, which is more expensive when compared to the later feeds. The price of feed ranged from Rs. 40-110 per kg with an average of Rs 75/kg.

Farmers mainly used feeds such as Growfin (Growel company) rated Rs 1,800 per 40 kg sack and Spark (Godrej company) rated Rs 1,510 per 40 kg sack. Feed cost was followed by family labour cost which was Rs. 5,39,734 per

acre and accounted for 32 percent of the total cost. Amount was not spent on purchasing water as every farmer had wells which supplied enough water.

Table 2: Cost of pond fish cultivation (Rs/acre/yr)

Sl. No	Particulars	Cost	Percentage
A	Variable cost		
1	Family labour cost	5,39,734	32.01
2	Material cost		
	a) Seed cost	1,07,785	6.39
	b) Manure cost	3,389	0.20
	c) Feed cost	6,49,675	38.54
	d) Lime	1703	0.10
	e) Solution kit	66,515	3.94
3	Maintenance	52,567	3.18
4	Interest on working capital (@ 7%)	99,496	5.90
	Sub total	15,20,863	90.22
B	Fixed cost		
1	Depreciation	1,49,789	8.88
2	Interest on fixed cost (@ 10%)	14979	0.88
	Sub total	1,64,768	9.77
C	Grand total (cost of cultivation)	16,85,631	100.00

The quantity of fish harvested and returns calculated from each fish species is summarized in table 3. It was found that from the total quantity of 19,763.52 kg of fish produced per acre, major portion of contribution was from Pangassius species. Majority of the farmers faced the constraint of poor quality of supplied fingerlings. It was noted that the mortality of fingerlings were 25 percent, in the study area. Quantity of

fish harvested from Pangassius species was 13,135 kg/acre (66.46 percent). Harvest from Tilapia and Anabus were 4,210 (21.30 percent) and 2,417 kg per acre (12.23 percent) respectively. Total returns from fish production were estimated to be Rs. 35,84,446.40 per acre. The table revealed that the returns from Pangassius, Tilapia and Anabus were Rs. 21,01,638.20, 8,42,064.20 and 6,40,764 respectively.

Table 3: Returns from different fish species

Sl. No.	Fish species	Quantity produced (kg/acre)	Unit price (Rs./kg)	Total returns (Rs/acre)
1	Pangassius	13,135.23 (66.46)	160.00	21,01,638.20
2	Tilapia	4,210.32 (21.30)	200.00	8,42,064.20
3	Anabus	2417.97 (12.23)	265.00	6,40,764.00
	Total	19,763.52 (100.00)		35,84,446.40

Note: Figures in parentheses denote percentage to grand total

The discounted cost and returns were worked out for an acre for 2 years and depicted in table 4. The discounted cost was Rs. 57,88,669.41 and discounted returns was Rs. 63,05,076.36 with net discounted returns of Rs. 5,16,406.95. The discounted benefit cost ratio was found to be 1.08. The benefit cost ratio on variable cost was found to be 2.13, which also showed that the pond fish farming is an economically feasible project.

Table 4: Economic feasibility of pond fish cultivation

Sl. No.	Particulars	Value
1	Discounted cost (Rs.)	57,88,669.41
2	Discounted benefit (Rs.)	63,05,076.36
3	Discounted benefit cost ratio	1.08
4	Benefit cost ratio on variable cost	2.13

Conclusion

The study revealed that inland pond fish farming was economically feasible. Every one rupee invested yielded 2.13 rupees on the variable cost. Government may adopt certain measures to subsidize the feed and reduce the cost for pond

fish production so that more farmers especially young generation would be attracted to the practice of fish farming.

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