



## ECONOMIC ANALYSIS OF POND FISH CULTURE AT WAHIM DISTRICT OF MAHARASHTRA IN INDIA

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**Abstract:** This research work was designed to assess the profitability of fish farming in Washim district of Maharashtra State India. A purposively sampling technique was used to select twenty (20) fish farmers from the study area. Data collected were analysed using descriptive statistics- frequency, percentages, while budgetary and gross margin was used to determine Farm Net Income (FNI). The study indicates that variable cost accounted for 68.15 per cent of the total cost while fixed cost of production accounted for 31.37. The result shows that a total cost (TC) was 25043.50 Rs. incurred by a respondent per farming season while total revenue (TR) 70329.60 Rs was realized with a returning net profit of 45112.66 Rs per farmer per annum. However the BC ratio was 1:2.79. Thus indicating that fish farming is profitable in the study area. The study reveals that the problems of fish seller during marketing time, which are discussed briefly in the present paper. Constraints encountered by the farmers includes, insufficient funds, high cost of feed, lack of storage facilities and market price fluctuation. The study thus recommend that government and other co-operative societies help to provide cheap sources fish feed, while also making funds available amongst other.

**Keywords:** Fish Farming, Fish Production, Total cost, Gross Profit, Net Profit, Profitability.

### I. Introduction

**1.1 Aquaculture** is the practice of rearing, growing or producing products in water or in managed water systems. Products of aquaculture include plants, insects, crustaceans, bivalves and pearls, fish, and anything else grown in water. Mires, also defined aquaculture as the commercial rearing of fish in conditions where all the basic means of production can be controlled within their respective limitations and from which producers aim to obtain optimal economical results.

India is the third largest producer of fish in the world next only to China and Peru and it ranks second in the production of Inland fishes. Fish production has increased from 0.75 million tons in 1950 to 6.90 million tons in 2006-2007, registering a compound growth rate of 4.53% per annum which has been the fastest growing one in respect of any item in the food sector. The fisheries sector contributes Rs. 19,555 cores to national income which is 1.4% of the GDP and 4.7% of the agricultural GDP. Out of total Indian exports, the share of export is 3.32%. The distribution however is

that it is the 3rd largest contributor to the net foreign exchange earned by the country. This sector accounts for 13.95% of total exports of the Indian economy. Fishery sector, besides contributing towards nutritional security component of the food basket of India, is recognised for providing livelihood and employment to millions of people.

India is endowed with a large number of freshwater bodies like rivers, lakes, and natural as well as manmade reservoirs, ponds and vast work of irrigation canals. These fresh water bodies support a variety of fish of which some are of great economic importance. With the ever increase of population demand of food increase continuously. This is not full filled by capture fisheries because of ecological disturbances. Culture fishery has little scope through healthy management with sustainable management practices.

After blue revolution, aquaculture became part of farmers' life. So many farmers turn their poor productive, unfertile soils into fishponds and get profit from them by following scientific methods.

Culture of fresh water fishes is not new aspect to Indians.

Nutritional standards of the people are improved by the taking fish as an item of food, because it is so nutritious rich in easily digestible protein resources. These are also essential for prevention of blindness and for the proper development and growth of a child as well as for nursing and lactating mother. Yet, it receives such a low priority as a food item in the scheme of things and this is a paradox in itself. Besides providing nutritional security and also provides the employment for several millions peoples belong to the poor and backward community of the rural people.

Globally fish prides about 16% of the animal protein consumed by human beings. Fish meat contains all the essential amino acid and minerals viz., iodine, phosphorus, potassium, iron, copper and vitamin A & D in desirable concentrations. It serves as valuable ingredient to a healthy diet because of its low carbohydrate and unsaturated fat contents. It is often recommended by doctors to heart patients since it is an excellent source of Omega 3 fatty acids.

#### **Economic importance of aquaculture and Fishery Management**

- ✓ It increases food production, especially of animal proteins, and achieving self-sufficiency in aquatic products supplies.
- ✓ It contributes to improvement of human nutrition.
- ✓ It generates new source of employment in rural areas, including part-time employment of farmers and small-scale fishermen, and arresting the migration of people from rural to urban areas.
- ✓ Earning foreign exchange through export or saving foreign exchange through import substitution.
- ✓ It promotes agro-industrial development, which could include processing and marketing of fishery products, feeds and equipment for aquaculture, and seaweed culture for the production of marine colloids, pearl, oyster culture etc.

- ✓ It creates and maintains leisure-time activities, including sport fishing and home and public aquaria.
- ✓ Overall development of rural areas through integrated projects, including aquaculture.

#### **1.3 Objectives and Scope**

- 1 To study the socio economic characters of the selected entrepreneurs.
- 2 To estimate the profitability from farm pond.
- 3 To study the marketing of fish.
- 4 To identify the constraints during production and marketing of fish.

#### **II. Methodology**

Standard cost concept was used for estimating profitability. During this project, it was totally focus on profitability, production and marketing of fish. The present study was conducted in Risod taluka of Washim district. The data was collected for the period of 2017-18. The targeted population that was used for this study, comprised of 20 fish farmers who were into fish farming in Risod taluka of Washim District.

#### **2.1 Analytical Frame Work**

Various analytical tools were used to achieve the objectives of the study viz; frequency distributions, tables, percentages, gross margin (GM) and net farm income (NFI)

The total cost per quintal composed of the average variable cost per quintal and average fixed cost per quintal and was calculated by addition of the these two costs.

Gross margin is the difference between the gross farm income and the total variable cost.

$$\text{Therefore; GM} = \text{GFI} - \text{TVC} \text{----- (1)}$$

Where; GM = Gross margin

GFI = Gross farm income

TVC = Total variable cost

The net farm income gives an overall level of profitability of an enterprise by putting both fixed and variable costs into consideration and subtracting the total costs from the total revenue.

$$\text{Therefore, NFI} = \text{TR} - \text{TC} \text{----- (2)}$$

Where; NFI = Net Farm Income,

TR = Total revenue,

TC = Total cost

### 2.2 Benefit Cost ratio:

A benefit cost ratio (BCR) or Profitability index rate is an indicator, used in formal discipline of cost-benefit analysis, that attempts to summarize the overall value for money of a project or proposal.

$$B. C \text{ Ratio} = Tr/Tc$$

Where,

B. C. Ratio = Benefit cost ratio

Tr = Total returns of production

Tc = Total cost

### III. Results and Discussion

#### 3.1 Socio-economic characteristics of the respondents.

Table No.1 revealed that, majority of the respondents were males (75 per cent) while 25 per cent were females. The result portrays that men dominated the study population and were more involved in fish farming in the study area. The result also indicated that 35 per cent of the respondents fell within the age group of 41>50 years. The result indicates that majority of the farmers were at their economic active age group. The result also shows that all most all the respondents were married.

**Table 1: Socio-economic characteristics of the Respondents (N=20)**

Variables	Frequency	Percentage %
<b>Sex</b>		
Male	15	75
Female	05	25
<b>Age</b>		
Bellow 30 yrs	-	-
30>40	05	25
41>50	07	35
51>60	04	20
Above 60	04	20
<b>Marital status</b>		
Single	-	-
Married	20	100
Divorced	-	-
<b>Educational background</b>		
No formal education	04	20
Primary education	02	10
Secondary education	11	55
Tertiary education	03	15
<b>Occupation</b>		
Fish farming only	-	-
Fish farming & other farming	20	100
Civil servant	-	-
<b>Income</b>		
Less than 1 lakh	03	15
1-5 lakh	12	60
Above 5 lakh	05	25

The Majority (55%) of the respondents had secondary education. Where as 15% had tertiary education, while 20% had no formal education. This shows that fish farmers in the study area were educated and can combined scarce resources for efficient production. All the respondents engaged in

other type of farming with combination of fish farming. The result also shows that, majority 60 % respondents had annual income in between 1 to 5 lakh and 25 % respondents had above 5 lakh income whereas less than 1 lakh income had 15 % respondents.

**Table 2: Types of cultural species stocked (N=20)**

Particulars	No. of Farmers	Percentage
<b>Name of species stocked</b>		
Catla	20	100
Pankaj	20	100
Pomplet	19	95
Rupchand	18	90
All four types of fishes	17	85
<b>Pond type</b>		
Concrete pond	-	-
Tarpaulin pond	20	100
Earthen pond	-	-
<b>Sources of finance</b>		
Personal savings	20	100
Friends/ relatives	-	-
Co-operative societies	-	-
Bank loan	-	-
<b>Sources of irrigation</b>		
Well	20	100
Tubewell	8	40

Table No. 2 indicate that the various type of cultural species stocked by respondents, shows that all the respondents cultured catala fish and pankaj. However, 95 per cent of the respondents cultured pomplet. These species may have more demand in the market.

All the respondents used Tarpaulin pond structure for culturing fish. The fund was obtained from personal savings, no one obtained from friends or relatives or loans from banks. However, state government has providing subsidy for construction of fish pond.

### 3.2 Economic Analysis

**Table No. 3: Average capital investment in establishment of farm pond (Farm pond size 24 x24 m<sup>2</sup>)**

Particulars	Amount (Rs)	Percentage (%)
<b>Pond establishment cost</b>		
Digging cost	50000.00	22.72
Polythene sheet	140000.00	63.63
Fencing cost	30000.00	13.63
<b>Total</b>	<b>220000.00</b>	<b>100.00</b>
<b>Subsidy from State Gov.</b>	<b>165000.00</b>	<b>75.00</b>
<b>Actual Expenditure</b>	<b>55000</b>	<b>25.00</b>
<b>Establishment cost per year (life 7 years)</b>	<b>7857.14</b>	

It is revealed from the Table No: 3 that, the total investment in capital assets in construction of farm pond was Rs. 220000. The investment on polythene sheet 63.63 % and digging cost 22.72 % was major investment followed by fencing about 13.63 %. On the other hand, State Government provide subsidy for construction of farm pond near

about 75 per cent i.e. Rs. 1.65 Lakh per pond. The establishment cost for one year was Rs. 7857.14.

The study examined the profitability of fish production in the study area. To determine the profit level, attempts were made to estimate the cost and return analysis from fish farming using input used, cost, and yield or output data generated from the respondents.

**Table 4: Variable cost for fish rearing (per annum)**

Cost Items (A)	Amount (Rs)	Percentage (%) share in Total Cost	Physical Units
Fish feed	9023.15	35.78	2.75 Quintal
Fish seed	3174.06	12.59	2232 Seeds
Organic manure	3300.66	13.09	1.15 Tons
Fuel	89.53	0.36	1.50 Litre
Labour	1224.36	4.86	2 Labours
Water Treatment	329.01	1.30	20.25 Kg.
Transportation	45.63	0.18	-
<b>Variable Cost (A)</b>	<b>17186.40</b>	<b>68.15</b>	

The variable cost is personated in Table No.4, reveals that the variable cost shows that larger amount of money spent by fish farmer in the study area was mainly on purchase of fish feeds and manure of which fish feeds accounted for 35.78 per

cent and manure 13.09 per cent of the total annual expenditure. However, 68.15 per cent share of variable cost was estimated in total cost for fish rearing.

**Table 5: Fixed cost for Fish rearing (per annum)**

Particulars	Amount (Rs)	Percentage (%) share in Total Cost
<b>a) Pond Establishment cost</b>	7857.14	31.16
<b>b) Depreciation of farm implements</b>		
i. Knives/cutlasses	27.00	0.11
ii. Dagnet	100.00	0.40
iii. Weighing balance	26.40	0.10
iv. Cart boards	20.00	0.08
<b>Fixed cost (B)</b>	<b>8030.54</b>	<b>31.84</b>

The fixed cost per annum was accounted 31.84 per cent of the total cost; of which the major components were pond construction i.e. 31.16 per cent.

**Table 6: Cost and returns of fish rearing**

Particulars	Amount (Rs)	Percentage (%)
Variable Cost (A)	17186.40	68.15
Fixed cost (B)	8030.54	31.85
<b>Total Cost (A+B)</b>	<b>25216.94</b>	<b>100.00</b>
<b>Production (per Annum)</b>	<b>10.56 qtls</b>	
<b>Price (per qtls)</b>	<b>6660.00</b>	
Gross returns	70329.60	
Net profit	45112.66	
<b>Cost of Production (Rs./Qtls)</b>	<b>2387.97</b>	
<b>Benefit /cost Ratio</b>	<b>1:2.79</b>	

The result shows that a total cost (TC) 25216.94 Rs. was incurred by a respondent per cropping season while total revenue (TR) 70329.60 Rs. was realized with Analysis of The Profitability of Fish Farming in Risod taluka of Washim District with net profit of Rs. 45112.66. Thus the study indicates that fish farming in the study area was

profitable with benefit cost ratio 1:2.79. The cost of production was estimated 2387.97 Rs./ Qtls.

### 3.3 Constraints during production:

#### Constraints Encountered by Fish Farmers:

Fish farmers were confronted with a number of problems in fish farming enterprise in the study area:

**Table 7: Constraints Encountered by Fish Farmers in the Study Area. (N=20)**

Sr. No	Constraints	Frequency	Percentage
1	Poor yield of fish	20	100
2	High cost of fish feed	20	100
3	Disease and pest Infestation	08	40
4	Insufficient capital	08	40
5	Market price fluctuation	14	70
6	High cost of Transportation	07	35
7	Inadequate storage facility	08	40
8	Insufficient Water	01	05
9	Lack of technical knowledge	03	35

Table No.7: shows that the major constraints were poor yield (100%) and high cost of feed (100%). Similarly 70 per cent of the respondents considered price fluctuation and high cost of fish feed as a problem facing during fish production in the study area

The minor constraints were disease and pest infestation (40%), insufficient capital and inadequate storage facility. However the other problems were storage facilities and lack of technical knowledge as fish rearing.

### 3.4 Fish marketing system in Risod Taluka of Washim District.

It was found that, marketing costs including handling and transportation of big size fishes was comparatively higher than that of small varieties of fishes. Fisherman selling fishes in market at the

Risod taluka. The fluctuation in prices of fish was very high because of the uncertain nature of production, Variation in short run supply, highly inelastic bumper catch on any day will slash down the prawn and fish prices and a small catch on any day will boost the prices to very high level. After the closing time of the market, the Retailers stored their unsold fishes in Refrigerator and those people who are not unable to store are willing to sell their fishes at comparatively low rates.

#### Identified Marketing channels in the study area:

- 1) Fisherman-Auctioneers-wholesalers-Retailers-Consumer.
- 2) Fisherman-Auctioneers-Retailers-consumer.
- 3) Fisherman-Auctioneers-commission agent-wholesaler-Retailer-consumer.
- 4) Fisherman-Auctioneers-Consumer.

**Table 8: Constraints during Marketing**

Sr No.	Constraints	Frequency	Percentage %
1	Demand driven market	12	60
2	High Perishability	20	100
3	Inability to sell produce/ goods quickly	14	70
4	price fluctuation	18	90
5	Arbitrator charges by Auctioneers	07	35
6	Inadequate union activities	11	55

According to the perception of the farmers and some market intermediaries the major problems faced in marketing of fish are documented and presented in Table No.8. Low production and high demand in rural areas necessitates efficient marketing system to benefit all producers, consumers and market intermediaries. High perishability (100%), quality deterioration result lower income of intermediaries are also major problems faced by

market functionaries. According to the perception of market functionaries high perishability had 70 % and More than 90 % are attached to the problems related price fluctuation, Arbitrator charges 35 %, high bargaining power of the consumers, lack of government support and Inadequate union activities etc.

#### IV. Conclusion and Recommendations

##### 4.1 Conclusion

1. The result of the study concluded that fish farming in Risod Taluka of Washim District was highly feasible and profitable.
2. The benefit-cost ratio recorded good value of 2.79 and net profit 45112.66 Rs.per annum.
3. The result also reflected that age and level of education of the fish farmers have positive relationship with the farmers output.
4. The larger amount of money spent by fish farmer in the study area was mainly on purchase of fish feeds, organic manure and Fish seed. It can be reduced by providing good quality input at reasonable prices.
5. It also need to educate the farmer for fish farming as a subsidiary enterprise to increase the farm income.

##### 4.2 Recommendations

1. The high cost of fish feed has been corroborated by previous findings of diverse study on fish farming & production hence farmers forming a formidable group of co-operative societies with aid with non govt organization and other organised private sectors to establish fish feed mill for quality feed at affordable price.
2. The cost of pond construction is another great limitation which govt could intervene by training more extension agents on sourcing least cost of pond construction & materials.
3. Govt should also provide transportation facilities & good infrastructural facilities within the study area to encourage the fish marketers.

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