



PD/A CRSP NINETEENTH ANNUAL TECHNICAL REPORT

ESTABLISHMENT OF NEW COLLABORATION IN BANGLADESH

*Ninth Work Plan, Regional Analysis: Human-Environment Interactions 1 (9RA1)
Final Report*

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ABSTRACT

This activity was conducted from January to June 2001. Through this activity, a new link between the PD/A CRSP and a Bangladesh institution has been established. The potential PD/A CRSP collaborators in Bangladesh were identified, including an academic institution, Bangladesh Agricultural University, and three nongovernmental organizations (NGOs), namely Bangladesh Rural Advancement Committee (BRAC), Caritas, and PROSHIKA. The needs in aquaculture research in Bangladesh were also identified with a priority to optimize the fertilization regimes in pond culture. This report describes the potential site, current status of aquaculture development in Bangladesh, and the potential role of the PD/A CRSP. The establishment of collaboration with academic institutions and NGOs in Bangladesh will provide great opportunities for extending research and impacts of the PD/A CRSP to Bangladesh and South Asia, which is a potential site of the project in the future. Bangladesh researchers, NGO and government extension staff, and fish farmers will benefit from the experiences, research results, and approaches of the PD/A CRSP through the collaboration.

INTRODUCTION

The PD/A CRSP has conducted research/outreach activities in Southeast Asia for nearly two decades. However, the project has not been expanded to South Asia where a large part of the population is poor, especially in countries like Bangladesh.

Bangladesh is one of the most densely populated countries in the world. Additionally, three-quarters of it is covered by flat floodplains rich in water resources and supporting enormous amounts of freshwater fish. Fisheries and aquaculture in particular are vital to Bangladesh's national economy in terms of nutrition, income, employment generation, and foreign exchange earning (Alam et al., 1996). Fish is the traditional source of animal protein for Bangladesh people, and currently approximately 80% of the animal protein supply for residents is provided by fish. Population growth is rapidly overwhelming the productive potential of the Bangladesh fishery (O'Riordan, 1992). Since the 1960s, per capita availability of fish has dropped from 12 kg to only 7 kg, due to destruction of natural habitat. Moreover, among lower income groups, per capita consumption of fish is only 4.4 kg. For the poorest of the poor, fish is simply unaffordable (O'Riordan, 1992). Thus, aquaculture plays a more important role to meet the nutritional needs of poor Bangladesh people. Indian major carps are the dominant cultured species, but tilapia is playing an increasing role in solving problems of malnutrition, health, and alleviating poverty.

The purposes of the activities, conducted by researchers of the PD/A CRSP Thailand Project at the Asian Institute of Technology, were to:

- 1) Establish a new link to a Bangladesh institution and
- 2) Identify a potential PD/A CRSP site in Bangladesh.

ACTIVITIES

The following activities were conducted from January to June 2001:

- 1) Primary identification of a Bangladesh institution as potential collaborator with the PD/A CRSP from January to March 2001, through:
 - a) Following up initial contacts of Dr. H.S. Egna (Director of the PD/A CRSP) with Bangladesh institutions during her trip in July 2000;
 - b) Consulting with Prof. J.H. Grover (ICLARM project leader in Bangladesh) and AIT colleagues who have conducted outreach activities in Bangladesh.
- 2) Contact was made with the primarily identified Bangladesh institution, Bangladesh Agricultural University (BAU), and Prof. Dr. Md. Abdul Wahab, Faculty of Fisheries, BAU, from February to June 2001. In March 2001, a researcher of the PD/A CRSP Thailand Project visited BAU, as well as fish ponds in villages (Kashimpcer and Muktugacha) in Mymensingh District. He also discussed potential collaboration between the PD/A CRSP and BAU with Dr. Wahab and visited Prof. Grover to discuss the research needs in Bangladesh.

- 3) A variety of NGOs in Bangladesh were contacted, including BRAC, Cooperative for Assistance and Relief Everywhere (CARE), Caritas, and PROSHIKA, from February to June 2001 for potential collaboration. Through emails we contacted Mr. Md. Mokarrom Hossain, Senior Regional Manager (Fisheries) of BRAC Rural Development Program; Mr. Greg Chapman, Coordinator of CARE Rice-Fish Project; Ms. Anwara Begum Sheely, Director of Caritas Fisheries Program; Dr. Thomas Costa, Development Director of Caritas; and Mr. Md. Abdur Rahman, Senior Coordinator of PROSHIKA Fisheries Program. A researcher of the PD/A CRSP Thailand Project visited Ms. Sheely at the head office of Caritas Fisheries Program at Dhaka in March 2001.
- 4) A junior staff member from BAU, Mr. Muhammad Mustafizur Rahman, was invited to visit AIT and several fish farms in Thailand in June 2001. He was briefed about the history and current activities of the PD/A CRSP, trained for analyses of water quality parameters using PD/A CRSP standard methods, and also trained for data collection, management, and analysis by researchers of the PD/A CRSP Thailand Project at AIT.

OUTPUTS, OBSERVATION, AND DISCUSSION

Identified Potential Collaborator: Bangladesh Agricultural University

Bangladesh Agricultural University is the largest institution in the country providing teaching, research, and extension support in agriculture. The Faculty of Fisheries is the youngest faculty and has some 40 academic staff. It remains the sole source of fisheries and aquaculture graduates in Bangladesh and is thus the principal trainer of fisheries and aquaculture extension staff. The Faculty of Fisheries maintains a good range of laboratories and field facilities.

On behalf of Bangladesh Agricultural University Research System (BAURES), Prof. Abidur Reza (Director of BAURES) has expressed interest and willingness to develop collaborative research activities between the PD/A CRSP and the Faculty of Fisheries of BAU. He has also ensured that BAURES and the relevant departments and laboratories will provide all necessary support for future collaborative research and training activities. Dr. Wahab has been nominated by BAURES as the principal investigator for collaborative activities with the CRSP.

Wahab started his teaching career as a lecturer in limnology at BAU in 1979. He obtained his Ph.D. in aquaculture from Stirling University, UK, in 1986. He studied nutrient enrichment in a flow-through land-based aquaculture system and its effects on benthic animals of the ponds. Since then, his major research interest has been in water quality and nutrient dynamics in various pond aquaculture systems. He has carried out extensive research on species combinations of both major Indian and exotic carps towards development of suitable polyculture technologies for small-scale aquaculture in rural Bangladesh. Wahab has been successful in receiving research grants from a number of national and international bodies, which include the International Foundation for Science (IFS), Department for International Development, UK (DFID), Norwegian Agency for Development Cooperation (NORAD), Danish International Development Agency (DANIDA),

European Commissions International Cooperation Programme (EU-INCO), and USAID. The excellent performance of Wahab and his team will make the future collaborative activities successful.

Description of the Potential Site

The Fisheries Faculty Field Laboratory of BAU has been identified as a potential experimental site for a future PD/A CRSP project. BAU is about 100 km north of Dhaka and 4 km south of Mymensingh town, Mymensingh District, and occupies 486 ha by the side of Old Brahmaputra River.

Description of Area/Region

Climate: Köppen classification Af: Humid tropical group (A), tropical rainforest type (f). Bangladesh has a subtropical monsoon climate characterized by wide seasonal variations in rainfall, moderately warm temperatures, and high humidity. Regional climate differences in this flat country are minor. Three distinct seasons are observed: a cool, dry winter from October to March; a hot, humid summer from March to June; and a cool, rainy monsoon season from June to October. In general, the maximum summer temperature is about 36°C. The hottest month is April and the coldest month is January, when the average temperature is 11°C. Average daily humidity ranges from a March low of about 57% to a July high of about 86%. Heavy rainfall is characteristic of Bangladesh. The annual rainfall in Mymensingh is about 3,000 mm, 80% of which occurs during the monsoon season.

Topography: Broad deltaic plain. Chittagong Hills in southeast, low hills in northeast, and modest-elevation highlands in north and northwest.

Description of BAU

The Fisheries Faculty Field Laboratory of BAU consists of a hatchery, 72 earthen ponds, and a large earthen water storage pond 4 ha in size. The hatchery can reproduce Indian major carps, common carp, and Chinese carps. The size of earthen ponds varies from 75 to 800 m² (9 ponds are 75 m², 17 ponds 100 m², 16 ponds 400 m², 12 ponds 500 m², 12 ponds 800 m²). The pond bottom soil is loam. The water supply for the ponds is groundwater from an adjacent deep tube-well. The Fisheries Faculty has a well-equipped Water Quality Laboratory.

Current Status of Aquaculture Development in Bangladesh and Potential Roles of the PD/A CRSP

Aquaculture is commonly practiced using polyculture of four to seven species of Indian and Chinese carps mainly in manured ponds (Wahab et al., 1991, 1999). The major pond inputs are cow dung and chicken manure, while the chemical fertilizers are either expensive, unavailable, or competitively used for agriculture. In spite of extensive research that has been conducted on fertilization in carp polyculture ponds in many parts of the world, such information is rather sparse in Bangladesh (Haq et al., 1993). In Bangladesh, most fish ponds are rain-fed and have multiple uses such as washing clothes, household, and kitchen items; serving as crop irrigation and drinking water for livestock; and even being used for bathing. During the dry season, the pond water level decreases and ponds may even dry up. The multiple use of fish ponds is a constraint for high nutrient inputs and high production. Thus, Bangladesh scientists estimate that the upper level of fish production in such ponds is 4,000 kg ha⁻¹ yr⁻¹. However,

current fish production is quite low in Bangladesh, averaging 2,800 kg ha⁻¹ yr⁻¹ (DOF, 1999). In rural aquaculture ponds, fish production is often lower than 1,500 kg ha⁻¹ yr⁻¹. Compared with manure, chemical fertilizers may help to enhance fish production and maintain better water quality at the same time. The two decades of worldwide experiences by the PD/A CRSP can contribute significantly to aquaculture development in Bangladesh through future research, outreach, and training activities, especially with tilapia becoming more popular there.

Bangladesh has a variety of aquaculture and fisheries projects that have been funded by international aid. Many NGOs such as PROSHIKA, BRAC, CARE, and Caritas have been making significant progress in promoting aquaculture development in Bangladesh. However, NGOs are working more or less independently through their own extension networks, and researchers in academic institutions are seldom involved in such extension work. NGOs have been working with farmers to increase fish production, but different NGOs often recommend different fertilization regimes to farmers, and these regimes do not all seem to increase yields. Fertilization regimes do vary with different local conditions such as soil and source water. However, in some cases, the same farmers receive very different recommendations on fertilization regimes from different extension partners. Both over- and under-fertilization may cause adverse effects on fish production, water quality, pond effluents, and economic returns. Liming ponds is an important management practice in aquaculture depending on the soil conditions. Almost every pond is limed before fish stocking in Bangladesh. It has been questioned whether liming is needed in many ponds, but no such research has been conducted.

There is a critical need for good research to support the development efforts in Bangladesh, and there is very little real substance in the institutions and development programs to support this needed research (Grover, pers. comm.). Future potential PD/A CRSP activities may fill this gap and bring NGOs, academic institutions, and even government agencies together to optimize pond fertilization and management strategies for farmers in order to maximize fish production, maintain good water quality, reduce environmental degradation, and maximize economic returns. Among the contacted NGOs, BRAC, Caritas, and PROSHIKA have expressed interest in the optimization of fertilization regimes through collaborative research with the PD/A CRSP and BAU. CARE is focusing on rice-fish integrated culture and cage culture but is willing to explore other areas of possible future collaboration with the PD/A CRSP. A research proposal entitled "On-station

and on-farm trials of different fertilization regimes used in Bangladesh" was developed for the Tenth Work Plan of the PD/A CRSP to begin with this collaboration. The purposes of the proposed research were to evaluate the different fertilization regimes currently used for aquaculture in Bangladesh; to compare effects of different fertilization regimes on fish production, water quality, pond effluents, and economic returns; and to recommend the best fertilization regimes to small-scale rural farmers from the joint efforts of the PD/A CRSP Thailand Project, BAU, BRAC, Caritas, and PROSHIKA.

ANTICIPATED BENEFITS

The establishment of collaboration with academic institutions and NGOs in Bangladesh will provide a great opportunity for extending research and impacts of the PD/A CRSP to Bangladesh and South Asia, which is a potential site of this project in the future. Bangladesh researchers, NGO and government extension staff, and fish farmers will benefit from the experiences, research results, and approaches of the PD/A CRSP through the collaboration.

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