

# A Study of Profitability and Socio Economic Aspects of Fish Cultivation: A Case Study on Selected Fishermen of West Bengal, India

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## Abstract

Fish is considered to be a vital source of both food and income to many people in developing countries like India. Fish farming in India is supposed to be the way of connecting the gap in the short fall between total domestic fish production and the total domestic demand. The objective of the present survey based study is to find out the profitability of the selected fisherman from their cultivatable pond of Shyampur area of Howrah district, West Bengal, India and tries to study the socio-economic pattern, lifestyle, educational background as well family profile of the said fishermen. The result of the study shows that level of education, size of land holding, annual family income from fish culture, etc., are important factors affecting the utilization of pond fish farming. The study shows that there is steady growth of profit of each salesman which is about more than half of sale. The fishermen should be brought under the insurance coverage from protecting them from losses arising out of natural calamities and should be given amenities on training program, input availabilities, credit facilities and amenities for education so that they can be well responsive of their problems.

**Keywords:** Fish, cultivation, profitability, socio-economic etc.

## 1. Introduction

Fish is considered to be a vital source of both food and income to many people in developing countries like India. Aquaculture is an industry that encompasses the cultivation of fish (fin and shell fish) in a controlled system for commercial recreation or resources management purposes with the aim of increasing production beyond natural limit (O.A Ayinla, 2003). Fish farming is the principal form of aquaculture, while other methods may fall under mariculture. Fish farming involves raising fish commercially in tanks or enclosures, usually for food. There are two kinds of aquaculture: extensive aquaculture based on local photosynthetic production and intensive aquaculture, in which the fish are fed with external food supply. The management of these two kinds of aquaculture systems is entirely different. India is a large producer of inland fish, ranking next only to Japan. Out of the total inland fish production of over 3.6 million metric tons, more than 60% is contributed by fish culture in ponds and reservoirs. The average productivity from ponds on the national level is around 2,500 kg/ha/year, though in Andhra Pradesh and Haryana, it is more than 5,000 kg/ha/year, while in some other states like Bihar and UP it is anywhere between 1,500 and 2,500 kg/ha/year. Fish culture is adopted by all kinds of farmers – small and marginal ones, relatively larger farmers and those who do it on commercial scale. Table-1 below shows the production of fish and fish seed in West Bengal.

**Table: 1: Production of Fish and Fish seed in West Bengal**

| Particulars                                   | 1990-91 | 2000-01 | 2011-12 | 2012-13 | 2013-14 |
|-----------------------------------------------|---------|---------|---------|---------|---------|
| 1. Production of Fish (in thousand tonnes)    |         |         |         |         |         |
| (a) Inland                                    | 555     | 879     | 1290    | 1338    | 1392    |
| (b) Marine                                    | 125     | 181     | 182     | 152     | 188     |
| Total                                         | 680     | 1060    | 1472    | 1490    | 1580    |
| 2. Production of Fishseed (number in million) | 7552    | 8850    | 13846   | 15002   | 15890   |

**Source:** Directorate of Fisheries, Govt. of West Bengal, adapted from Statistical Handbook, 2014.

Fish farming is supposed to be the way of connecting the gap in the short fall between total domestic fish production and the total domestic demand. Although fish farming plays this kind of perceived role, there is low level of fish production which is due to resource use constraints such as feed supply, low managerial know-how, low capital hindering the pace of development in the fish farming sub-sector. Nevertheless, a great deal of opportunity still exists in small scale fish farming business.

### 1.1. Factors affecting fish production:

Fish production passes through several stages like pond preparation, control of weeds, liming, proper stocking, monitoring of physico-chemical parameters, use of organic and inorganic fertilizer, supplementary feeding, netting, stock manipulation, harvesting etc. While selecting ponds for cultivating fish, the following factors should be considered:

(a) Appropriate size and shape of pond, (b) Assured supply of adequate quantity of water (c) quality of soil and water of the pond congenial for fish cultivation (d) connectivity by road from pond to market place for ease of transportation.

In view of the above backdrop, the objective of the present survey based study is to find out the profitability of the selected fisherman from their cultivatable pond of Shyampur area of Howrah district, West Bengal, India and tries to study the socio-economic pattern, lifestyle, educational background as well family profile of the said fishermen.

## **2. Methodology and data base:**

The study has been conducted by survey method by taking primary or raw data collected from field survey by visiting different ponds of the entrepreneurs under our study. For the purpose of the study, we have surveyed 7 fishermen at Shyampur area.

### **2.1. Sampling Plan**

We collect data from the above locations near Shyampur P.S, the core area of Shyampur region, Howrah, West Bengal, India.

### **2.2. Sampling Method**

In case of choosing the sampling method here, the first priority is random sampling method. Considering this method in mind here, we have tried to focus on those samples which are easy to get access. Sample size of the study is 7.

### **2.3.. Sources of Data**

The study is mainly dependent on primary data collected through a series of questionnaire thrown upon the different entrepreneurs of the fish cultivation at particular locality. But we have to also rely on secondary database for review of literature, technique used to compute results etc. Therefore, the study is involved in collection of data both from the primary and secondary sources. Different types of data and their sources are discussed under the following heads:

**(a) Primary Data:** Primary data were collected by the researcher through personal interview with a structured questionnaire by appointing several surveyors. A structured interview schedule was developed incorporating all the queries to accomplish the objectives set for the study. The collected data were tabulated for analysis.

**(b) Secondary Data:** The secondary sources include different web sites, books, journals, annual report and unpublished research works.

A few socio-economic indicators are identified in the study i.e. Gender of fish farmer, age, education, landholding, family size, housing pattern, fuel for cooking, health service, mode of bank loan etc. are included.

## **3. Analysis of result:**

The following table shows that the study has been conducted with young and middle-aged fish farmers being aggressive and energetic people willing more to adopt new technology than older farmers. The survey of the study suggests that fish farmers in the study are moderately educated to adopt new technology in fish cultivation. In fact, literacy rate of pond fish farmers can play a crucial role in proficient management and operation as well as in booming production of fish. Education and farming efficiency are intimately related and education generally has a positive effect on farm productivity. The pond area and water depth are the important determinant of fish productivity as it provides living space for fishes. In the present study, it was found that the average pond size in the study area was found to be 3 bigha in the study area.

**Table: 2: Socio-economic profile of respondents**

|                                             | Name of entrepreneurs |                                  |                                  |                                |                                  |                             |                                  |
|---------------------------------------------|-----------------------|----------------------------------|----------------------------------|--------------------------------|----------------------------------|-----------------------------|----------------------------------|
|                                             | Suprakash Pal         | Sk. Abdul Hamid                  | Bikash Samanta                   | Rahul Das                      | Sukumar Jana                     | Milan panja                 | Sujit Mandal                     |
| Gender                                      | Male                  | Male                             | Male                             | Male                           | Male                             | Male                        | Male                             |
| Age                                         | 34                    | 42                               | 35                               | 30                             | 50                               | 26                          | 38                               |
| Educational level                           | Madhyamik             | Higher Secondary                 | Graduate                         | Graduate                       | Graduate                         | Higher Secondary            | Higher Secondary                 |
| Family Size of the Fish Farmers             | 8                     | 4                                | 6                                | 7                              | 4                                | 5                           | 3                                |
| Caste status                                | OBC                   | General                          | General                          | Scheduled caste                | General                          | General                     | Scheduled caste                  |
| Family Status of the Fish Farmer            | Joint Family          | Nuclear Family                   | Joint Family                     | Joint Family                   | Nuclear Family                   | Nuclear Family              | Nuclear Family                   |
| Religious Status                            | Hindus                | Muslims                          | Hindus                           | Hindus                         | Hindus                           | Hindus                      | Hindus                           |
| Area of Ponds                               | 1 Bigha               | 3 Bigha                          | 5 Bigha                          | 2 Bigha                        | 6 Bigha                          | 1.5 Bigha                   | 4 Bigha                          |
| Ownership & mode of occupation of the Ponds | Single & owned        | Multiple & hired on rental basis | Multiple & hired on rental basis | Single & hired on rental basis | Multiple & hired on rental basis | Single & owned              | Multiple & hired on rental basis |
| Source of Fish Farming Experience           | Fore father & NGOs    | Neighbours/friend/Relatives      | Neighbours/friend/Relatives      | Fore father                    | Neighbours/friend/Relatives      | Neighbours/friend/Relatives | Fore father                      |
| Housing Pattern of Fish Farmers             | Kacha & tin shed      | Pucca wall & tiled shed          | Brick building houses            | Kacha & tin shed               | Brick building houses            | Pucca wall & tin shed       | Brick building houses            |
| Health Service Received                     | Rural Hospital        | Village doctor (RMP)             | MBBS Doctor (Private)            | MBBS Doctor (Private)          | MBBS Doctor (Private)            | Homeopathic Doctor          | Rural Hospital                   |
| Fuels for Cooking                           | Wood & cow dung       | LPG cylinder                     | LPG cylinder                     | Wood & Coal based fuel         | LPG cylinder                     | Wood & Coal based fuel      | LPG cylinder                     |
| Electricity for lighting                    | yes                   | yes                              | yes                              | yes                            | yes                              | yes                         | yes                              |
| Whether Bank Loan Received for Farming      | yes                   | yes                              | yes                              | yes                            | yes                              | yes                         | yes                              |

**Source:** Field Survey

\*1 bigha=0.161885643981 hectare

In the study area, it was found that the ponds are under single ownership as well as under multiple ownership. Multiple pond ownership is a major restraint for pond aquaculture. For assessing the economic well-being of any society, housing pattern is one of the most noteworthy indicators. The study shows that farmers holding large pond for aquaculture are having brick built house. All fish cultivators are having electricity facilities for lighting. Fish farmers with sizable income are having LPG as fuel for cooking and others use wood and coal or cow dung as fuel for cooking. Some respondents stated that they mainly used LPG cylinder as fuel and some use wood as coal fuel. Religion plays a very important role in the social and cultural environment of people in a given area. In the study, *Hindus (major community in India)* act as the absolute majority of the fish farmer in the study area. Fish farmers are underprivileged in terms of health facilities of the locality and it was found that when health problem occurs, initially the farmers takes the advice from village doctor and frequently takes medicine from Homeopathic Doctor of the area. Aquaculture requires a substantial amount of investment which is necessary for the preparation of pond annually before stocking of fingerlings and also for purchase of inputs. The survey shows that almost all the fish farmers are dependent on bank loan for aquaculture. One of the reasons behind taking bank loan is that they get a substantial portion of govt. subsidy while repaying loan. The result of the analysis shows the profitability of selected fishermen from different ponds at Shyampur area of Howrah district. The table 3 below shows the cost structure of seven fishermen selected in our study in terms of different variable or operational cost and fixed cost.

**Table: 3: Details break up of different expenditure in pond cultivation**

| Name of entrepreneur                                                        | Suprakash Pal | Sk.Abdul Hamid | Bikash Samanta  | Rahul Das     | Sukumar Jana    | Milan panja   | Sujit Mandal    |
|-----------------------------------------------------------------------------|---------------|----------------|-----------------|---------------|-----------------|---------------|-----------------|
| Pond size                                                                   | 1 Bigha       | 3 Bigha        | 5 Bigha         | 2 Bigha       | 6 Bigha         | 1.5 Bigha     | 4 Bigha         |
| <b>A.Operational or VariableCost:</b>                                       |               |                |                 |               |                 |               |                 |
| <i>1. Cost of preparation of congenial water:</i>                           |               |                |                 |               |                 |               |                 |
| (a) Application of Mahua oil cake:(Rs) p.a                                  | 7,000         | 21,000         | 35,000          | 2,800         | 42,000          | 8,000         | 28,000          |
| (b) Lime :(Rs) pa                                                           | 5,00          | 1,500          | 2,500           | 1,000         | 2,800           | 7,00          | 2,200           |
| (c)Manure/Fertilizer:(Rs) pa                                                | -             | 2,000          | 2,500           | 8,00          | 11,000          | 6,00          | 2,000           |
| Subtotal (a+b+c)                                                            | 7,500         | 24,500         | 40,000          | 4,600         | 55,800          | 9,300         | 32,200          |
| <i>2. Maintenance cost after cultivation of fish</i>                        |               |                |                 |               |                 |               |                 |
| (a) Mustard oil cake                                                        | 1,400         | 4,200          | 6,300           | 2,000         | 7,000           | 1,700         | 5,500           |
| (b) Mixed food                                                              | 5,000         | 10,000         | 15,000          | 7,000         | 8,000           | 6,000         | 12,000          |
| (c) Pesticides                                                              | 3,000         | 5,000          | 6,000           | 3,500         | 15,000          | 3,300         | 5,500           |
| Subtotal(a+b+c)                                                             | 9,400         | 19,200         | 27,300          | 12,500        | 30,000          | 11,000        | 23,000          |
| <i>3.Fishing cost:</i>                                                      |               |                |                 |               |                 |               |                 |
| (a)Hiring of fishing net/ notional hire charge including repair of own net* | -             | 10,000         | 13,000          | 6,000         | 23,000          | -             | 11,000          |
| (b)Irrigation cost                                                          | 2,000         | 3,000          | 3,500           | 1,500         | 4,600           | 2,700         | 3,000           |
| ( c) Depreciation on fishing apparatus/ Hire charges                        | 1,000         | 2,500          | 5,000           | 1,200         | 6,000           | 1,000         | 2,000           |
| Subtotal(a+b+c)                                                             | 3,000         | 15,500         | 21,500          | 8,700         | 33,600          | 3,700         | 16,000          |
| <i>4. Selling cost:</i>                                                     |               |                |                 |               |                 |               |                 |
| (a) Carrying cost                                                           | 2,000         | 4,000          | 4,500           | 2,500         | 5,000           | 2,300         | 4,200           |
| (b) Salesman's wages(Rs150per labour)                                       | 3,00          | 5,00           | 7,00            | 4,00          | 8,50            | 3,00          | 5,00            |
| Subtotal(a+b)                                                               | 2,300         | 4,500          | 5,200           | 2,900         | 5,850           | 2,600         | 4,700           |
| <i>5. Labour charge:</i>                                                    |               |                |                 |               |                 |               |                 |
| (a)Total labour cost( permanent+ occational)                                | 3,000         | 4,500          | 5,000           | 4,000         | 6,000           | 3,000         | 4,800           |
| <i>6. Rental charge of pond</i>                                             | -             | 35,000         | 60,000          | 10,000        | 72,000          | -             | 45,000          |
| <i>7. Cost of purchase of small fishes at initial stage</i>                 | 9,600         | 40,500         | 55,000          | 20,000        | 72,000          | 9,800         | 42,000          |
| <b>Total cost</b>                                                           | <b>34,800</b> | <b>99,700</b>  | <b>2,14,000</b> | <b>62,700</b> | <b>2,75,250</b> | <b>39,400</b> | <b>1,67,700</b> |

**Source:** Own estimate from collected data

The cost structure shows that the selected fishermen incurred expenditure from preparation of congenial water of the pond to final marketing of fish to market. The result shows that the cost patterns are more or less same but quantum of expenses depends upon area of the pond size. It has also found that all fishermen employed hired labour for different process of fish cultivation. The survey shows that the cultivators have to incur huge cost in preparation of pond as well as cost of purchase of small fishes. The study shows that most of the fishermen incurred huge cost in cultivating ponds of which a major part is variable costs.

**Table:3: Sale proceed of fish during the entire year, 2014-15.**

**Total production x rate/kg. = total sales**

| Name of entrepreneur   | Suprakash Pal | Sk.Abdul Hamid | Bikash Samanta | Rahul Das | Sukumar Jana | Milan panja | Sujit Mandal |
|------------------------|---------------|----------------|----------------|-----------|--------------|-------------|--------------|
| Pond size              | 1 Bigha       | 3 Bigha        | 5 Bigha        | 2 Bigha   | 6 Bigha      | 1.5 Bigha   | 4 Bigha      |
| Total Production p.a : | 7,50 kg.      | 2,200 kg.      | 3,250kg.       | 1,100kg.  | 4,800kg.     | 8,75kg.     | 2,900kg.     |
| Rate/kg. :             | 120/-         | 110/-          | 130/-          | 120/-     | 115/-        | 130/-       | 100/-        |
| Sales :                | 90,000        | 2,42,000       | 4,22,500       | 1,32,000  | 5,52,000     | 1,13,750    | 2,90,000     |

**Source:** Own estimate from collected data

**Table:4: Calculation of profit/ loss**

| Name of entrepreneur | Suprakash Pal | Sk.Abdul Hamid | Bikash Samanta | Rahul Das | Sukumar Jana | Milan panja | Sujit Mandal |
|----------------------|---------------|----------------|----------------|-----------|--------------|-------------|--------------|
| Pond size            | 1 Bigha       | 3 Bigha        | 5 Bigha        | 2 Bigha   | 6 Bigha      | 1.5 Bigha   | 4 Bigha      |
| Sale :               | 90,000        | 2,42,000       | 4,22,500       | 13,200    | 5,52,000     | 1,13,750    | 2,90,000     |
| Less: total cost     | 34,800        | 99,700         | 2,14,000       | 62,700    | 2,75,250     | 39,400      | 1,67,700     |
| Profit               | 55,200        | 1,42,300       | 2,08,500       | 69,300    | 2,76,750     | 74,350      | 1,22,300     |

Source: Own estimate from collected data

The profit figure of each fisherman shows the sizeable amount of profit earned through cultivation of ponds. It can be enhanced if the fishermen can do it at large scale applying more scientific technique. According to the survey result, it was found the per bigha production of fish, return on investment (earning) go after a definite trends. Higher income group fishermen having more ingestible funds have definitely higher production, consequently higher profitability.

#### 4. Conclusion:

The objective of the study is to show the socio-economic pattern of the selected fishermen and profitability position from their fish cultivation in Shyampur area of Howrah district, West Bengal, India. The result of the study shows that level of education, size of land holding, annual family income from fish culture, etc., are important factors affecting the utilization of pond fish farming. In fisheries sector, socio-economic status of fish farmers plays a key role in prolific activities. Socio-economic parameters such as family size, age structure, education, size and nature of ownership of pond persuade fish production. The study shows that there is steady growth of profit of each salesman which is about 50% on sale. The economic benefits derived in terms of earning from fish farming are more in comparison to cultivating rice or any other crops. Last of all, it has been found that cultivation is based on hired labourer throughout the year. It needs huge amount of capital and it becomes risky sometimes when natural calamities occur. As suggestive measure, it can be inferred that the fishermen should be brought under the insurance coverage from protecting them from losses arising out of natural calamities and should be given amenities on training program, input availabilities, credit facilities and amenities for education so that they can be well responsive of their problems.

#### References

- [1]Data collected from Field survey, 2014-15.
- [2]O.A Ayinla, Integrated Fish Farming: A Veritable tool for poverty alleviation/hunger eradication in the Niger Delta Region. pp.14-16 In: A.A. Eyo and J.O Atanda (Eds). Conference proceedings of Fisheries Society of Nigeria, Owerri, Nigeria 2003.
- [3] Directorate of Fisheries,Govt. of West Bengal, Statistical Handbook,2014.