

## **PRODUCTION BASED COSTING, AN ANIMATOR FOR MARKET DEVELOPMENT OF OXBOW LAKE FISHERIES**

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### **ABSTRACT**

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The main objective of the study was to prepare a cost function in a manner that the fishermen can manage the oxbow lakes with a community based approach in a sustainable way. The duration of the study covered a period of over 48 months, financial years 2000-01 to 2003-04. One privately managed oxbow lake (PMOL) named Morshina, one Government managed lake (GMOL) named Kathgora and the last but the least, community managed oxbow lake (CMOL) named Purakali lake were taken for this study. Annual income statements for each oxbow lake were prepared following Generally Accepted Accounting Principle (GAAP). Important costs were identified from the income statements. Contribution margins and percentage of contribution margins (%) were calculated by deducting the variable costs from selling price in terms of per unit (kg) carp yields. Contribution margins and percentage of contribution margins (%) were calculated to find out total profit of carp yields. The CMOL was taken as an experiment whereas the rest two, PMOL & GMOL were taken as control groups where no support of Production Based Costing (PBC) was provided. Major ecological factors included primary production and other food availability in the water biomass, seasonal variations, carrying capacity, standard water area, fish growth, stocking mixes, and catch composition. Cost factors included operating costs, fixed and variable costs, contribution margins, break-even-points, daily income, market price and Benefit Cost Ratio (BCR). Social factors included income level and behavioral changes of the fishermen. By using a least-square regression equation cost functions of yield-kg was prepared for each oxbow lake where the value of R<sup>2</sup> was found better in CMOL in compare to the PMOL & GMOL.

**Keywords:** *Production cost, market development, oxbow lake fisheries*

### **INTRODUCTION**

An oxbow lake is a cut-off or dead segment of a river which have an inlet and an outlet for water inflow and outflow along with the river. This renewable water resource is potential by its varieties of biodiversities comprising phytoplankton, zooplankton, algae, indigenous fish species, birds, aquatic vegetations and different types of flora and fauna. Its bottom level is made of nutrient rich soils and allocthanous materials which are potential habitats of different ecologically important microorganisms. Also different castes of fishermen inhabits around the water body from the very beginning. These castes include *Paro, Malo* (Local name) etc.

About 50 years back *Jomidars* (Land lord) were the owners of the oxbow lakes. Then the fishermen received only a small portion of catch shares. After the end of *Jomidary* era states became the owner of the oxbow lake. After the independence in 1971 efforts had been made to change the socio-economic condition of the fishermen but still the condition remained as it was.

In the year 2001 Aquaculture Development Project (International Fund for Agriculture Development) under the auspicious of Department of Fisheries (DOF) and Local Government and Engineering Department (LGED) endeavored to develop entrepreneurship into the oxbow lake through creating opportunities for the fishermen. They engaged fishermen investing into fish culture and enjoying the whole profit thereby. Production planning and budgeting were prepared in time but unequal variations were found between the planned and actual activities. This was distinct in Purakhali oxbow lake, Avoy Nagar Upazilla, Jessore where improper cost management was identified as the main setback for entrepreneurship development. Production Based Costing (PBC) didn't emerge in the oxbow lake within some days rather it has been happened from the years of experiments and learning. The main purpose is to take effective cost decisions by using cost functions of fish yields. Successful outcomes of this model depend on proper integration with culture based fisheries and community based fisheries management. Selected ecological, social and cost related factors shape the outcomes of this cost frame.

### **METHODOLOGY**

The cost function measures operating costs in terms of fixed costs, variable costs and fish yields-kg. Operating costs comprised of direct materials, direct labors and manufacturing overheads. Cost of direct materials included only the fingerling costs. Direct labor costs imply the costs paid to the fishermen as shares and equities after paying all the liabilities and expenses at the end of every operating cycle. In Purakhali oxbow lake variable costs included distribution of shares to the fishermen, fingerling costs, fingerling transporting costs, manufacturing over head costs e.g. guard salaries, costs related to crafts and gears used, costs related to establishment of pata or Komor etc. Fixed costs comprised of lease costs, interest expenses and General and administrative expenses. General and administrative costs included monthly meeting, litigation, office supply and entertainment expense.

**RESULT**

By using least-square regression method a cost function of fish yields- kg was prepared on basis of the cost equation of Horngren *et.al.*, 2002 ;

Operating cost = Fixed cost + Variable cost per unit × Yield-Kg.

Number of Operating cycle	Operating Costs BDT (Y)	Fish yields-kg/ha (X)
01	1587600	600
02	1747980	690
03	1932417	793.5
04	2144508	912.5185
05	2388444	1049.407
06	2668944	1206.815
07	2991519	1387.833

This is a production based linear cost equation which involves scientific approach to predict costs with statistics rather than human eyesight. The fixed cost measure is labeled “constant” or “intercept” and is BDT\* 518000 per operating cycle. The variable cost measure is labeled “X coefficient” and is BDT 33 per kg fish yield. The linear cost function is:

$$Y = \text{BDT } 518000 + (\text{BDT } 33 \times \text{Fish yields-kg})$$

The  $R^2$  of the relationship measured with the quantity of fish yield-kg is 0.92, which is quite high. This value indicates that quantity of fish yield-kg explains operating cost extremely well and can be interpreted as meaning that quantity of fish yield-kg explains 92% of the past fluctuation in operating cost.

In contrast, performing a regression analysis on the relationship between operating costs and income at the end of the operating cycles produces the  $R^2$  value, 0.19, indicates that the value of income at the end of the operating cycles does not fit operating cost as well as cost function using fish yield-kg.

**CONCLUSION**

There are approx. 600 oxbow lakes in southwestern Bangladesh with an estimated combined water area of 5000 ha (Hasan *et.al.*, 1990). Middendorp *et al.* (1997) reported that clearly in a densely populated country like Bangladesh, emphasis should be on poverty alleviation by maximizing the number of people benefiting from the same resource. He also depicted that when fishermen are left to their own management affairs, recorded carp yields were on average 29% higher. PBC impacts on fish value chain through supporting fishermen to take effective cost decisions. Sometimes power politics encroach into the oxbow lake to destroy the organizational structures. PBC blows the breath into the fishermen communities and acts as a changing agent through increased intervention into the decisional processes.

**REFERENCES**

- Horngren, T. C., Sundem, L. G. and Stratton, O.W., 2002. Introduction to Management Accounting, Prentice-Hall of India Private Limited, M-97, New Delhi, India, 80-379 pp.
- Hasan, M.R., Bala, N. and De Silva, S.S., 1990. Stocking strategy for culture based fisheries: A case study from Oxbow lakes. *Proceedings of ICLARM/ Danida, National workshop on policy for sustainable Inland Fisheries Management*. Dhaka, Bangladesh.
- Middendorp, H.A.J., Rahman, M.M. and Sattar, M.A., 1997. Financial performance of culture based fisheries in Oxbow lakes in Bangladesh managed by fishers groups. *Proceedings of ICLARM/ Danida, National workshop on policy for sustainable Inland Fisheries Management*. Dhaka, Bangladesh.

\*BDT (Bangladeshi currency called Taka) 1 = USD 0.58<sub>APPROX.</sub> (as on the study year 2000).