

SOCIOECONOMIC FACTORS IN THE DEVELOPMENT OF POND FISHERIES

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ABSTRACT

Fishery resource development in pond represent two separate issues. One related to bringing ponds into use and the other relate to raising the existing traditional fish farming practices to a semi-intensive level. We have analysed the pond ownership and pond use types as the two most important factors affecting the fishery use of pond. The latter part of the essay explain the role of different factors in raising the intensity of fish farming. The discussion evidently suggests that family income, level of education, type of ownership are important socioeconomic factors affecting utilization of ponds for fish farming. Other important factors are size of pond and stocking rate. Cultural factors and marketing facilities also affect fish farming in ponds.

I. INTRODUCTION

There is consensus among experts on pisciculture that the potential for fish production in ponds and tanks in Bangladesh is very great. The development of tank resources does not require importation of sophisticated capital intensive technology and can rely on skills and resources built up within Bangladesh. Tank development is rather a labour intensive and highly productive activity. Furthermore, the work can be so scheduled as to supplement labour demand in relatively slack crop seasons. For example, tank excavating and cleaning can occur during the dry and filling during the monsoon periods when other activities are almost nil.

Inspire of all facts favouring utilization of these resources for fish production they remain neglected. Dumont (1973) described this syndrome as a situation of "so much to be dote and so many hands remaining idle" in his oft-quoted report - A self-reliant Rural Development Policy for the Poor Peasantry of Sonar Bangladesh. It is, however, important to note that reclamation of these resources and putting them to continuing use for fish production are two facets of the same problem. The urge for making productive

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use of ponds and tanks has encouraged investigation into factors causing their non-use for this purpose. In the course, it has been increasingly felt that socioeconomic factors more importantly than technical factors, are at the root. Research interest in fishery development among social scientists, although a recent phenomenon, has started yielding new insight into the problems. The present essay is an attempt to bring together the results of some recent research studies with a view to briefly focusing on the nature and importance of the problems of development of fisheries in ponds.

It may be important at the outset to enumerate the problems hypothesized by different investigators. These are the problems of multiplicity of ownership of ponds/tanks, multiplicity of use of ponds/tanks, lack of capital, lack of marketing facilities, inadequate fry supply, lack of know-how, theft, poisoning.

II. MULTIPLE OWNERSHIP AND POND USE

The problem of multiple ownership of ponds has been well-documented in all recent studies. Gill and Motahar (1982) demonstrate it by depicting the picture of fragmentation of ownership as occurs according to the Quranic Law of inheritance. The extent of fragmentation is only one aspect of the problem. The more important aspect is the nature of the complex situations that may arise from fragmentation itself. There may be at least as many situations as the number of co-sharers of a pond. Case studies are used to reveal the complexities of situations arising out of joint ownership.

It has, however, been found in several cases that multiple ownership has not been as much of a deterrent as it is usually thought to be. Table below illustrates that other factors rather than ownership alone may have caused ponds to remain fallow.

TABLE 1. AQUACULTURE IN PONDS BY TYPE OF OWNERSHIP OF PONDS

Ownership	Comilla		Chittagong I		Chittagong II	
	Culture	Non-culture	Culture	Non-culture	Culture	Non-culture
Single	8(81)	1(19)	6(60)	4(40)	8(42)	11(58)
Joint	27(96)	1(4)	11(60)	7(40)	3(16)	8(84)
Total	35(95)	2(5)	17(60)	11(40)	25(48)	27(52)

Note: Figures in brackets are percentages of row totals for each location. This table is based on total survey of 3 villages reported in Khan (1981) and (1985).

It is to be mentioned that villages Comilla and Chittagong I were chosen in the study as villages with fish culture in ponds while Chittagong II was an area with no fish culture tradition. Joint ownership tends to remain deterrent in the village where fish culture is yet to gain a start. But once fish culture starts to gain momentum jointly owned ponds do not continue to lag behind the ponds owned by single individuals. Gill and Motahar (1982) found 83 percent of all ponds in their study areas (at Joydebpur and South Shahra) to be used for fisheries. The ponds were 19 percent owned by single individuals and 81 percent by a number of individuals. In a more recent survey of 56 ponds in a Comilla village of Gunjar at Muradnagar Upazela the present author found 90 percent of single and 85 percent of joint ownership ponds under fish production. Ponds, irrespective of ownership types, experience quick adoption of fish farming specially in villages near experimental stations and model demonstration tanks. For example, Mahbubullh (1983) reports fish culture (at a traditional level) in 78 out of a total of 87 (26 single ownership and 61 joint ownership) ponds in a Noakhali village near the NIRDP - DANIDA "Khoasagar Dighi" Project.

Gill and Motahar (1983) observe that in the majority of cases (of multiplicity of ownership), even in those with multiple ownership and with unequal shares, fish farming has gone ahead. They, however, found a negative relationship between the stocking rate of fry and number of different owners. In one of my own studies, an analysis of factors influencing investment in fish production revealed that joint ownership is unfavourable for investment in ponds. Mahbubullah finds number of owners, rather than nature of ownership (single or joint), important in determining the level of investment in ponds. He suggests that the number should not exceed 3 for the pond to be well-managed.

It becomes evident from the above discussion that multiplicity of ownership does not remain an unsurmountable obstacle in the way of pond utilization although evidences suggest that it hinders investment and, therefore, intensification of fishery use of ponds. Suggestions to enable multiple ownership ponds to be used for fisheries are start of (a) co-operatives, (b) leasing in by the eager cosharers and (c) village organisation under which all ponds, like all resources of the village may be put into productive use. The first and second types, are referred to in all the studies quoted here and the third by the present author. This is based on the experience of a village at Rangpur Upazela of Chittagong. It will certainly require (further) action research to understand the mechanism of such approaches, and studies have to be conducted to reveal their relative advantages or otherwise.

III. MULTIPLE USE AND FISH CULTURE

Pond owners treat their ponds as a multipurpose asset and as such it has been traditionally put to a number of uses. An investigation into the purpose for which a pond is initially constructed would reveal that in overwhelming majority of cases need for

earth to raise house mounds and household uses of water were the prime considerations. Whenever the initial purpose of construction of a pond, afterwards it continues to be put to other uses as long as such uses are not competitive with each other. Mahbubullah (1983) reports that 23 percent of ponds are used for 4 different purposes and 50 percent for 3 different purposes. Only 6 percent ponds are found to have been put to a single use. Gill and Motahar (1982) found a maximum of 5 different uses of a pond. Thirty four percent of owners use their ponds for 3 different purposes and almost all ponds (91 percent) are multipurpose ponds.

The most important current use of ponds is for household purposes including drinking and bathing water. This use is in conflict with use for fish culture which includes practices like fertilizing ponds with cow dung, kitchen refuse, oil cakes, lime and chemical fertilizers. It is rare to find scientific fish culture in a Bangladeshi pond. Little wonder studies on use of ponds for fish production adopt all ponds with only stocking of fries as their unit of analysis.

Household uses of ponds like for drinking water are, however, fast fading to unimportance with large scale introduction of tube-wells in rural areas in recent times. Yet other household uses also prevent use of fertilizer for fish production in ponds to a large extent. Mahbubullah (1983) using adoption of fish culture approach to analyse factors which influence fish production has reported very low adoption scores (1 or less out of 5) in over 50 percent of cases whichever variable (number of owners, a cashflow of owner families, size of land owned, pond size, literacy rate etc.) is used to relate with adoption scores based on application of (a) cowdung, (b) rice bran, (c) lime, (d) chemical fertilizer and (e) fingerling. This score has remained less than 2.5 in 90 percent cases and the maximum score reported by any pond was 3.5.

Suggestions to improve the existing traditional fish culture practices to a semi-intensive level include replacement of ponds by tubewells and provision of one or two tanks in each village for bathing. Mix of fish feed may also be adjusted with a bias towards more acceptable form of feed like rice bran and fertilizers; like dried straw and dried water hyacinth may be used in place of others. Another important use of ponds that conflicts with its use for fish culture is irrigation. Gill and Motahar (1982) found that 34 percent of all pond owners in their study areas reported both these uses of their ponds. Other studies report a smaller percentage. Smith (1973), however, assigns a greater role of ponds and tanks in irrigation and scheduling of water use for the two purposes so that fish farming also can be done alongside. In schedule 1 fish has to be harvested during the irrigation period from November to January. This will not only hamper fish farming but also leave no water for household use and for plant growth for next year's fish. Schedule 2 permits less irrigation but seeks to maintain a minimum depth of water for drinking, bathing and plant growth.

In respect of socioeconomic traits of owners of used and unused ponds a considerable difference is observed in my own study. The owners of utilised ponds are agricultu-

rists by profession, have a high dependency ratio and are young in age. In contrast, the owners of unused ponds generally have a low dependency ratio, high educational level, and a high annual income. Similarly, utilized ponds and unutilized ponds differ in certain characteristics. We can rank the characteristics according to the frequency of their presence in both utilized and unutilized ponds. Such an exercise revealed that size and age of the pond and the nature of uses the pond has to its owners are relevant factors. The unutilized ponds are reported to have been maintained for other purposes than fish farming. They are old and large. In contrast, the utilized ponds are primarily held for fish farming, relatively new and small.

IV. FACTORS AFFECTING INTENSITY OF POND USE

Apart from their role in determining the use of a pond for fish farming socioeconomic factors also influence the intensity of fish farming in ponds. We shall here discuss the influence of these factors using the results of some statistical exercises reported in the studies of Mahbubullah (1983) and myself already quoted. More information will certainly be needed to further strengthen these findings. Future studies focusing on these issues may be fashioned along these methodologies or others containing data from different physical locations. Both the studies quoted here used Regression Analysis and Mahbubullah also used Rank Sum Tests. These studies, however differ in certain respects and most importantly, in the selection of explanatory variables and the form of regression. Yet their results make some interesting comparisons.

Investment Function Analysis

Mahbubullah identified family income and pond size as factors having significant positive relationship with investment in ponds. In my own study also family income was found to significantly affect investment. Further, ownership pattern was also found significant, joint ownership being unfavourable to investment. Mahbubullah further using Rank Sum comes to the conclusion that number of owners rather than nature of ownership is important—three being the ideal number of owners. Other variables such as dependency ratio, land ownership, age, education and occupation of the owners were not found to significantly influence investment.

Production Function Analysis/Yield Difference Approach

A production function analysis yielded results to show that size of pond and stocking rate have a significantly positive contribution to output. Other factors like experience of pond owner in fish farming, use of feed or fertilizer and nature of ownership do not significantly affect output. Mahbubullah used a "yield difference approach" where a ran-

ling of ponds into 3 categories was used according to their yield performance. He found purchased inputs, family income and education level to have significantly positive relation with yield. It is to be noted that stocking of fry represents the most important purchased input in fish farming. Thus, it may be said that both studies identify stocking rate (purchase input) as an important factor.

Profit Function Analysis/Profitability Approach

The Profit Function analysis has shown that stocking rate has a significantly positive contribution to profit. Other factors, such as, other capital and labour used, length of culture period etc. were not found to be significant. Mahabubullah identified cultural factors and marketing facilities important in determining profitability of fish farming.

V. CONCLUSIONS

Fishery resources development in ponds represents two separate issues. One related to bringing ponds into use and the other relates to raising the existing traditional fish farming practices to a semi-intensive level. We have analysed the pond ownership and pond use types as the two most important factors affecting the fishery use of ponds. The latter part of the essay explains the role of different factors in raising the intensity of fish farming. The discussion evidently suggests that family income, level of education, type of ownership are important socioeconomic factors affecting utilization of ponds for fish farming. Other important factors are size of pond and stocking rate. Cultural factors and marketing facilities also affect fish farming in ponds.

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