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# Cost Benefit Analysis of Fish Farming at Northern Chattogram, Bangladesh.

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## Abstract

Aquaculture is regarded as a remunerative and raising sector in terms of income generation. There are many patterns of aquaculture systems have been practiced by the farmers in Muhuri Project area. Among them carp-tilapia polyculture is mostly dominating. The study was conducted to evaluate the economic analysis of fish farming of Northern Chattogram in Bangladesh from October, 2019 to October, 2020. The total area of the selected pond is 1 acre (100deci) and water depths were 8 feets. Average fish production of the farmer was 29,115 kg. The study shows aquaculture at Northern Chattogram of Bangladesh is feasible and profitable with a cost-benefit ratio of 1.78 for commercial fish culture. The per acre total cost of production of commercial fish culture are BDT26,83,690 and The calculated net income was BDT 15,04,010. The main factors affecting profitability are the cost of pond leasing, fish feeds and fish seeds etc. From the result of present study, it is clear that fish production and financial benefit in carp-tilapia polyculture were higher. The present findings reveal that carp-tilapia polyculture system is more suitable and profitable culture system.

**Keyword:** Aquaculture, Polyculture, Pond, Cost-benefit

## Introduction

Aquaculture plays an important role in food security and poverty alleviation worldwide because of its ability to provide freshwater fish, which, although mainly consisting of low-value species in terms of market value, provide food on the table and increases nutritional variety.

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Aquaculture could play an important role in meeting the needs of people in terms of food now and in the future. Freshwater fish farming or aquaculture plays an important role in the livelihoods of rural people in Bangladesh (Mazid, 2002). It creates diverse livelihood opportunities for a number of people, many of whom living below the poverty level, in the form of farmers, operators, employees, traders, intermediaries, day laborers and transporters (Ahmed and Rahman, 2004). Pond fish farming has been proved to be a profitable business than rice cultivation. So many farmers in rural areas are converting their rice field into aquaculture pond (Islam *et al.*, 2002). Bangladesh has gain self-sufficiency in fish production with the successful efforts of government and private sectors in recent few decades. Bangladesh is producing 43.84 lac MT of fish against the demand of 40 lac MT and consuming 62.58 grams of fish against the daily demand of 60 grams per capita (DoF, 2018). Bangladesh has risen to the second position in the world in terms of the growth rate of freshwater fish production (FAO, 2020) and Bangladesh is now the fifth biggest fish producer in the world after China, India, Vietnam and Indonesia (FAO, 2018) .

Dominating species for pond aquaculture are Indian major carps and exotic carps (Hasan and Ahmed, 2002). The port city Chattogram is the most crowded place after the capital city Dhaka. It has the aquaculture potentiality in the northern part of the city namely the Muhuri project area. After the construction of embankment in the Feni river, many more char land have been developed which become a blessing for aquaculture development in this area. The physioco chemical parameters of the water are suitable for fish culture in this area. Among 62,840 MT of fish production of Chattogram, muhuri project contributes more than 70% (DoF). And it meets the demand of the Chattogram city, the adjacent upazilas and Chittagong hill tracts. It's a good example of cluster based fish culture. At present about 5,000 fish farmers culturing fish with in the water body of 20,000 acres in 20,000 ponds.

## Materials and Methods

### Study Area

The present study was conducted in Mirshorai Upazilla under the Chattogram district of Bangladesh for the period of one year

(October, 2019-October, 2020) as a case study for the Sustainable Enterprise Project (SEP) of PKSF.

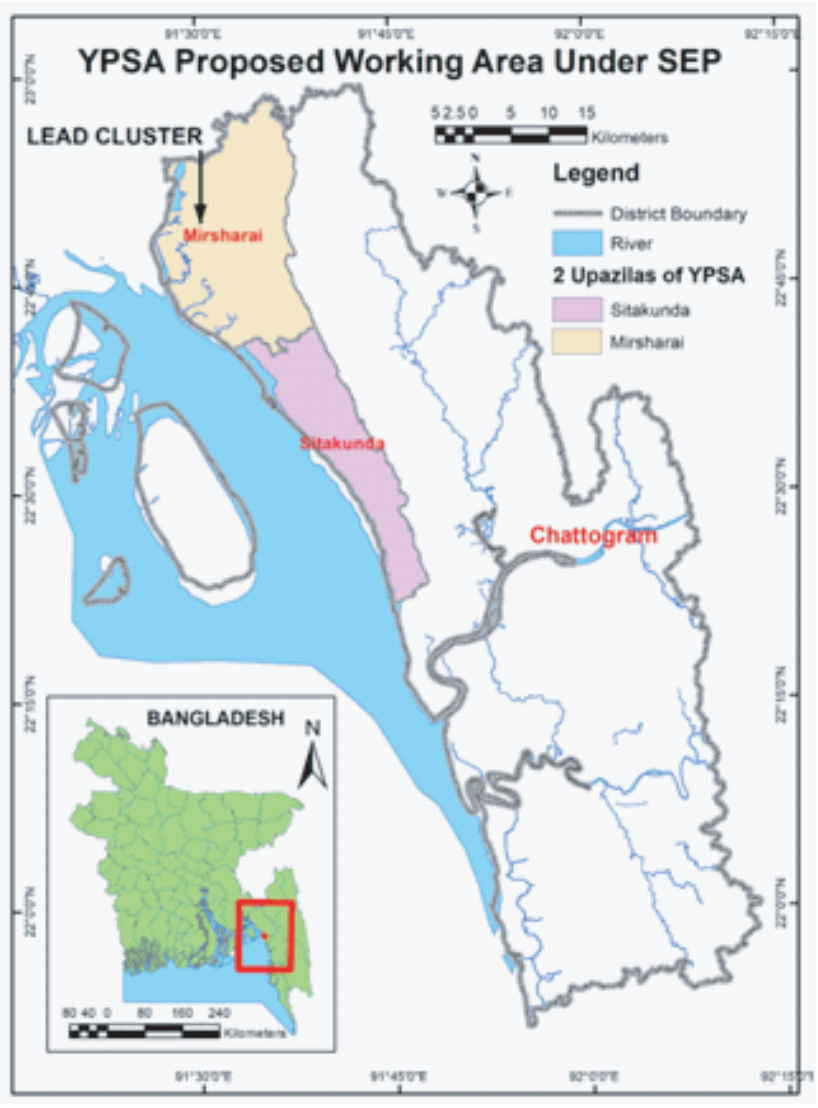


**Fig-1.** Map of Mirshorai Upazila under Chattogram district showing the study area

### Data Collection

During the study PRA tools such as questionnaire and record keeping book were used for data collection. One fish farmer was selected, who is the beneficiary of YPSA and engaged in fish farming at Muhuri Project area. Data were collected by applying interview method and regular monitoring.

### Cost-Benefit analysis

The total expenditure during the culture period (includes fixed and variable costs are summation) and the total income from fish productions were recorded by following standard questionnaire and record keeping, finally the total expenditure was subtracting from the total incomes and got the benefit.

## Results & Discussion

### Pond Management

The selected pond was in good condition where communication access, water supply, feed storage and other aquaculture facilities were available and these are the pre requisite for pre stocking. In the study pond, the dykes were well prepared. There are no aquatic weeds are found in the cultured pond of the study area. Rotenon is used by the farmer to removed predatory and unwanted fish species. Total amount of poison is 20 Kg. for 100 decimal at the rate of 30gm/feet/decimal. During pond preparation lime stone is being used and the application rate is 1 kg/decimal normally. Diluted lime was applied prior to inorganic (Urea and T.S.P.) fertilizers. The application method of fertilizer; inorganic fertilizer (in diluted form) is applied by throwing. In stocking management, poly culture system was practiced in the study pond generally. The farmer selected those fish species, which have faster growth, good market demand, availability of seed, disease resistant and more social acceptability. The selected fish species and namely; Monosex tilapia (Oreochromisniloticus, Rui (Lebeorohita), Catla (Catlacatla), Mrigal (Cirrhinus mrigala), Silver carp (Hypophthalmichthys molitrix), Common carp (Cyprinuscarpio var. communis), Grass carp (Ctenopharynogodon idella). The farmer collected fish seeds from two major sources for culture. These are govt. and private hatchery. Mono sex tilapia fry supply depends on private hatcheries. Size of the stocked species

found to be varied form50g to 250g. During the release of fry, the farmer did not consider the quality of fry, proper technique of fry release and the rate of stocking density is 296 fishes/1decimal. And the total number of stocked fish was 29,550 (for 100 decimal). In post-stocking management the farmer in the study pond monitored his pond regularly. He monitored his pond to observe the watercolor, abundance of food, growth performance of the fry and to prevent pouching. The farmer did not applied lime at the time of post-stocking management but applied both organic and inorganic fertilizers into his pond to increase the primary productivity. The farmer practiced regular feeding for his cultured species and used mainly high cost fish feeds as supplementary feeds. The farmer in the study pond practiced sampling. Partial harvesting was found as most common harvesting technique in the study pond. The farmer used kheplajal (Cast net) to partial harvest for his household consumption and sampling. In the study area there is less stealing tendency. At the end of the culture period, the farmer did final harvesting. Final harvesting was carried out by using seine net. After one year of cultivation the total production of the pond is 29,115 kg.

**Cost-Benefit analysis**

The total cost, benefit and CBR (%) was found as 1:0.56, respectively. Cost-benefit analysis of the studied pond (100 decimal) is nerated in the following table.

| **Cost-Benefit Analysis of Fish Faring of 1 Acre Pond Area** | | | | | |
|---|---|---|---|---|---|
| **Total Cost in Details** | | | | | |
| **Item** | **Quantity** | **Measurement** | **Unit cost** | **Total (BDT)** | **Note** |
| 1. Lease Cost | 100 | Deci | 1200 | 120000 | Fixed Cost |
| 2. Removal of aquatic weeds | 100 | Deci | Lumpsum | 10000 | Fixed Cost |
| 3. Dyke repairment | 100 | Deci | Lumpsum | 100000 | Fixed Cost |
| 4. Rotenone | 20 | kg | 450 | 9000 | Fixed Cost |
| 5.Liming | 100 | kg | 20 | 2000 | Occasional |
| 6. Bleaching powder | 20 | kg | 90 | 1800 | Occasional |
| 7.Salt | 100 | kg | 20 | 2000 | Occasional |
| 8. Watering/ dewatering | 50 | hour | 100 | 5000 | Occasional |
| 9. Fertilization | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| a. Urea | 100 | kg | 17 | 1700 | Occasional |
| b. TSP | 50 | kg | 26 | 1300 | Occasional |
| c. Potash | 20 | kg | 32 | 640 | Occasional |
| **Sub-total** | | | | **253440** | |
| 10. Stocking of Fry | | | | | |
| Rui | 3000 | Pcs | 15 | 45000 | 8-10 PCs Each Kg |
| Catla | 2500 | Pcs | 20 | 50000 | 4-5 PCs Each Kg |
| Mrigal | 1000 | Pcs | 10 | 10000 | 8-10 PCs Each Kg |
| Kalibaus | 1000 | Pcs | 18 | 18000 | 8-10 PCs Each Kg |
| Silver | 2500 | Pcs | 8 | 20000 | 8-10 PCs Each Kg |
| Bighead | 2500 | Pcs | 8 | 20000 | 8-10 PCs Each Kg |
| Grass carp | 1000 | Pcs | 12 | 12000 | 8-10 PCs Each Kg |
| Common Carp | 1000 | Pcs | 10 | 10000 | 8-10 PCs Each Kg |
| Black carp | 50 | Pcs | 15 | 750 | 8-10 PCs Each Kg |
| Tilapia | 15000 | Pcs | 1.2 | 18000 | 3000-3500 PCs Each Kg |
| **Sub-total** | | | | **203750** | |
| 11. Guard cost | 12 | Month | 12000 | 144000 | Permanent (Each Person in Year) |
| 12. Boat cost | 1 | Lumpsum | 30000 | 30000 | Wooden |
| 13. Day Lobour | | | | | |
| a.Normal Days | 2 | Person | 100000 | 200000 | Contractual |
| b.Harvesting Days | 8 | Person | 10000 | 80000 | Contractual |
| 14. Salary | 1 | Person | 240000 | 240000 | Permanent (Each Person in Year) |
| **Sub-total** | | | | **694000** | |
| 15. Feeding cost | | | | | |
| 15.A.Factory feed | | | | | |
| A.1.Nursery Plater-01 | 500 | kg | 70 | 35000 | First Month (Each Day 16 kg) |
| A.2. Starter | 2850 | kg | 60 | 171000 | Second Month (Each Day 95 kg) |
| A.3. Starter & Grower With Oil | 3250 | kg | 56 | 182000 | Third Month (Each Day 108 kg) |
| A.3. Starter & Grower With Non-Oil | 3000 | kg | 53 | 159000 | Third Month (Each Day 100 kg) |
| A.4. Starter & Grower Floating | 6500 | kg | 52 | 338000 | Continuing Upto Next Fourth to Nineth Month ( Each Day 217 kg) |

| | | | | | |
|---|---|---|---|---|---|
| A.5.Starter & Grower sinking | 5000 | kg | 52 | 200000 | Continuing Upto Next Fourth to Ninth Month (Each Day 167 kg) |
| 16. Aqua-medicine (Zeolite, Probiotic, ……) | | Lump sum | 40 | 100000 | Renamysin, Micronil, Amonil, Gasonil, Oxigen-A, Sumithiyanetc According Expert Suggetion |
| 17.Netting | 10 | | 100000 | 80000 | occasional |
| 18.Marketing/ transportation cost | 10 | | 8000 | 120000 | occasional |
| 19. Labour cost (own) | | | 12000 | 22500 | 100*25 days* 9 months |
| 20. Loan Interest | | | | 125000 | 1,000,000 |
| **Sub-total** | | | | **1532500** | |
| **Total Cost** | | | | **2683690** | |
| **Total Income in Details** | | | | | |
| **Item** | **Quantity** | **Measurement** | **Unit cost** | **Total (BDT)** | **Note** |
| Rui | 3780 | Kg | 180 | 680400 | 2nd Phase |
| Catla | 4050 | Kg | 160 | 648000 | 2nd Phase |
| Mrigal | 1080 | Kg | 160 | 172800 | 2nd Phase |
| Kalibaus | 900 | Kg | 180 | 162000 | 2nd Phase |
| Silver | 4500 | Kg | 150 | 675000 | 2nd Phase |
| Bighead | 4275 | Kg | 150 | 641250 | 2nd Phase |
| Grass carp | 1890 | Kg | 160 | 302400 | 2nd Phase |
| Common Carp | 1800 | Kg | 140 | 252000 | 2nd Phase |
| Black carp | 90 | Kg | 140 | 12600 | 2nd Phase |
| Tilapia | 6750 | Kg | 95 | 641250 | 1st Phase |
| **Total** | | | | **4187700** | |
| **Net Income** | | | | **1504010** | |
| **Cost-Benefit Ratio (CBR)** | | | | **1.78** | |
| **Return on Investment (ROI)** | | | | **0.56** | |

Benefit = Total income-Total cost
= 41,87,700-26,83,690
= 15,04,010
Cost benefit Ratio (CBR %) =Total cost : Benefit
= 26,83,690: 15,04,010 = 1: 0.56
CBR (%) = 1:0.56 Tk. that means, 0.56 Tk. came from per 1.00 Tk.

## Conclusion

Fisheries sector has great contribution in enterprise development. The result of this study showed that fish farming in Muhuri Project area is highly feasible and profitable. Findings also indicated that carp-tilapia poly culture is constrained by high feed cost (Hossain et al., 2020). The Cost-Benefit Ratio (CBR) recorded a good value of 1.78 and the Return on Investment also recorded a good value of 0.56 indicating a return of about 0.56 BDT should be expected on every 1BDT spent in the enterprise which is higher than the findings of Islam et al., (2017),. This research will helps to increase the small enterprise and can ensure the demand of animal nutrition by ensuring potential utilization of the water resources and increase the production of the fish in a cost effective way.

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## References

Ahmed N and Rahman M M. 2004. A study on fish marketing system in Gazipur, Bangladesh, Pak. J. Biol. Sci. 8(2):287-292.

DoF (Department of Fisheries). 2018. National Fish Week Compendium (In Bengali). Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh. 148p.

FAO (Food and Agriculture Organization), (2018).The State of World Fisheries and Aquaculture. FAO Fisheries and Aquaculture Department. Rome: FAO (2018).

FAO. 2020. The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. https://doi.org/10.4060/ca9229en

Hasan, M.R. and Ahmed, G.U. (2002). Issues in carp hatcheries and nurseries in Bangladesh, with special reference to health management. FAO Fisheries tech, paper, Dept. Aquaculture. Bangladesh Agricultural University, Mymensingh-2202 (406): 147-164

Hossain M.A., Hossain, M.A., Haque, M.A., Mondol, M.M.R. and Rashid, M.H.U. (2020). Determination of suitable species combination for good aquaculture practice based carp fattening in ponds under drought prone barind area of Bangladesh. Archives of Agriculture and Environmental Science, 5(2): 114-122, https://dx.doi.org/10.26832/24566632.2020.050205

Islam M S, Murshed S M M, Moniruzzaman M and Baree M A. 2002. Rice-cum Fish Farming in selected areas of Mymensingh District, Online J. Biol. Sci. 10(2):715-718.

Islam M. S., Rahman M. S., Akter F and Moniruzzaman M .(2017). Cost benefit analysis of aquaculture in northern part of Bangladesh, International Journal of Applied Research, 3(2):105-107

Mazid M A. 2002. Development of Fisheries in Bangladesh, Plan and Strategies for Income Generation and Poverty Alleviation. 176 Dhaka: Nasima Mazid,74 A/2, Kallyanpur Main Road. 176p.