Food and Agriculture Organization of the United Nations

In collaboration with

Department of Fisheries
Ministry of Fisheries and Livestock, Government of Bangladesh

Project Inception Workshop Report
Enhancing aquaculture production for food security and rural development through better seed and feed production and management with special focus on public-private partnership (TCP/BD/3501)

Lakeshore Hotel, Dhaka, Bangladesh
28 – 29 May, 2014

1. Introduction

The project is a continuation of an earlier TCP Facility project that sought to identify and understand the key constraints to seed and production and management in Bangladesh aquaculture. It was also recommended as one of the priority project ideas to be implemented in 2013–2014 in a National Consultation Workshop on Review and Formulation of Bangladesh National Aquaculture Development Strategy and Action Plan. The project period is 24 months and comprises 12 Outputs.

2. Purpose

This report provides an account of the inception workshop for TCP/BD/3501 "Enhancing aquaculture production for food security and rural development through better seed and feed production and management with special focus on public-private partnership". The inception workshop was held at the Lakeshore Hotel, Dhaka on 28–29 May 2014, and was meant to introduce the TCP project to all the major stakeholders in the aquaculture sector, discuss the project objectives and outcomes, and finalize the project implementation plan. The project framework was revised only at the output and activity levels, the purpose of which is to more effectively achieve the project objectives. The timeframes for the various project activities were also revised. The program of the workshop, which was designed to achieve the purpose, appears as Annex A.

3. Participation

The workshop was attended by 44 participants drawn for government agencies, research institutions, the private sector and FAO. The institutions that were represented included the Department of Fisheries (DoF) of the Ministry of Fisheries and Livestock (MoFL), External Relations Division (ERD) of the Ministry of Finance, Bangladesh Fisheries Research Institute (BFRI) and Bangladesh Agricultural University (BAU), the Private Enterprises on feed and seed, the Bangladesh Shrimp and Fish Foundation (BSFF), the WorldFish, and FAO. The list of workshop participants is presented in Annex B.

The target beneficiaries of the TCP Project comprise:

- Aquaculture seed producers;
- Feed manufacturers and semi-commercial/farm-made feed producers;
- Academes and Fisheries Research Institutions; and
- DoF and other regulatory Government Departments.

Honorable Muhammed Sayedul Hoque, MP, Minister, Ministry of Fisheries and Livestock is speaking in the opening session of the Inception Workshop (TCP/BD/3501, Lakeshore Hotel, Dhaka, 28 May, 2014) (Photo courtesy of FAO/Mohammad R. Hasan)

3. The workshop

3.1. Day 1

3.1.1. Opening Session

Welcome address
Mr Mike Robson, FAO Representative, FAO Representation, Dhaka, Bangladesh

Mr Robson recalled that the current TCP was a recommendation from an earlier TCP Facility that explored the issues constraining seed and feed production, supply and use. Mr Robson pointed out that the current TCP, requested by the Government of Bangladesh, was also one of the initial activities to support the recently adopted National Aquaculture Development Strategy and Action Plan. It is one of a number of FAO technical assistance programmes running in Bangladesh that are designed to promote food security.

Project Objectives and Deliverables
Mohammad R. Hasan, Aquaculture Officer, Aquaculture Branch, FAO Headquarters, Rome

Dr Mohammad Hasan, who serves as the Lead Technical Unit (LTU) Officer of the project, will provide Technical Support Services (TSS) to the project. Using PowerPoint presentation (Annex D), he spoke broadly about the results hierarchy of the project: the immediate and long-term impacts, expected outcomes, and provided an overview of 12 outputs that are expected to be achieved by a number of activities. The project outputs were defined as:

Output 1: Improved broodbanking pilot project for Indian major carp species in two (2) selected government hatcheries established.
Output 2: A pilot-scale selective breeding programme in one government seed multiplication farm/hatchery is developed and initiated.
Output 3: A comprehensive long-term selective breeding programme of Indian major carps and Chinese carps Nile tilapia and striped catfish (Thai pangas) is prepared.

Output 4: A set of operational guidelines for implementation of the Fish Hatchery Act and Rules is developed.
Output 5: Human capacity of private and public hatcheries for breeding and hatchery management and operation is enhanced.
Output 6: The National Fish Seed Producer Association (NFSPA) is strengthened.
Output 7: A set of operational guidelines for the implementation of Fish Feed and Animal Feed Act and Rules is developed.
Output 8: A pilot-scale feed quality analytical laboratory (proximate composition) is established in DoF and a feasibility study of a country-wide feed quality analytical service is completed and a proposal of setting up of a full-fledged analytical service is developed.
Output 9: Inventory of all feed additives being used and a review of their efficacy are completed and findings are disseminated.
Output 10: Capacity of feed producers is improved.
Output 11: The Feed Producer Association of Bangladesh (FBAB) is strengthened.
Output 12: A study and proposal for credit facility for small-scale farmers, hatchery operators, and feed producers is developed.

He provided a detailed explanation of the 13 deliverables, which he said should be reviewed by the workshop.

Speech by the Special Guest
Ms Sultana Afroza, Joint Secretary, External Relations Division, Ministry of Finance, Dhaka, Bangladesh

Ms Afroza appreciated the opportunity to take part in the workshop because her office is responsible for assessing externally assisted projects in terms of their potential contribution to the economic development of the country and allocating counterpart government contributions. She was delighted to learn that Bangladesh has achieved the status of a top ten aquaculture producing country in the world, and that aquaculture is increasingly contributing to the economic development and social welfare of the people. She looked forward to a fruitful meeting and was grateful for being invited to Chair one of the technical sessions.

Background of the project and importance of improving fish feed and seed in Bangladesh Economy
Mr Syed Arif Azad, Director General, Department of Fisheries, MoFL, Dhaka, Bangladesh

Mr Arif Azad recalled that the Bangladesh delegation to the Committee on Fisheries (COFI) meeting in 2012, of which he was a member, had discussed with FAO the urgent need for assistance in aquaculture development, the result of which were a TCPF and a National Aquaculture Development Strategy and Action Plan., which were referred to by the FAO Representative. He thanked FAO for their timely and generous assistance and expressed the DoF's commitment to make the Project a success. He added that the country's' achievements in expanding aquaculture production have been largely a result of the intensified and collaborative efforts of government and all other stakeholders. He expects the same close and productive collaboration in the pursuit of the Project's objectives.

Introduction of the Chief Guest
The Chief Guest was introduced by **Ms Begum Nurun Naher**, National Operations Officer of FAO Bangladesh. The Honorable Minister was recently appointed to the post but has been in public service for a long time, occupying various government posts with high responsibility.

Keynote Speech by the Chief Guest and Opening of the Workshop
Honorable Muhammed Sayedul Hoque, MP, Minister, Ministry of Fisheries and Livestock, Dhaka, Bangladesh

The Honorable Minister thanked FAO, which he described as a long-standing partner, for taking the necessary initiatives to address the emerging issues in the fisheries sector. He said that the significant gains that Bangladesh has made in aquaculture development need to be sustained to support a rapidly increasing demand for fish. In this regard, he emphasized that fish production largely depends on the availability of affordable and good quality seed and feed. He pointed out that the progressive policy and governance context for this goal has been strengthened with enactment of the Fish Hatchery Act (2010), and Fish Feed and Animal Feed Act (2010) and the issuance of the Fish Hatchery Rules (2011), and Fish Feed Rules (2011). He urged the stakeholders – the hatchery owners, feed millers, entrepreneurs and importer-exporters – to be directly involved in the implementation process. He looked towards strengthening further the collaboration among agencies and development partners in pursuing the policy objectives of these two Acts. He expected a project implementation plan that will address the challenges to ensuring the production and supply of good quality seeds and feeds at growers' level. He expressed his best wishes for a successful workshop and declared opening of the workshop.

Participants of the Inception Workshop (TCP/BD/3501, Lakeshore Hotel, Dhaka, 28 May, 2014) (Photo courtesy of FAO/Begum Nurun Nahar)

3.1.2. Workshop Technical Sessions

3.1.2.1. Technical Session 1

The first technical session of the workshop was chaired by Ms Sultana Afroza, Joint Secretary, Ministry of External Resource Division, Government of Bangladesh. Four papers were presented in the session. These papers focused on various aspects of seed and feed production:

***Presentation 1: Implementation of a TCP on improving national carp seed production system in Nepal and the lessons learnt* – Mr Weimin Miao**, Regional Aquaculture Officer, FAORAP

Mr Miao Weimin, Regional Aquaculture Officer, FAORAP, Bangkok presented a paper (Annex E) on the implementation of a TCP to improve the national carp seed production system in Nepal and the lessons learnt. Mr Miao gave an analysis of the achievements of the study and highlighted some of the failures, which he said could serve as object lessons for the current TCP project. The weak points in the Nepal project were in brood production, the selective breeding program, and the poor coordination between government and research institutes. He recommended narrowing down the number of objectives and to keep the outputs that are important but achievable within the project period of 24 months.

***Presentation 2: Fish seed in Bangladesh – enhancing seed quality through targeted genetic broodstock management and improved organization of hatchery operations* – Dr Krishen J. Rana**, International Aquaculture Breeding, Hatchery Management and Operation Expert

Dr K.J. Rana, Aquaculture Breeding, Hatchery Management and Operation Expert, described some of the important problems in the seed sector and described the possible means to address them through technical, management and policy measures (Annex F). The Fish Hatchery Act (2010) is a significant step, which the project would help strengthen through technical implementation guidelines. He stressed however that the challenges are with the people not the fish, averring to the need for well trained personnel and the proper enforcement of the hatchery and the feed acts, amongst others.

***Presentation 3: Aquafeeds in Bangladesh – improving the supply of safe quality feeds for the farmers* – Dr Thomas Shipton,** International Aquaculture Nutrition and Feed Development Expert

Dr Thomas Shipton, Aquaculture Nutrition and Feed Development Expert, described the problems in the feed sector in Bangladesh, which included the availability and quality of feed ingredients, the addition of feed additives and its consequences (Annex G). He stressed the importance of the Fish Feed and Animal Feed Act (2010) in resolving many of these problems and the necessity for guidelines and better practice. He stressed the need for a well-functioning feed test laboratory.

***Presentation 4: Value chain analysis of aquafeed and fish seed production in Bangladesh* – Mr Pedro Bueno,** International Enterprise Development and Management Expert

Mr Pedro Bueno, International Enterprise Development and Management Expert cast the feed and seed production, distribution and utilization subsectors of the aquaculture industry of Bangladesh in a value chain perspective (Annex H). One important purpose of using the value chain framework is to identify and describe the inefficiencies along the chain so that these could be addressed with appropriate measures. The outcome for the players along the chain would be an increase in the profitability of their operations, and for the entire chain to be one effectively functioning sector that fosters the efficient use of resources, economic viability, social and environmental responsibility and sustainability.

Open forum discussion- Moderated by Mr AKM Zafar Ullah Khan and Dr Mohammad R. Hasan

The Chair thanked the resource persons and was particularly interested in the remark from Dr K.J. Rana that the problem in the seed production sector is not in the fish, but with the people. Ms Afroz thought that this appropriately reflects the need for capacity building and critical value orientations in the seed and feed sectors. She then requested Mr AKM Zafar Ullah Khan of the Bangladesh Shrimp and Fish Foundation to chair the session because of another urgent meeting she had to attend to.

The discussion was started by Mr Jahidur Rahman, Maitri Fish Hatchery and Integrated Farm, Jessore, who was deeply concerned that the increase in feed prices had eroded the economic viability of the fish farmers. He also mentioned the quality deterioration of broodstock and urged the scientists to work for its improvement.

Replying to the request for clarification of the infrastructure required for a breeding programme ("do the broodbanks function as nuclear breeding centres?") by Mr Shamim Ahmed from FAO, Mr Weimin Miao and Dr Krishen Rana said that a nuclear breeding centre is a place where broods are produced and maintained. Mr Miao added that the nuclear breeding centre in China was primarily set up by the government and subsequently handed over to private sector. Dr Rana said there is need to assess the capabilities of the broodbanks and build their capacity to become nuclear centres, adding that selective breeding should be a long-term sustained programme rather than a merely a short-term project.

A crucial point was raised by Dr Rana when he asked how inbreeding is occurring when the broodbanks seem to simply collect, rear and pass on wild stock to hatcheries — in other words, the

broods are F1s – who then use the broodstock for two or three years and then discard them. Where is the quality problem arising, in this case? In reply, Dr Rafiqul Islam Sarder, Professor of Bangladesh Agricultural University (BAU) offered these explanations: inadequacy of facilities, probably contaminated wild stock, and inadvertent mixing of hatchery bred and wild stocks.

Dr Md. Goljar Hossain, Assistant Director (Aquaculture), DoF, described the government initiatives to improve the quality of broodstock and seed. He said that the DoF has established a number of brood banks where broods are produced by rearing carp seed collected from rivers. The juveniles/broods are distributed to private hatcheries for seed production. He emphasized the need for training to improve the quality of seed production. Dr Hossain also discussed the Department's progress in implementing the Feed Rules (2011). He indicated that implementing the new regulatory dispensation was proving to be a significant challenge to the Department, and that while financial provision had been provided to test commercially manufactured aquafeeds in some districts, the process was uncoordinated and there were no implementation guidelines. Significantly, the Department of Fisheries does not have the dedicated nutrition laboratories to undertake the necessary proximate composition analyses, and while the District Fisheries Officers (DFOs) have been tasked with implementing the Feed Rules (2011) they have not been trained to do so, and do not have operational guidelines. Dr Hossain finished by reiterating that the development of laboratory capacity combined with the operational procedures required to effectively implementing the Feed Rules (2011) was of paramount importance to improving farmer access to high quality aquafeeds.

Dr Md. Rafiqul Islam Sarder of BAU explained the constraints in the brood banks, especially the small size of the hatcheries and overstretched responsibilities of the hatchery managers. He suggested setting up brood banks in big hatcheries where a good number of ponds are available, and to reduce the work load of the hatchery managers.

Mr Md. Israil Golder, Director, DoF said they have every intention to implement the brood bank programme, but due to some constraints they could not do it properly. He is optimistic on the improvement of the quality of fish seed and feed through the intervention of the FAO TCP.

Summary of Technical Session 1 and wrap up

The Session Chair, who had been Secretary of a number of agencies including the External Relations Department of the Ministry of Finance and was now member of Bangladesh Shrimp and Fish Foundation (BSSF), said that the current activities of the BSSF include improvements to the food safety attributes of aquaculture products to improve market access. A code of conduct was also developed and promoted for adoption among the farmers and exporters. A particular programme is addressing the problem of nitrofuran and other banned substances in prawn and shrimp. He saw the present TCP as a foundation for a larger and more comprehensive programme for capacity building in producing and marketing affordable and quality aquatic products.

Dr Mohammad Hasan of FAO HQ, wrapped up the session with the remark that the Government of Bangladesh has done much to improve the quality of seed over the years and the effort continues. On feed, BFRI and BAU have the capacity to analyze feed samples but the sheer number of samples often overwhelms the capacity. The project is meant to fill the gaps in the government programme and provide assistance and expert advice. He noted the lengthy and intense discussion over the numerous issues related to seed but also the critical issues on feed quality and cost of raw materials that were the focus of the discussion on feeds. He concluded with a sobering reminder: that Bangladesh has become one of the top ten aquaculture producers, which is a serious effort of all stakeholders, but more important than producing a lot of fish is the need to produce enough to meet the country's food security and nutritional needs. In his more succinct statement: "It does not matter that Bangladesh is fifth largest producer of fish, the point is to meet the demand of 150 million people".

Closing Remarks

Ms Begum Nurul Naher, National Operations Officer, FAOBD formally closed the day 1 of the workshop.

3.2. Day 1

3.2.1. Technical Session 2

The chair of this second set of presentations was Mr Md. Israil Golder, Director, DoF. He introduced the speakers and suggested that the discussion be carried on after the presentations.

***Presentation 5: Aquafeeds in Bangladesh: status and nutritional quality of commercial feed ingredients and feeds* – Dr Md. Zulfikar Ali**, Senior Scientific Officer, BFRI

The presentation (Annex I) outlined the nutrition research that is being undertaken at the Bangladesh Fisheries Research Institute. Of particular import to the current study is their work on the evaluation of the nutrient quality of locally and imported aquafeed ingredients, their shelf life characteristics, and levels to which commercial feed manufacturers are currently complying with the Feed Rules (2011). The BFRI research programme on fish nutrition and feed management was described. It includes these activities:

- survey to identify potential fish feed ingredients based on their availability, price and primary nutritional value;
- investigation into the nutritional requirements of different aquaculture fish species and age;
- utilization of non-conventional feedstuff of plant origin as dietary protein sources in formulated fish feed;
- formulation of cost-effective quality feeds from indigenous raw materials for nursery and grow-out systems for carp, catfish, and other commercially important species;
- reducing feeding costs for pangas and tilapia farming through improved feeding techniques;
- development and optimization of quality feeds and feeding strategies of commercially important fish species;
- development of a low-cost semi-automated pellet machine using locally available materials;
- publication of a feed reference standard manual (2004); and
- research (2008–11) on the evaluation of nutrient quality and shelf life of commercial feed ingredients and feeds used for aquaculture production.

The presentation provided the following recommendations that have relevance to the project:

- The nutritional quality, packing and labeling of the feeds by most manufacturers are not satisfactory. Moreover, the rate of adulteration of common feed ingredients has recently been increasing. Monitoring protocols to ensure the quality of feed and feed ingredients need to be implemented.
- Developing monitoring capacity and the implementation of the Fish Feed and Animal Feed Act (2010) and the Fish Rules (2011) should be viewed as priority interventions.
- Feed manufacturers, feed traders and farmers need to be provided training on good aquafeed manufacturing practices.
- Feed quality analytical laboratories need to be established at the district level in order to analyze and monitor feed and feed ingredients being produced/ used by the small-scale feed millers, feed traders and farmers.
- There is a need to create awareness among the feed manufacturers, traders and farmers about the need for quality of commercial feeds and feed ingredients.

Other activities of the Institute include contributing to the preparation of the Animal and Fish Feed Act (2010) and Fish Feed Rules (2011); providing analytical services to establish the nutritional quality of commercial feed ingredients and feeds, and evaluating the efficacy of probiotics as feed additives in formulated feeds for commercially important fish species.

***Presentation 6: Quality fish seed in Bangladesh: contribution of BFRI* – Mr Md. Shahidul Islam**, Senior Scientific Officer, BFRI

The above presentation (Annex J) comprehensively described the BFRI'S programme to improve the seed quality and productivity. Genetic techniques are being used for stock improvement as follows: cross breeding between wild stock; selective breeding for four Indian major carps species; improving strains of rohu, silver barb, BFRI GIFT tilapia and koi (climbing perch); planned hybridization/cross breeding of desirable species such as indigenous and exotic catfishes.

Research achievements in genetic selection have included: BFRI rajpunti (silver barb) that has shown about 32–36 percent higher growth rates than normal breeds; similarly BFRI GIFT Tilapia – 35–40 percent higher growth rates than normal breeds; BFRI rohu – 15–20 percent higher growth rates than normal breeds; monosex male tilapia production – all-male tilapia production (96–98 percent male) using hormonal sex manipulation technique and improved tilapia seed production and grow-out technique.

Achievements in brood development, breeding and seed production include breeding and mass seed production techniques of both endemic and exotic climbing perch (*Anabas testudineus)* strains; breeding and mass seed production techniques for walking catfish (*Clarias batrachus*) and stinging catfish (*Heteropneustes fossilis*).

The genetic research plan is to obtain pure strains from suitable countries and improve the existing germplasm, develop of markers for assisted selective breeding techniques, identify quantitative Trait Loci (QTLs) using different molecular markers, conduct a genetic stock improvement program using best stocks as base population through the application of selective breeding and line crossing techniques, develop cryogenic gene banking to facilitate the artificial breeding of carp as well as improving the conservation of improved stocks, continue the stock improvement program and dissemination of improved germplasm among private and government hatchery operators, and establish a brood bank with pure strain carp species.

BFRI recommends establishing a centre for the conservation and improvement of fish genetics through the development of a Genetic Resources Bank. This should be maintained at the DoF, and include the involvement of BFRI. It would be used to supply improved germplasm to selected public and private hatcheries for the quality seeds production and dissemination to the farmers

Presentation 7: Current role of WorldFish-Bangladesh in seed and feed sector f Mr Mohammad Mamun-Ur-Rashid, Technical Officer, WorldFish, Bangladesh

The WorldFish programmes on seed and feed and a study of the feed value chain were described (Annex K). The seed programme consisted of improving brood management and hatchery operational practices, the provision of quality carp brood stock from riverine origins, and a selective breeding program for Indian major carps. Tilapia improvement continued with, amongst others, the setting up of tilapia breeding nucleus hatcheries that distribute high quality brood stock to satellite hatcheries. The programme on seed includes a review of the regulations, the development of tools to improve capacity to implement the Hatchery Act (2010).

In the feed sector, a feed value chain study was conducted, the results of which were the basis for recommendations to increase feed mill operational efficiencies, the customization of formulation matrices for better nutrient availability in feeds, research on locally available protein sources, collaborate to increase production of local raw materials, the development of feeding and culture practices, and other measures. Likewise, regulations were reviewed and tools and capacity are being developed to implement the new feed regulations in collaboration with DoF.

***Presentation 8: Presentation from Fish Hatchery Owners Association* – Mr Md Firoz Khan**, President, Regional Hatchery Association, Jessore Region

Mr Firoz Khan cited the support that the hatchery operators have received from the government particularly the DoF and BFRI as well as from the WorldFish. The operators have attained a good level of technical competence from the various technical support programmes that they have received. Many problems however persist such as the high cost of energy and the shortage of highly skilled technicians, and the seeming degradation of the quality of broodstock. The association has been active in the seed development programmes, and would be happy to be a partner in the implementation of the TCP project.

Presentation 9: Presentation from Feed Producers Association **– Mr Md. Anisur Rahman**, General Manager, Spectra Hexa Feeds Ltd.

The presentation (Annex L) provided a valuable economic and policy perspective of the current status of the commercial feed manufacturing sector in the country from the feed manufacturers' standpoint. He provided important information outlining the current cost structures in the feed manufacturing sector, and highlighted the problems associated with high feed ingredient costs which now account for 64 –72.5 percent of total production costs. He noted that companies only made BDT[1]0.70 – 1.00/kg on feeds that cost BDT40–45/kg to manufacture – this gives feed manufacturers a slim profit margin of 1.75 – 2.0 percent on their feeds, leaving little scope to reduce retail prices. Mr Rahman concluded with a description of the current constraints to the aquafeed sector. In their order of importance from his viewpoint, these are as follows:

- Power shortages/power cuts (electricity, gas).
- Availability of feed Ingredients.
- Quality of available feed ingredients.
- High prices of ingredients.
- Poor transportation network.
- Fluctuations in ingredient prices and quality.
- High interest rates on loans.

Summary and Conclusion: Salient points from the presentations and discussions of the two sessions:

The issues that were the focus of the discussion were summarized by Mr Md. Israil Golder Chair of the Technical Session 2 and Dr Mohammad Hasan of FIRA, FAO as follows:

<u>Seed</u>:

- High feed and seed costs are squeezing profits making the businesses marginal.
- There was general consensus that the quality of seed has declined over the years but how this was determined remains unclear.
- There was a common view amongst the private sector that the training provided by WorldFish, is necessarily selective as it is project-based. The DoF should develop a long-term programme for the provision of regular training to farmers.
- The participants, especially the representatives of the private sector, made a plea to the DoF to take the lead and a more proactive role in continuing the brood banking project, and to undertake a long term selection programme of key farmed species. The participants emphasized the need to develop a country-wide genetic selection programme.
- Mr Weimin Miao, who has had a long experience in the region stated that poor seed quality was due to inbreeding, crossbreeding, and through negative selection.
- There was concern that although the Fish Hatchery Act (2010) and Fish Hatchery Rules (2011) are in place, the DoF is inadequately equipped to implement these regulations.

[1] US$1= Bangladesh Taka (BDT) 77.50 in May 2014.

- The private sector expressed a strong desire to collaborate with the DoF in a broodstock selection programme.
- FAO explained that this TCP intends to identify one DoF hatchery to serve as a live gene bank for selected species, to propose a broodstock management scheme for the captive stock, and develop a plan for a selective breeding programme for the consideration by DoF.
- It was noted that it requires a long term commitment and a sustained programme (as opposed to a sort term project) to run a successful selective breeding programme.
- Gains from a long term selective breeding programme need to be sustained; neglect can destroy the gains that would have been achieved over a long period.

Feed:

1. Increasing feed costs, which when combined with static fish sales prices resulted in lower profit margins for farmers.

- Adulteration of feed ingredients reduces feed quality. Current packing and labeling procedures are not satisfactory.
- Implementing the Animal Feed and Fish Feed Act (2010) was proving to be a significant challenge to the DoF, and that while funds had been provided to test commercially manufactured aquafeeds in some districts, the process was poorly coordinated.
- Significantly, the DoF does not have nutrition laboratories to undertake the necessary proximate composition analyses, and while the District Fisheries Officers (DFOs) had been tasked with implementing the Feed Rules (2011), they have not been trained to do so, and do not have operational guidelines.
- The development of appropriate laboratory capacity combined with the operational procedures required to effectively implement the Feed Rules (2011) is of paramount importance. It is hoped that this TCP would address these issues.

Recommendations

Dr Mahmudul Karim, Former Executive Director, Bangladesh Shrimp and Fish Foundation described a few but critical areas for attention and actions as a follow up to the inception session:

1. There is a need to make amendments to the project deliverables in line with the workshop discussions which included a consideration of the critical importance of starting, managing and sustaining a selective breeding programme; building on the ongoing projects that DoF, BFRI and WorldFish have initiated rather than duplicating them; reducing the deliverables if necessary or revising them so that they are achieved within the project period.
2. From a technical perspective, he emphasized the need to formulate feeds that are species-specific, life stage specific and possibly culture system-specific.
3. He appreciated the importance of analyzing the seed and feed sectors of Bangladesh using the value-chain framework, as it can identify the inefficiencies (and their causes) in the production-distribution-and utilization systems for both inputs. He said they should not be analyzed separately as seed and feed are inextricably linked in their utilization by farmers.

4. Review of the Project Implementation Plan

Based on the recommendations of the workshop two working sessions were carried out. The first session comprised of staff from DoF (Mr Md. Israil Golder, Mr SK. Mustafizur Rahman and Dr. Md. Sainar Alam), FAO Bangladesh (Ms Begun Nurun Naher), and the members of the project team (Mohammad Hasan, Weimin Miao, K.J. Rana, Tom Shipton and P. Bueno).

The first working session was held in the early afternoon of 29th May and discussed the possible participation of DOF centres, facilities and offices. The project scope was reviewed in light of the workshop deliberations. The session suggested specific areas for revision.

These were taken on board by the project team, which met for a second session at the Asia-Pacific Hotel in the evening of 29th May and morning of 30th May. The revisions were confined to the Outputs and Activities. The revised project implementation framework appears as Annex C.

Annex A: Workshop Agenda

Department of Fisheries
Ministry of Fisheries and Livestock, Government of Bangladesh

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Inception Workshop
on
Enhancing aquaculture production for food security and rural development through better seed and feed production and management with special focus on Public-Private Partnership (TCP/BGD/3501)
Ikebana Hall, Lakeshore Hotel, Road 41, House 46, Gulshan – 2, Dhaka, Bangladesh
28 – 29 May, 2014

WORKSHOP AGENDA

Day 1: 28 May 2014		
MORNING		
10:00–10:30	Arrival of the guest and registration	
10:30–10:55	Guests take Tea/seat	
10:55–11:00	Recitation from Holy Quran	
Session 1 11:00–12:00	**Inauguration Session** Chair: Director General, DoF	
		Chief Guest: Mr Muhammed Sayedul Hoque, MP, Honourable Minister, MoFL, Dhaka, Bangladesh **Special Guest: Mr Syed Arif Azad**, Director General, DoF, Dhaka, Bangladesh **Special Guest: Ms Sultana Afroza,** Joint Secretary, ERD, Ministry of Finance, Dhaka, Bangladesh **Mr Mike Robson**, FAO Representative, Dhaka, Bangladesh
11:00–11:10	Welcome address	**Mr Mike Robson, FAO Representative in Bangladesh**

11:10–11:35	Project Objectives, Outputs and Deliverables	**Dr Mohammad R. Hasan,** Aquaculture Officer**,** Aquaculture Branch **(**FIRA), FAO Headquarters, Rome
11:35–11:40	Speech by the Special Guest	**Ms Sultana Afroza,** Joint Secretary, ERD, Ministry of Finance
11:40–11:50	Background of the Project and Importance of improving fish feed and seed in Bangladesh Economy	**Mr Syed Arif Azad,** DG, DoF
11:50–12:00	Speech by the Chief Guest and opening of the workshop	**Mr Muhammad Sayedul Hoque**, MP, Honourable Minister, Ministry of Fisheries and Livestock
Master of the Ceremony: Mr Krishnendu Saha, Department of Fisheries		
13:00–14:30	*Lunch/prayer break*	
	Session 2: Technical Session 1 Chair: **Ms Sultana Afroza**, Joint Secretary, ERD, Ministry of Finance	
14:30–14:50	Implementation of a TCP on improving national carp seed production system in Nepal and the lessons learnt	**Mr Miao Weimin,** Regional Aquaculture Officer, FAORAP, Bangkok
14:50–15:20	Fish seed in Bangladesh – Enhancing seed quality through targeted genetic broodstock management and improved organization of hatchery operations	**Dr K.J. Rana,** International Aquaculture Breeding, Hatchery Management and Operation Expert
15:20–15:50	Aquafeeds in Bangladesh – Improving the supply of safe quality feeds to the farmers	**Dr Tom Shipton,** International Aquaculture Nutrition and Feed Development Expert
15:50–16:20	Value chain analysis of aquafeed and fish seed production in Bangladesh	**Mr Pedro Bueno,** International Enterprise Development and Management Expert
16:20–17:40	Discussion	**Mr AKM Zafar Ullah Khan,** BSFF, Dhaka
17:40–17:50	Wrap up of the Session	**Dr Mohammad R. Hasan, FAO, Rome**
17:50–18:00	Closing Remarks	**Ms Begum Nurun Naher,** National Operations Officer, FAOBD, Dhaka

Day 2: 29 May 2014		
	Session 3: Technical Session 2 Chair: **Mr Md. Israil Golder,** Director, DoF, Dhaka	
09:00–09:30	Status of feed and seed programmes undertaken by BFRI	**Dr Zulfiker Ali and Md. Shahidul Islam,** BFRI, Mymensingh
09:30–09:45	Current role of WorldFish-Bangladesh in Fish Feed Sector	**Mr Mohammad Mamun-Ur-Rashid,** WorldFish, Bangladesh
09:45–10:15	Presentation by Hatchery owner association	**Mohammad Firoze Khan,** Managing Director, Ma Fatema Fish Hatchery, Jessore
10:15–10:45	Presentation by Feed producer association	**Md. Anisur Rahman,** AGM, Spectra Hexa Feeds Ltd.
10:45–12:10	Discussion and Recommendations	
12:10–12:20	Wrap up of the Session	**Dr Mohammad R. Hasan, FAO, Rome**
12:20–12:30	Closing Remarks	**Mr Md. Israil Golder, DoF, Dhaka**
12:30–13:30	Lunch	
	Session 4: Internal Session on Project Work Plan Chair: **Dr Mohammad R. Hasan**, FAO, Rome	
13:30–17:30	Review by the DoF and FAO Team { project work plan and Scope}	**Dr Mohammad R. Hasan, FAO, Rome** **Mr Miao Weimin, FAORAP, Bangkok** **Dr Krishen J. Rana,** International Aquaculture Breeding, Hatchery Management and Operation Expert **Dr Tom Shipton,** International Aquaculture Nutrition and Feed Development Expert **Mr Pedro Bueno,** International Enterprise Development and Management Expert **Mr Md. Israil Golder,** DoF, Dhaka **Mr SK. Mustafizur Rahman,** DoF, Dhaka **Dr Md. Sainar Alam,** DoF, Dhaka **Ms Begum Nurun Naher,** FAOBD, Dhaka

Annex B. List of Participants

Inception Workshop

Enhancing aquaculture production for food security and rural development through better seed and feed production and management with special focus on Public-Private Partnership (TCP/BGD/3501)

Date: May 28–29, 2014
Venue: Lakeshore Hotel, Dhaka.

Sl.	Name	Designation	Contact address	Telephone number and e-mail address
1	Mr Muhammed Sayedul Hoque, MP	Honourable Minister	Ministry of Fisheries and Livestock, Dhaka, Bangladesh	
Department of Fisheries (DoF)				
2	Mr Syed Arif Azad	Director General	Department of Fisheries, 13, Shahid Captain Moonsur Ali Sharani, Matshya Bhaban, Ramna, Dhaka-1000	Tel.+88-02-9562861; Mobile: +88-01714-746-405; E-mail: dg@fisheries.gov.bd; arifazad.syed@yahoo.com
3	Mr Md. Israil Golder	Director (Reserve)	Department of Fisheries, 13, Shahid Captain Moonsur Ali Sharani, Matshya Bhaban, Ramna, Dhaka-1000	Tel. +88-02-9562861; E-mail: golder_dof@yahoo.com
4	Mr SK. Mustafizur Rahman	Principal Scientific Officer, Fisheries Planning and Survey Unit	Same as above	Tel. +88-02-9553088; Mobile: +88-01712-521-682
5	Mr Parimal Chandra Das	Deputy Director (Admin.)	Same as above	Tel.+88-02-9562861
6	Dr Md. Goljar Hossain	Deputy Director (Aquaculture)	Same as above	Tel.+88-02-9562861
7	Dr Joarder Md. Anowarul Haque	Deputy Director (Finance and Planning)	Same as above	Tel.+88-02-9562861
8	Mr Md. Monowar Hossain	District Fisheries Officer (Reserve), DoF, Dhaka	Same as above	Tel.+88-02-9562861
9	Dr Qazi Iqbal Azam	Project Director, Development and Management of Identified Degraded Water Bodies and Conservation of Small Indigenous Fishes Project	Same as above	Tel.+88-02-9562861
10	Mr Md. Abul Khair	District Fisheries Officer (Reserve)	Same as above	Tel.+88-02-9562861
11	Mr Md. Arifur Rahman Tarafder	Project Director, ID Card Project	Same as above	Tel.+88-02-9562861
12	Mr Md. Rafiqul Islam	Project Director, Fresh water Prawn Culture Extension Project	Same as above	Tel.+88-02-9562861
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16	Mr Mohammad Mamunor Rashid	Assistant Director	Same as above	Tel.+88-02-9562861
17	Mr Md. Wahiduzzaman	Assistant Chief	Same as above	Tel.+88-02-9562861
Bangladesh Agricultural University				
18	Dr Md. Rafiqul Islam Sarder	Professor	Department of Fisheries Biology and Genetics Bangladesh Agricultural University Mymensingh - 2202, Bangladesh	Tel. +88-09166662; Mobile:+88-01712-015908; E-mail: rafiqulsarder@yahoo.com
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Bangladesh Shrimp and Fish Foundation (BSFF)				
23	Mr AKM Zafar Ullah Khan	Member	Bangladesh Shrimp and Fish Foundation, House 3 (4th Floor), Road 7, Block F, Banani, Dhaka -1213	Tel.: +88-02-9871627
24	Dr Mahmudul Karim	Director	Bangladesh Shrimp and Fish Foundation, House 465 (1st Floor), Road 8 (East), DOHS-Baridhara, Dhaka 1206	Tel.+88-02 8417731-; Mobile: 01711-590866; E-mail: dr_mahmudul_karim@hotmail.com; dr_mahmudul_karim@yahoo.com; karim@shrimpfoundation.org
Food and Agriculture Organization of the United Nations (FAO)				
25	Mr Mike Robson	FAO Rappresentative	FAO Representation in Bangladesh, House 37, Road 8, Dhanmondi R/A, Dhaka 1205	Tel. +88-02-8118015-8; E-mail: mike.robson@fao.org
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27	Mr Weimin Miao	Regional Aquaculture Officer	FAO RAP, Bangkok, Thailand	E-mail: Weimin.Miao@fao.org
28	Dr Thomas Ashley Shipton	FAO International Consultant	Department of Ichthyology and Fisheries Science, Rhodes University, Grahamstown, South Africa	E-mail: ihts@imaginet.co.za
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30	Mr Pedro Bueno	FAO International Consultant	Rome, Italy	E-mail: pete.bueno@gmail.com
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34	Mr Md Nurul Islam	Country Office Manager (FAO project MTF/BGD/046/STF)	FAO Representation in Bangladesh, House 37, Road 8, Dhanmondi R/A, Dhaka 1205	Tel. +88 02- 8118015-8; E-mail: Islam.Nurul@fao.org
Economics Relations Division, Ministry of Finance				
35	Ms Sultana Afroz	Joint Secretary (UN-4)	Economic Relations Division Ministry of Finance, Dhaka	Tel: +88-02-9145476; E-mail: safroze_1@hotmail.com
Bangladesh hatchery association				
36	Mr Md. Firoj Khan	President	Regional Hatchery Association, Jessore Region and Managing Director, Ma Fatema Fish Hatchery, Dalmil Masjid Road, Chachra, Jessore	Tel. +88-0421-63022; Mobile: +88-01711-390513
Fish Feed Association				
37	Mr Ehtesham Bin Shahzahan	Managing Director	Quality Feeds Ltd, House 14, Road 7, Sector 4, Uttara, Dhaka-1230	Phone:+88-02-8916024; E-mail: ehtesham@qfl.com.bd
38	Mr Moshiur Rahman	Managing Director	Paragon Group, 5, Mohakhali C/A, Dhaka	Tel:+88-02-8821393; E-mail: hr.ho@paragongroup-bd.com
WorldFish				
39	Mr Craig Meisner	Country Director	WorldFish Bangladesh and South Asia Office , House 22B, Road 7, Block-F, Banani, Dhaka 1213	Tel: +88-02-881 3250, +88-02-881 4624; Mobile: +88-01755-646468; Email: C.Meisner@cgiar.org
40	Mr Mohammad Mamun-Ur-Rashid	Technical Officer	Same as above	Mobile: +88-01714-022-519; Email: mamunurashid@gmail.com
	Mr. Manjurul Karim	Deputy Chief of Party	Same as above	Tel: 88-02-8814624; E-mail: M.Karim@cgiar.org
Private Feed Sector				
41	Md. Anisur Rahman	Assistant General Manager	Spectra Hexa Feeds Ltd., House 17, Road 106, Block CEN(F), Gulshan-2, Dhaka	Tel: +88-02-9892030; Mobile: +88-01712-112242; E-mail: anis_spectra@yahoo.com
Private Fish Hatchery Owners:				
42	Md. Abdul Kader Tarafder	Managing Director	Sarna Lata Agro Fisheries Ltd., Village: Radhakanai, Union-Furkanabad, Upazilla-Fulbaria, Mymensingh	Mobile: +88-01711-168-205 E-mail: k.tarafder@yahoo.com
43	Md. Kudrat-E-Alahe	Managing Director	The M.O. Agro Fisheries and Hatchery, Village-Pachpara, Union-Trishal, Upazilla-Trisal, Mymensingh	Tel: +88-091-63111; Mobile: +88-01715-005009; moagrohatchery@ymail.com
44	Mr Jahidur Rahman	Managing Director	Maitri Fish Hatchery and Integrated Farm, Chandra Goldar Bari, Chandra, Jessore	Tel: +88-0421-67185; Mobile: +88-01711-210-707; 01711-375-413

REVISED WORKPLAN OF THE PROJECT (MAY 2014 – APRIL 2016)

OUTPUTS/ACTIVITIES	YEAR 1												YEAR 2											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Output 1: Improved broodbanking pilot project for Indian major carp species in two (2) selected government hatcheries established.																								
Activity 1.1: Survey a sample of the DoF hatcheries and prepare a strategy to upgrade their facilities for broodbanking.																								
Activity 1.2: Develop a management plan for broodbanking programme and train the staff on the concept and mechanics of the programme																								
Activity 1.3: Upgrade the facilities needed for broodbanking in the participating farms.																								
Activity 1.4: Initiate the pilot-scale operational activities on improved broodbanking programme.																								
Output 2: A pilot-scale selective breeding programme in one government seed multiplication farm/hatchery is developed and initiated.																								
Activity 2.1: Select one government hatchery to participate in the programme.																								
Activity 2.2: Develop the selective breeding programme procedure and train and orient the staff of the participating hatchery.																								
Activity 2.3: Upgrade the proper facilities and equipment needed for the selective breeding programme.																								
Activity 2.4: Initiate a pilot-scale selective breeding programme for a selected species.																								
Output 3: A comprehensive long-term selective breeding programme of Indian major carps and other selected aquaculture species (e.g., Chinese carps, Nile tilapia and striped catfish [Thai pangas]) is prepared.																								
Activity 3.1: Survey and assess the current status of brood stock in the selected hatcheries with respect to genetic integrity.																								
Activity 3.2: Prepare a comprehensive long-term selective breeding programme for identified priority culture fish species.																								
Activity 3.3: Develop a national action plan to support the implementation of the selective breeding programmes.																								
Output 4: A set of operational guidelines for implementation of the Fish Hatchery Act and Rules is developed.																								
Activity 4.1: Review the Fish Hatchery Act and the rules in consultation with DoF and other stakeholders and propose potential amendments/revisions for consideration																								

Activity 4.2: Develop the implementation guidelines through consultation with DoF, hatchery and nursery operators and other relevant stakeholders.																								
Activity 4.3: Review the current requirement for hatchery registration (i.e., standard and process of for hatchery and suggest any required modification.																								
Output 5: Human capacity of private and public hatcheries for breeding and hatchery management and operation is enhanced.																								
Activity 5.1: Develop the Better Hatchery Management Practices (BHMP) guidelines.																								
Activity 5.2: Train ninety (90) selected hatchery technicians (government and private) in BHMP.																								
Output 6: The National Fish Seed Producer Association (NFSPA) is strengthened.																								
Activity 6.1: Review the capacity and function of NFSPA.																								
Activity 6.2: Prepare recommendations for strengthening capacity and function of NFSPA and promote it for adoption.																								
Output 7: A set of operational guidelines for the implementation of Fish Feed and Animal Feed Act and Rules is developed.																								
Activity 7.1: Review the Fish Feed and Animal Feed Act, 2010 and Rules in consultation with DoF and other stakeholders and propose potential amendments/revisions for consideration as required.																								
Activity 7.2: Develop the implementation guidelines through consultation with DoF, feed ingredient supplies, feed manufacturers and traders, and other relevant stakeholders.																								
Output 8: A pilot-scale feed quality analytical laboratory (proximate composition) is established in DoF and a feasibility study of a country-wide feed quality analytical service is completed and a proposal of setting up of a full-fledged analytical service is developed.																								
Activity 8.1: Identify and select a suitable existing facility for upgrading into a feed analysis laboratory, develop analytical protocols, select and designate suitable technical staff.																								
Activity 8.2: Train technical staff and commission the laboratory.																								
Activity 8.3: Conduct a feasibility study for a country-wide feed quality analytical service and develop a proposal of setting up of a full-fledged service in the country.																								
Output 9: Inventory of all feed additives being used in the country and a review of their efficacy are completed and findings are disseminated.																								
Activity 9.1: Design a survey on the use of feed additives throughout the country.																								
Activity 9.2: Conduct the survey throughout the country using structured and semi-structured questionnaire on the use and perceived efficacy of feed additives in aquaculture.																								

Activity 9.3: Analyze the survey data and prepare the report and disseminate the findings to different stakeholders.																									
Activity 9.4: Where appropriate propose recommendations for inclusion into feed rules.																									
Output 10: Capacity of feed producers is improved.																									
Activity 10.1: Develop a better feed production guidelines / manuals appropriate.																									
Activity 10.2: Develop a training course based on the guidelines.																									
Activity 10.3: Train selected 120 feed producers in better feed production.																									
Output 11: The Feed Producer Association of Bangladesh (FBAB) is strengthened.																									
Activity 11.1: Review the capacity and function of FBAB.																									
Activity 11.2: Prepare recommendations for strengthening capacity and function of FBAB and promote it for adoption																									
Output 12: A study and proposal for credit facility for small-scale farmers, hatchery operators and feed producers is developed.																									
Activity 12.1: Study investment and operating constraints and the financial facilities available for small-scale farmers (hatchery and grow out) and feed producers and provide recommendations to DoF.																									
Activity 12.2: Develop enterprise management cases of hatchery operators, feed manufacturing enterprises, seed nurseries, and grow-out farm.																									
Activity 12.3: Include this output in the better practices training workshops.																									
Project coordination and management																									
Inception workshop																									
Terminal workshop																									
Final reporting																									

SECTION II

Speeches and Presentations

Inception Workshop on
Enhancing aquaculture production for food security and rural development through better seed and feed production and management with special focus on Public-Private Partnership

Venue: Lakeshore Hotel, Road 41, House 46, Gulshan – 2, Dhaka
Date: 28 May 2014

Speech by Honorable Minister, MoFL

- Chair of the session, Syed Arif Azad, Director General, Department of Fisheries
- FAO Representative in Bangladesh Mr Mike Robson
- Representative from FAO Headquarter, Rome, Italy
- Representative from FAO Regional Office, Bangkok, Thailand
- Representative from WorldFish, Bangladesh
- Representatives from ERD, MoFL, DoF, FAO, BSFF and Distinguished Guests
- Ladies and Gentlemen

Assalamualikum and very good morning

At the very beginning, I would like to express my gratitude to the organizers for giving me the opportunity to be here as Chief Guest. It is of great pleasure to know that our long-trusted development partner FAO has taken necessary initiatives to address the emerging issues in fisheries sector, especially on seed and feed. I hope such initiatives will help-support for ensuring good quality seeds and feeds at growers' level.

Bangladesh, being one of the world's leading fish producing countries with a total production of 3.41 million tonnes in 2012–13, where the aquaculture production contributes around 55 percent of the total fish production. During the last five years the growth rate of this sector is about 5.5 percent. At present Bangladesh is ranked 5th in world aquaculture production.

Ladies and gentlemen
You will be happy to know that, this fast growing sector contributes 4.37 percent to our national GDP and almost one-fourth (23.37 percent) to the agricultural GDP. This sector performs the highest GDP growth rate (5.52 percent) in comparison to other agricultural sectors – crop, livestock and forest. Fish alone is supplementing about 60 percent of animal protein in our daily dietary requirement. Fisheries sector has been earning a notable amount of foreign exchange. Moreover, expansion of the fisheries industry is also viewed as an important means of creating employment. During the recent past years this sector creates employment on an average 0.6 million people per year. At present more than 11 percent of the total population directly or indirectly involves with this sector. Probably, fisheries sector is the country's largest employer after agriculture.

Dear participants
Fish production largely depends on the availability of good quality seeds irrespective of farming systems. In the early days of aquaculture practices seeds were collected from the wild sources. The major

dependence on nature for the supply of seeds has been gradually replaced by hatchery produced seeds with the rapid expansion of aquaculture and to address the increasing gap between the demand and supply of fish seed. This has led to the establishment of almost 1 000 carp hatcheries in both public and private sectors across the country. As a result, the hatchery production of spawn has increased from around 5 thousand kg in 1985 to 500 thousand kgs in 2013.

Induced breeding techniques of cultured species through low cost hatchery designs have been successfully adopted in Bangladesh from mid-70's. Now the availability of fish seed is no more a problem in Bangladesh. It is assumed that the produced finfish fry/fingerling and shrimp post-larvae are almost sufficient for aquaculture. It is a good sign as a whole for aquaculture industry but the deterioration of quality at the same time is a great threat to its speedy development. The most common complaint is that the hatchery-produced seeds now-a-days are not performing well as it did in the early years of hatchery production.

Ladies and gentlemen
On the other hand, good quality fish feed is one of most important production input for sustaining aquaculture production, especially in semi-intensive and intensive farming practices. But now-a-days, the availability of good quality fish feed, feed ingredients and feed additives/chemicals at growers' level have become a severe problem for this fast growing aquaculture industry. Moreover, food safety issues are also directly related with the quality of feed ingredients and feed additives/chemicals.

To address the prevailing situation, the government has already enacted Fish Hatchery Act 2010, and Fish Feed and Animal Feed Act 2010. Following the acts, Fish Hatchery Rules 2011, and Fish Feed Rules 2011 have also been duly passed by the Ministry of Fisheries and Livestock. Under these acts, the registration process is in progress.

Dear participants
I do hope and expect that the relevant hatchery owners, feed millers, entrepreneurs, importers and exporters will be directly involved in the implementation process. In the process of Fish Hatchery and Fish Feed Act implementation, existing good collaboration among the relevant agencies is expected to be strengthened. Development partners may facilitate the process by ensuring additional supports. At the same time from this inception workshop, the challenges of ensuring good quality seeds and feeds at growers' level will be identified and by addressing the issues future action plan will be developed.

Before I conclude, I am again expressing my heartfelt thanks to the organizers, who are working on this demand driven important issues.

Thank you all