



A PRELIMINARY REPORT FROM  
THE NGO FISH CULTURE WORKSHOP  
**'STRATEGIES TOWARDS  
BENEFITING THE POOR'**

Organised by ADAB and ITDG

Dhaka, Bangladesh 25 and 26 October 1992

in the Bangladesh Management Development Centre

PLEASE NOTE

This Preliminary Report was written as quickly as possible to provide Workshop participants, and other interested parties with an immediate record of the proceedings. The Report is based on notes taken and tape recordings made. It was prepared by Brian O'Riordan (Fisheries Coordinator, ITDG).

Please note any factual errors, or omissions, and notify him so that these can be incorporated into the Full Report



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## **SECTION 1. INTRODUCTION**

### **Background.**

Despite considerable investment in fish culture projects targeted at the poor, there appears to be little evidence that poor rural people - particularly the landless - are benefiting from these projects (either in terms of improved food supplies or incomes).

The Intermediate Technology Development Group (ITDG) and the Fisheries Cell of the Association of Development Agencies in Bangladesh (ADAB) proposed that Non Government Organisations (NGOs) working in this area (poverty alleviation and fish culture) should organise a Workshop where their various experiences could be shared. The main purpose of the Workshop would be to increase understanding about ways in which the poor could benefit from fish culture, thereby assisting the process of fish culture development in favour of the poorest.

A preliminary meeting was held in May 1992 to discuss this idea. Representatives from 6 NGOs participated (BRAC, PROSHIKA, TMSS, ADAB, CARITAS and ITDG). The meeting recommended unanimously that the Workshop take place, and that it should deal with both technical and social problems and issues. It was proposed that the Workshop be organised through the NGO Fisheries Forum, and that ADAB and ITDG should take the lead roles in organising it.

### **The ADAB Aquaculture and Fisheries Forum**

In 1990 ADAB together with IVS, and with support from PRIP, established an Aquaculture Cell. The subsequent networking activities of this Fisheries Cell led to the formation of the NGO Aquaculture and Fisheries Forum. This Forum covers 4 Regions (North West, South West, North East and South East). Each Regional Forum networks through the ADAB Aquaculture Cell. The Forum encourages the sharing of skills, knowledge, experiences and expertise between NGOs working in fish culture.

### **The Intermediate Technology Development Group**

The Intermediate Technology Development Group is an International NGO founded in the UK by the late Dr E.F. Schumacher (the Author of *Small is Beautiful*) in 1965. Although ITDG has been involved with projects in Bangladesh for some years, ITDG Bangladesh was only formally registered as an NGO relatively recently (July 1990). ITDG's main role is as a 'service NGO', to provide technical support to other organisations. Currently IT Bangladesh is working in 3 main project areas: Food Processing, Textiles and Small-Scale Fish Culture.

## **Meeting Format.**

### **Day 1: 25 October**

Chairman : Dr A.K.M. Nuruzzaman, Member Director (Fisheries) BARC

#### **INAUGURAL SESSION**

Welcome Address by the Director of ADAB, Mr Mahbubul Karim.

Address by the Special Guest: Mr A.K. Ataur Rahman, Director, Department of Fisheries, Government of Bangladesh

Inaugural speech and opening of the Workshop by the Chief guest:

Mr Md F.R. Chaudhury, Director General, NGO Affairs Bureau, Government of Bangladesh.

Address by the Chairman, Dr A.K.M. Nuruzzaman.

#### **WORKING SESSION**

Introduction by Brian O'Riordan, Fisheries Coordinator, Intermediate Technology Development Group (ITUK).

Key Note Paper by Dr Qazi Faruque Ahmed Executive Director Proshika and Chairman of ADAB on: The Social and Environmental Implications of Benefiting the Poor through Fish Culture.

Questions, clarifications and discussions from the floor

Remarks by the Chairman.

Key Note Paper by Mr Masudur Rahman, Additional Director, Department of Fisheries, Government of Bangladesh on : The Technical Problems of Benefiting the Poor through Fish Culture.

Questions, clarifications and discussions from the floor

Concluding remarks by the Chairperson

## **DISCUSSION GROUP SESSION**

Explanation of the format and organisation of afternoon Workshop. Clarification of purpose and expected result. Brian O'Riordan.

Discussions in 2 groups (one group on Technical Problems, one group on Social Problems) to propose strategies towards benefiting the poor.

a) Presentation by each participant.

b) Discussions and proposals.

### **Day 2. 26 October.**

Chairman: Prof Shahadat Ali, Chairman, Dept. Zoology, Dhaka University.

### **Feed Back from Discussion Groups**

Each group presented a summary of its discussions, and gave its recommendations to the workshop participants. These presentations included:

- agreeing strategies towards benefiting the poor.
- establishing priority areas (Technical, Social, Economic) for new work.

The Chairman then summarised the discussions.

The Discussion Groups then proposed areas for NGO collaboration to assist the implementation of the proposed strategies.

Summary of the findings and concluding remarks by the Chairman.

Vote of thanks. Brian O'Riordan.

## **SECTION 2. SUMMARY OF ADDRESSES GIVEN DURING THE INAUGURAL SESSION.<sup>1</sup>**

### **2.1. Address by the Special Guest Mr A.K. Ataur Rahman Director of Fisheries, Government of Bangladesh.**

#### **Introduction**

Despite the natural factors which combine to create a great potential for fisheries in Bangladesh, the overall availability of fish is declining - particularly from the open water capture fisheries. There many factors responsible for this decline, these include:

Population pressure and resultant overfishing; large scale siltation; shouldering of rivers and canals; industrial effluent and insecticides; the reduction of fish habitat due to flood control, drainage and irrigation projects.

During the current 5 year plan production from inland open water capture fisheries has declined by over 40,000 tonnes. This has been more than compensated for by aquaculture production, estimated at over 55,000 tonnes, brought about mainly through the introduction of artificial breeding of carp and hatchery technology in the early 1980s.

#### **Constraints to Aquaculture Development.**

Although there have been significant developments in artificial breeding, hatching and nursery operations, aquaculture production is still constrained by a number of factors:

- a) Inadequate supply of appropriate fish fingerlings at village level.
- b) Lack of appropriate technology packages.
- c) Inadequate extension efforts to transfer available technology.
- d) Problems of access to institutional credit.
- e) Lack of understanding of pond production dynamics.

#### **Importance of Private Sector.**

Most fish production, processing and marketing activities are carried out in the private sector. The Government endorses and encourages this.

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<sup>1</sup>. These summaries are based on tape recordings of the addresses.

### **The Role of the Department of Fisheries (DOF).**

Recognising its institutional weaknesses and lack of success in aquaculture extension, the DOF has launched several development projects recently. These have strong extension and institutional strengthening components for both carp and shrimp culture.

#### The Asian Development Bank assisted Second Aquaculture Development Project.

Shrimp and carp culture is being developed in 25 districts. DOF staff will be trained by consultants to develop demonstrations of improved cultivation, pond engineering and setting up fry handling techniques on existing privately operated enterprises. Extension teams will work with selected farmers to plan and implement pond upgrading, including pond management.

All the inputs (fry, fertiliser, feed etc) will be provided to the participating farmers in exchange for their agreement to follow the recommended strategy, and to allow neighbouring farmers to visit and observe farm activities. The demonstration farmer owns the crop produced, but the input costs are deducted from the harvest. The project plans to carry out demonstrations in 450 shrimp farms and in over 1,100 private fish farms. Productivity should increase from 90 kg to 250 kg/ha for shrimp, and from 1 tonne to 2.5 tonnes for carp.

#### The DANIDA assisted Extension Project at Mymensingh.

This project takes a different approach. All input support is provided at the village level using a 'fool proof' credit system based on existing proven systems. The project guarantees the loans provided by participating banks, and works with an NGO in 3 of the project Thanas. So far there is a 97% recovery rate on loan repayments.

#### FAO/UNDP Institutional Strengthening Project.

This is adopting a highly successful 'trickle down' approach to aquaculture extension. Farmers are selected according to well made criteria, and the farming system is based on their own capabilities and resources. Management and technical advice are the only inputs given.

Field workers make frequent visits to organise and supervise farm demonstrations, record keeping, and to offer solutions to problems (if any). These farmers are then encouraged to associate with at least 10 other farmers, who follow the demonstrations closely and get trained in the aquaculture operation. Over 3.5 tonnes per hectare have been produced by most of the demonstrators, who now act as extension agents for the DOF.



## **Socio-Economic Status of Fishfarmers.**

Fish farmers belong to the lower socio-economic strata of the economy. Most are uneducated and have no knowledge of pond production dynamics. They follow traditional methods with inappropriate and irregular inputs, which result in very low productivity. This is made worse by seasonal floods, heavy fish mortality due to poor water quality, disease, poaching etc. There is a need to provide a much wider in depth training in modern scientific farming. The extension efforts of the DOF are not adequate, and need to be strengthened to cater to the needs of the private sector investment in aquaculture production and marketing.

### The Role of the NGOs

Many national and local NGOs have developed fisheries programmes, and some are involved with the DOF in projects for the development and welfare of the fisherfolk, and with the management of open water bodies under the new management system.

Many NGOs do not have access to fisheries and aquaculture extension staff. Appropriate training programmes for NGOs are needed, and they should recruit extension personnel to strengthen their capabilities.

The deliberations of this meeting should address many of the constraints and bring solutions to most of the problems constraining aquaculture in this country.

### **2.2. Address by the Chief Guest Mr Md F.R. Chaudhury, Director General, NGO Affairs Bureau, Government of Bangladesh.**

The Director General emphasised the importance of the Workshop theme and subject area. An area where there is tremendous potential, but also neglect. Fish culture is becoming increasingly important in the context of increasing scarcity and costliness of fish. Fish used to be plentiful, but it is now a luxury item.

The Government capacity to develop our fisheries potential is limited, it is therefore important that involvement of the NGO and private sectors are encouraged. It has been said that fish should be produced to satisfy our minimum protein requirements. However, fish should also be produced for export earnings.

There are many foreign experts who have commented on the potential of our fish resources. A recent German Government (GTZ) project identification mission stated that fisheries had the most potential out of the 4 or 5 they had studied. A British Expert connected with the Flood Action Plan suggested that the large numbers of ponds should be renovated and their banks built up. In this way not only would they provide a good fish harvest, but also shelter from the floods.

The lack of adequate technology, knowledge and training in the fisheries sector has been mentioned. NGOs should take the initiative here and organise (training). The Workshop should not draw the line here. A continuing initiative is required if we are to develop the full potential of fish culture through developing our technical competence in all parts of Bangladesh. NGOs have a crucial role to play in organising and training rural people.

### SECTION 3. SUMMARY OF KEY NOTE PAPERS.

#### 3.1. Summary of Key Note Paper by Dr Qazi Faruque Ahmed, Executive Director of Proshika and Chairman of ADAB <sup>2</sup>.

##### SOCIAL AND ENVIRONMENTAL IMPLICATIONS OF BENEFITING THE POOR THROUGH FISH CULTURE

###### **Fisheries and Fisherfolk.**

The fisherfolk, like the fish they catch, are ensnared in a net. Development of the fisheries potential can not be brought about without development of the fisherfolk. Many projects are purely technology focused and exclude the fisherfolk. These types of projects can not hope to achieve any development of the resource potential.

###### **Access to Resources.**

According to satellite surveillance, Bangladesh has potentially one of the richest fresh water fisheries in the world. However, the fisherfolk are denied access to these resources by more powerful interests. Non fishermen are able to capture the leases on these state owned water resources (hoars, boars, beels, ponds etc) which should go to genuine fisherfolk. The genuine fisherfolk are forced to sell their labour, and are therefore unable to benefit from the fruits of their labour or to retain the harvest they reap.

In this way sustainable resource productivity is threatened. The fisherfolk understand very well the resource limitations, but in order to survive are forced to use damaging techniques (like the *Current Jahl*<sup>3</sup>) to obtain some food.

Under these conditions of bondage and exploitation, one can not talk about fisheries development or technology transfer. Genuine fisherfolk (both seasonal and full time) must be granted access to fish resources. We need to develop some simple system which allows this to happen. Only when they have such access can we begin to talk about other aspects of development.

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<sup>2</sup>. This paper was prepared from a tape recording of Dr Qazi Faruque's presentation to the Workshop. This presentation was made from hand written notes. There was no formal paper as such.

<sup>3</sup>. The '*Current Jahl*' is a very fine mesh gill net. When placed in a pond (or other water body), it is difficult to see or to notice where it has been used. It is a very effective, though illegal, fishing technique.

### **Environmental Issues.**

There is much cause for alarm in the data which shows the negative impact of humankind on the environment in general and on fish resources in particular. Some of the biggest threats are through the use of pesticides, agro-chemicals, untreated domestic and industrial waste disposal. This has had a big impact on the fish habitat.

### **Solutions.**

If we discuss problems, we must propose solutions. Cooperation and action by both the Government and NGO sector is essential if these problems are to be solved.

### **Access to and Ownership of Resources.**

Some NGOs have signed an agreement with the Department of Fisheries which allows for direct access to Open Water Bodies by the genuine fisherfolk. This is considered to be a key issue.

It is only when the ponds actually belong to the poor that their full potential will be realised. There is no incentive to generate a surplus when (the water bodies) belong to someone else. Through ownership of the ponds the poor would be motivated to realise their full productive potential.

### **Organisation of, and Credit for the Fisherfolk.**

To develop their capacity and to be able to deal with their own problems, the fisherfolk need to organise themselves.

Credit needs to be made available to them in a **timely** and **convenient** manner.

### **Appropriate and Inappropriate Technology.**

Technology developed in isolation in the research stations can not be appropriate for the poor. To be appropriate, technology must be developed for the conditions under which the poor live. It must be cost effective and environmentally sound. In particular the use of chemical fertilisers in ponds is questionable. There are many organic alternatives, such as *Azola and Duck Weed*.

An example of a totally inappropriate project is one being implemented by the ADB. This project proposes to kill off all the traditional/indigenous varieties of fish by poisoning them. Then, after cleaning up, to introduce exotic new varieties. In the name of *Science* local biodiversity is being destroyed.

## Popular Wisdom

Fisherfolk are often considered to be ignorant people. However, they have been undertaking fish culture and harvesting for many generations. They have accumulated a great deal of popular wisdom. This popular wisdom has not been tapped into, and moreover is generally ignored or devalued as superstition.

Any productivity increases through technology development must take into account this immense resource of popular knowledge - and build technology and development around it.

## Marketing Support.

Once the barriers to access the resource are removed, the bondage in the market place must also be removed. This is a constraint in almost every other sector too. There is a modern tendency to think of everything in terms of the market - common wisdom all over the world promotes a market oriented approach. However, production for family needs must come first. Only once these needs have been taken care of should we think in terms of marketing the surplus. Production should first and foremost be for family needs.

The market is not neutral, and there is no such thing as the *Free Market*. Markets are subject to distortions and manipulations by the powerful. Under such conditions the poor must be given some assistance with bargaining power. This can be achieved through better organisation, and more technical support - particularly in fish processing.

### **3.2. Summary of Key Note Paper by Mr Masudur Rahman, Additional Director of Fisheries.**

#### **TECHNICAL PROBLEMS OF BENEFITING THE POOR THROUGH FISH CULTURE**

##### **Introduction**

The important role of fish and fisheries was noted. It provides some 80% of the animal protein intake, nearly 3% of GDP and over 12% of export earnings. The Fisheries sector employs some 13 million people, 2 million full time, and 11 million part time.

Both Inland and Marine fisheries play an important role; the marine sector employing some 40% of the fishermen population and the inland sector some 60%. Employment in the inland sector peaks during the 4 month South West Monsoon season (June to October), when it is estimated that some 70% of the total land area is inundated. The natural environment is ideal for fish production.

The fishing community are a disadvantaged class in the rural sector, and improvements in the fishing sector are likely to bring them direct benefits.

##### **Identification of Problems.**

The Department of Fisheries has been organising workshops at divisional levels which allow the fish farmers to interact with Government Officials. This recognises that the imposition of ideas, solutions, welfare packages on the poor without taking their views into account is not appropriate. They need to be given an opportunity to voice their problems, and to propose technical solutions.

##### **Technical Problems.**

These were discussed under the following headings:

- a) **Water Bodies not Purposely Built for Fish Culture.**
- b) **Improper Use of Seasonal and Perennial Ponds.**
- c) **Irrational Timing of Pond Preparation.**
- d) **Improper Stocking.**
- e) **Lack of Knowledge of Modern Fish Culture and Lack of Appropriate Training Manuals.**

**f) Less Emphasis on Need Based Technologies.**

The tendency to apply technology packages which do not take into account local needs and capacities results in many failures. Once support (finance, training etc) is withdrawn, the project collapses. Development agencies must transfer need based technologies, suited to local capacity. Only this approach will increase sustainability.

**g) Unavailability of Certain Critical Material Inputs.**

**h) Outbreak of Diseases.**

**i) Unorganised Marketing System.**

Under current practices, which work against the interests of poor producers, the consumer pays 2-3 times the price paid to the producer.

**Conclusion.**

Despite favourable environmental and resource factors, and available appropriate technologies, efforts have failed to increase fish production significantly. One of the main reasons for this is the lack of linkage between the research centres and the producers. Cooperation and Coordination between the NGOs and the Department of Fisheries has the potential to breakdown many of the barriers which are currently preventing the effective transfer of technology and the bringing benefits to the poor through fish culture.

### **3.3 Discussions on Social and Technical Problems for Benefiting the Poor through Fish Culture.**

#### Main Discussion Points on Dr Qazi Faruque Ahmed's Paper

- a) One strategy to address the non-availability of fingerlings at village level would be to encourage group members to set up their own small hatchery.
- b) Problems of poaching can be reduced by using ponds close to where group members live.
- c) Problems of overfishing in open water bodies can be addressed by controlling access and restocking.
- d) Water retention problems can be reduced by applying organic matter to the pond bottom.
- e) It was pointed out that not all fish can consume duck weed, and that to feed fish in 1 hectare of water, 5 hectares of water for duck weed was required. It was doubtful whether this could be cost effective.

#### Main Discussion Points on Mr Masudur Rahman's Paper.

- a) In 1986 the Government agreed to lease out ponds below 3 acres to NGOs for fish culture. In 1988 The East Bengal Tank Improvement Act was amended. This meant that all water bodies under 3 acres came under the jurisdiction of the Lands Ministry. Their policy favoured other ponds users, and if they were being used for other activities (washing, domestic water etc) they could not be used for fish culture. The policy differences between the Ministry of Fisheries and Livestock, and the Ministry of Lands is a problem area that needs to be resolved. It is necessary for these 2 Government departments to sort out their differences on this important issue.
- b) It was proposed that NGOs should have some say/representation in the District Committee which decide who gets leases on water bodies. Often bogus cooperatives and non-fishermen get these leases. NGOs representation would help true fisherfolk get these leases.
- c) The African magur issue was raised. It was proposed that the NGOs should make a joint statement asking for its further introduction to be banned, and to lobby for its cultivation to be banned also.



Conclusions by The Chairman (Dr Nuruzzaman).

- a) There must be less of a colonialistic 'Top Down' approach to development, and much more 'Bottom Up' development.
- b) With regard to restocking water bodies, in a poor country like Bangladesh survival rates of 1% are unacceptable. The stocking of rivers should stop, and instead more manageable water bodies (ponds, beels, lakes etc) should be stocked.

#### **SECTION 4. SUMMARY OF WORKING GROUPS DISCUSSIONS. SOCIAL AND TECHNICAL PROBLEMS OF BENEFITING THE POOR THROUGH FISH CULTURE.**

The Workshop participants divided into 2 groups (Group A and Group B). Group A were asked to focus on the Technical Problems, and Group B to focus on the Social Problems of Benefiting the poor through Fish Culture. The terms of reference for each group were:

- To share their experiences. Participants were asked to spend 5 minutes providing a summary of their experience, and that of the NGO, with the problems of benefiting the poor through fish culture (technical and social).
- To discuss and agree:
  - What strategies have proved successful
  - Alternative strategies (that should be considered).

Each group was asked to provide for Plenary Session outlines of:

- a) Main problem areas.
- b) Successful strategies.
- c) Proposals and recommendations for alternative strategies.

#### **4.1. Summary of Discussion Group A: Technical Problems of Benefiting the Poor through Fish Culture.**

##### **MAIN PROBLEM AREAS IDENTIFIED.**

NGO experience in fish culture fell into 4 main areas:

**Cage Culture, Rice cum Fish, Seasonal Ponds, Permanent Ponds. Specific and general problem areas were considered.**

##### ***1.1. Cage Culture***

Netting materials are not readily available locally, and need to be imported.

It is difficult to obtain mesh sizes to suit requirements (re fry, fingerling etc).

High mortality of tilapia during transport.

### **1.2. Rice cum Fish Culture**

High Predation

Wide temperature fluctuations

Shallow water

Short growing season

### **1.3. Tilapia Culture**

Prolific breeding and associated problems.

### **1.4. *Macrobrachium rosenbergii***

High mortality after 30 gm size.

### **1.5. North West**

This is a much neglected area, from both NGO and GO activities.

### **1.6. Carp Culture (*C. carpio*)**

High mortality in some ponds (associated with high organic loadings)

### **1.7. General problem areas**

Areas discussed included:

***Inputs, Growth and Mortality, Miscellaneous.***

#### ***a) Inputs***

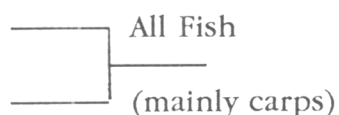
4 main factors which cause problems were identified:

***Quality, Quantity/Availability, Timeliness and Costliness.***

Seed Inputs (fry, fingerlings etc).

Quality (Species and characteristics)

Timeliness (not available when needed)



Brood stock - costliness and availability (mainly carp, but all species).



Feed Inputs.

Quality and costliness

Feeding regime not cost effective.

Organic Fertiliser.

Availability (much sectoral competition).

Inorganic Fertiliser.

Costliness

Fish Toxins.

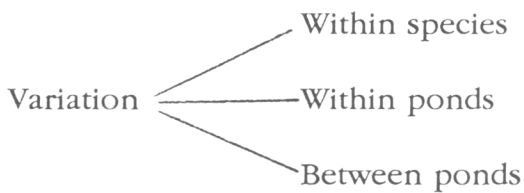
Costliness and availability.

All

Fish

Species

**b) Growth.**



Competition between some species (Catla can not compete with plankton feeding chinese carps (esp silver carp)).

Overstocking tendency results in overall low growth rates.

The very short growing season (in seasonal ponds) esp with flooding and drying out (drought and water holding capacity).

**c) Mortality.**

Disease - especially Epizootic Ulcerative Syndrome (EUS).

Inflow of pesticide.

**d) Miscellaneous.**

Wild/weed fish difficult to remove from the pond.

Pond groups do not spend sufficient time or take sufficient care with pond management (NB, this was only in one area (Jessore), and may be due to the ponds being too far from the homesteads).

Lack of knowledge amongst poor farmer groups about modern fish culture (although much knowledge about traditional systems).

Farmer groups receive mixed messages (from different NGOs, middlemen, pathil wallahs<sup>4</sup> etc).

Lack of training materials (especially for illiterate people).

Problems with selecting appropriate farmers (rich over poor, non farmers, no interest etc).

Problems of convincing the farmer group to undertake modern fish culture.

Not sufficient supervision or coverage by field staff.

**2. Issues.**

The discussion then identified some main issue areas, which included:

***Effective Training and Extension***

***Approach - Flexibility of Technology Package to suit:***

***Socio-economic and environmental conditions, and within the resource constraints.***

***The technology package should be based on:***

***What the farmers already know, do and have (resources around the homestead which can be used for fish culture)***

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<sup>4</sup> A '*Pathil*' is a carrying vessel (aluminium, steel or plastic pot) used by the small-scale fry and fingerling traders. In the fingerling season '*Pathil Wallahs*' make lengthy journeys on foot, supplying ponds with fingerlings out of their '*Pathils*'.

It was noted that farmers adopt fish farming strategies based on their needs, resources and expectations. Thus they stock with large quantities of fish (whatever the species) when they are readily available and low price; they use whatever sources of feed are available and low cost; they regulate their investment in capital and inputs given their capacity, expectations of levels of returns. The Extension Agents need to understand the farmers' strategies before disseminating 'improved' fish culture packages.

*Note that Fish Farming is but one of several production and survival options undertaken by poor producers. Their decision to invest their meagre capital, their time, labour and other resources is based on what they consider to be the comparative advantages of fish culture as an option. Extension Agents also need to understand the relative merits of fish culture against other options before they promote it.*

**Water quality.** Although water quality is one of the main factors assessed prior to promoting fish culture, assessment techniques are not comprehensive enough. Generally only 3 or 4 parameters are measured. Often chemicals used for analysis are not available or lack potency (out of date).

3. Strategies Recommended for Action.

<b><u>PROBLEM AREA</u></b>	<b><u>STRATEGY RECOMMENDED</u></b>
<b>SEED SUPPLY</b>	
Seed supply is too centralised (main area of production is Jessore)	Promote decentralised hatchery production through group owned mini-hatcheries. BRAC and RDRS experience in this technology should be shared.  <b>An area for <u>COOPERATION</u></b>
Mixed seed in pathil.	Provide pathil wallahs with right mix from mini-hatchery.
Brood stock supply problem.	NGOs should encourage group members to have their own brood stock. Initially NGOs may have to provide a brood stock service.
Timely availability of fry	Encourage the establishment of Nursery Ponds with groups (taking the supply from the Mini-Hatcheries - <b>Vertical Integration</b> ).
<b>FEED PROBLEMS</b>	
<b>Quality</b>  <b>Cost</b>  <b>Availability</b>	Is supplementary feeding really necessary? (In Thailand over 4 tonnes of fish per hectare are produced on fertilisation only)  Less intensive cultivation.  Use fertiliser only.  Careful species selection for Stocking (including grass carp).



<b><u>PROBLEM AREA</u></b>	<b><u>STRATEGY RECOMMENDED</u></b>
<b>FERTILISER PROBLEMS</b>	
<p><b>Organic Fertiliser</b></p> <p>Availability</p> <p>a) Manure (faeces) - not readily available.</p> <p>b) Compost - farmers reluctant to engage in this practice.</p> <p>c) Doincha* - high market value for doincha. Farmers prefer to sell it in the market.</p>	<p>Encourage use of:</p> <p>a) Manure, but noting that there is sectoral competition for both cow dung and chicken pellets.</p> <p>Stocking with Grass Carp will provide a lot of organic input, but need to feed GC and sources of supply not always certain (of GC and feed).</p> <p>b) Need to understand why farmers are reluctant to engage in composting, to overcome this constraint.</p> <p>c) Use seedlings (1.5 months), and grow them as a mono crop on the slope and pond bottom.</p>
<p><b>Inorganic Fertiliser:</b></p> <p>a) Costliness</p> <p>b) Environmental considerations (the problems of phosphate and nitrate leaching out into the soil)</p>	<p>a) If the enterprise is profitable, then the NGO should assist with credit for purchase of inputs.</p> <p>b) Is it a problem? Only if there is overflooding, or there is much loss of water through the soil. Otherwise the fertilisers are contained in the pond. Each NGO to adopt its own strategy.</p>

<u>PROBLEM AREA</u>	<u>STRATEGY RECOMMENDED</u>
<b>FISH TOXINS</b>	
<p>Piscicide is needed for ponds, <b>or need to go</b> (which allows weed</p> <p>Piscicide is costly and not widely available.</p>	<p>intensification in existing <b>back to traditional system</b> fish in pond).</p> <p>a) NGOs should experiment with <b>Derris</b> (source of <b>Rotenone</b>). However, the Derris plant has very specific environmental requirements (hilly terrain with good irrigation).</p> <p>b) NGOs should experiment with <b>Tea Seed</b>. Some investigations with tea estate managers might be useful.</p> <p>c) BAFRU (Chris Price) suggested a mixture of Ammonium Sulphate and Urea (at high pH the interaction of the 2 chemicals causes Ammonia to be released, killing off everything in the pond). <b>Chris Price to advise.</b></p> <p>d) Bleaching Powder is used in India. It may be too costly in Bangladesh.</p> <p>e) Dewatering. This is very costly, and empties the pond at a time of low water when the pond is needed for fry/fingerling stocking.</p>

<u>PROBLEM AREA</u>	<u>STRATEGY RECOMMENDED</u>
<b>CAPITAL REQUIREMENTS</b>	
<p>Investment in ponds and other water bodies (leasing or purchase) is very costly.</p>	<p>If the enterprise is profitable, the NGO <b>must</b> provide credit to assist the group to lease or purchase the water body.</p> <p><b>NB Close supervision with the credit will be necessary.</b></p> <p>Wherever possible try to <b>Start Small</b>. Try to keep the capital investment to a minimum.</p>
<b>GROWTH AND MORTALITY</b>	
<p>Competition between Catla and Chinese Carps (esp Silver Carp) results in poor performance of Catla.</p>	<p>Partial harvest and phased stocking is a strategy to consider.</p> <p>Stock Silver Carp in March/April.          Stock major carps in July.          Harvest with large mesh net in November for Silver Carps.</p> <p>Adopt a flexible approach - micro management at the pond level.</p>

<b><u>PROBLEM AREA</u></b>	<b><u>STRATEGY RECOMMENDED</u></b>
<b>FISH DISEASES</b>	
<p>Epizootic Ulcerative Syndrome (EUS).</p>	<p>EUS is a seasonal disease, where it is generally secondary infection of the ulcers (by bacteria and fungi) that causes mortality. It is also associated with stress.</p> <p>Strategies for minimising its impact include:</p> <p>Where possible lime.</p> <p>Keep stocking density as low as possible (perhaps a partial harvest just prior to November).</p> <p>Good pond management.</p>
<b>SPECIFIC PROBLEMS</b>	
<p>It was agreed that further nature of these problems. could do to progress</p>	<p>information is needed on the There was little this meeting discussion on strategies.</p>

<u>PROBLEM AREA</u>	<u>STRATEGY RECOMMENDED</u>
<b>TRAINING AND EXTENSION</b>	
<p>Technology package developed at Macro level is not appropriate for Micro level application - <b>one extension package is not appropriate for all farmers.</b></p> <p>Training materials not available for illiterate farmers.</p>	<p>Need to adapt the technology package to meet local circumstances and needs.</p> <p><b>Macro Level:</b> FRI, DoF, BARC, the Universities and Donors are all making training materials. <i>These efforts should not be duplicated.</i></p> <p><b>Intermediate Level:</b> Regional NGO Fora should assess the various training materials being produced at the Macro Level to see how they can be adapted regionally.</p> <p><b>Micro Level:</b> Each NGO should adapt the regional material to suit local village conditions.</p> <p><b>NB This <i>trickle down</i> approach needs to combined with a <i>Grass Roots up</i> approach, where the NGOs learn from the farmers, and feed the lessons back to the Macro Level. It needs to be a 2 way process (top down <i>and</i> bottom up).</b></p> <p>Special materials need to be developed for illiterates (pictures and video).</p>

**Note\*:** Doincha is a small nitrogen fixing leguminous tree/shrub, grown in rural Bangladesh. The leaves are used for animal fodder, and the stems used for firewood or construction.

#### **4.2. Summary of Discussion Group B: Social Problems of Benefiting the Poor through Fish Culture.**

##### **1. Problem Areas.**

The main problem areas were summarised under 7 main headings:

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### **SOCIAL PROBLEMS**

- 1. Theft**
  - 2. Multiple Pond Ownership**
  - 3. Fair Prices and Marketing**
  - 4. Credit**
  - 5. Religious Problems**
  - 6. Lack of Security/Ownership**
  - 7. Group Management.**
-

Practices/strategies already being implemented successfully are designated (S);

Practices and strategies which as far as is known are untried but which might be tried are designated (P).

Practices and strategies which have been tried in a few cases, but which have not been widely adopted, and therefore not yet proven are designated (P/S).

### 1. THEFT

- \* Good Supervising Location (eg near the homestead) (S)
- \* Shared Night Patrols (with 2 or more people) (S)
- \* Bamboo in Ponds (S)
- \* Public Campaign (to discourage theft) (S)
- \* Seek Cooperation of Officials/Elites (S/P)
- \* Inter-Group, Inter-NGO Cooperation (P)

### 2. MULTIPLE OWNERSHIP

- \* Find Key Person for Lease Agreement (S/P)
- \* Persuasion/Incentive (S)
- \* Successful Examples Copied (P/S)
- \* Lease Paid by Share Crop (not fixed cash sum) (S)
- \* Call Owners Together (to negotiate) (P)
- \* Derelict Ponds Ordinance (P)
- \* Absentee Landlords Better (P)

#### Notes on Multiple Ownership Strategies:

\* Successful Examples. Where it is known that lease agreements have been successfully worked out with multiple pond owners, copy these examples.

\* Derelict Pond Ordinance. Try to use the Derelict Pond Ordinance to wrest control of derelict/neglected ponds.

\* Absentee Landlords. It may be easier to negotiate with absentees landlords.

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### 3. MARKETING/FAIR PRICES

- \* Use Women Buyers (P)
- \* Use NGOs/DOF/Networks as Marketing Intermediaries (S/P)
- \* Consciousness Raising and Solidarity Building (S)
- \* Assess to Market Information. (P)
- \* Holding Ponds (P)

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### 4. LACK OF CREDIT

- \* Lending to Groups Members (not individuals) (S)
- \* Low Input/High Return (S)
- \* Flexible Credit in Control of Users (P)
- \* Initial Subsidies (esp. Excavation), but Eventual Self-Reliance. (S)
- \* NGO to Arrange Formal Bank Credit (S/P)

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### 5. RELIGIOUS PROBLEMS

Cow dung and refusing lease to women

- \* Contact Religious Leaders (S)
- \* Inter-Project Visits (Group Members and Elites). (S)

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### 6. LACK OF SECURITY/OWNERSHIP

- \* Net Working (P)
- \* Written Deeds (S)
- \* Long-Term Lease (with Incentive to Owner) (S)
- \* Be Prepared for Legal Back Up (S/P)



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## 7. MANAGEMENT BY GROUPS

- \* Need for Literacy & Numeracy Training (S)
  - \* Need for Leadership Training (S)
  - \* Group Cohesion and Solidarity (S)
  - \* Homogenous Group (S)
  - \* Divide Tasks (S)
- 

### 3. Marketing/Fair Prices

\* Use Women Buyers - to benefit poor women. It was suggested that women wont cheat each other (men cheat women), so women should be encouraged to buy and sell between each other.

\* NGOs/DOF networks etc. Try to do away with the middle man. NGOs should purchase the fish from the group and try to market it themselves or through the DOF network. NGOs may be able to afford cold storage and ice boxes (where as groups may not).

\* Holding Ponds. Strategies for holding fish and making the market come to the pond side should be considered. One strategy might be to maintain a particular holding pond for marketable fish, or to cordon a portion of the pond off (use of net cages/happas?).

### 4. Lack of Credit

\* Low input/high return. Try to minimise the quantity of credit, and maximise the output.

\* Flexible Credit. Allow the group to decide what the credit is used for (ie how much is spent on seed, feed, nets etc).

\* Initial subsidies. The NGO should plan for eventual self reliance of the group. Initial subsidy may be required for excavation etc, but the enterprise should be self sustaining.

\* NGO to arrange formal bank credit. Wherever possible the NGO should not use its own funds for credit. The NGO may act as intermediary to introduce the group to the bank, or may act as guarantor to the bank for the group loan.

## **5. Religious Problems**

\* Inter project visits. Where religious problems have been overcome, arrange visits not only for group members but also for elites and religious leaders.

## **6. Lack of Security/Ownership.**

\* Networking. Try to arrange for local elites, Government Officials or banks to act as witnesses/guarantors to leases. Create a larger solidarity group.

\* Be prepared for legal back up. Try to provide legal aid or legal education/awareness training for group members to prepare them for the eventuality of the lease agreement breaking down.

## **7. Management by Groups.**

\* Need for Literacy/Numeracy Training. This is crucial for record keeping and accounting.

\* Homogenous Group. Group cohesion should be better if the group members are of the same socio-economic, cultural, religious, ethnic group.

\* Divide tasks. Divide tasks amongst the group members. Do not have everyone doing the same work operations.

\* Sub Groups. Create a division of labour amongst sub groups. Eg for dealing with the banks, for marketing, for processing, for obtaining inputs etc.

## **4.3. Remarks by the Chairman (Prof. Shahadat Ali) and Discussions.**

### **Social Factors**

a) The Chairman noted that multiple ownership was a severe constraint to, and a key issue for successful projects. In a recent study of 20 villages some 80% of ponds were

found to be multiply owned. If ponds were owned by the same family (eg several brothers) they were not considered to multiply owned.

b) Getting a fair price for the fish in the market. DANIDA had some experience in establishing marketing cooperatives in Noakali. This was not successful.

c) Lack of credit is a big problem. Fisherfolk should be encouraged to save. In particular Food for Work through WFP can be used for savings. Each day surplus grain can be sold, and the money saved.

d) Lack of security is also a big problem, especially when the local elites use force.

#### Technical Factors

a) Fish cum Rice is not new to Bangladesh. With the tendency towards High Yielding Rice Varieties, there is a need to adopt a new strategy. There is a huge potential area for fish culture if all the rice fields are used.

b) Seasonal Ponds (particularly prevalent in the North West) need to adopt specific systems using special fast growing species.

c) Cage culture is not successful yet. There are many constraints. One of the main problems is locational. Ponds are limited, rivers alternatively flood and dry out. The ADB experience in Kaptai lake was not successful.

d) One of the most important areas for development is training and extension. In a recent review of an ICLARM Project pond production had increased 3 fold (from 400 kg/ha) without any support other than extension advice. NGO and Government coverage is very low, and should be increased.

e) Khas ponds. It was suggested that NGOs adopt a special strategy towards Khas ponds. They should get title to these ponds for their members, and transfer ownership. It was pointed out that under the Government Ordinance (the East Bengal Tank Improvement Act of 1939, amended in 1988) all ponds under 3 acres (derelict and Khas ponds) come under the regulation of the Union Council (ie not owned by the Upazilla). This Act favours uses other than fish culture (such as jute retting, washing, bathing etc). These uses are given priority over fish culture. The Union Council is composed of local elites, and as such does not look to the interests of the poor. In theory the NGOs could apply to the Union Parishad to get a lease, but this is difficult in practice.

Some Khas ponds have been put up for auction, and in one case in particular, the title deeds were used against the group members (illiterates). The pond had been taken over by a more powerful group, but the original group were being forced to pay the rent.

#### 4.4. Recommendations for Further Action.

*It was suggested that the Workshop concentrate on what actions the NGO Forum should take forward, rather than proposing the adoption of particular strategies to benefit the poor.*

The summary of this discussion is presented below, on the next page.

#### 4.5. Concluding Remarks by the Chairman (Prof Shahadat Ali).

There is a very well known picture painted by Picasso which shows a fish flying in the air, with a man chasing it with a harpoon. The picture is called '*Fishing in the Air*'. Let us **not** do **our** fishing in the air, but rather in the pond. That is fishing in ponds correctly and for the betterment of the rural poor.

## **PROPOSALS FOR FURTHER ACTION**

1. That the Group/Network continues to meet together.
2. That the Group/Network is widened to include others particularly WFP and ODA and other actors and Donors.
3. Try to involve Grameen Bank more (their absence from this meeting was noted and regretted).
4. Social and technical problems of benefiting the poor should remain on the agenda, and need to be addressed together.
5. List the Training Organisations/Institutes in Bangladesh, and in the region. Produce a directory of Institutes: Courses and Training offered; who for and who by; facilities available etc.
6. Develop regional training (ie try to decentralise it).
7. Develop specific training materials for Trainers, Extension Agents and Farmers. In particular use of pictures and videos for illiterates.
8. Network should compile list of endangered species (area by area).
9. Project monitoring. ICLARM/ODA to be asked to assist the production of monitoring guide lines to include social impact (esp downside/negative aspects such as further impoverishment and marginalisation of groups encouraged to take up fish culture).
10. Forum/Network Funded till '92 by ODA and DANIDA and PRIP. The NGO Forum needs to take action to continue this support. An action plan must be agreed and proposals made.

**Participant List Discussion Group A. (Technical)**

<b>Name</b>	<b>Organisation</b>
Brian O’Riordan	ITDG
Masud Rana	BRAC
Md Badrul Alam	Jagorani Chakri
Ashoke Sarkar	AEP/DANIDA
John Sollows	ICLARM/FRI
Md Abul Khair	RDRS
Tapash Kumar Roy	LRP
Francisco Noble	ADAB
Md Abdur Rahman	Proshika
Anwara Begum Shelly	CARITAS
Khabir Ahmed	BARC
Chris Price	ODA/BAFRU
Md Harun Ar Rashid	PRISM
Md Akhteruzzaman	FRI
Eklim Reza Chowdhury	CARE

**Participant List Group B (Social).**

<b>Name</b>	<b>Organisation</b>
Richard Holloway	PACT/PRIP
Tarit Datta Gupta	PACT/PRIP
Manzurul Mannan	ITDG
Kawser Ahmed	ITDG
Md Ali Reza Raj	GUP
Nasimum Ara Begum	CODEC
Eric Worby	ICLARM
Anisur Rahman Akhand	IFIB Rotary Club of Comilla
Md Mokbul Husain Khandaer	TMSS
Md Ataur Rahman	TMSS
Mashihur Rahman	CARE

**SECTION 5. LIST OF GUESTS, KEY NOTE SPEAKERS, FUNCTIONARIES,  
PARTICIPANTS AND OBSERVERS.**

**Chief Guest:** Mr Md F.R. Chaudhury, Director General, NGO Affairs Bureau, Government of Bangladesh.

**Special Guest:** Mr A.K. Aatur Rahman, Director of Fisheries, Government of Bangladesh.

**Key Note Speakers:** Dr Qazi Faruque Ahmed, Executive Director Proshika and Chairman of ADAB. (On Social Issues).

Mr Masudur Rahman, Additional Director of Fisheries, Government of Bangladesh. (On Technical Problems).

**Chairmen:** Day 1: Dr A.K.M. Nuruzzaman, Member Director (Fisheries) BARC.

Day 2: Prof. Shahadat Ali, Chairman, Dept. Zoology, Dhaka University.

**FUNCTIONARIES**

**Welcome Address:** Mr Mahbulul Karim, Director of ADAB.

**Master of Ceremonies:** Mr Abdullah Al Amin (Inaugural Session), Deputy Director ADAB.

Mr Brian O'Riordan (Working Session), Fisheries Coordinator, Intermediate Technology Development Group.

**Rapporteur:** Mr Khabir Ahmed, BARC.

**Workshop Organisers:** Mr Francisco Noble, IVS Fisheries Expert, ADAB NGO Fisheries Network/Forum.

Mr Brian O'Riordan, Fisheries Coordinator, Intermediate Technology Development Group.

Mr Kawser Ahmed, Aquaculturist, IT Bangladesh.



**PARTICIPANTS (P) and OBSERVERS (O)**

<u>P/O</u>	<u>NAME</u>	<u>ORGANIZATION</u>
P	Masud Rana	BRAC
P	Anwara Begum Shelly	Caritas
P	Md Abdur Rahman	Proshika
P	Fazlul Haque	Proshika
P	Brian O'Riordan	ITDG
P	Md Kawser Ahmed	ITDG
P	Francisco Noble	ADAB
P	Md Abul Khair	RDRS
P	Md Ali Reza Raj	GUP
P	Mashiur Rahman	CARE
P	Eklim Reza Chowdhury	CARE
P	Md.Badrul Alam	Jagorani Chakra
P	Ataur Rahman	TMSS
P	Tapash Kumar Roy	LRP
P	Anisur Rahman Akhand	Comilla Rotary
P	Md Harun-ar-Rashid	PRISM
P	Ms. Nasimun Ara Begum	CODEC
P	Md Mokbul Hussain	TMSS
P	Md Marbul Husain Khandaer	TMSS
P	Abdul Matin	IVS
P	Tarit Dhota Gupta	PACT/PRIP
O	M.Akhteruzzaman	FRI
O	Chris Price	ODA/BAFRU
O	Eric Worby	ICLARM
O	John Sollows	ICLARM
O	Ashoke Sarker	AEP/DANIDA
O	Khabir Ahmed	BARC (Rapporteur)
O	Richard Holloway	PRIP/PACT
O	Manzurul Mannan	ITDG
O	Farhad Hossain	ITDG

**The following were invited, but were unable to attend :**

P	Bishnu Das	Caritas
P	Shaikh Daiyan	Grameen Bank
P	Motahar Hussain	Grameen Bank
P	Abdul Mannan	Banchte Shekha
P	Mokorrom Hossain	BRAC
P	Amin ul Alam	BRAC
O	Rick Gregory	ODA
O	Subrata Saha	AEP/DANIDA
O	Dr. Dilip Kumar	FAO/UNDP
O	Dr. Anwarul Islam	FAO/UNDP
O	Andras Peteri	AEP/DANIDA

MCC, Unnayan Shangho and UBINIG were also invited.

## **ANNEX 1. Address List of Participant and Observer Organisations**

### **NON GOVERNMENT ORGANISATIONS**

ADAB	1/3, Block-F, Lalmatia, Dhaka 1207.
BRAC	66 Mohakhali C/A, Dhaka 1212.
Banchte Shekha	Biman Bondor Road, Arobpur, Puraton Koshba, Jessore.
CARE	House-63, Road 7A, Dhanmondi R/A, Dhaka 1209.
CARITAS	2 Outer Circular Road, Shantibagh, Dhaka 1217.
IFIB Comilla Rotary	Ranir Bazar, Comilla.
CODEC	House No. 122/B, Road No. 6, Chandangaon R/A, Chittagong.
GUP	130/10C, Babar Road, Block-B, Mohammadpur, Dhaka 1207.
Grameen Bank	Mirpur Section No. 2, Dhaka 1216.
ITDG	1/13 Iqbal Road, Block-A, Mohammadpur, Dhaka 1207.
ICLARM	House No. 20, Road - 9/A, Dhanmondi, Dhaka 1209.
IVS	House No. 36F, Road No. 7, Banani, Dhaka 1213.
Jagoroni Chakra	44 Mujib Sarak, Jessore.
LRP	Maijdi Court, Noakhali.
PROSHIKA	5/2 Iqbal Road, Mohammadpur, Dhaka 1207.
PRIP	78 Shat Majit Rd, Dhanmondi, Dhaka

PRISM	House No.67, Road No. 5A, Dhanmondi R/A, Dhaka 1209.
RDRS	House No. 62, Road No. 7A, Dhanmondi R/A, Dhaka 1209.
TMSS	Vill: Thengamara, PO: Gokul, Bogra Sadar, Bogra.

#### **GOVERNMENT, BILATERAL AND MULTILATERAL ORGANISATIONS**

AEP/DANIDA	AEP, 53 DM Rd, Kristapur, PO Box No 33, Mymensingh 2200.
BARC	Farm Gate, New Airport Road, Dhaka 1215.
FAO/UNDP	4th floor, Matsya Bhaban, Ramna, Dhaka 1000.
FRI	Fisheries Research Institute, Mymensingh.
ODA	Djemila House, House No. 42, Road No. 28, Gulshan, Dhaka 1212.

## ANNEX 2. Fish Culture: Can the Poor Really Benefit? A Summary of ITDG's Experience.

### 1. Background

The Intermediate Technology Development Group (ITDG<sup>5</sup>) is an international NGO. Although ITDG's involvement in fish culture in Bangladesh dates back to 1987, it has only recently opened an office here (1989), become registered as an NGO (1990) and obtained permission to undertake its own projects (1992). ITDG works mainly as a service NGO, providing technical support to projects undertaken by other organisations. For the purposes of this Workshop, ITDG's experience will be described under 3 main headings: **Technology, Methodology and Economic Factors.**

### 2. Technology Factors.

The 'Technology Package' or 'Blue Print Project' Approach: The tendency to apply technologies developed in research stations or in geographical areas outside the region to rural Bangladesh results in many failures. Technology, or production led *'Blue Print'* projects have little hope of success unless they have the flexibility to adapt to changing circumstances and to the social, economic and environmental realities of field conditions.

Most training materials are based on information derived from work outside Bangladesh, and therefore of limited application.

It is necessary to develop fish culture in accordance with the particular conditions of rural Bangladesh (social, economic and technical). This should involve applied research at field level in existing ponds, with pond owners or whoever the target group are.

Resource Limitations: Existing ponds tend not to be fish ponds, they are generally 'borrow pits' or ponds created for reasons other than fish culture. Their limitations are rarely acknowledged by development organisations.

Bangladesh is a country with a high population and intense competition for limited resources. Most 'improved fish culture' systems being promoted assume wide availability of inputs (seed, feed, fertiliser, pesticide etc) at low cost. This is not the reality in our experience.

Capacity of NGO's and Field Staff. Often development agencies employ field workers with insufficient experience of field work - their knowledge is academic and they lack

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<sup>5</sup>. The Intermediate Technology Development Group is an International NGO, founded in the UK in 1965 by the late Dr EF Schumacher (the author of 'Small is Beautiful'). IT Bangladesh is registered with the NGO Affairs Bureau. The office address is:  
1/13 Iqbal Rd, Block A, Mohammadpur, Dhaka-1207. Tel: 811934.

sufficient training to do their work properly. This results in work being carried out in a very *ad hoc* way, with out proper monitoring. Also, projects tend to be over ambitious (covering too large an area, too many ponds, too many people) given the capacity of the NGO and its field staff.

### 3. Methodology Factors

Despite having developed very effective methodologies for forming groups for savings and credit projects, the application of these methodologies to group formation for fish culture projects has not met with much success. It would seem that joint ownership of assets and joint enterprise management are not appropriate for fish culture. Social and economic disparities and divisiveness within the group undermine the potential success of the project.

### 4. Social and Economic Factors

The Nature of Poverty: The particular problems of working with the poor are often not taken into consideration in fish culture projects. Their vulnerability, their extreme poverty, their utter dependence upon their social superiors (patrons) for favours (credit, work, shelter etc), their lack of skills, education, literacy, and physical capacity all work against their being able to take control and manage fish pond enterprises.

Ownership of, Access to and Control over Ponds: These are highly complex factors due to multiple ownership of ponds by mixed social and economic classes.

### 5. Towards Developing Strategies to Benefit the Poor.

- a) Pre project appraisal of technical, resource, economic, environmental and resource factors.
- b) Identifying clearly who the poor are.
- c) Careful selection of project activities in line with the findings of the pre-project appraisal, and in participation with the target group (many projects still adopt a 'trickle down' approach to development; this does not work!).
- d) Less emphasis on technology and production led high input aquaculture, and more emphasis on low input fish farming.
- e) Participative close performance monitoring (which involves the fish culture group).
- f) Providing the necessary support to the fish culture enterprise to enable it to succeed (in terms of intensity of field presence, technical and economic support).