

Exploring the links between fishpond and crops in Bangladesh

Manjurul Karim, Dr.Md.Abdul Wahab, Dr David Little

Research for the POND LIVE project has been conducted in Bangladesh since 2001.

The principle aim is to analyse the impact of pond aquaculture on the livelihoods of Asian farming households; and to enhance the role of aquaculture ponds in nutrient cycling on farms through improved nutrient management of farming households especially between crops around the dike and pond.

The institutional context for promoting pond-dike systems is often indistinct and learning this context is one of the major objectives of the project.

Four villages were selected, two rural and two peri-urban, from two different Upazilas of Mymensingh District of Bangladesh. Selection was based on secondary information including: villages having some ponds with dike crops; access to markets and information assumed to affect the level of pond-dike development; vulnerable poor households; and community peoples' interest to share thoughts and ideas.

Participatory Community Appraisals (PCA) were carried out in the villages to review existing pond-dike systems, aquaculture practices and overall livelihood strategies of different farming households, which were categorised further based on the level of integration between aquaculture and crop cultivation practices and well-being status. A considerable number of male and female members participated in this process. Farmers were identified for this exercise through lottery from a large number of samples and finally based on their interest. Findings from these exercises were cross-checked in a workshop with four stakeholder groups: representatives of households from the communities, traders, NGOs, and government agencies and researchers. Prioritised research and policy issues are given in annex 1.

PCA participants were categorised based on gender, well-being and involvement in pond-dike systems (pond-dike with vegetable crops, pond-dike with trees, and non-pond). Six PCA tools were used to appraise the villages & general farmers and another six tools for appraising pond-dike integrated farmers. It is revealed

from the PCA exercise that there are separate and combined effects of gender, well-being and site on general activities and food consumption pattern of community households. Expected use, current use, and problems and benefits associated with fish culture were also affected by pond-dike system groups and sites separately and jointly.

The findings of the PCA were cross-checked and validated in the respective villages through presentation of the results and later in a State of System (SOS) workshop where participants from GOs, NGOs, fish traders, fish growers and researchers from different institutes took part. All four groups of participants identified problems of pond-dike systems, trends of aquaculture, research and policy implementation issues for growing pond-dike crops and prioritised the issues in order of importance.

After having a preliminary idea about the existing pond-dike systems, a baseline survey was carried out through a pre-structured questionnaire from a substantial number of farming households covering a wide range of information, which included all aspects of livelihoods. The baseline provided an ample opportunity for the stakeholders of the project to understand the critical role of the pond as a source of water for family use and surrounding crops, income, and nutrition. For the monitoring phase, six villages were eventually included where a total of 180 active (irrigating crops by the pond water) and passive (using moist dikes for cropping and tree plantation) integrated farmers are involved. Six field facilitators have been collecting necessary information from sample farmers each month since April 2002.



Pond dike crops.

Once this year of monitoring is complete, farmers who principally focus on pond-dike production will be involved in on-farm trials to solve existing farming problems. Both the farmers and project staff will design the participatory action research in such a manner that there will be no specific design, rather research will be based on the farmers' local resource and willingness. Along with the above activities the project will also be searching out the existing extension models being followed by the local organisations for promoting aquaculture and integrated aquaculture in the POND LIVE working area. Eventually, impact of local institutions on the flow and development of knowledge and the relationship between success of integrated aquaculture and access to critical inputs will be assessed together with a comparison of approaches used by different promoters. Participatory methods have been found to be useful to understand the local situation, farming systems, farming problems and farmers' attitude to solving their existing problems.

Improved nutrient management can increase nutrient efficiency and total farm productivity and can, therefore, have a beneficial effect on livelihoods. It is expected however, that the role of ponds in improving livelihoods is likely to be strongly seasonal and related to the complementary use of water for the local irrigation for high value crops.

In addition to rice and fish, vegetables are a major part of the Bangladeshi diet. Pond-dikes support production of a wide range of crops, probably reduce malnutrition and further could be an important way to diversify livelihoods and use valuable space more efficiently. There is potential for the utilisation of ponds in the deep tubewell irrigation systems, which may offer constant and nutrient rich water for surrounding crops.

The success of pond-dike systems will largely depend on the combination of local expertise, scientific know-how, and the understanding of social, cultural, ecological, economic and political will. The participation of community organisations, representatives of local

A British Council link between the Institute of Aquaculture and the Research Institute for Fisheries, Aquaculture and Irrigation in Szarvas, Hungary

Professor Sandra Adams and Dr Kim Thompson of the Aquatic Vaccine Unit, Institute of Aquaculture, received a British Council award in July of this year as part of the British Council's Hungarian - British S&T Cooperation Programme. Drs. Zsigmond and Galina Jeney from the Research Institute for Fisheries, Aquaculture and Irrigation (HAKI) in Szarvas, are the Hungarian partners on the grant. The purpose of this link is to collaborate on studies examining the effect of immunostimulants on immunisation of genetically different lines of carp against erythrodermatitis.

Carp culture is one of the oldest and most widely practised systems world-wide. HAKI has a unique live gene bank of carp, comprising of 17 foreign strains and 20 Hungarian strains of carp. The gene bank was established for use in genetic (DNA typing), stress and disease resistance studies, which are currently in progress at HAKI. Two bacterial diseases are noted as causing major problems for carp aquaculture, namely carp erythrodermatitis (CE) and ulcer disease of goldfish (UDG). Both are caused by the organism a typical *Aeromonas salmonicida*, which produces a subacute to chronic infection in the fish. Vaccination against this pathogen has not been fully investigated for carp, although commercial vaccines are available for furunculosis in salmonids, a disease caused by typical *Aeromonas salmonicida*.

The two groups are examining the use of immunostimulants independently or in conjunction with vaccination in genetically different carp lines to establish beneficial effects of treatment and the most responsive fish lines to vaccination against erythrodermatitis. Professor Adams and Dr Thompson visited HAKI in early November, 2003, and the visit was reciprocated by Hungarian partners later on in the month when Dr Zsigmond Jeney and Ms Timea Racz (a research assistant at HAKI) visited the Institute of Aquaculture.



Participatory Community Appraisal with the villagers.

bodies, GOs, NGOs, researchers and farmers in all levels of planning and implementation of research should help to formulate appropriate policy. There is a paucity of information on the importance of pond-dike systems in Bangladesh, nonetheless prior to further research and extension it is imperative to explore what is known and what has been done in this field. Intensive support from institutional players is crucial for pond-dike systems development within the general agricultural systems to help both producers and consumers of this country. A well-planned and realistic approach to fish and vegetable cultivation can succeed.

Annex 2 Research issues

Priority	Farmers	Traders	NGOs	GOs
1	Trials to assess integration of fish and vegetable production, and to assess impact of pond-dike systems	Final evaluation between fish culture alone and integrated pond-dike culture	Criteria for selection of appropriate fish and vegetable for pond-dike integration	Development of a list of vegetable fish and vegetable production in pond-dike systems
2	Alternatives to raising fish for fish and pond-dike crops	The multiple value of pond-dike systems (crop, fertilizer, irrigation)	Relative benefits of fish and vegetable alone and integrated pond-dike culture	Potential of integration of fish and vegetable crops
3	Strategies to produce high quality vegetable seed	The relative effects of pond-dike and other systems to other crops and irrigation techniques for growing crops (vegetables)	Potential of integration of fish and vegetable crops	Strategies to use seed and pond-dike cultivation to improve crop production

Policy / Implementation issues

Priority	Farmers	Traders	NGOs	GOs
1	Encourage trials of different systems to improve availability of seed	Develop fish culture	Highlight the benefits and provide general support	Identify the potential farmers and provide technical assistance
2	Encourage access to improved seed of vegetable crops	Develop fish culture	Integration between fish and vegetable crops	Encourage participation of women in the culture activities
3	Encourage biological control of fish and vegetable pests and diseases	Develop fish culture	Integration of fish and vegetable production	