

## **EXPERT CONSULTATION on DYNAMIC AGRIBUSINESS FOCUSED AQUACULTURE DEVELOPMENT**

**25<sup>th</sup> April 2005**

### **Background**

Developing countries contribute almost 90% of global aquaculture production and aquaculture contributes significantly to GDP and foreign exchange earnings in many low-income Asian countries like Bangladesh. In many developing countries, aquaculture has had significant positive effects on rural and urban food supply and on income and employment. However, increasing demand for fish in global markets and the complex networks that affect the supply and price of fish are influencing aquaculture production both at national and local levels. All countries are being driven to consider the efficient and effective operation of “end to end” agribusiness systems. Aquaculture is no exception. These facts indicate that there are both opportunities and challenges if we are to reduce poverty and hunger and promote overall economic development through promotion of socially and environmentally sustainable aquaculture.

Fish are a highly efficient source of micronutrients and provides 51 percent of animal protein in a typical Bangladesh diet. Shrimp aquaculture is the second highest export earner for Bangladesh. Together these data indicate that freshwater and marine aquaculture has a major potential to contribute to increasing incomes and employment and improving nutrition. Aquaculture can therefore contribute significantly to Bangladesh’s Poverty Reduction Strategy and in meeting the UN Millennium Development Goals.

Over 70% of the Bangladesh population lives in rural areas and there is a pressing need to combat poverty, and migration to the cities. The increasing diversification of rural production systems and the low cost of labor present a significant opportunity for scaling up agribusiness to achieve increased employment and wealth generation for all stakeholders. This goal can be achieved through further development of aquaculture as an agribusiness with the participation of poor. Rural enterprise can be promoted at a range of positions within the value chain and can be positively tuned to meet needs of poorer households and communities. Agribusinesses provide inputs and services needed for on-farm production, markets for farm products and livelihood opportunities like local seed and fingerling supply, production of feeds using local materials, and the fabrication of materials for aquaculture. Aquaculture as an agribusiness presents opportunities for stimulating rural, urban, and export markets and using markets as a tool to realize development objectives. The challenge would be to include the needs of the poor as a core focus of this market.

The Development of Sustainable Aquaculture Project (DSAP) implemented by The WorldFish Center and the Agro-based Industries & Technology Development Project - phase II (ATDP-II) implemented by The Louis Berger Group, Inc., both supported by USAID-Bangladesh/Enterprise Development unit, have provided a solid foundation for carrying forward rural aquaculture development programs. The reviews of these projects have suggested a dynamic agribusiness focus in aquaculture development with the involvement of various stakeholders. The dynamic vision should promote rural aquaculture trade and foster a gradual transition from subsistence to commercial aquaculture (see Fig 1: Dynamic Aquaculture Model). A “dynamic aquaculture” model also involves increasing the responsiveness of the sector to market forces, change-agents or policy changes. For example, the growth and development of private hatcheries, major NGO interventions, liberal land and water use policies and a huge supply-gap were major factors behind the extensive aquaculture development in the previous decade. Further integration is now required. The key actors in the future program should be private sector entrepreneurs i.e. fish farmers, hatchery and nursery operators, seed vendors, commercial fish feed manufacturers, domestic resource-based feed producers, fishing equipment manufacturers, fish processors, fish traders and exporters. In the proposed dynamic aquaculture model, the small-holders and

resource-limited farmers will be involved directly as producers and indirectly through backward – forward linkages of this emerging sub-sector.

It is clear, however, that there are, presently, some problems with the smooth flow of product and value along the entire aquaculture value chain in Bangladesh. One indication of this is the over production of hatchlings and the mismatch of supply and demand at various points. Decentralized seed production – allowing farmers to have access to high quality, larger sized (over-wintered) freshwater fingerlings and marine shrimp PL's (post larvae) available at the appropriate time for stocking i.e. early spring at the beginning of the aquaculture season – is pivotal to the effective operation of the entire value chain and is a key aspect of the dynamic aquaculture model. Proper linkage with commercial service providers and with processing and marketing sectors is required to effectively complete the cycle of dynamic aquaculture. The expert consultation was designed to look at the entire value chain as a system (Fig 1), to consider these issues amongst others and to suggest solutions and ways forward.

The growth of aquaculture as an agribusiness will largely depend on private sector entrepreneurs. However the government has an important role in setting the right framework conditions, building the required rural infrastructure and promoting fair local, urban and export markets. Overall this will require government to give agribusiness both the incentive and the freedom to innovate and foster wealth creation. With the decentralization of many of the rural development programs in Bangladesh, the support of local government bodies like the Union Parishad and Gram Sarkar are essential for the success of any agribusiness. Micro-finance is crucial to ensure the participation of small-holders and resource-limited farmers. The successful initiation of aquaculture as an agribusiness will depend on bringing together informal community based groups, local NGOs, Local entrepreneurs, small/medium enterprises, research Institutes, local and national government and international NGOs. The expert consultation meeting also considered these issues.

### **Expert Consultation objectives and outputs**

An expert consultation on “dynamic agribusiness focused aquaculture development” was jointly organized by The Development of Sustainable Aquaculture Project (DSAP), the Agro-based Industries & Technology Development Project - phase II (ATDP-II) and the Bangladesh Shrimp Foundation on 19 April 2005 at the Brac Center Inn, Mohakhali/Dhaka. The list of expert/subject specialists that attended the meeting and the agenda of the one-day consultation are appended.

The main purpose of the identification workshop was (i) to reach a common understanding among the stakeholders on the concept of a more dynamic agribusiness focused aquaculture development, (ii) to identify the major issues and potential solutions and to discuss priorities for action, objectives and deliverables and (iii) to begin to identify the roles and responsibilities of partners and collaborators (although it is recognized that further processes will be required to fully flesh out these aspects). Specific issues that were discussed at the expert consultation meeting under the different components of the dynamic aquaculture concept are outlined below.

The consultation meeting began with a brief presentation from Johannes Janssen (World Fish) on the overall concept of a more dynamic systems view (Fig 1) and some discussion and clarification ensued. The issues discussed will be treated in “end to end” order below, beginning with genetic and stock breeding issues, moving on to decentralized seed production, the roles and responsibilities of commercial service providers, processing and marketing, and, finally, cross-cutting issues such as knowledge diffusion, extension services, gender balance, rural finance, public/private partnerships and other issues.

#### **1. Genetic quality of seed**

The major points identified were the need to:

- Define the specific status of the quality of the current brood stocks of major culture species
- Develop guidelines to ensure genetic quality
- Development of geographically spread focal points within the national network of seed suppliers to ensure genetic quality
- Development of a hatchery accreditation system to ensure adoption of guidelines on genetic quality by seed producers

At the outset it is necessary to clearly distinguish between freshwater fish and freshwater and marine shrimp production. The issues between these are rather different. Both freshwater and marine shrimp seed are collected from the wild and produced in hatcheries. Freshwater brood fish originate from three types of stocks: wild brood fish from native stocks, hatchery seed from various improved and domesticated stocks of native species, and hatchery seed from introduced (Chinese carps) and improved exotic species (e.g. *Tilapia*).

At present there appears to be a low level of appreciation of the importance of maintaining the genetic quality of the freshwater fish stocks. Indeed, the incentives are for quantity of hatchling production rather than quality. The genetic status of wild stocks is now unclear and there have been recent failures in the recruitment of native fish. Also cultured stocks are released into the wild during floods so contaminating wild stocks that are important for the maintenance of natural biodiversity and which act as an important genetic reservoir. There is a problem of hybridization between wild and cultured stocks and the selection of undersized and slow growing fingerlings for reproduction (it is the larger and quicker growing fingerlings that are sold to farmers). There is therefore a need for a carefully controlled and accredited breeding program to ensure that high quality stock are maintained and delivered to nurseries. Genetic markers to be used as diagnostic tools are required for both wild and cultured stocks. Attention needs to be paid to defining and promoting "quality" both "top down" in the form of certification and accreditation programs, but also "bottom up" in terms of promoting market demand for higher quality stocks. Private and government hatcheries should take on the role of promoting quality. Collaboration between, and capacity of, DoF/BFRI, could be improved. As expressed by several participants, the private sector should be involved in the collaboration and this is a unique opportunity to strengthen Public/Private Partnerships. This is a matter which requires urgent attention.

A three tiered system being proposed by BFRI and DOF was discussed involving a national gene bank, certified brood stock distributors and mass multipliers distributed throughout the country. The discussion also centered on the establishment of a nation breeding strategy and a certification program to ensure quality. Issues identified were the relative effectiveness of quality control top-down through licensing and enforcement (with the associated problems with compliance and sustainability) rather than through local level bottom-up approaches (where the issues are how this might be established so as to be encompassing, equitable and sustainable). For all types of aquaculture there is a need for genetic monitoring and a complete audit ability for "paddy to plate" to ensure quality and maintain stock identity. Quality assurance is a major requirement for reasons of national and international trade, nutritional quality and health improvement.

## **2. Decentralized seed**

The issues identified here were:

- Assessment of current and potential fingerling demand and availability (species, size, numbers, and period) in rural Bangladesh.
- Organization of decentralized seed producers (e.g. into Upazila associations) and linking to small farmer groups, hatchery owners and seed traders through a national network

- Increase awareness through demonstration of economic advantage of genetic quality/ late season seed
- Technology refinements (like over-wintered nursing) required

There was a lengthy discussion of this aspect of the overall system because of the evident problems with the present supply chains. It is clear that there is presently an oversupply of hatchlings and post-larvae but these are easily transported so the bottlenecks in the value chain lie elsewhere. In the case of freshwater fish the real problem is with the production of fingerlings. Over the last decades all projects were focused on the “grow out” phase resulting in an oversupply of fingerlings. Nursery operation is not well or widely understood. There are issues with markets for fingerlings, and with the necessary training and learning associated with fingerling production. Nursery operation is an unknown activity (technical knowledge is often lacking) so there is hesitation, perceived risk, and the need for demonstrations and success stories.

In the case of marine shrimps also there is an over production of post-larvae but here there are disease and certification issues. The center for post-larvae production and certification is at Cox’s Bazaar and post-larvae are then flown into the main production area. For the marine shrimp value chain to function properly disease, environmental management and product quality issues must be addressed so that export production can grow and be maintained.

One topic discussed was the need for larger fingerlings earlier in the year. Although this problem was solved many years ago there is still a problem with uptake and adoption of this technique. There is, as yet, not a strong demand for larger, high quality fingerlings. This problem is related to climate, seasonality and water temperature and availability, and also to price factors influencing supply and demand.

Water supply for freshwater aquaculture is a major issue and the development of this industry in Bangladesh must be seen in the light of the overall supply and demand for irrigation water supplies in rural areas. There appear to be opportunities for more effective use to be made of irrigation water supplies during the dry season. Decentralized fingerling production to produce large size fingerlings could be limited by the drying of the ponds or reduced water level during the months of October/November to March/April. The non availability of finance early in the season to purchase big size fingerlings is a further issue, coupled with the existing system of repayment of loans from financing institutions

The dynamic aquaculture concept requires a closer integration of hatcheries, nurseries and production facilities but recognizes that there will be regional differences in climate, seasonality and the requisite species mix. There is therefore the need for studies and assessments of the resource base, market conditions and demand for various species, integration plans and business cases, which will differ region by region. For the entire value chain to function effectively there is a need for improved information flows and more coordination between hatcheries, nurseries and growers. There are opportunities to establish nurseries closer to the growers where issues of supply and demand, price sensitivity and quality may be addressed. This is true both for freshwater fish and shrimps. There is a potential role for community based organizations, collectives and other means of bringing growers together to organize their own nurseries and fingerling supplies, and to address quality issues. After farmers acquire an awareness of the potential of quality fingerlings, then they will need specific training targeted at the issues of quality and survival around these. Family-based operations have great potential to improve income and nutrition and to also provide important opportunities for women.

### **3. Commercial service providers (feed, fertilizers, ice, cold storage, aquaculture equipment, transport)**

Here the issues identified were:

- Comparative role of commercial service providers, community based organizations (CBO) and Union Parishads (UP)
- Linking quality inputs and quality of embedded extension services
- Promote communication and linkage among all types of service providers.

To ensure smooth operation of the entire value chain there appears to be a need for a range of services of various types and quantities (inputs: fertilizers, feeds, equipment) by the various aquaculture systems. The complete details and profile of the entire dynamic aquaculture system are not known; so the nature of the opportunities, the size of the resource base, and the size and scope of markets have not been defined. There is a need to put together several kinds of business cases including the resource needs and potential profitability of various support activities (e.g. demand for feed, fertilizer, etc.). The meeting agreed that there is a need to facilitate this process.

There are no aquaculture-specific fertilizers; rather there is a need to ensure that the supply stays in the market, avoiding distortions through local supply quotas, transfers across Upazilas and so on. We can learn from good experiences in DSAP – e.g. knowledge by NGOs of the utilization of locally available resources/wastes as feeds to fish. This can be facilitated by selecting NGOs well and monitoring performance according to specified criteria. It is likely that over time the market for feed pellets and other supplements will grow improving quality and minimizing wastes as it has in other intensive agri-business operations (e.g. chickens).

Discussion centered on how it might be possible to link supply with demand through entrepreneurs; whilst also involving CBOs, NGOs, entrepreneurs, the poor and government departments. This will require collaboration between government, CBOs/NGOs and entrepreneurs involving considerable capacity building and institutional reform. Experience shows that community based activities produce sustainable results and promotes greater gender equality and opportunity. In discussion it became clear that there was need to think through the models of knowledge transfer and service delivery in situations where “training the trainers” may be an effective strategy to ensure adoption. Projects such as Livelihoods, Empowerment and Agroforestry Project (LEAF) of the Sustainable Land Use Programme of Swiss Agency for Development and Cooperation have shown that it is effective to work with expert tree nursery operators/owners who then act as trainers to other groups and also to work with individual farmers who communicate to other farmers and with their associations. The specific measures at relationship building and establishing linkages between local service providers, CBOs, government officials and farmers under the LEAF project which had contributed to its success is another practice that can be adopted in aquaculture. The organization of nursery owners into Nursery Malik Associations at Upazila and District level can serve as a model to organize the decentralized seed producers under ‘Dynamic Aquaculture’

A more dynamic and agribusiness-based approach to aquaculture will also require flexibility and diversification together with an increased awareness and training on the use of distributed market solutions and governance mechanisms appropriate for these more complex networked problems. Smooth functioning of the entire aquaculture value chain requires horizontal and vertical integration as well as increased coordination in service delivery. Some NGOs are already well integrated vertically. Integration will require access to finance and loans and there is strong potential for more micro-finance and for public-private partnerships (PPPs) in this sector. Also there is an opportunity for greater commercial activity in the extension and knowledge transfer sector.

#### **4. Processing & Marketing**

The issues identified were:

- Promotion of local market to ensure fair price for producers and increase consumption by poor

- Promotion of urban market for increased income to rural poor
- Promotion of export market and increasing trade within developing countries
- Role of public sector in promoting and regulating markets
- Development of group marketing through the involvement of community based organizations
- Processing infrastructure development to support rural producers
- Popularization of low cost processing techniques
- Increased private investment in marketing and storage infrastructure

No thorough analysis of the demand for fish has been done for more than 40 years. Because fish products are so important in the overall national Poverty Reduction Strategy, there is a need for analysis of the national and international market situation and the relationship between exports and imports of fish of various kinds. What is the real demand of fish? Market prices have substantially increased vs other sectors, but producers receive a lower share compared to this price increase. In a market economy producers are under pressure to constantly improve efficiency and reduce production costs as competition leads to lower prices. If market prices are rising and prices paid to producers are still low then there is a need to review the ability of the various players in the market to extract rents. Improved organization of fish and shrimp producers, better information flows and improved marketing of fish products may be required. There is also a role for government in setting economic policies and incentives to support this important industry.

To be effective market players poor farmers need access to services for (1) technical knowledge, (2) market access/information and (3) credit and finance. While rich farmers essentially do not need credit, small farmers cannot handle credit very well because of interest rates, the need for collateral, and the conflict between repayment schedules and the seasonality of income. More important, perhaps, are joint savings programs to supply the necessary finance (e.g. women's groups in Grameen Bank system). Startup incentives and other support costs which defray the initial cost and risk are available in other countries; e.g. matching funds provided as grants by the Government in India. The discussion was concentrated on commercial aquaculture. This is less important in subsistence farming where about 30% of farmers having seasonal ponds sell their produce at a lower price but still have a benefit cost ratio of 2-3.

Because of the great seasonality in supply (including both capture fisheries and the seasonality in options for culture) and the fact that fish are a highly perishable commodity, there is a need to look at the availability of buffering infrastructure (refrigeration, transport etc) so as to smooth the seasonality in price and supply. Bangladesh has become a fish importer (informal trade) importing rohu from Myanmar, despite transport and duties, imports are still competitive with local market price. This indicates a problem with local production, transportation, and the availability of ice and cold storage facilities. Presently there is no market in Bangladesh for frozen product, only chilled, so frozen fish imported from Myanmar is marketed as a chilled product in the local market. Nevertheless infrastructure investments have the potential to even out the cyclical nature of supply and demand. Production should be increased because it will promote growth of the sector to reduce poverty and hunger and also address the issue of overcapacity in the processing sector. Projects should promote growth and equal distribution of profit ensuring the poor (producers, seed vendors etc) are getting their part of the profit.

Infrastructure development (not only roads, electricity, communications and buildings, but also their maintenance/upgrading) can support private sector involvement in national and international markets. There are opportunities for carefully targeted initiatives to support development of the private sector, without distorting the service and production markets too much. Above all, a more complex and dynamic agri-business focused aquaculture industry in Bangladesh requires new mechanisms of market governance, finance and risk management; including incentives, loan facilities, rural adjustment schemes, insurance and improved knowledge and information. A more closely coupled supply and demand chain is going to require careful development and management to capture benefit and assist the poor with income, employment and nutrition.

Attention needs to be paid to ways in which value and finance can flow back up the value chain to ensure profitability, security of supply, good governance and suitable risk management. This should include the full gamut of public and private policy options.

## **5. Other crosscutting issues for each of the component of Dynamic Aquaculture**

Issues discussed here included:

Extension/Knowledge diffusion

- Appropriate extension and capacity building approaches
- Role of Union Parishad and Gram Sarkar as service providers and as resource Learning Centers
- Local documentation/learning centers (Union/village level) in Bangla "gram boi" or "village bookshop"
- Media as an pivotal tool in technology diffusion

Gender

- Steps to increase involvement of women.
- Innovative initiatives to promote gender equality

Rural finance services:

- Rural banking institutions accessible to the poor
- Strategies to promote savings

Private/Public partnership

- Roles of public and private sector (including large NGOs) and development of public-private partnerships in both forwards and backward linkages

Fish information system

- Establishment of a national fish information /communication system (national INFOFISH)

The meeting identified a need for both knowledge diffusion and sharing, and the generation of new knowledge. Much is already known, but is not widely disseminated. Perhaps there is the need for some focused and outcome oriented analysis of the knowledge gaps across the value chain so that effective use is made of scarce resources. The involvement of private companies in research funding was mentioned. This role requires them to clearly understand the value-add of the research done and to be able to capture the benefits of the knowledge generated. In other countries (e.g. Australia) because of market failures and an inability to capture benefits from research in the agricultural and aquaculture sectors, Rural Research and Development Corporations have been established. These RRDCs are funded partly by sectoral industry levies (e.g. wheat, wool, meat and livestock, fisheries) and partly by matching government grants. The RRDCs carry out highly targeted research the results of which are widely promulgated throughout the relevant sectors.

One thing became clear during this session; there is a need for information sharing between aid projects, agencies, NGOs and other groups active in this sector. There are considerable opportunities for greater sharing of knowledge about basic science, successes and failures in adoption, market developments and other matters. It was suggested during the meeting that one possible forum for this is the Bangladesh Fisheries Research Forum. As the entire dynamic value chain develops there will be more need for information sharing, not less. Equally, if the sector is to develop its full potential, there will be a need for continuity of leadership and advocacy beyond the project level.

In terms of extension and knowledge diffusion there is a need to clearly define the mandates and modus operandi of the various players in the chain. As new markets and players emerge, and new financial and risk management strategies emerge, then there will be a need for continued review and reform of institutional and other mandates.

Rural finance is critical for the further development of the new aquaculture sector in Bangladesh. While there are existing forms of rural credit and finance there are limitations (as discussed above) so innovation in this area is to be encouraged. First, any new market based solution should encourage better organization of farmers. This is a critical issue: group formation will allow farmers have better bargaining power and improved financial sustainability. Also contract farming has potential: some marine shrimp hatcheries already supply post-larvae on credit, and the farmers are obliged to give back marketable size shrimp and receive the profit from their production. In addition, "back-to-back" arrangements are possible, and there are many precedents (e.g. the garments sector, where a producer takes a confirmed order to a bank to get a credit guarantee which is taken to raw products suppliers to obtain cloth, all without cash transactions, only when product is delivered and purchaser pays, bank takes cut and suppliers and producers receive the rest). Such agreements could also guarantee floor prices for products. Also raised was the importance of rural finance for decentralized service providers, both input and post-harvest services. This will be essential for the growth of an agribusiness focused development model.

## **6. Links to export trade and the national Poverty Reduction Strategy**

Quality initiatives are spreading through the marine shrimp industry under pressure from global trade agendas. During discussion it became very clear that "quality" is going to be a major issue for the aquaculture industry in Bangladesh and that careful attention needs to be paid to the dissemination and understanding of all aspects of this. If the aquaculture industry is to ensure the growth of export trade and play its role in the national Poverty Reduction Strategy this is going to be a key aspect of its further growth and success. Quality – in all its aspects – will impact on price, market access, industry growth, profitability and nutritional value. Aquaculture has the potential to improve employment and nutrition which are among the major outcomes targeted by Bangladesh PSRP

For the Poverty Reduction Strategy to be successful there will also be a need to pay attention to the integrated aspects of the new aquaculture industry in terms of low technology solutions which link agriculture and aquaculture. At family and community level there are real gender equity benefits in an integrated strategy which delivers a form of integrated aquaculture at household or family level. There is a need to disseminate this knowledge through agricultural fairs and other community based fora. Many of the family and community based activities associated with aquaculture are "gender friendly" in that they encourage and support the involvement of women in the production of shrimp and fish, the running of the family business, and in community projects to support these goals. At the regional level there is scope for a systems view of rural water management and irrigation to obtain the maximum benefits from scarce resources, particularly during the dry season. This the new dynamic aquaculture sector should engage with the water management and irrigation sectors to seek maximum synergies and capture of benefits.

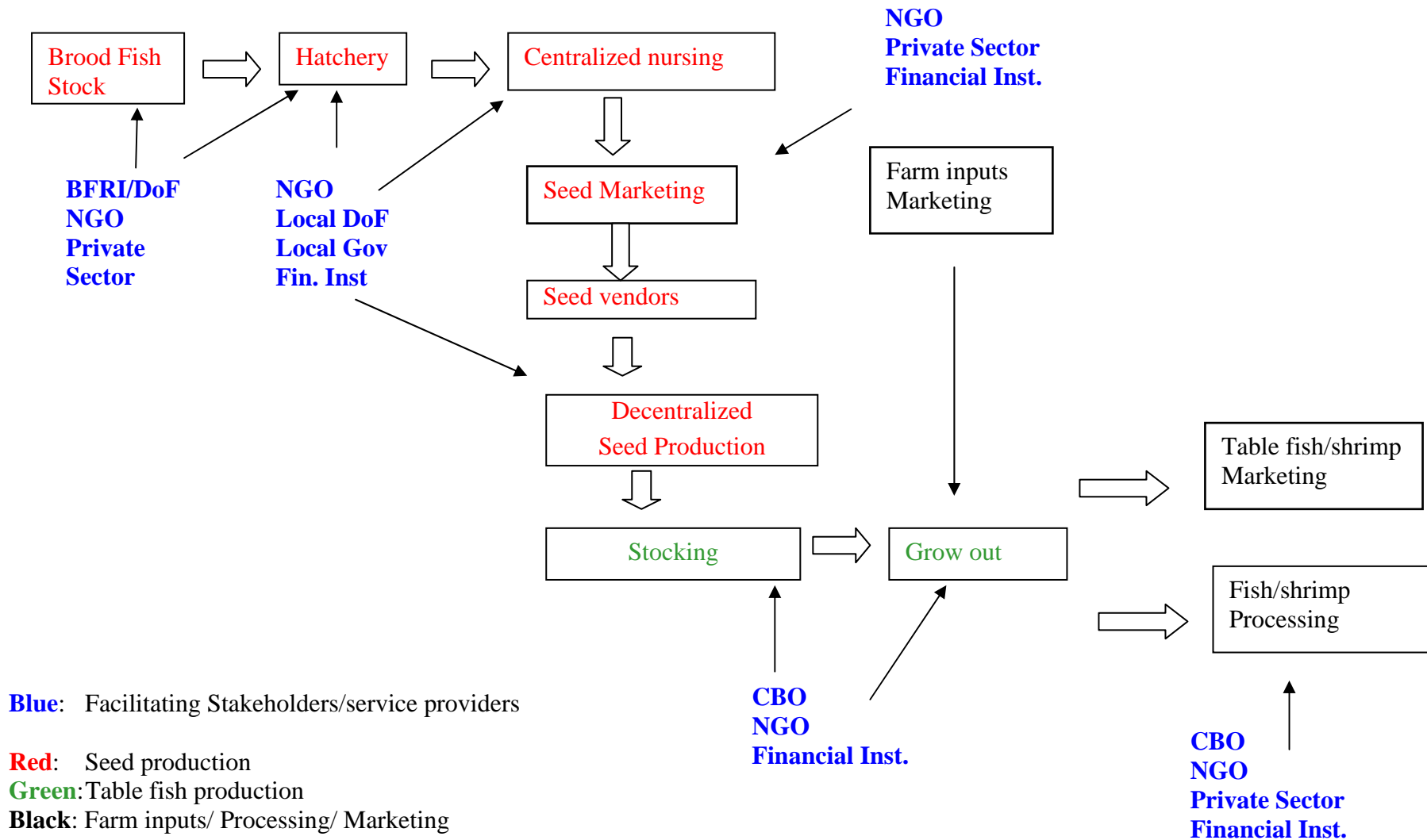
The concluding discussion on public/private partnerships revisited the statements made at the outset. Aquaculture is a major contributor to the economy of Bangladesh. So what might we do to ensure an even higher growth rate? Increasing the growth rate will require close attention to linking sub-systems, integration and the creation of synergies. These will also include public and private partnerships, market solutions to issues of sustainable investment and close attention to quality and traceability. Integration of aquaculture with the broader national agenda on land allocation and water management will be required if the industry grows strongly in future.

Aquaculture's potential as an important growth and income augmenting factor in the national Poverty Reduction Strategy for Bangladesh will be better realized if technological interventions, such as those prioritized in this expert consultation are structured so as to provide additional efficiency to the participants in different "end to end" stages. Further detailed work needs to be done to identify or map who the direct beneficiaries would be for each of the priority areas. By identifying the target beneficiaries for different stages it will be possible to identify the social, economic and institutional constraints of various stakeholders or beneficiaries. Above all aquaculture can play a key role in the national Poverty Reduction Strategy if it adopts a more dynamic agribusiness focus in its planning and execution.



Finally, as agreed there will be a follow-up technical consultation with the policy stakeholders in order to link the technical priorities identified during this expert consultation with poverty reduction, nutrition, income and rural economic growth strategies of Bangladesh.

## Dynamic Aquaculture Model



Flow of biological materials

## List of Participants

Venue: BRAC Centre Inn, Mohakhali

Date: 19 April 2005

Sl #	Name of the participants	Institution	Address	E-mail address
1	Alan Brooks	DFID	Rural Livelihoods Evaluation Partnership (RLEP) ITAD Project House No. 10, Road 135 Gulshan-1 Dhaka 1212	alan_brook@betsbd.com
2	Bruno Poitevin	IC/SDC	Delegation of Intercooperation House 29, Road 35A, Gulshan 2, Dhaka	icbruno @citech-bd.com
3	Munzurul Karim	IC/SDC	c/o Delegation of Intercooperation House 29, Road 35A, Gulshan 2, Dhaka	icleaf-munzu@libra.net
4	Mr. Francois Rajts	GEF	Management & Conservation Studies of the Fourth Fisheries Project Road # 25, House # 46 Block-A Banani, Dhaka	francis_rajts@yahoo.com
5	M G Hussain	BFRI	Research and Planning Bangladesh Fisheries Research Institute (BFRI) Mymensingh-2201	fsbfri@bdonline.com
6	F H Ansarey	ACI	Agribusiness Advanced Chemical Industries Ltd. ACI Center 245, Tejgaon Industrial Area Dhaka-1208	edab@aci-bd.com
7	Major Manzoor Ahmed	ATDP-Shrimp Seal of Quality	ABM Tower Road # 113/A, Gulshan-II Dhaka-1212	<a href="mailto:manzoor@atdpsoq.biz">manzoor@atdpsoq.biz</a> ; <a href="mailto:manzoor@intrepidbd.com">manzoor@intrepidbd.com</a>
8	Ms. Shourovi Zinnat Ara	CARE	CARE Bangladesh Pragati RPR Center (10 <sup>th</sup> Floor) 20-21, Kawran Bazar Dhaka-1215	<a href="mailto:shourovi@carebangladesh.org">shourovi@carebangladesh.org</a>
9	Ms. Zenne	CARE	CARE Bangladesh Pragati RPR Center (10 <sup>th</sup> Floor) 20-21, Kawran Bazar	

Sl #	Name of the participants	Institution	Address	E-mail address
			Dhaka-1215	
10	Bashiruddin Ahmed	LGED		
11	Prof. Sattar Mandal	BAU	Flat 7A, Dream Tower 72, Shiddeshwari Dhaka	<asmandal@sdnbd.org>
12	Prof. M A Taslim	DU	Development Initiative Bashati Horizon Apartment B8, 8 <sup>th</sup> Floor House # 21, Road # 17 Banani C/A Dhaka-1213	<a href="mailto:di@dhaka.net">di@dhaka.net</a>
13	Abdur Rahman	Proshika	PROSHIKA I/1-GA, Section-2, Mirpur Dhaka-1216	proshika@bdonline.com
14	A K Arzoo	JCF	Mr. A.K. Arzoo Executive Director Jagorani Chakra Foundation (JCF) 44 Mujib Sarak Jessore-7400	<a href="mailto:jcjsr@bttb.net.bd">jcjsr@bttb.net.bd</a>
15	Mahbabur Rahman	CBFM-2	Department of Fisheries (DoF) Matshya Bhaban 1 Ramna Dhaka-1000	
16	Syed Mahmudul Huq	BSF	Bangladesh Shrimp Foundation House # 47, Road # 23 Block-B, Banani Dhaka-1213	tsi@dhk.net
17	Mahmudul Karim	BSF	Bangladesh Shrimp Foundation House # 47, Road # 23 Block-B, Banani Dhaka-1213	<a href="mailto:karim@shrimpfoundation.org">karim@shrimpfoundation.org</a>
18	Darell Deppert	MACH project	Mr. Darrell Deppert Chief of Party MACH Project House # 2 (4th floor) Road 23A, Gulshan 1 Dhaka 1212	ddeppert@winrockbd.org
19	Arne Anderson	Fourth Fisheries Project	Mr. Arne Andersson Team Leader Fourth Fisheries 6th Floor Matsha Bhaban	arne@fourthfish.org

Sl #	Name of the participants	Institution	Address	E-mail address
			Department of Fisheries Ramna Dhaka-1000	
20	Md. Shariful Islam Akanda	Fourth Fisheries Project	Fourth Fisheries Project 6th Floor Matsha Bhaban Department of Fisheries Ramna Dhaka-1000	<a href="mailto:pcd@fourthfish.org">pcd@fourthfish.org</a>
21	Richard Gillet	Fourth Fisheries Project	Fourth Fisheries Project 6th Floor Matsha Bhaban Department of Fisheries Ramna Dhaka-1000	<a href="mailto:rgillet@fourthfish.org">rgillet@fourthfish.org</a>
22	Erik Keus	Danida, Patuakhali	Great Noakhali Agricultural Extension Project (GNAEP) House # 16, Road # 36 Housing State Maijdee Court Noakhali  Royal Danish Embassy Road # 51, House # 1 Gulshan Dhaka	<a href="mailto:hjkeus@citechco.net">hjkeus@citechco.net</a>  <a href="mailto:gnaec@citechco.net">gnaec@citechco.net</a>
23	McDonald Hommer	USAID	EGFE/ED USAID Baridhara Dhaka	<a href="mailto:mhomer@usaid.gov">mhomer@usaid.gov</a>
24	Latifur Rahman	USAID	EGFE/ED USAID Baridhara Dhaka	<a href="mailto:lr Rahman@usaid.gov">lr Rahman@usaid.gov</a>
25	Motahar Syed	USAID	Motahar Syed USAID Baridhara Dhaka	<a href="mailto:smotahar@usaid.gov">smotahar@usaid.gov</a>
26	Ron Gillespie	ATDP-II	ATDP-II Road No. 113/A Plot # 8 ABM Tower Gulshan-II Dhaka	<a href="mailto:gillespie@atdp.biz">gillespie@atdp.biz</a>
27	Nik Akwei Acquacy	ATDP-II	ATDP-II Road No. 113/A Plot # 8	<a href="mailto:nii@atdp.biz">nii@atdp.biz</a>

SI #	Name of the participants	Institution	Address	E-mail address
			ABM Tower Gulshan-II Dhaka	
28	Abdul Hossain	ATDP-II	ATDP-II Road No. 113/A Plot # 8 ABM Tower Gulshan-II Dhaka	hossain@atdp.biz
29	Graham Harris	consultant		<graham.harris@ozemail.com.au>
30	Alphis Ponniah	WorldFish	The WorldFish Center House # 22B, Road # 7 Block-F, Banani Dhaka-1213	a.ponniah@cgiar.org
31	Mark Prein	WorldFish	The WorldFish Center House # 22B, Road # 7 Block-F, Banani, Dhaka-1213	m.prein@cgiar.org
32	Hans Janssen	WorldFish	The WorldFish Center House # 22B, Road # 7 Block-F, Banani Dhaka-1213	j.janssen@cgiar.org
33	Naseem Aleem	WorldFish	The WorldFish Center House # 22B, Road # 7 Block-F, Banani Dhaka-1213	n.aleem@cgiar.org