

Some Notes on the Socio-Economic Aspect of Small-Scale Aquaculture Development in the Bay of Bengal Region

Shigero IWAKIRI* and A. R. Mowla NEAZ**

Abstract

It has been observed that during the last 30 years "development" has tended to disrupt the social and economic life-ways of the rural Asian population. In order to restore and maintain the balance of a developing rural economy, 'rural' aquaculture development can be adopted as an important element in rural development programs. 'Rural' aquaculture development can be instrumental in not only augmenting protein supply in the local diet and additional incomes for rural population but also in promoting and enhancing village welfare through the provisions of education, health service and sanitary facilities etc. This paper focuses on the aquaculture potentialities in the countries bordering the Bay of Bengal, emphasizing the development of village level small aquaculture projects for a more balanced development among regions.

I Introduction

It has been recognized that the benefits of economic development are not equally distributed throughout all classes of citizens and that during the past few decades the gap between the rich and the poor in the developing countries has widened due to the economic development policies and activities. It has been observed that during the last 30 years "development" has tended to disrupt the social and economic life-ways of rural Asian populations. Needless to say that the majority of these rural populations is comprised of a large number of small farmers and fishermen, who, in the process of such development are being increasingly marginalized and pauperized. Almost all of them are the poorest of the poor, living in a state of malnutrition and underemployment or unemployment. These problem are particularly acute in the Major South Asian countries bordering the Bay of Bengal viz., Bangladesh, Burma, India, Nepal and Sri Lanka. The continuing increase in population, in spite of family planning programs, has increased the man/land ratio of these countries to an alarming situation. Present figures already show that farmers in Bangladesh, India and Sri Lanka have a small and limited land base where more than 50% of all farmers have less than 1.0ha

* Laboratory of International Marine Policy, Faculty of Fisheries, Kagoshima University, Kagoshima, Japan.

** Department of Agricultural and Forestry Economics, Faculty of Agriculture, Kyoto University, Kyoto, Japan.

and more than 90% have less than 5.0 ha.¹⁾ As the land area becomes more and more limited it is necessary for a farmer to adopt, in order that he remains viable as an economic unit, a more diversified or mixed farming system utilizing and maximizing the land and water resources available to him. In this context, it has been considered here that aquaculture could enhance the income of small farmers in this region as well as provide substantial employment and livelihood to the growing army of landless farm labor. In fact, considering the natural and environmental condition of the Bay of Bengal, aquaculture with very simple and unsophisticated technology, can make a tremendous impact on the present fish production in the region. Fish yields from existing ponds can easily be increased many fold with existing simple techniques within the reach of the small farmers and fishermen. Further, as it has been observed in some other Asian countries, rural aquaculture development can be instrumental in not only augmenting the protein supply in the form of food fish production and additional incomes for poor rural population but also it could be helpful in promoting and enhancing village welfare through the provision of health services, sanitary facilities and other communal activities and in the process it will help restore and maintain the balance of a developing rural economy.

Unfortunately, the failure to realize the importance of rural aquaculture development which is so relevant to the needs of the vast rural majority, has led the government efforts and international aid to funnel resources in market-oriented, profit motivated large scale fish farming where most effort is concentrated on the production of high value species such as Shrimp, Prawn, Oysters and Eels etc. Very little or no effort have been made in this region to develop small-scale 'Rural Aquaculture' that would utilize and maximize the productivity of the water resources available to the farmer or fishermen and raise the level of income of the farmer and his family. In the following paragraphs, the aquaculture potentialities in the countries bordering the Bay of Bengal have been highlighted and in the light of that an attempt has been made to suggest that at village level small aquaculture development can be instrumental in not only augmenting protein supply in the local diet and additional incomes for rural population but also in promoting and enhancing village welfare through communal activities centering around such projects.

II Aquaculture potential and development trend

Owing to the natural, extensive, fluvial advantages, fish, along with rice, is the most important food of almost all the people in this region. With the exception of certain regions of India, fish constitutes over 50 per cent of the total animal protein intake in the diet of the people. The indigenous peoples of this region have a strong fish eating traditions and have practised cultivation of fish in fresh and brackish water for many centuries. Originating in China, and then spreading through Southeast Asia, traditional fish culture practices based predominantly on the Carp have become highly developed skills throughout this region. These traditions (fish and rice eating habit and fish cultivation practices) together with the vast inland water areas provide an invaluable basis for the expansion of fish culture practices throughout the region with the necessary financial and technical support. Unfortunately, in spite of the long tra-

dition of cultivating and eating fish, relatively little use has been made of the vast potentialities. There still remains a great area of inland waters which is neglected or only partially used (Table 1). There are many reasons for this situation. One reason for such neglect is that fisheries has not traditionally been a priority sector for development. Another reason is the fact that fishing has traditionally been viewed in these societies as an inferior occupation. However, such attitudes have changed markedly in recent years and much more attention is being paid to the development of marine and aquaculture fisheries. Efforts and funds have been expended with national programs throughout the region under national and international funding. Such government efforts and international aid has, in most cases, centered on large scale marine and aquaculture development projects under the market-oriented, profit-motivated development concept. This type of development approach seems to gravitate towards interests and objectives irrelevant to those of small scale rural farmers and fishermen.

For example, until 1978, ADB had given loans to several of its member countries

Table 1. Total fish production, areas utilized for aquaculture and potential areas for aquaculture and inland fisheries in the Bay of Bengal region.

Country	Total catch (tons)	Aquaculture fin-fish production(t)	Aquaculture fin-fish % of Total	Aquaculture fin-fish area (ha)	Potential area for aquaculture and Inland Fisheries (ha)
Bangladesh ^{a/}	800,000	35,000	4.5	7,700	1,473,000
Burma ^{b/}	442,700	1,494	0.3	2,920	6,477,000
India ^{b/}	1,845,000	480,000	26.0	607,915	2,730,000
Nepal ^{c/}	2,750	700	25.0	700	410,165
Sri Lanka ^{b/}	87,700	15,000	17.1	10,000	644,000

Source : Bell and Canterbury, Aquaculture in the Developing Countries, (1976) and Rabanal, H. R., Aquaculture in Southeast Asia, 1977, Fifth FAO/SIDA Workshop on Aquatic Pollution in Relation to Protection of Living Resources, Manila, Philippines, 1977.

a/ Data relates to 1975/76

b/ Data relates to 1973

c/ Data relates to 1978/79

for 17 Fisheries Development Projects, 3 Aquaculture Development Projects and for 3 Projects with small fisheries components. The total amount lent to the 17 Fisheries Development Projects was about U. S. \$ 178 million and that for the 3 Aquaculture Development Projects was about U. S. \$ 41 million while the amount for the 3 Projects which has small fisheries component was about U. S. \$ 74 million.²⁾ The loan amount for those small scale fisheries in the 3 projects constituted U. S. \$ 1.64 million only. The loans that were given to the fisheries and Aquaculture projects range from U. S. \$ 2.5- U. S. \$ 26 million for a single project, indicating their 'big scale'. The impact which these big-scale projects makes on the economy through increased GNP and foreign exchange income, soon levels off as it does not reach the majority of the rural small farmers and fishermen. In view of this, the main emphasis in this study has been on the small farmer in the Bay of Bengal region, who forms the large majority of the total population. Having no alternative jobs in any other sectors that they can escape to, these small farmers still holding on to very small pieces of land, sometimes less than 1.0 hectare, barely to make out a subsistence living. Our main interest is how to help the small farmers to stay on the land and make a decent living there.

III Scope of small-scale aquaculture development

When considering the economic development of the rural small farmer, the first question to be asked is how to make the small-scale farmer economically viable so that he can continue as an economic unit. With a very small and limited land area available for cultivation, usually of less than 1.0 ha, it is obvious that in order to remain viable, a small farmer has to utilize all his land and water resources available to him in the best possible way. This means that he has to switch to a 'mixed' farming system, that will not only maximize the productivity of his land but also will help his family members to gain useful employment and increase family income.

The greatest resource in this region, other than manpower, is land and water. However, the population pressure on land has led to fragmentation of land holdings to such an extent that it no more allows a small farmer to make a living. Therefore the poor farmer in this region must not depend alone on his land anymore to produce food and other economic crops for sustaining a living but he also has to utilize the vast water resources which has so far remained unutilized or underutilized (village ponds and tanks, lakes, irrigation canals and ditches, reservoir, rivers, seasonal inundations, swamps and mangroves etc.) for aquaculture to produce fish and other products. In other words, in order that the poor farmer remains viable as an economic unit, it is necessary to integrate crop-livestock-fish farming. The technical and economic feasibilities of integrated fish culture have been demonstrated successfully in several developing countries. For example, a case study undertaken by RAFF/IFPC in north-eastern Thailand showed that a farmer could increase his net income 20 to 100 times in comparison to rice, by taking up fish farming on the same area of land. In another study in Thailand it was found that while a maize farmer requires about 10 hectares of land to make a yearly income of U.S. \$ 1000, a small farmer and his family could make a net yearly income of about U.S. \$ 3000 from fish with pig farming and banana growing on a 0.8 hectare of pond area. Another study in Indonesia showed that a farmer could make 70% of his income out of fish farming in only one-third of his 1.5 hectare land with one-third used for rice growing and the remaining one-third for dry agriculture. There are also several other examples of different types of small-scale aquaculture projects demonstrating their economic feasibility in the Southeast Asian region.³⁾ From these examples, undoubtedly, it can be suggested that there are many similar sites in the Bay of Bengal region where this type of small scale fish culture operation can be applied with very little financial assistance and technical support. Now that we have seen that small scale aquaculture operated by small farmers is feasible and that there are vast unutilized and underutilized water areas available in the Bay of Bengal region for extensive fish culture, it is necessary to have a look at the constraints that hinder small scale aquaculture development.

IV Constraints in small scale aquaculture development

The major constraints of small scale aquaculture development involving small farmers can be identified as (i) training for small farmers, (ii) supply of inputs (fish seed and

feed, fertilizer etc.), (iii) provision of credit and (iv) marketing.

Although the Bay of Bengal region has a long tradition of fish culture practices, the small farmers are not well acquainted with the practical methods involving diseases and parasites as well as control of water quality etc. Therefore the rural farmers are in urgent need of training in fish culture practices to implement as well as to increase production from their village ponds and water bodies while dealing effectively with diseases and parasites. There is an urgent need to train the small farmers so that they become motivated to explore the potentialities of aquaculture. There is a necessity to convince the small farmer of the advantages of the integrated fish farming system i. e., aquaculture, agriculture and livestock for maximizing productivity and gaining higher economic benefits per unit area as compared to single farming. In view of the above, it will be necessary that extension workers directly engage in operations which are part of the fish culture programs, for example, in the collection and distribution of fry and the management of hatcheries. While in other cases, the work of the extension worker will be to advise and guide the small farmers and in some cases the extension worker will be required to engage in activities whose purpose will be to assist the small farmer to continue their work, e. g., in arranging for transport of fry and the fish catch or in arranging credit facilities and promoting the establishment of fish farmers organisation. Further, priority should be given to the demonstration of farming systems which will induce the small farmers to adopt beneficial farming systems. Where possible, some small farmers should be included in the demonstration fish farms so that they can continue in the absence of extension personnel.

Insufficient supply of pure fish seed, fish feed and fertilizer often limits the small farmers initiative for rapid development of aquaculture practices. Therefore in order to intensify aquaculture practice among the small farmers, it is necessary to increase the production of various fish seed and to make arrangements so that the fish seed and fish food becomes easily available to the small farmers.

The target group in our aquaculture development program are mostly small farmers with or without land holdings which makes them ineligible for loans to start even small fish farming. In order to enable the small farmers to establish their own projects and to acquire the necessary inputs for operating them effectively, arrangements should be made so that credit under easy terms and conditions becomes readily available to them.

Lastly, the existing marketing mechanism does not allow better returns to the rural small fish farmers since they are handicapped in bringing their product individually to the larger markets. Therefore, measures should be taken to institutionalize the small farmers and help them to manage the production, harvesting and marketing system by themselves with necessary financial assistance and technical support. By doing so, the small farmer will be encouraged in fish farming as they will be able to fetch higher returns from the sale of their products.

V Conclusion

It would appear from the foregoing paragraphs that we have emphasized the development of small scale aquaculture as a means of restoring and maintaining the balance of a developing rural economy, and the guiding principle in our small scale aquaculture

development approach is that improvement can be effected by way of assisting directly the small farmer and fishermen in developing and improving their operations. It is expected that the small scale aquaculture development would be able to provide additional income, employment to the rural poor and to supply additional food source of protein. However, in the earlier section we only mentioned a few of the major constraints of small scale aquaculture development. There are other issues linked with small scale aquaculture development which need to be carefully examined. For example, the question of ownership and effective use of inland waters presents a number of difficult problems. Secondly, the question of deciding whether the development of small scale aquaculture is to provide a subsidiary income or to allow the producers to maintain themselves solely from aquaculture activities through cash income also presents certain problems. Finally, another issue which is closely linked with the development of aquaculture is the role of labor in aquaculture. It is necessary to examine carefully how small scale aquaculture operations will utilize labor demands: whether it will use hired labor or solely depend on family labor. These issues have not been discussed in the former section and there is a need for in-depth research on these key problems. We intend to carry out research concerning these issues as related to the development of small scale aquaculture in our future study.

REFERENCES

1. *Rural Asia-Challenge and Opportunity*, Praeger publications, New York, 1977, pages 96-97.
2. *Bank Operations in the Fisheries Sector*, Asian Development Bank, Manila, June, 1979.
3. Rabanal H. R. and Delmendo M. N., *The Role of Aquaculture in Small-scale Fisheries Development*, IPFC 19th Session Symposium on the Development and Management of Small-scale Fisheries, May 21-23, Kyoto, Japan.