A PROFILE OF
AGRICULTURAL ADVISORY SOCIETY (AAS)

Agricultural Advisory Society (AAS)

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Table of Contents

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Background of AAS

The AAS Approach to Agricultural Development: AAS has, from its earliest days, approached the challenges of agricultural development in Bangladesh from the perspective that Bangladesh, after all, is a rich country, blessed with abundant agricultural resources, (i.e., fertile land, plenty of low cost farm labor and abundant reserves of easily available, continuously renewed fresh water). AAS believes that Bangladesh's endemic poverty is simply a reflection of its lack of capacity to effectively manage its rich endowment of agricultural resources. Furthermore, the nation has been too slow in developing its agricultural production capacity. Accordingly, AAS has focused its available energies on helping Bangladesh's farmers to become more productive; to, in the context of their rich land, small plots, plentiful labor resources and abundant supplies of fresh water, substantially increase their output.

AAS's sustainable agricultural development strategies are focused on:

- **Modifying traditional agricultural practices to accommodate higher yielding production**
- **Advocating the use of sustainable intensive cropping, fishery and livestock production strategies**
- **Using field based demonstrations to model " a higher standard of best practice"**
- **Popularizing its strategies through a network of community based partners**
- **Using state of the art training modules: Participatory Rural Appraisal (PRA), Farmer's participatory training (FAMPAT) and Focused Group Discussions (FGD) to overcome knowledge and skill deficits**
- **Sustainable technology transfer through validated uptake pathway with reliable service providers and unique extension methods along with farmers' participatory approaches on the incentive basis for the involved actors and players**
- **Emphasizing poverty alleviation, gender equity and environmental preservation**
- **Promoting participatory approaches at every stage of project planning and implementation**

Bangladesh has traditionally been a rice-based society; indeed, it remains so today. Now that the country has reached food-grain self-sufficiency, thus AAS is pioneering the introduction and popularization of high value, non-rice and specialty-rice crops along with their sustainable production practices including in-field irrigation technique. AAS has made a material contribution to the introduction and popularization of new, higher yielding strains of well-known vegetable, fruits, spices and specialty rice varieties. Through its demonstration based training programs, AAS has helped small plot cultivators adapt their farming practices to accommodate the requirements of higher value, higher yielding crops, fishery and livestock. AAS is using state of the art training and participatory demonstration methodologies to accelerate the uptake of promising new varieties and improved agricultural technologies all over Bangladesh including coastal and coastal chars. Accordingly, AAS's agricultural programs have materially affected the

capacity of Bangladesh's small plot farmers to increase their wealth on the basis of a more efficient use of their quite formidable resources. Their results have been impressive.

Vision

To promote sustainable, high value agricultural production strategies in order to improve the livelihood of Bangladesh's rural poor

Mission

To create wealth in the hands of small and poor farmers, by imparting needed agricultural skills; by demonstrating innovative ways to use and apply these skills and by opening new channels of access to the high value cropping inputs that are such a vital aspect of high value cropping outputs.

Background of AAS Establishment

The idea of establishing an agricultural NGO to provide quality technical support to other, more generic NGOs; developing their capacity in the field of agricultural was first mooted by a group of prominent professionals including Dr. David Gisselquest, Mr. Harun-Ar-Rashid, Dr. A.J.M Azizul Islam, Mr. William H. Derrenger, Dr. Humayun Kabir and Dr. Tariful Islam in 1989. With this end in view, this group formed a non-profit, non-political, rural service provider and civil society organization called Agricultural Advisory Services. To meet government and registration requirements the name was later changed to Agricultural Advisory Society (AAS) from January 1991.

Since its inception, AAS has implemented a numerous projects to alleviate poverty among the resource poor and small farmers of Bangladesh. AAS has been working as a bridging organization for technology transfer between farmers, Partner Organizations (POs), input/output traders and companies, the department of Agricultural Extension (DAE), other research institutions (e.g. BRRI for rice technology, BARI for non-rice crop technology, etc) and public inputs suppliers (BADC as a source of foundation and certified seed)

Achievements of AAS

The major activities and achievements of AAS since it's founding in 1989 are as follows:

AAS working areas and infrastructures

Since its inception, AAS has implemented a numerous projects to alleviate poverty and to ensure the food security among the resource poor and small farmers of Bangladesh. Thus AAS has been implementing its project activities at about 680 villages in more than 320 unions under more than 134 upazilas of 36 working districts with about 115 partner NGOs within four working zones (Northeast, Northwest, Southcentral and Southwest) of the country during last more than 10 years. Since inception, AAS has been established offices and relevant infrastructures (Training centers, IT centre, fish hatchery etc) in the three working zones to implement its project activities at the grassroots levels. Working areas of AAS and involved PNGOs are provided in Annex. I.

AAS Partner NGOs Network

AAS has historically implemented its rural based, agricultural productivity enhancing projects through its large network of rural based Partner Organizations (NGOs/CBOs). AAS has been strengthening and expanding its "partner NGO network" all over the country since 1989. At the beginning, a total of 23 national and international NGOs were involved with AAS partner NGO network during 1989-90 under funding support from USAID (PRIP/PACT). At present more than 100 NGOs directly and indirectly are involved with AAS partner NGO network. Moreover, 200 NGOs were involved for implementing AAS developed intensified crop management strategies with their client resource poor farmers in 3 working zones (Northwest, Northeast and Southwest) during 1996-2004. A total of 125 AAS partner organizations (NGOs and CBOs) were responsible for implementing IRRI/PETRRA/DFID funded thirteen sub-projects/activities in 62 upazilas of Moulvibazar, Habiganj, Sylhet, Sunamganj, Rajshahi, Chapai Nawabganj, Natore, Pabna, Sirajganj, Bogra, Naogaon, Jessore, Jhenaidah, Kushtia, Magura, Rajbari, Faridpur, Gopalganj, Mymensingh, Jamalpur, Gaibandha districts under the umbrella network of AAS during 1999-2004. A total of 91 partner organizations received training on sustainable FARMSEED strategy for its implementation with their partner resource poor farmers in three working zones. Total of 36 AAS partner NGOs were developed a partnership network all over the country in 3 working zones for extension of intensive pond carp poly-culture and fish fingerling production and distribution under donor support. Oitijhya network of 22 member NGOs of was developed in Satkhira, Khulna, Bagerhat and Pirojpur districts of southwest coastal region for scale-up salt tolerant rice variety through FARMSEED approach under the funding support from IRRI/BMGF during 2008-2010.

One of AAS's great strengths is that it is able to work through a large network of experienced grassroots partner organizations. Large number of the skilled staffs established relevant infrastructures and sufficient micro-credit of the members of AAS partner NGO Network are the foundation strength of AAS to implement the suitable project activities on the cost-effective basis. Accordingly, AAS, being a relatively small organization itself, is able to cast a very big shadow over a large area. AAS could have such an impact on the basis of its own resources alone. Rural youth groups, women groups, CBOs and local NGOs representing diverse rural constituencies are all part of the AAS-Partnership Network. Accordingly, AAS gains strength from its network partners. On the other hand, AAS maintains close and congeniall relationships with a large number of public sector and international organizations that have solid agri-technical credentials. These include IRRI, BRRI, BARI, BARC, BADC, DAE, BARD, CIMMYT, FAO, CABI, Rutgers University, JOBS, BMGF, IFAD, GROSS, DFID, EU, RDA, IFPRI, AA and others with whom AAS maintains and sustains long-term collaborative relationships.

AAS partner Community Based Organizations (CBOs) network

People living in a particular area or place (e.g. a village or part of village or part of town or more than one village) irrespective of religion, caste, or of ethnic origin of being tribal or aboriginal, who interact in their daily life with each other is called a "Community". Inside such a community people generally have more or less similar occupation, culture and common interests, condition of sharing or having things/issues in common, and being alike or together in some ways for the interest of the community. .In Bangladesh CBOs have existed for a long time in rural and urban areas. These are either formal or informal organizations in the communities who act together towards a common goal in order to realize common interests and operate in an institutional manner. Various CBOs in rural areas in Bangladesh include cooperative societies, IPM Club, Integrated Crop Management (ICM) Club, Sport Club, Youth Club, Agriculture association, Landless association, Farmers association, Water user association, Irrigation Club, Farmer

group, Krishok Samobay Samity (KSS), Milk cooperative Society, Fishermen association among others. Both formal and informal CBOs are active in the rural communities with various kinds of activities. A number of them are playing important roles in different agricultural activities including dissemination of agricultural technologies in a cost-effective manner.

Poverty Elimination Through Rice Research Assistance (PETRRA), a Project of IRRI funded by DFID has used CBOs for implementation of a large number of sub-projects during 1998-2004 with various organizations including Agricultural Advisory Society (AAS). On the basis of the findings of AAS and other involved organizations, PETRRA concluded that working with CBOs are more cost-effective and successful than NGOs, especially with small fund resources (Mele, P.V. et.al. 2005 and Rashid, H. 2004). AAS was developed a CBOs network with about 250 CBOs during 2008-10, of which 152 CBOs were active under the funding support of STRASA, a project of IRRI funded by BMGF in southwest coastal region. Out of these active 152 CBOs, 75 CBOs in Satkhira, 42 in Khulna and 35 in Bagrehat are invovled with the network for implementation of scale-up salt tolerant rice variety through FARMSEED. Out of these 152 CBOs, 102 are IPM/ICM clubs, 39 Samobay Samity and 11 are community clubs.

Farmers' group formation

AAS farmer-groups are formed mostly among resource poor farmers as informal agricultural production groups. These grass-root groups are committed to creating their own wealth by using AAS's sustainable and intensive agricultural production strategies and techniques. AAS has organized a total of more than 800 farmer groups including 180 female groups comprised of more than 30,000 resource poor farmers since its founding in 1989 in the four working zones in the country. Each group is formed with an average of 25 interested and motivated farmers with atleast one selected coordinator. To implement the activities of projects / programs and approaches, AAS is formed farmers groups in collaboration with PNGOs in its working areas.

Developing the skill and capacities of partner farmers

AAS has been used its network of field based demonstrations in combination with state of the art of training modules to enhance the skill and capacity of more than 30,000 farmers to adapt a wide range of sustainable, high value, intensive agricultural practices. Most of participating farmers are classified as “resource poor“, and as such are the ongoing partners of AAS and its partnership network. The skills and capacities of all its partners are being developed through the practical participatory training and motivational actives sponsored by various donor funded projects and agencies since 1989.

Building the capacities and skill of its partners

AAS has been conducted a series of agricultural training programs for the benefit of more than nine hundred staff of AAS and its partner organizations (NGOs & CBOs) along with relevant public sector organizations and private sector players since its founding in 1989. AAS devotes substantial resources to strengthening and expanding its network of partner NGOs and CBOs in the country. At present besides CBOs, more than 100 local NGOs make up the “AAS Partnership Network” in its working zones in the country.

Technical support to NGOs

During 1989-90, AAS trained about 200 Staff of 23 NGOs including RDRS, CARE, CCDP, Wold Vision-Bangladesh, IDE, PROSHIKA, GK etc on nursery and orchard management, Agro-forestry and sustainable irrigated intensified cropping strategy under the funding support from

USAID (PRIP/PACT). Principal objective of initiative was to develop skill and capacity of the NGOs in the field of high value year round crop production including plant nursery and horticultural orchard. Practical field based training for the agricultural staff of 23 NGOs on nursery and orchard management, Agro-forestry and sustainable irrigated intensified cropping strategy was the foundation initiative for the involved 23 NGOs at beginning of AAS emergence in 1989. About 600 mini-nurseries and 250 small-scale orchards were established with skilled farmers of the trained NGOs in their working areas under the technical supervision of AAS during 1990-91. It was particularly a strong founding contribution of AAS in early stage of private nursery flourishing in the country. Moreover, thousands of trained and motivated farmers of trained partner 23 NGOS were able to grower .more than 20 high value cash crops in their small plots attached and outside of the homestead in the community. Such kind of technical support through NGOs network innovative drive was undertaken by Harun-Ar-Rashid, Executive Director under direct advice and supervision of the founder instigator, Dr. David Gisselquist of AAS. AAS has established more than 1000 small scale orchards with high value fruits such as Mango, exotic Jujube, Litchi, Sapota etc with trained and motivated farmers (fruit growers) since in 1989. AAS was played a great role in introduction of exotic Jujube cultivars through various initiatives including first demo orchard at Bonpara, Baraigram, Natore.

Exotic Jujube extension

AAS was introduced exotic Jujube cultivars (Taiwan Kul, Thai 1&2 Kul, Chinese Kul, Burmese Kul and Apple Kul) since 2005 through various initiatives including establishment of demo. orchards in collaboration with Modern Horticulture Center (MHC) in Natore district. One of the first demo Orchard on Taiwan Kul was established at Bonpara, Boraigram, Natore with Mr. Kolam Tar Ali, an innovative person in 2004. There was large scale media coverage (TV channels, Newspaper etc) on this successful demo. orchard during harvesting of fruits (January-February 2005) of Jujube. Accordingly, information on the success of exotic jujube cultivation spreads all over the country within shortage possible time due to large scale media coverage (TV, Newspaper) on the AAS established first demo. orchard at Bonpara, Baraigram, Natore. AAS provided practical training on improved jujube orchard establishment and management among more than 500 interested farmers and elite orchard owners in southwest and northwest regions in country during 2004-2011. Training follow-up in field technical services provided by AAS's practical horticulturists during jujube orchard establishment and post management practices. AAS conducted research on Nut weevil of jujube and Tube Spittle Bug under the leadership on Dr. Z.H. Prodhan, Entomologist and scientific collaboration with CABI, UK. On the basis of research findings, AAS published two fact sheets on Nut weevil of jujube and Tube Spittle Bug for distribution among the owners of jujube orchards in Natore, Pabna and Rajshahi districts. AAS also established a whole sale market at Bonpara more, Baraigram Natore as a hub market for marketing the jujube all over the country in collaboration with lead jujube orchard owners, local elites at Bonpara market.

Banana production and marketing

Commercialized Banana production and marketing, as a high value cash crop is the central activity of AAS under its uptake of high value crop varieties and sustainable intensive cropping strategies. AAS has introduced AAS Sagar-1 (Known as Ranggin Mehar Sagar in greater Rangpur district) and Meher Sagar of Banana through demonstration as a high value cash crop for resource poor farm families in its working zones since 1989. About a million suckers of AAS Sugar-I, Meher Sagar and Amrita Sagar cultivars distributed among the banana growers during 1989-2004 within and outside of the AAS's working areas. AAS has also been introducing its own developed improved production and post harvest practices of Banana among the banana growers in the country.

Commercial intensive crop production management

The central activity of AAS is the establishment and operation of its commercial intensive crop production management demonstrations on demand driven and incentive basis. For commercial purpose, AAS established intensive crop production partnership with more than 1000 resource poor farm families (Small, medium and marginal), input suppliers, middlemen, POs and DAE representatives in the country during 1996-2000 under the funding support from ASSP/DFID/DAE. AAS mobilized its own resources and resources its partner farmers for the commercialized crop production with more than 20 high value cash crops. The performance of AAS's commercialized crop production management system was found mixed in its different working areas. AAS staffs were fully able to administer the commercialized crop production management feature of the revolving fund scheme. They were able to do this on behalf of the participating farmers, the input and revolving credit suppliers and the middlemen who purchase the crops produces. The major frustration was found to collect the revolving fund from the partner resource poor farmers by the salary based field staff of AAS without establishing of the credit management system.

Pilot revolving fund management scheme

AAS had shown that small plot cultivators, given systematic access to essential crop production inputs, were successful in alleviating their poverty. AAS's crop production financing capacity was enable for small plot cultivators to purchase necessary inputs gradually and use appropriate practices for yield and incomes. Agricultural advances disbursed to individual participants who form themselves into AAS supervised production/marketing groups within the command areas of each demonstration cluster. The loan sanctioning/collection authority was with the concern AAS crop production supervisor. The crop production supervisor managed advances and collections within the commend area of each cluster. For farmers' accepted crops, a total of Tk. 25,65,250 revolving fund was mobilized among more than 1000 trained participating farmers. However, AAS's experience with managing the revolving fund was found frustrating due to lack of established credit management system with the involved partner resource poor farmers in the working areas.

Homestead garden plots establishment

AAS established 256 organized and protected homestead garden plots during 1996-2000 within the working zones of AAS under the funding support from ASSP/DFID/DAE. The farmers' response was found poor about the exotic, organized and protected homestead garden establishment. As a result involved farm families were reluctant to invest the time and resources necessary to sustain AAS's homestead gardening demonstrations. However, AAS is committed to make efforts to meet its homestead gardening commitments by concentrating its efforts on extremely high value crops for short duration on a year-round basis within and attached small plots of AAS trained farm families.

Nursery and orchard strategy

During 1996-1999, AAS established about 300 commercialized private nurseries with skilled farmers including resource poor farmers of 32 partner NGOs in 15 districts of three working zones of AAS in the country. AAS trained total of 58 staff of 32 members of AAS partner NGO network under the funding support of ASSP/DFID/DAE on plant nursery and horticultural orchard establishment, operation and management during 1996-1999.

Uptake of high value crop varieties

AAS, where appropriate, introduces new, high value cash crops and accompanying production packages. More than 90% of these available high value crop varieties and production packages were demonstrated through AAS partner farmer/partner organizations. Of these, more than 50 crops and associated production packages were accepted by farmers at the field level and reached a high level of commercialized of production. The high value crop uptake process is participatory and is demand-led by the involved farmers under taken with several donors, seed companies, PNGOs support and resources also from AAS's own fund.

Uptake of sustainable intensive cropping

The central activity of AAS is to establish income generating, sustainable cropping systems on the basis of introducing high value cash crops. So far, AAS was established model on sustainable, intensive crop production systems among more than 30000 of its partner farmers. Specially, AAS developed the strategy on irrigated intensive cropping system in charland and its dissemination was under taken through AAS partnership network in Manikgonj, Mushigonj and Dhaka districts during 1989 under funding support from USAID (PRIP/PACT)/DSC. Selected Private Organizations were mobilized revolving working capital resources among them for the purpose of financing the cost for high value inputs.

Seed production and distribution

Quality seed / planting material production and distribution of different demand-led crops among its relevant skilled seed farmers and partners are the central activities of AAS. AAS produces and distributes seed planting material of more than twenty different inbred and hybrid crops. Thus demand-led crop seed production and distribution systems and strategy were established in the AAS working areas. AAS has also developed contract farming system for production seed of rice and non-rice crops in southwest and northwest regions for private seed companies and dealers. Moreover, AAS developed contract farming system for seed production of rice and non-rice crops in southwest and northwest regions for the private sector seed selling agencies in the country. AAS has also developed F_1 rice hybrid seed production management system for private agencies. A draft practical manual on F_1 hybrid rice seed production was developed by AAS during last 2009-10 Boro season. Further, improvement will be done on the manual for distribution among the F_1 rice seed production agencies in Bangladesh.

Irrigation system development

AAS has many successful experiences with the introduction, demonstration and operation of minor irrigation systems in the country and has played a vital role in irrigation system development in Bangladesh. AAS has been working on command area development of irrigation equipment (STW, DTW etc) with irrigated intensive cropping system in the country. AAS has published several manuals on “irrigated intensive crop production management systems”. AAS has established irrigation systems with low cost-effective difficult water table/aquifer condition in the country.

Promoting micro-nutrients in crop production

Besides fertilizer management, AAS, through field demonstration and linkages with suppliers, was undertaken the initiative for promoting the effective use of several essential micro-nutrients including boron and zinc as essential micro-nutrient supplements for high yield crop production in specific nutrient deficient areas during 1989-2004. AAS also published two compendiums on Boron and Zinc management in crop production during 1995-96.

Aquaculture management program

AAS has been operating its fish hatchery at Alampur, Kushtia with trained fishermen and fish farmers on contractual agreement. Under such sub-contract system, about 500 Kg of quality hatchlings of seven different carps produced and distributed every year since 1996. AAS developed intensive fish fingerling and carp poly culture production and marketing strategy for the fish farmers and fishermen in Southwest Bangladesh.

Arsenic hazard abatement

The water of 9853 tube wells (mostly HTWs) at 112 villages in 25 upazilas of Faridpur, Jessore, Satkhira, Kushtia, Jhenaidah, Magura, Gopalgonj, Chuadanga, Meherpur, Kishoregonj and Rajbari districts were for Arsenic contamination by AAS during 1995-2001 using resources from AAS own fund. A total of 520 new arsenic free HTWs for drinking water were installed through changing well depth with the support of Krishok Bandhu Agro-System Ltd (KBAL) and world vision-Bangladesh. A total 173 HTW installers, 429 civil society members, journalists etc were trained on arsenic hazards and its adaptation and mitigation methods. AAS implemented a project on Arsenic in the food chain: Assessment of the water-soil-crop systems in Rajshahi and Chaipai Nawabganj districts in collaboration with BAU, Mymensingh and BRRI, Gazipur under funding support from PETRRA/IRRI/DFID. The project has generated several relevant findings related to Arsenic in the food chain. AAS participated in conducting workshop and publishing the proceedings of the workshop on Arsenic in the Food chain: Assessment of Arsenic in the water-soil-crop-systems held on 22 July 2004 in Dhaka.

Road safety program

AAS played facilitating advisory role in developing an NGO network for implementing programs appropriate to making our roads safer. AAS actively participated in the NGO network on road safety under the umbrella organization of IMCT. AAS was assigned to coordinate Dhaka Division of the Network, Road safety and Executive Director, AAS was actively involved as a national Advisor of the network (Road safety) during 1999-2001.

Post flood rehabilitation program

AAS was involved in post flood agri–rehabilitation programs of 1998 and 2004 devastating floods under direct funding support from DFID-Dhaka/ASSP, DAE, PRISM-Bangladesh, Concern Bangladesh, GROS-Belgium and IRRI.

As per agreement between AAS and ASSP/DFID, AAS procurred a total of 25,171 kgs of Vegetable seeds (Lalshak 15384kgs, Spinach 7727kgs, Radish 522 kgs, Sweet gourd 769 kgs and bottle gourd 769 kgs) for distribution among the flood affected resource poor farmers of 65 ASSP partner NGOs to implement 1998 post flood agri-rehabilitation program. Under these collaborative efforts of AAS and KBAL with funding support from DFID/ASSP a total of 1,63,428 master packets of vegetable seeds were delivered to 65 ASSP partner NGOs and 16 partner NGOs of AAS partner NGO network.

AAS distributed a total of Tk. 15,50,000 as cash and a total 2500 master Packets (220 gm/Family) of vegetable seeds five crops in badly affected six thanas of Narsighdi, Kishoregonj and Gaibandha districts. Besides, this, AAS directly received 500 master packets of vegetable seeds and distributed among the flood affected 500 farmers at 50 Villages in 5 Unions under Sadar and Boalmari thanas of Faridpur district. Total of 9590 master packets (220gm/family) of five different vegetables seed were distributed among 9590 flood affected resource poor

farmers in Sirajgonj, Pabna, Gopalgonj, Dinajpur and Faridpur districts through 16 AAS partner NGOs of the network.

AAS also supplied 3000 master packets (92gms) of 6 differ vegetables seed to PRISM-Bangladesh. AAS provided field supervision after distribution of the seed among 3000 resource poor farmers of PRISM-Bangladesh in Manikgonj district.

As per contractual agreement with concern-Bangladesh, AAS supplied own produced quality 108 MT of certified potato seed (variety: Cardinal) to Concern-Bangladesh. This potato seed was distributed among the flood affected resource poor farmers in Faridpur, Pabna and Niphamari districts under post flood agri-rehabilitation programme of Concern-Bangladesh.

AAS distributed 2000 Kg foundation seed of BRRI dhan 28 and 29 for seed production (3 Kg/farmer/variety), 5000 Kg rice hybrid seed and 6000 Packets of vegetable seed (five crops) among the flood affected 11,700 resource poor farm families at about 250 communities of 36 POs as post flood agri-rehabilitation program during 2004-5 winter season in seven districts of Northeast, Northwest and Southwest regions of Bangladesh under the funding support of IRRI and GROS, Belgium of 2004 post flood agri-rehabilitation program.

Locally intensive farming enterprise (LIFE)

AAS has worked as a partner NGO (PNGO) to implement the LIFE project of CARE-Bangladesh funded by the European commission (EC) during 1999-2000. The LIFE project has implemented with about 2000 resource poor farm families (RPFFs) at 24 Villages in Sadar upazila of Kishoregonj and Nandail upazila of Mymensingh districts.

Performance of rice hybrids

Four rice hybrids-Aalok, Sonarbangla 1, Loknath 503 and Amarsiri-1 were permitted by GOB for commercial cultivation during 1998-99 Boro season based on the recommendation by the National Seed Board (NSB). Accordingly, Commercial Seed Companies-Advanced Chemical Industries (ACI), Ganges Development Corporation, Mallika Seed Company and McDonald Bangladesh Private Ltd-were permitted to important 2,200 metric tons of 4 rice hybrids seed from India (Aalok, Loknath 503 and Amarsiri 1) and China (Sonarbangla 1). Meanwhile, there were a lot of reports published in the daily newspapers in favour of or against each of large scale import of such hybrid rice seed without adequately verifying their adaptability under Bangladesh conditions.

Four rice hybrids (Sonarbangla 1, Amarsiri 1, Aalok and Loknath 503) along with BRRI Dhan 29 as check were assessed during 1998-99 Boro season with 50 farmers (33 farmers were reported) in 10 districts (Jessore, Faridpur, Narail, Norsingdi, Kishoregonj, Bogra, Gaibandha, Rangpur, Dinajpur and Jamalpur). Such assessment was conducted through field trial by Agricultural Advisory Society (AAS), as a third neutral party, under the guidance of Dr. A.J.M. Azizul Islam (Ex. DG, BRRI) and Dr. A.N.M Rezaul Karim (Ex. Director of Research, BRRI); under the supervision of Mr. Harun-Ar-Rashid, (Executive Director, AAS) with the objective to continuous assessment of rice hybrids available from commercial seed companies at the farmers' field at various locations of Bangladesh and feed back to the respective companies about the merits and demerits of their rice hybrids. Thus, in cooperation with the four involved seed companies, Agricultural Advisory Society (AAS) as a third neutral party assessed the performance of the four permitted rice hybrids during the 1998-99 Boro season in 10 districts. The average grain yield, yield contributing characters, field duration, important ancillary

characters and physic-chemical grain properties are collected, analysised and presented in the report. Overall, Sonarbangla 1, a Chinese rice hybrid performed better than the 3 Indian hybrids (Aalok, Amarsiri 1, and Loknath 503) and BRRI dhan 29, a local Inbred HYV. The study's findings were influential among private seed companies and NGOs. Subsequently, other private seed companies and BRAC, the largest NGO in Bangladesh, decided to important rice hybrids seed from China. Thus, the planted area of rice hybrids in 2007-8 is about 1 million hectares, mostly under Boro season in the country. Accordingly, such initiative was the foundation effort for introduction of rice hybrids in general and Chinese rice hybrids in particular in Bangladesh.

Rice yield maximization

The purpose of the farmer's participatory yield maximization of rice was to demonstrate, how resource poor farmers could maximize rice production with higher income from their small plots. Rice yield maximization trial was conducted with 560 resource poor farmers in seven districts of AAS working Northeast, Northwest and Southwest regions of the country in collaboration with three private seed companies, PNGOs and CBOs. Three tested high yielding rice hybrid cultivars (Sonarbangla-1, Hira and Aftab LP50) were used in participatory rice yield maximization trial during 2003-4 Boro seasons. The overall performance of rice hybrids was found tremendous and very much encouraging for the approach to replicate all over the country with all categories of farmers including resource poor farmers. The rice yield maximization trial was conducted by PETRRA/AAS staff using AAS own fund for implementation of the trial.

Field trial on short duration rice cultivars

Farmer's participatory field trial on three Nepalese short duration rice cultivars (Pant dhan 10, Judi 582 and PNR 381) was conducted during 2004-05 Boro seasons with 5 partner NGOs (PNGOs) in Moulvibazar, Habiganj, Jhenaidah, Sirajganj and Natore districts. This field trial on short duration rice cultivars was undertaken in collaboration with the centre for Arid Zone Studies-Natural Resources (CAZS-NR), University of Wales, Bangor, UK under a project on "Improvement of Rainfed Cropping Systems in the high Barind tract of Bangladesh", funded by DFID, UK. Three Nepalese short duration rice cultivars were tested against BRRI dhan 28 and Aftab LP 50 (F_1) at 6 communities in Northeast, Northwest and Southwest regions.

The paddy yield of three short duration rice cultivars failed to produce higher yield than BRRI dhan28. Growth duration of the three cultivars was found little higher than BRRI dhan28. Aftab LP 50 (F_1) produced significant higher yield than four short duration rice cultivars including BRRI dhan28 with very little higher duration.

Plant health management services initiative

Crop losses are increasing due to pests and diseases for rice and non-rice crops including high value vegetables, fruits and spices in Bangladesh. The scenario is further complicated by increases in the level of pest and disease infestation. In order to protect high value non-rice crops from pest and disease damage, farmers are day-by day becoming increasingly dependent on the frequent use of dangerous and highly toxic pesticides. Moreover, pesticide adulteration is an increasingly common experience among the farmers. In general farmers' knowledge about crop health relating to insects, diseases and soil problems is minimum. Accordingly, AAS was undertaken an initiative to address the sustainable plant health management services in collaboration with farmers and their relevant service providers in 2004 with the funding support of CABI Bioscience, UK.

(a) Participatory Qualitative Survey

AAS implemented a participatory qualitative survey under a project on plant health services initiative (PHSi) with financial support and technical guidance from CABI Bioscience UK in 30 villages of Natore, Norsingdi and Moulvibazar districts during 2004-5. The project developed an effective plant health management system for providing a better flow of information about diseases and pests to the scientists, researches and extensionists in the country. In this regards, the project prepared 5 reports, of which 3 seasonal reports, 1 summary report and local knowledge of plant health in Bangladesh by the end of the one year initial project cycle.

(b) Plant Clinic Operation

To understand plant health problems and their management strategies from the participatory qualitative survey, AAS has undertaken initiatives on plant health management in collaboration with CABI, UK since 1 September 2005.

The plant clinic is a centre where investigation and diagnosis of plant health problems can be undertaken and advice on control measure administered. It can also provide a base for doing survey of crop health problems and farmers' need and as an information centre for extension service providers and farmers. The plant clinic is a new approach for providing effective plant health services on plant health problems to farmers. The plant clinic approach has been introduced for the farmers in Baraigram upazila of Natore district of Bangladesh by AAS in collaboration with CABI, UK since 1 September 2005. In view of the objectives of Global Plant Clinic (GPC), AAS has established a network of 13 model plant health management permanent plant clinics to ensure better plant health management services among the farmers in Baraigram upazila of Natore district, so that they can enhance their crop production, reduce cost of crop production by avoiding the frequent use of chemicals, increase their income and remove the risk of crop failure due to the pest and disease infestation and finally, they save the environment from pollution.

Besides operation of the permanent plant clinic, AAS has undertaken for piloting on four extension methods such as (i) mobile plant clinic (open), (ii) mobile plant clinic (fixed), (iii) going public and (iv) plant health camp with more than 15 relevant agricultural extension service providers (AESPs) to ensure better plant health management services to the farmers in Natore district and to some extend surrounding districts of Natore under the funding support from CABI, UK. Assigned project plant doctor (Pathologist/Entomologist) is solely responsible in collaboration with community plant doctors (CPDs) from involved AESP in operation of permanent plant clinics and piloting the extension methods for better plant health management services in Natore district and its surrounding districts under the overall technical support from highly experienced plant health specialists (Pathologist/Entomologist) in the country. By the end of 2013, AAS has provided about 20,000 prescriptions among the client farmers through investigation and diagnosis on the plant health problems in Natore and other districts. However, AAS developed a plant health management service model with four approaches, selected AESPs (giving emphasis on inputs dealers) and prepared few hundred fact sheets on plant health management for more than 30 crops. Based on the success, AAS has intends to scale-up the most effective method(s) in the other parts of the country.

(c) Community Plant Doctors (CPDs) training

AAS has organized total of 4 training courses on plant health management ((Pathologist and Entomologist) services for the involved CPDs of the 13 plant clinics network in Baraigram upazila of Natore district during 2009-12. Reputed plant health specialists ((Pathologist and

Entomologist) conducted the training courses (Theoretical and practical) and each trained CPDs received a certificate from AAS.

(d) Plantwise

Asia plantwise summit 2012: CABI UK organized Asia plantwise summit 2012 on plant clinics today and plant health tomorrow at Shankor hotel in Kathmondu, Napal during 14-16 March 2012. The purpose of the summit was to learn what existing initiatives have done and to plan further activities and strategy on plant health management initiatives under plantwise of CABI, UK.. Dr. Asadur Rahman, plant health specialist of BSMRAU attended in the summit on behalf of Agricultural Advisory Society (AAS) and he presented AAS's achievement and future scale-up strategy on plant health management services initiative of AAS in Bangladesh. He also distributed various reports and document of AAS on plant health management initiative as soft copy DVD and hard copy among the participants of the summit.

Plant doctor training: Total of six persons (one AAS staff and 5 CPDs) received training on module 1-3 of plantwise at Bangladesh Agricutural Research Council (BARC), Farmgate, Dhaka at two batches during 26-30July 2012 and 7-10 October 2012. Dr. Jeffery Bentley & Dr. Steve Edgington were the resource persons from CABI, UK for the training on module 1-3 of plantwise and training was conducted under the overall supervision of the chairman, BARC and National Coordinator of CABI, Bangladesh.

New plant clinic establishment under plantwise: AAS has established six new plant clinics under plantwise in Jessore sadar, Jhikorgacha and Bagerpara upazilas of Jessore district and Mr. Fazlur Rahman, Zonal Coordinator, AAS was responsible for the plant clinic network establishment in Jessore district during August-September 2012. He selected 12 community plant doctors (CPDs) for six established plant clinics and 40 community coordinators from surrounding 40 communities of six plant clinics. Selected 12 CPDs and they the owners of pesticide shops at the six market places. Each plant clinics were surrounded by several communities where high value cash crops including cut flowers are grown in large scale with existing marketing channels throughout the country including Dhaka urban and up-scale urban markets.

(e) Experience sharing between AAS and BCRL

There was an experience sharing visit initiative between Bio-Control Research Laboratries (BCRL) of Pest Control India (Pvt) Ltd. AAS and BCRL along with production, quality control, field performance, promotion, adaption and commercialization of Bio-control products of BCRL in India and those marketing prospect in Bangladesh. In this experience sharing visit schedule Dr. Malvika Chaudhary, Senior Manager, BCRL visited Bangladesh during 4-9 December 2011 and Harun-Ar-Rashid, Executive Director, AAS visited Bangalore, Karnataka, India during 13-20 January 2012.

(f) Fact sheet

A total about 220 fact sheets (draft & final) on the demand-led plant health problems have produced for distribution among the CPDs of AAS plant clinics, lead farmers and relevant users in the country. Such demand-led fact sheets development process has been undertaken from beginning of the plant clinic operation during 2005. Fact sheet preparation design was finalized on the basis of suggestions and recommendations from farmers, extensionists and plant health specialists in the country.

AAS-PETRRA Project Activities

AAS implemented 13 PETRRA (a DIFD funded project of IRRI-BRRI) funded sub-projects/activities with more than 25,000 resource poor farmers (RPFs) through more than 750 resource poor farmer groups (RPFGs) of 74 partner organizations (POs) and 60 CBOs in 22 districts of Bangladesh. Findings of the PETRRA funded sub-projects are available for dissemination among the targeted farm families with the leadership of the skilled group coordinators of the trained partner organizations (NGOs/CBOs) under the supervision of AAS as a technical apex organization. The AAS-PETRRA project activities and their brief achievements are as follows:

Strengthening FARMSEED extension method: The sub-project has been implemented in 246 villages of Kishoreganj, Habiganj and Moulvibazar districts with around 331 groups including 84 female groups in collaboration with 31 partner organizations (NGOs/CBOs). More than 2,000 resource poor farmers from 161 villages have been trained and enlisted as "Truthfully labeled seed producers" by the FARMSEED network. As a result, the overall rate of FARMSEED exchange in the sub-project area has steadily increased from about 4.5% in the year 2000 to more than 35% in 2004. AAS has been implementing the FARMSEED strategy in Natore, Pabna and Sirajganj districts, in about 80 communities; with it own resources since 2003 T. Aman season. Nevertheless, based on this great achievement and the initial responses of the resource poor farmers, AAS accepts FARMSEED as the preferred standard extension method and is strongly committed to scaling-up the method to a national wide level. AAS has also taken initiative of producing foundation rice seed since last 2002-2003 Boro season. AAS has been taken initiative to test FARMSEED strategy for other crops' seed production such as wheat, Onion, Potato and Mug bean with its own resources.

Participatory integrated plant nutrient management: Participatory integrated plant nutrient management for intensive rice-based cropping sub-project funded by PETRRA was executed in Habiganj and Moulvibazar districts during December 2001 to June 2004. The purpose of the sub-project was to encapsulate farmers' indigenous knowledge of soil fertility evaluation and making them to prepare village level soil fertility maps, prescribe integrated plant nutrient management (IPNM) packages for their specific field and increase rice productivity. During the two and half year tenure, the project reached at 215 villages, formed 429 groups (215 males and 214 females) with 6837 members, trained 8907 farmers (13% women), developed 213 PIPNM packages and prepared 216 soil fertility maps by the 216 skilled farmers extension agents (FEAs) in Habiganj and Moulvibazar districts. Based on the soil fertility maps and research results of the field experiments, a nutrient management packages for grades of soil of the entire village were prepared that was term as participatory integrated nutrient management packages (PIPNM). Based on the field trials' results, field specific final IPNM package was developed in village level workshop. Participating farmers in each village workshop thoroughly discussed on FP (farmer's practice) and IPNM (improved practice) doses, yield and accounted the economic outcome and finally prepared IPNM packages for each grade of soil fertility. The FEAs took the main leadership for dissemination of the PIPNM packages. Thus, the PIPNM packages reached to about 14,000 farmers' field by the end of the project cycle in greater Sylhet district. With this, large-scale dissemination of the process is now very much possible where farmers can make their own nutrient packages with minimum laboratory support.

Participatory field trial on the performance of BRRI hybrid dhan1: PETRRA's (a project of IRRI funded by DFID) sub-project on hybrid rice and BRRI decided to undertaken pilot testing on NSB released BRRI hybrid dhan 1 in Rajshahi and Comilla regions during 2001-02 Boro

season. The PETRRA's sub-project on hybrid rice and BRRI selected Agricultural Advisory Society (AAS) as the collaborator for pilot testing of BRRI hybrid dhan 1 in Rajshahi region. The purpose of the pilot testing was to evaluate the performance of BRRI hybrid dhan 1 under farmers' field conditions in Rajshahi region. BRRI hybrid dhan 1 was assessed against BRRI dhan 29 as check during 2001-02 Boro season at 15 villages in 15 upazilas of 6 districts (Pabna, Natore Rajshahi, Nogaon, Bogra and Sirajganj) in Rajshahi region with 45 farmers (reported 33 farmers). The average grain yield of BRRI hybrid dhan 1 was about 7.22t per hectare, which is more or less similar to BRRI dhan 29. On the other hand, the maximum grain yield of BRRI hybrid dhan 1 was as much as 9.49t/ha and that of BRRI dhan 29 was 9.30t/ha. Thus, it is indicated that the higher level of yield potentiality for both BRRI hybrid dhan 1 and BRRI dhan 29 during Boro season is existed.

Participatory field trial of rice hybrids: The purpose of the farmer's participatory hybrid rice field trials was to identify location specific adaptable rice hybrid(s) which are suitable for inclusion in a rice yield maximization package for the small plots of the resource poor farmers (RPFs). Six hybrid rice varieties were selected for the field trial. Five imported varieties (Sonarbangla 1, Jagoran 1, Hira, Aftab-LP50 and Richer 101) were selected along with BRRI hybrid dhan1 as check cultivars during 2003-04 Boro season. In order to implement the sub-project funded by PETRRA, 75 villages of 18 upazilas of 10 districts in Northeast, Northwest and Southwest regions of Bangladesh were selected.

Among the 6 rice hybrids tested in three regions, Hira was found to be the highest average grain yield producing variety with 7.94 ton/ha followed in order by Sonarbangla1 (7.88 ton/ha), Aftab LP50 (7.85 ton/ha), Richer101 (7.83 ton/ha), Jagoran1 (7.49 ton/ha) and BRRI hybrid dhan1 (6.97 ton/ha) during 2003-2004 Boro season.

However, during farmers' participatory evaluation workshop in 3 regions, the most accepted rice hybrids was found Sonarbangla1 (about 36%) followed in order by Hira (about 31%), Jagoran1 (about 11%), Richer (about 10%), Aftab LP50 (about 8%) and BRRI hybrid dhan1 (about 4%).

Performance of rice hybrids in Bangladesh: The primary purpose of this study was to assess the actual performance of hybrid rice, particularly the scale of adoption of different varieties and their impacts towards the lives of rural communities in Bangladesh. The study was conducted from middle of April to middle of May 2004 by a small group of experts with diversified experiences in agriculture in Southeast and South Asia.

An important parameter to assess the performance of hybrid varieties was the average yields obtained by farmers as against those of non-hybrid modern varieties. The overall findings of the study in all the twelve sites indicate that the yields of hybrid varieties are tremendously higher than those of other modern varieties. Invariable to sites depending on the management practices and the skills of farmers the increases are noticed from at least **14 mounds to as high as 37 mounds per acre (1.38t/ha-3.66t/ha).** Considering this average yield increase, overall production per farm family, subsequent income and enhanced rice provision ability attained by a family and the comparative cost and return analysis between hybrids and non-hybrids, it is very obvious to note that the farmers are gradually **shifting from non-hybrids to hybrids**.

Hybrids have made significant changes towards the incomes and livings of farmers. With the introduction of hybrids farmer's average incomes have increased remarkably, which range from **1000** taka to as high as **42,065** taka per family based on the total areas of cultivation.

Production and marketing of fine, aromatic and glutinous (FAG) rice: The primary purpose of the sub-project is to improve the production and marketing system of FAG rice in northeast Bangladesh. AAS organized trials and demonstrations with 22 FAG varieties in 2004 T. Aman and 7 varieties in 2003-04 Boro. Among the 11 fine and aromatic rice, the performance of 4 varieties were found to be good of which BRRI dhan 34 was found to be very promising particularly for Sylhet region. In the case of the Beruin cultivars, which are very sticky and somewhat glutinous, more or less similar performances were observed. The project selected nine Beruin cultivars, through are suitable for commercial cultivation in Northeast region of the country. The project developed quality seed production system for FAG rice production and marketing through group approach in greater Sylhet district. FAG rice production, nevertheless could be suitable for resource poor farmers, as it is highly profitable on cash-cost basis than full-cost basis.

Women-led group extension method: Women do most of the post harvest work including drying and storage particularly in rice. The project introduced innovative women-led extension methods to disseminate drying tables and storage technique to resource poor female farmers (RPFFs). Accordingly, since its inception in November 02, the project has formed and developed the leaderships of 26 women-led groups, 10 in Kishorganj and 16 in Habiganj districts, with around 570 RPFFs of 10 partner NGOs (PNGOs). Using the locally available materials the groups have designed a low cost drying table, and have validated the use of AAS developed plastic drum with naphthalene for rice seed storage. Both the technologies are now being widely used by members and non-members female farmers of the communities, and the method has been seen making good contribution in disseminating the rice technologies.

Skilled family members extension approach: The "Whole Family" sub-project was particularly aimed to introduce and organize a whole family extension approach as compared with half family (husband & wife), husband alone or wife alone approach on the dissemination of improved rice technologies among the RPFs. The particular purpose of the project, however, is innovative skilled family member(s) extension approach for rice knowledge dissemination among the resource poor farmers of Bangladesh.

To assess the effectiveness of the four tested methods, the project conducted an independent evaluation. The evaluations were made based on some key parameters such as knowledge and understanding levels of the participants, their uses of technologies, management of the field, decision making and problem solving ability, and finally based on the increases of rice yields and rice provision ability by each categories of the farmers. According to all the tests the half family member group ranked first, while the whole family group ranked second. The husband alone and wife alone group stood third and fourth respectively.

Extension of the system of rice intensification (SRI): A new approach of growing rice, globally known as SRI, has drawn much attention for its tremendous potentials of yield increase. Thousands of farmers all across the world have been involved in evaluating the practices in their farms. The introduction of the system of rice intensification (SRI) through this sub-project is to evaluate the opportunities of yield maximization in northeast region of Bangladesh in collaboration with BRRI regional station, Comilla during 2003 & 2004 Boro seasons. The project accordingly organized a number of trials in Habiganj and Moulvibazar districts. The results in terms of yields, field duration and yield components with the selected set of methodologies, however, noted that the system, at this stage, compare to farmer's practices as well as the improved management practices recommended by BRRI is not performing well.

Arsenic in ground water and food chain: Ground water is the most important source of water supply for drinking and irrigation in Bangladesh. But, arsenic contamination in groundwater is

one of the most serious natural calamities to befall Bangladesh. Around 80 million people, more than 65 percent of the population in Bangladesh, live in the arsenic contaminated areas. Ground water, which is the main source of contamination, is also a major source of irrigation. There are controversies that the contaminations are made by ground water irrigation as well. The project intends to establish information on the status of arsenic pollution in water-soil-plant in rice based cropping systems and suggest directions for future research. The project has been implemented in Chapai Nawabganj and Rajshahi districts in partnership with BAU and BRRI.

This study was aimed to find out the variation of arsenic content in groundwater according to well depth, age of and distance between wells (HTWs, STWs and DTWs) and distance from rivers in Rajshahi (Charghat and Bagha upazilas) and Chapai Nawabganj (Sadar, Shibganj upazilas) districts using GIS mapping to fix the database and plot the various indicators.

Among the three types of wells, arsenic contamination was found to be the highest with HTWs (27%), followed by STWs (21%) and the least with DTWs (7%). The middle layers (i.e., those between 40-160 feet) reflected the highest levels of arsenic contamination in groundwater. The shallower layers up to 35 feet and the deeper layers below 160 feet below the surface showed uniformly low (safe) levels of arsenic. As for age; the 3 types of tube wells tested were found to have no relationship with arsenic contamination. In case of lateral zoning with a 4 km assigned distance, most of the unsafe wells were within the 1st zone and gradually decreased with the increase of distance from the rivers.

It was observed that arsenic concentration started to increase with the beginning of dry season and continued up to May/June. Arsenic concentration started to decrease with the beginning of the monsoon and reached at the minimum level after the monsoon. Further research activities from the preliminary findings confirm that arsenic uptake in different crops including rice and vegetables irrigated with arsenic contaminated ground water is well within safe limits of human consumption.

Community based integrated rice-duck farming: BRRI validated rice-duck farming as an "exotic technology" in collaboration with FIVDB, BDS and HEED-Bangladesh with funding support from PETRRA. The sub-project operated during 1 July 2001 to 31 June 2004 in greater Sylhet, Barisal and Khulna districts. The sub-project findings are very positive with several benefits and impacts among the participating resource poor farmers (especially farmers) in the project areas. But the sub-project has a missing element. The missing element is: How to cost-effectively disseminate and popularize this revolutionary technology on a broader scale among the resource poor farmers (RPFs). Thus, AAS proposed a project intends to provide the missing link in the context of a community based, integrated Rice-Duck farming extension programme. Mac-Bangladesh in collaboration with AAS conducted farmer's participatory validation on a prospective "community based extension approach" in Srimangal upazila of Moulvibazar district during 2003 T. Aman season. The farmer's participatory, early-validation on "Community Based Extension Approach" findings are, so far, very encouraging. Accordingly, AAS/Mac-Bangladesh conducted pilot test the rice-duck concept as a "Community Based Extension Approach" among resource poor farm families in Moulvibazar and Habiganj districts during 2004 T. Aus season (rainfed) with eight partner organizations (NGOs/CBOs). The overall performance of community based extension approach for dissemination of integrated rice-duck farming among the resource poor farmers was found very encouraging. So integrated rice-duck farming can be disseminated through community based extension approach in northeast Bangladesh.

Use of leaf color chart (LCC): On the basis of BRRI/IRRI findings on the practical use of LCC in rice production, AAS has taken an initiative with BRRI/IRRI to scaling-up the LCC technology in its working areas during 2003 T. Aman and 2004 Boro seasons. At the beginning of the

initiative, BRRI provided practical training to AAS's staffs and farmers on the use of LCC for urea top-dressing in rice production. For this purpose, AAS distributed about 300 LCC among the trained resource poor farmers during 2004. Post distribution monitoring was conducted on the use of LCC in urea application in rice production plots. Farmers' response was not found encouraging in the project communities in Northeast, Northwest and Southwest regions in all three rice-cropping seasons.

Piloting Bangladesh rice knowledge bank (BRKB): Bangladesh Rice Knowledge Bank (BRKB) was launched in 2004 by IRRI with Bangladesh Rice Research Institute (BRRI) as leader and RDRS and Agricultural Advisory Society (AAS) as partners for testing its content with relevant stakeholders including farmers and communication feed back from them. BRKB started with materials coming up from PETRRA sub-projects of IRRI/BRRI. The availability of rice knowledge information with audience friendly materials is of utmost importance. Accordingly, the establishment of BRKBs at the regional level is an essential aspect of making BRKB "rice knowledge" available to the widest range of extension service providers and farmers as knowledge source **"Hub'**. BRKB is an electronic repository/library of rice knowledge. It contains information of rice technology, rice training, extension method, and even related knowledge beyond rice. However, the problem in the agricultural technology transfer/dissemination process is that the highest demand rice knowledge for the maximum farmers has not been fully identified. Accordingly, a systematic effort must be undertake to categorize BRKB knowledge according to the priority interest of its several users.

AAS has established its training and information (TI) center at its zonal office at Srimangal in Moulvibazar district during 2004 with funding support from IRRI/DFID to provide electronic training services to extensionists and their client farmers as **northeast Hub**.

AAS conducted need assessment survey in order to include farmer's demand-led rice knowledge issues in the BRKB content for the farmers of northeast region. From the survey on specific rice knowledge need assessment for BRKB content in Northeast region of Bangladesh, 15 major rice knowledge issues were found as the major demands for the farmers of this region. Under these 15 major rice knowledge issues, 56 specific rice knowledge issues what are they demanded were selected and categorized as 4 types of demands in Northeast region.

A pilot testing on BRKB content at community was conducted in 37 sessions. The BRKB content, concept and strategy seem to have been highly accepted at both the farmer and secondary stakeholders' levels. Overall, the acceptability of rice knowledge learning through video show was fund to be unique way of knowledge dissemination. Both levels of stakeholders it was concluded that the future training for the farmers would be effective through multimedia presentation including well-designed picture-rich fact sheets, videos with folk songs, drama, documentary, live sample demonstration, open discussion etc on farmer demanded, specific rice knowledge.

Regional communication fair 2004: A two-day long regional communication fair on Agriculture technology was organized in Srimangal under the leadership of Agricultural Advisory Society (AAS). AAS organized the fair on behalf of the Northeast Focal Area Forum in collaboration with other stakeholders in the region, such as DAE, BRRI and BADC

Scientists, investigators and extensionists from BRRI, NGOs and DAE presented relevant research papers in different sessions. Farmers, beneficiaries, officials from Northeastern districts attended the fair and learned lot. Stalls of PETRRA sub-projects displayed communication materials in the form of poster, brochure, booklet, leaflet, video, painting etc for easy understanding of the audience. Through such events PETRRA was interested to communicate information on different innovations to its stakeholders including men and women

resource poor farmers, GO-NGO policy makers and extension agents. The 2004 fair successfully brought together stakeholders from the northeast region. Apart from discussions and presentations, sub-project research innovations were presented in the form of Pots songs, Folk songs, Jari Gaan, Puthipath etc by the artists of GO-NGOs and cultural organizations from different districts led by different partner organizations.

Contract farming system

Recognizing the potential and benefits of contract farming arrangements in the agriculture sector, AAS took the important initiative for developing contract farming system aim at promoting increased production of commercial crops in general and seed in specific along with fish and livestock productions and creation of marketing avenues for the farmers. During last 12 years, AAS has developed contract farming model for seed production of inbreed and hybrid rice and non-rice crop varieties in Southwest and Northwest regions for private seed sectors. AAS has undertaken an initiative to produce seed of 10 types OP vegetables at 30 communities in Chuadanga and Meherpur districts for bulk seed marketing to involved seed companies and large seed dealers in collaboration with Krishi Sheba in all over the country.

Coastal agricultural production system

Recognizing the potentiality and benefits of coastal agricultural production system, AAS has taken initiative to introduce salt tolerant rice varieties in Southwest, South-central and Southeast coastal regions and suitable non-rice crop varieties and progress in found significant.

Study conducted on existing salt tolerant crop varieties at CDSP protected chars in southeast coastal region in collaboration with PRISM/CDSP in 2009. A crop menu developed with more than 50 crop varieties on farmers' demand-driven basis for scale-up in protected chars of southeast coastal region.

Scale-up salt tolerant rice variety

AAS has implemented a project on scale-up salt tolerant rice variety through FARMSEED (Farmer-to-farmer seed exchange system) during 1 June 2008-31 October 2010 with 22 member NGOs of "Oitijhya" network in Satkhira, Khulna, Bagerhat and Pirojpur districts in south coastal region in the country under the funding support from STRASA (a project of IRRI funded by BMGF). BRRI dhan 41 (T.Aman) and BRRI dhan 47 (Boro) were demonstrated with 3469 farmers of which 1911 farmers during 2008 & 2009 T.Aman seasons and 1558 farmers during 2008-9 & 2009-10 Boro seasons at 125 Communities in Satkhira, Khulna, Bagerhat and Pirojpur districts. Besides, Oitijhya NGOs network, CBOs network established with 250 CBOs in Satkhira, Khulna and Bagerhat districts. Out 250 member CBOs of the network, 152 member CBOs were trained as active members of the CBOs network.

Based on the findings during 4 cropping seasons, it is absolutely evident that acceptability of both BRRI dhan 47 (Boro season) and BRRI dhan 41 (T.Aman) is as found frustrating among the farmers in Satkhira, Khulna and Bagerhat districts of southwest coastal region. It is also reported that farmers stored as seed from produced paddy at negligible proportion (3-7% during T.Aman and 0.5-4.24% during Boro season). Farmers were found very much reluctant to store as seed of their produced paddy of BRRI dhan 41 and 47 due to large number of reasons are expressed by the trained and motivated farmers in the project areas. Farmers' comments were found towards disadoption of BRRI dhan 41 and 47 during T.Aman and Boro season in Satkhira, Khulna and Bagerhat districts. It is very obvious to note that the BRRI dhan 47 is not

tolerable at moderately saline and strongly saline condition during the whole life cycle during Boro season. More over, BRRI dhan 47 has shattering and viviparous germination characteristics. On the other hand BRRI dhan 41 is failed to prove its superiority over the existing popular modern varieties such as BR 23, 11 etc during T. Aman season in southwest coastal region.

Large number of farmer's innovations on successful Boro rice (eg. BRRI dhan 47) cultivation in salinity affected areas of Satkhira, Khulna and Bagerhat districts is documented. Such farmers' innovations can be used for developing sustainable packages for successful Boro rice cultivation in salinity affected areas in coastal region of the country. Salt tolerant rice variety dissemination strategy needs to be developed through participation of innovative rice farmers in southwest coastal region. In this regards cost-effective, useful and user friendly salinity mapping (eg.GSI mapping) needs to be developed for both soil and irrigation water sources for southwest coastal region.

Adaptation of salt tolerant rice varieties

GRS Division of BRRI in collaboration with STRASA project of IRRI distributed Breeder seeds (10 kg/farmer/variety) of two salt tolerant rice varieties (BRRI dhan 47 and BINA dhan 8) among the trained farmers of AAS trained 13 member NGOs of Oitijhya NGOs Network in Satkhira, Khulna and Bagerhat districts in Southwest coastal region during 2010-11 Boro season with a purpose to produce seed. AAS in collaboration with Shushilan administered an assessment on the performance of BRRI dhan 47 and BINA dhan 8 with 36 participated seed farmers through conducting a field study during March-July 2011 in Satkhira, Khulna and Bagerhat districts. AAS field staff in collaboration with the scientists of soil science division of BRRI collected soil and water samples. The collected soil and water samples were analysis by the scientists of physiology division of BRRI. AAS in collaboration with Shushilan collected all relevant data and information from 36 farmers in Satkhira, Khulna and Bagerhat districts. The collected data and information compiled/summarized by AAS staff for presentation in the report.

AAS collected data/information relevant to the performance of two salt tolerant rice varieties (BRRI dhan 47 and Bina dhan 8) from 36 involved farmers of 13 member NGOs of Oitijhya in eight upazilas of Satkhira district (Debhata, Shayamnagar and Sadar upazilas), Bagerhat district (Sadar, Mollahat and Chitalmari upazilas) and Khulna district (Dacope and Botiaghata upazilas).

Out of 36 assessed farmers' seedbeds, 15 seedbeds with 14 farmers were damaged due to high soil salinity and low temperature stresses at the early stage of the crop life cycle on the seedbed, which is known as most susceptible stage of rice crop to salinity stress. Out of 14 farmers, five farmers reported that seedbeds were damaged due to high soil salinity and ten farmers were reported due to high soil salinity cum low temperature stresses.

Total of 22 established plots were assessed of which 14 plots with BRRI dhan 47 and 9 plots with Bina dhan 8 (one farmer transplanted both varieties in two sub-plots). Out of 22 established plots, 3 plots were damaged due to high soil salinity (11.6-27.6 ds/m). In case of Bhobesh Gaiyeen's rice plot with Bina dhan 8 was damaged during reproductive phase at moderate salinity of soil (11.6 ds/m) with high salinity of irrigation water from canal. But rice crop of Gobindo Sarkar's plot and Ashutosh Das's plot with BRRI dhan 47 were damaged at early tillering stage due to high soil salinity at 27.6 ds/m and 21.1 ds/m respectively.

Average about 5.53 t/ha and 5.75 t/ha grain yield is estimated for BRRI dhan 47 and Bina dhan 8 respectively at low level of soil salinity (< 4 ds/m). However, in the findings revealed that the

grain for both the varieties progressively decreased with increased the soil salinity from 4-9 ds/m and drastically grain yield decreased with more than 9 ds/m soil salinity for both the varieties in the study areas. Out of 22 assessed farmers' plots, 12 farmers achieved very low to moderate grain yield (0.48 to 3.34 t/ha) under moderate to high soil salinity status (7.0-15.5 ds/m) through using their various innovative practices during rice culture in their transplanted rice fields during 2010-11 Boro season..

High value cash cropping in chars

Recognizing the potentiality and benefits of non-saline char agriculture, AAS has undertaken an initiative to introduce high value cash cropping system in chars of Tista River in Lalmonirhat district and Padma River in Rajshahi and Chapai Nawabganj districts through using participatory approaches and strategies under the sponsorship of JOBS since 2007. During last five years, AAS demonstrated more than 30 demand-led crops varieties in the selected chars in Tista and padma rivers of Lalmonirhat, Rajshahi and Chapai Nawabganj districts, of which about 15 crop varieties have been accepted at very high level. Out of 15 highly accepted crop varieties, the most adapted and commercialized crop varieties are: (a) Cabbage (var: Atlas70), Cauliflower (var: Snow star), Maize (Var: NK40, 900M, 900 gold), Country bean (var: LIV), Groundnut (var: Dac-1), Onion-bulb (var: Taherpuri), Onion seed (var: Taherpuri), White gourd (var: LIV), Sponse gourd (var: LIV), Bottle gourd (Var: Jhenai F_1), Bitter gourd (Var: Eureka F_1), Potato (Var: Diamont, Granula), Cucumber (Var: Shila) and pumpkin (var: Baromashi).

Preliminary market linkages for the produced products have been development in Lalmonirhat district. Accordingly, involved char dwellers income has increased due to cultivation and marketing of the high value cash crops in Lalmonirhat, Rajshahi and Chapai Nawabganj districts. However, such high value cash cropping strategy need to be disseminated among the char dwellers within and outside of demonstrated chars in three project districts. Moreover, such high value cash cropping strategy can be uptake in other non-saline chars of the country.

FARMSEED approach for non-rice crops

AAS developed FARMSEED approach has been using by farmers in general and resource poor farmers in specific for rice in AAS working districts. On the basis of FARMSEED success with rice, AAS has undertaken FARMSEED approach for non-rice OP varieties, such as Onion, Wheat, Mustard, Mujbean, Garlic, Potato and Brinjal from 2005 in its working districts in Southwest and Northwest regions. Acceptability of FARMSEED approach for tested crops has been found encouraging among farmers in general and resource poor farmers in specific. Accordingly, AAS has been planning to scale-up FARMSEED approach with most suitable crop varieties with long term donor funding support all over the country.

Benchmark study

AAS has implemented series of Benchmark survey since its inception in 1989 on basis AAS implemented projects and project for the clients with their funding support. List of few important Benchmark surveys are provided in Annex.VIII

Impact study on plant clinic operation in Bangladesh

The performance and impact study on plant clinic operation was conducted by AAS in collaboration with RDA, Bogra, Shushilan Satkhira and CABI, UK. The study was designed to assess plant clinic operations, performance and impact in Bangladesh. The study was

conducted with 350 respondents at 18 sites within the areas of influence of the 18 plant clinics of Agricultural Advisory Society (AAS), Rural Development Academy (RDA) and Shushilan. The study was conducted by Harun-Ar-Rashid, ED, AAS with staff of AAS, RDA and Shushilan. Field data was collected by Mr. Alok Kumar Biswas of AAS in collaboration with staff of AAS, RDA and Shushilan. The study was conducted during January-March 2010 in Natore (AAS), Bogra (RDA) and Satkhira (Shushilan) districts. Total of 350 farmers were interviewed, of which 230 from 12 plant clinics in Natore district with AAS, 60 from three plant clinics of Shushilan in Satkhira and 60 from three plant clinics of RDA in Bogra.

The 350 farmers surveyed received recommendations on 41 crops. The surveyed farmers brought in problems mainly for fruit and vegetables. Insects were high on the list than diseases. Total of 25 plant health problems diagnosed of seven vegetable crops in Natore with AAS, 23 plant health problems diagnosed of 12 vegetable crops in Satkhira with Shushilan and 27 plant health problems of 17 vegetable crops in Bogra with RDA. Similarly, 40 plant health problems diagnosed of 13 fruit crops in Natore, 12 plant health problems of five fruit crops in Satkhira and nine plant health problems of seven fruit crops in Bogra. The 18 plant clinics diagnosed 22 plant health problems with four spice crops in three districts. The plant clinics diagnosed 57 plant health problems with two cereal crops (rice and maize) in three districts.

Impact study on good seed initiative of WRC

In collaboration with Wheat Research Centre (WRC), Dinajpur, an impact study was conducted on wheat seed activities for good seed initiative (GSI) of WRC in Dinajpur, Thakurgoan, Panchagar, Nilphamari and Kurigram districts during July-October 2010. The study was conducted by Harun-Ar-Rashid, ED, AAS in consultation with Dr. Elahi Baksh, PSO, WRC, Dinajpur. Field data was collected by Mr. K.M. Alauddin of AAS in collaboration with staffs of partner NGOs, DAE and wheat farmers' group leaders under the overall supervision of Harun-Ar-Rashid, team leader of the study team. Field data were collected through interviewing 302 respondents (151 from project village and 151 from control villages) followed by conducting focus group discussion (FGD) and interviewing staff of NGOs and DAE (SAAO) by the study team at 41 villages in 10 upazilas of five Northwestern districts.

Among the 151 project farmers, the highest number of farmers recalled as good quality wheat seed (75.50%) sown during 2009-2010 wheat cropping season followed by farmers recalled as moderate wheat seed quality (21.85%) and excellent wheat seed quality (2.65%). On the other hand, among the 151 non-project farmers, the highest number of farmers recalled as good quality wheat seed (65.56%) sown during 2009-2010 wheat cropping season followed by farmers recalled as moderate wheat seed quality (33.77%) and excellent wheat seed quality (0.66%). However, about 12% more project farmers used good and excellent quality wheat seed during 2009-2010 wheat cropping season than non-project farmers. On the other hand 18% more non-project farmers used moderate quality wheat seed during the same wheat cropping season.

A total of eight wheat varieties were cultivated by the responding project and non-project farmers in five northwestern districts during 2009-2010 wheat cropping season. Among those wheat varieties, Prodip and Shatabdi were found most popular at project villages. On the other hand, Shatabdi, Kanchan and Prodip were found most popular at control villages. The highest number of project farmers cultivated Prodip variety of wheat (37.09%) followed by Shatabdi (30.46%), Prodip/Shatabdi (15.23%), Sourav (4.64%) and rest varieties at minimum percentage with the users (farmers) at project villages. In contrast the highest number of non-project

farmers cultivated Shatabdi (29.80%) followed by Kanchan (29.19%), Prodip (18.54%), Sonalika (11.92%), Sourav (5.30%) and rest varieties at minimum percentage with the users (farmers) at control villages.

The highest number of project farmers stored wheat seed in poly bag + synthetic bag (45.70%) followed by in plastic drum (31.13%) and do not store (23.18%). In contrast, only about 5.96% non-project farmers stored wheat seed in poly bag + synthetic bag, 1.99% non-project farmers stored wheat seed in plastic drum and 92.05% non-project farmers do not store wheat seed. A total of 118 farmers sown of their own saved wheat seed during 2009-2010 wheat cropping season, of which 106 were project farmers and only 12 were non-project farmers. Estimated average 61.24 Kg wheat seed was sown per farmer at project villages and average 51.33 Kg per farmer at control villages. Besides community based seed business, study team enlisted 30 common new income generating activities as expressed by 302 respondents at project and control villages in the study areas.

Study on hybrid rice in Bangladesh

Study on hybrid rice is conducted in collaboration with relevant public and private organizations under funding support from IFPRI during 1 July-31 January 2011. The study was conducted by a small group of experts which includes Harun-Ar-Rashid, AAS as collaborator, Dr. A.W. Julfiquar (Ex. head of hybrid rice Division & Director of BRRI) and Mr. Shajahan Ali (Seed Specialist).

From 1998-99 to 2009-10 a total of 85 rice hybrids have been released and notified in Bangladesh, out of which 80 come from private sector/NGO and 5 from public sector (4 from BRRI and one from BADC). Eight rice hybrids are developed in Bangladesh, of which 4 developed by BRRI, 2 developed by BARC and 2 developed by a private seed company. Out of 85 released rice hybrids, only 2 rice hybrids released for transplant Aman season. Thus, a total of 85 rice hybrids are available for commercial seed sale and seed production in Bangladesh. Most of these hybrids are sticky rice with amylose content less than 25% and most are also bold grain hybrids. From 1998 to 2010 a total of 44 organizations have been involved with hybrid rice technology transfer, seed selling and seed production in the country, of which private seed companies are recorded as highest (40) followed by NGOs (2), BRRI and BADC.

In 9 years from 1998-99 to 2007-8, hybrid rice area increased about 4263% (0.024-1.011 million ha) and subsequently, hybrid rice area decreased it peak in 2007-8 by 7% in 2008-9 and by 34% in 2009-10. Clean rice production from hybrid rice increased about 4368% from 0.11 million MT in 1998-99 to 4.8 million MT in 2007-8, before falling to an estimated 4.31 million MT in 2008-09 and 3.15 million MT in the 2009-10. Such change in area and production of hybrid rice it estimated at very higher percentage due to very low base. High rice yield is estimated with more or less similar trends from 1998-99 to 2009-10 between 4.59-4.75 t/ha

Currently, hybrid rice accounts for about 22% of total Boro rice or 9% of the total rice area of Bangladesh in 2007-8. Hybrid rice produced about 26% of the total clean rice harvested in the Boro season, and about 15% of the total clean rice produced in 2007-8. During 1998-2010, a total of 16.57 million MT of clean rice was produced through cultivating hybrid rice on a cumulative total of 3.54 million ha. Hybrid rice accounted for a net increase in production of clean rice of about 3.88 million during 1998-2010, sufficient to feed approximately 23 million people for a year. The additional rice production of 3.88 million MT contributed US$ 1,406 million (BDT. 97,000 million) to GDP during 1999-2010. In addition, a total of about 13,503 MT of hybrid rice seed was produced in the country on 5,478 ha of land during 1999-2010.

Domestic production of hybrid seed saved about US$ 34 million (BDT 2,436 million) of foreign exchange. Moreover, production of hybrid rice and hybrid rice seed generated a lot of rural employment in the country,

Production of hybrid rice seed in Bangladesh increased from 47.56 MT in 1999-2000 to 3,600 MT in 2009-10 Boro seasons. Hybrid rice seed production area increased from 52.63 ha in 1999-2000 to about 1,200 ha in the 2009-10 Boro season. Average hybrid rice seed yield increased about 233%, from 0.99 t/ha to 3.00 t/ha from 1999-2000 to 2009-10 Boro seasons. As of 2010, the highest recorded hybrid rice seed yield in Bangladesh is more than 4.0 t/ha, which can be compared to a maximum yield of less than 1.3 t/ha achieved in 1999-2000.

Floating bed agriculture

Bangladesh is one of the worst affected among countries that are facing the early impacts of climate change particularly in agriculture sector. The coastal area of Bangladesh is naturally susceptible to disaster whereas climate change asserts a new depressing effect to the lives and agriculture. Increasing rates of sea level rise (SLR) caused by global warming are expected to lead to permanent inundation, drainage congestion, salinity intrusion and frequent storm surge inundation. Sea level rise is a growing threat for the coastal regions of Bangladesh. Estimated about 11% more land in the country's south coastal regions will be permanently inundated over next century. However, farmers' innovation on floating bed crop culture would be a crucial adaptation approach to fight the impact of climate change in south coastal regions.

Accordingly, AAS has undertaken a study on floating bed agriculture practices in Barisal and Pirojpur districts of south central coastal region. Floating bed is called by various names in southern coastal regions such as Dhap, baira, geto, gaota, vasoman chash etc. Floating bed agriculture is a popular practice of the low-lying areas of the south central region of Bangladesh where lands remain submerged most of the time in a year. Floating bed agriculture is more than 300 years old local knowledge based technology in south central coastal region. Floating bed is prepared by water hyacinth and other aquatic plants on the standing water body in river, canal, beel, crop field, pond, ditches etc for crop culture. It is prepared at the beginning and during monsoon for crop culture. Preparation techniques and management practices varies from location to location and farmers to farmers. It shape is rectangular, width is about 2m, depth is about 1m and length varies on many reasons.

The surveyed areas are highly vulnerable and population poverty is at higher level. On the other hand, year round crop production is not possible due to experience of standing water as natural event on the land for about 6-8 months (May-December) period with climatic disaster risk. Thus, crop production on floating beds is the only option during the disadvantage period of the year in the surveyed areas. Moreover, standing water in the surveyed areas is found as blessing element for the floating bed crop culture along with the availability of abundant crop residues for floating bed (locally called Dhap) preparation crop culture including seedling production. Farmers are raising seedlings and producing vegetables/spices for more than 30 crops. Most cases profitability from the produces (seedlings and crops) on floating bed is found much higher than the flood free plain land in the country.

Private innovation and R&D in Bangladesh agriculture

AAS in collaboration with Rutgers University under the funding support from Bill and Melinda Gates Foundation conducted the study on agricultural innovation and R&D in Bangladesh during 2009-10. The purposes of this study are: (a) to describe private introduction of

agricultural technology, including private research; (b) to assess the impact of private technology on agricultural production, poverty, and the environment, and (c) to identify government policies and programs that effect private technology introduction.

For almost two decades, GOB has encouraged private agricultural innovation. Government and donors have established programs to assist private R&D, but there is room for improvement. Private organizations ask for financial assistance, collaboration, and educational support. Some regulations delay or block private innovations. Both private and public organizations are learning new ways to collaborate. For example, the Bangladesh Fertilizer Association publishes a soil science journal, providing a venue for government scientists to report research findings.

Private companies and NGOs introduce new technology in all agricultural sub-sectors. Technology transfer appears to have motivated in-country R&D. For example, in 1990, when Kushtia Seed Store imported and introduced the first maize hybrids from Thailand, the company had no trouble finding hybrids that would yield much more than available OPVs. Twenty years later, with scores of hybrids already in the market, companies systematically review available hybrids from foreign breeding; some also breed for desired characteristics. In this case, technology spill-in led to technology-based competition, motivating companies to invest in R&D. Companies and NGOs have been expanding their R&D efforts. Some vegetables cultivars from private breeding in Bangladesh have already been introduced into other regional countries.

In so far as farmers and consumers benefit from private agricultural innovation, these innovations have a public benefit. Because private organizations do not capture all of the benefits, they are not motivated to do the socially optimal amount of innovation and R&D. Thus, there are good reasons for government and donors to extend grants and other financial assistance for private agricultural innovation and R&D, and especially for innovations considered to have more social returns.

Improved Litchi orchard promotion

AAS has undertaken an initiative to scale-up improved Litchi orchard with high yielding export quality cultivars in Pabna and Natore districts. Accordingly, AAS provided a day long practical training to 40 selected owners of Litchi orchards from Ishurdi upazila of Pabna district on 14 April 2011 in collaboration with Redo-Mati-O-Manos Krishok Samobay Samity, BARI and BSMRAU. Each trainee has received a folder with production guidelines for Litchi and its plant health problems identification and their management practices faced by the Litchi orchard owners in their orchards. Trainers cum facilitators team has captured and documented Litchi growers' innovations in Litchi orchard management practices for preparation a booklet on improved litchi orchard management system.

Woman-led vegetable and seed production

AAS has significantly contributed in good seed initiative (GSI) phase-I as an active partner. As per MOU between AAS and RDA, Bogra, AAS has been working on production, processing, storage and marketing of selected vegetable seed crops for ultra poor women in 4 isolated chars in Sariakandi upazila of Bogra district since inception of GSI phase-II under the funding support from CABI, UK. AAS assigned staff in collaboration of TMSS staff under the overall supervision of RDA Bogra implemented various pre-decided activities in selected Noyapara, Dighapara and Chakrothinath chars under Hatsherpur union in Sariakandi upazila of Bogra district, such as (i) Providing training to women on vegetable seed production, processing, storage and marketing; (ii) Providing source seed of the selected vegetable crops for seed

production; (iii) Providing in field advice on vegetable seed production; (iv) Collecting farmers innovation for vegetable seed video production; (v) Assisting trained and motivated seed women at project chars for preparing plan on seed production and marketing; (vi) Assisting in vermicomposting and vermicompost use in vegetable seed production plots at project chars; (v) Conducting cost analysis for vegetable crop and seed production in collaboration with trained women seed producers at the project chars in Sariakandi upazila of Bogra district during 2010.

Farmers' led yield maximization trial of rice hybrids

AAS has conducted farmers' led yield maximization trial with five rice hybrids (AgroG2, Hira 2, BRRI hybrid dhan2, Aftab108 and SL8H) with a check BRRI dhan 28 with 10 farmers in Tala upazila of Satkhira district during 2010-11 Boro season. The average grain yield, yield contributing characters, field duration and important ancillary characters are collected, analysised and presented in the report. Overall, 5 rice hybrids performed better than the BRRI dhan 28, a local Inbred HYV. Average about 40% higher paddy was achieved of 5 rice hybrids over BRRI dhan 28. But acceptability of rice hybrids was found discouraging than BRRI dhan 28. This is due to lower paddy market price of 5 rice hybrids than BRRI dhan 28. All most all paddy of 5 rice hybrids sold in the market price due to its stickiness (low amylose content), low cooking and eating quality.

Operating fish hatchery

AAS has established a fish hatchery at Alampur in sadar upazila of Kushtia district in 1996 with AAS own fund to produce quality fish carp seed. AAS has been operating its fish hatchery at Alampur, Kushtia with trained fishermen on contractual agreement since 2000. Under such sub-contract system a total of 350-700 Kg quality hatchlings of five different carps has been produced and distributed among the resource poor fish farmers and fisherman with affordable price in Kushtia district during 1996-2012. AAS developed intensive fish fingerling production and marketing strategy for the fish farmers and fishermen in Southwest Bangladesh.

Extension of aromatic rice

Although the rice cultivation in Bangladesh is dominated by coarse and long slender rice, there is a substantial demand for fine and aromatic rice. During PETRRA project implementation, BRRI dhan 34 was found to be very promising. Accordingly, AAS has under taken its extension all over the country since 2005 T.Aman season. However, AAS has been distributed Breeder certified, TLS and farmers' saved seed of BRRI dhan 34 among the trained commercial farmers at 30 communities with 30 CBOs in Natore, Pabna and Sirajgonj districts for its commercial cultivation and quality seed exchange among farmers. AAS has developed linkages between the fine and aromatic rice producing farmers and millers on the basis of profit for the both.

Rice hybrid field trial

The farmers' participatory field trial was conducted by AAS with 200 farmers on the selected rice hybrids released during 2008-9 at 20 villages with 20 CBOs in Tarash upazila of Sirajganj district and Gurudaspur and Baraigram upazilas of Natore district during 2009-10 Boro season in collaboration with BRRI, BADC, EAL, Supreeme seed, BRAC and ACI. The purpose of the farmers' participatory rice hybrids field trials was to popularize the latest released rice hybrids among the farmers in Chalan beel of Natore and Sirajganj districts. Ten rice hybrids were selected for the field trial (Heera 6, Heera 4, AgroG1, AgroG2, BRRI hybrid dhan 2, SL-8H,

BRRI hybrid dhan 3, BRAC-6, Shankar-3 and Mongol). Total of 500 gm seed was provided for each rice seed grower at selected 20 communities in Challan beel of Natore and Sirajganj districts. One trained farmer at each community received seed for only one selected rice hybrid (i.e. 20 farmers received for each selected rice hybrids at 20 communities in 2 districts). Germination test of seed of the selected ten rice hybrids were conducted by AAS after procurement and before distribution among the trained 200 farmers. The post established rice hybrids field trial plots were monitored by the field Agronomist of AAS. Farmers' demand-led 20 field days were conducted at 20 communities in two project districts. This rice hybrids trial conducted with AAS resources, staff and facility.

AAS-PRICE Project Activities

PRICE (Poverty Reduction by Increasing the Competitiveness of Enterprises) is a USAID-funded economic development project in Bangladesh. Its mission is to reduce poverty by increasing the competitiveness in aquaculture, horticulture and leather sectors, particularly for the benefit of women, young adults and SME suppliers. To accomplish its mission PRICE undertakes interventions to address key constraints limiting the growth of sales, jobs and investments in the accepted 3 sectors in general. The major activities and achievements of AAS with PRICE supported horticulture and fishery projects during November 2009 to July 2011 are as follows:

(I) Horticultural Project

PRICE has worked during 1November 2009 to 30 July 2010 to achieve its mission through undertaking various interventions on horticulture sector for strengthening the value chain of the horticultural crop produces and their processing products. As per MOU, PRICE has worked with Agricultural Advisory Society (AAS) to address the constraints faced by commercial farmers under the AAS proposed project on "Demand-driven horticultural crop production and marketing" at 18 locations with 18 CBOs in Natore, Pabna and Rajshahi districts. Accordingly, PRICE has assisted AAS in the training and motivation of 540 commercial farmers; helping them to organize commercial contract farming system in order to plan market driven production, increase unit yield and at the same time, improve the quality of horticultural produces by adopting environment friendly production practices. To implement the activities of the project, on Demand-driven horticultural crop production and marketing, PRICE has supported AAS, providing horticultural specialists and field supervisors to support 540 farmers in market driven production planning of high value horticultural crop production. However, PRICE has worked in collaboration with AAS to explore the potential for developing a flow of market information regarding the demand and supply of targeted horticultural products. PRICE has assisted AAS to support farmers for increasing productivity, minimize post harvest losses and access to market in producing commercial horticultural crops. The horticultural specialist has implemented training on improved cultivation techniques, farming management system, use of better inputs, adoption of environment friendly practices, better plant health management, post harvesting management/handling and establishing demonstration plots for showing best practices/introducing good agricultural practices and conducting field days in those.

Project Location: PRICE in collaboration with AAS has implemented the activities of accepted project on "Demand-driven horticultural crop production and marketing" at 18 communities in Natore (Baraigram, Gurudaspur and Lalpur upazilas), Pabna (Ishurdi upazila) and Rajshahi (Putia upazila) districts. Out of 18 working communities of AAS/PRICE project, 10 communities are in Natore district and 4 communities in each Pabna and Rajshahi districts.

Working team: Four members working team and additional staff of AAS in collaboration with group coordinators were undertaken the following interventions/activities under the overall supervision of Horticultural Specialist, PRICE and in consultation with the team leader, Horticulture, PRICE during the reporting period.

Commercial farmers' group: PRICE has worked with 18 AAS developed commercial farmers groups in Natore (10 groups), Pabna (4 groups) and Rajshahi (4 groups) districts to implement the Demand driven horticultural crop production and marketing strategy since its inception. Each group was a group coordinator with 30 representative active members. Large numbers of farmers were involved with each group, who produced high value horticultural crops for marketing (540 group members & 2066 federation members). All groups were qualified to grow any potential and suitable high value horticultural crops through commercialized contract farming system with reliable buyers, those who are capable to procure the horticultural produces from farm gate using "farm to market" strategy.

Group meeting cum training: At the beginning of project intervention, working team and relevant AAS staff conducted the group meeting cum training at 18 communities in Natore, Pabna and Rajshahi districts. Each group meeting cum training conducted in collaboration with group coordinators. Total of 681 farmers participated in 18 group meeting cum training at 18 communities in 3 project districts.

Constraints for Brinjal production and marketing: During group meeting cum training at 18 communities in 3 projects districts, facilitators documented the major constraints for Brinjal production and marketing on the basis of participated farmers' comments and suggestions. Such major constraints are similarly applicable for other horticultural crops. The highest constraints were estimated with Plant health problems identification and management (5), Adulteration in fertilizers (5) followed by Soil health and its management (4), Brinjal marketing (4), Lack of field advice on production practices (4), Lack of knowledge on improved harvesting and post harvesting handling practiced (4), Irrigation facility and method (3) Produces transportation (2), Seed availability (2) and Working capital as least (1) at 18 communities in 3 project districts.

Selection of existing potential horticultural crops: At the beginning of the project intervention, AAS-PRICE's working team enlisted the existing horticultural crops at 18 communities in Natore, Pabna and Rajshahi districts during group meeting cum training. After enlisting the horticultural crops, potential crops were selected through farmers' assessment using scaling (scale: 1-5) approach during group meetings and FGDs followed by validation at 18 communities in 3 project districts. Potentiality of horticultural crops were assessed at 18 communities in Natore, Pabna and Rajshahi districts on the basis of their acreage, production, productivity, profitability, market demand, market access etc. Numbers of potential horticultural crops of 18 communities are provided in the following Table.1 and Annex.IX

Table.1: Existing number of potential horticultural crops of 18 communities

SL #	Community	Upazila	District	Crops (Nr.)[1]
1	Khamar Pathuria Akkanda Para KUF	Gurudaspur	Natore	10
2	Kodim Chilan	Lalpur	Natore	10
3	Purbo Noyapara	Gurudaspur	Natore	17
4	Dhola	Lalpur	Natore	12
5	Manik pur	Baraigram	Natore	10
6	Khamar Pathuria Madrasa Para	Gurudaspur	Natore	5
7	Lakshmipur	Baraigram	Natore	8
8	Modhya Noyapara	Gurudaspur	Natore	19
9	Purbo Noyapara	Gurudaspur	Natore	10
10	Dhulia	Baraigram	Natore	14
11	Char Gorgoria	Ishurdi	Pabna	16
12	Gorgoria	Ishurdi	Pabna	23
13	Rahimpur	Ishurdi	Pabna	18
14	Kalampur	Ishurdi	Pabna	26
15	Nandonpur Fozdari Para	Putia	Rajshahi	10
16	Chak Bhitapara Bhaluk gachi	Putia	Rajshahi	14
17	Majpara Bhaluk gachi	Putia	Rajshahi	10
18	Telipara Bhaluk gachi	Putia	Rajshahi	8
Average		**-**	**-**	**13**

[1] *Total 46 enlisted potential horticultural crops are selected at 18 communities*

Safe pest management initiative: The country is lagging behind in the development and implement of efficient, eco-friendly plant health management practices. It is an irony that in spite of the known serious consequences, pesticides, in most cases, still serve as the only method used in protecting crops from massive insect/pest-born losses. Pesticides are often used indiscriminately and at very high rates of application and very frequently without knowledge the actual purpose of the pesticide being applied. In order to protect high value non-rice crops from pest and disease damage, farmers are day-by day becoming increasingly dependent on the frequent use of dangerous and highly toxic pesticides with about 30-40% pesticides cost of the total production cost. Moreover, pesticide adulteration is an increasingly common experience among farmers. In most cases, farmers use pesticides in their crop fields on the basis of recommendations and advice from their local pesticide dealers. In general, the dealers, themselves are not professional crop/soil/pest scientists and thus we have a situation of the "blind leading the blind" with certain incentives for both farmers and dealers to advocate the use of inappropriate and/or excessive pesticide levels.

Thus, safe pest management (SPM) is found crucial for all type of crops in general and horticultural crops in specific for safe products consumption within and outside of the country. Safe pest management (SPM) concept includes several control methods and techniques including integrated pest management (IPM), use of sex pheromone, parasitoids releasing, Bio-pesticides use, cultural control, ecological control, biological control, resistant varieties use, use of physical and mechanical methods, use of various traps, destruction of crop residues and affected plants/plant parts, tillage, clean planting materials use etc. In this regards, the working team undertaken following interventions under the overall supervision of Horticultural Consultant, PRICE:

(i) Power Point Presentation (PPP) based farmers' training: About 500 farmers participated at 4 power point presentation (PPP) based 4 hours training events at Manikpur, Khamar Pathuria Madrasha Para and Lakshimpur villages in Natore district. Power point presentation based training on safe pest management was found highly acceptable among the farmers in the project communities in Natore district. The PPP based training events were conducted by the senior Entomologist from BARI and safe pest management (SPM) specialist from Ispahani Biotech. Both the specialists conducted the ppp training events on SPM covering the pest such as Brinjal shoot and fruit borer (BSFB), fruit fly of gourds and fruits (e.g, jujube, mango etc). Such training events motivated the large number of farmers within and outside of the project communities.

(ii) Farmers' participatory safe pest management training: Farmers' participatory day-long safe pest management training implemented by AAS under the support from PRICE in collaboration with group coordinators at 18 communities at the selected venues in 3 project districts.. Day-long training was divided into two sessions, such as theoretical session and practical session. Both training sessions were conducted based on the guidelines developed by Ispahani Biotech in collaboration with BARI. Theoretical training session was conducted through using prepared Flip Chart and following participatory approaches all through the training session. Such farmers' participatory training events on safe pest management conducted following with two methods such as (i) Sex pheromone trap use and (ii) Parasitoids releasing in crop fields for BSFB, fruit fly for gourds and fruits trees. On the other hand practical training session was conducted at Brinjal crop field through practical set-up demonstration on sex pheromone trap and releasing parasitoids (Tricograma and Bracon) in the Brinjal crop field.

A total of 989 farmers were participated at 18 training events on safe pest management at 18 project communities in Natore, Pabna and Rajshahi districts. Out of 989 participants, 152 were female farmers. Most of the participated farmers showed their willingness to introduce safe pest management practices in their horticultural crop fields/orchards through field demonstration at their horticultural crops fields with in-field technical support at least for one cropping season. Moreover, trained farmers suggested for marketing the pesticide free safe horticultural products with better price from their crop fields.

(iii) Group Coordinators and dealers training: A day-long training conducted on safe pest management for horticultural crop production by AAS with funding and technical support from PRICE on 23 January 2009 at training room, AAS, Bonpara, Natore. Total of 21 participants attended at the day-long training course, of which 13 were group coordinators, 3 were agri-inputs (pesticides, fertilizers, seed etc) dealers (Natore & Rajshahi districts) and 5 staffs of AAS. Kdb. Md. Ibrahim Khalil, senior scientific officer, Ispahani Biotech conducted training through multimedia power point presentation (PPP) during theoretical session followed by practical session in the Brinjal crop field at Bonpara, Natore and Harun-Ar-Rashid, Executive Director,

(iv) Demonstration on safe pest management: AAS established 9 acres demonstration on safe pest management with sex pheromone trap and releasing parasitoids (Tricograma and Bracon) on brinjal shoot and fruit borer (BSFB) and fruit fly of Bottle gourd. Out of 9 acres demonstration, 8.5 acres was on BSFB at Khamar Pathuria Madrasha Para on 7.5 acres as block demonstration with 27 farmers and 1.0 acre as cluster demonstration with 5 farmers at Poschim Noyapara in Gurudaspur upazila of Natore district. On the hand about 50 decimals demonstration plot was established on Bottle gourd at Dhala village in Lalpur upazila of Natore district.

(v) Plant health management initiative: Plant health problem's diagnosis and management is reported as one the prime constraint for cultivation of high value horticultural crops at 18

working project communities in 3 project districts. Accordingly, 4 permanent plant clinics established at Khamar Pathuria Madrasha Para, Khamar Pathuria Akando Para, Manikpur and Dhulia in Natore district to provide plant health management services on demand driven basis.

On the basis of farmers demand from the communities, plant health management services provided at 4 plant clinics during January to December 2010 by plant doctor of AAS and plant health specialists from BARI and BSMRAU. Besides plant clinic operation a "Going Public" event was conducted at Purbo Noyapara Bazar in Gurudaspur upazila of Natore district on 5 major plant health problems of Garlic and Onion. During operation of plant clinic and implementation of "Going public" about 900 participated farmers received prescriptions on their wanted plant health problems.

Vermicomposting: Vermicompost is composting utilizing various species of worms, specifically red wigglers, white worms, and earthworms creating the heterogeneous mixture of decomposing manures, vegetable, food waste, bedding materials and pure vermicast produced during the course of normal vermiculture operation. Vermicast, similarly known as worm castings, worm humus or worm manure, is the end-product of the breakdown of organic matter by the species of earthworm. It contains water-soluble nutrients and bacteria; vermicompost is an excellent, nutrient rich organic fertilizer and soil conditioner. The process of producing vermicompost is called vermicomposting. However, AAS in collaboration with PRICE was undertaken initiative in vermiculture cum vermicomposting with 20 farmers at project communities in Natore district as demonstration. Large number of farmers visited vermicomposting demonstration and showed their willingness to start vermicomposting with technical support and earthworms supply on cost basis. The working team undertaken motivational activities at 18 working communities in 3 working districts.

Farmers' group coordinators and lead farmers training on Vermicomposting: Day training on vermicompost production and use was conducted by AAS in collaboration with PRICE at Training Room, Zonal Office, AAS, Bonpara, Natore on 29 May 2010. Dr. Gul Hossain and Ms. Shonavan Begum, were provided both theoretical and practical training on vermicompost production and use during 9:30am to 4:30pm under overall facilitation of Harun-Ar-Rashid, Executive Director, AAS. A total of 26 farmers were participated in the day long training events on vermicompost production and use from AAS/PRICE working communities in 3 project districts. At the end of the day long training event, participants were developed an **Action plan** on vermicompost production at AAS/PRICE working villages in 3 working districts under the facilitation of Harun-Ar-Rashid, Executive Director, AAS on the basis of availability of efficient species of earthworms from reliable sources in the country.

Exotic crop varieties demonstration: AAS in collaboration with PRICE established 34 farmers' participatory field demonstration plots with five exotic hybridscrops (Red Cabbage, Brocolli, Tomato, Bitter gourd and Khira) at Manikpur, Khamar Pathuria Madrasha Para and Lakshimpur villages in Natore district during 2010 Rabi season. Trained farmers received only seed of the involved crop varieties from AAS. Crop performance assessment has been conducting by the project staff. Both red cabbage and Brocolli were found as highly acceptable crops among the farmers at demo. villages and their surrounding villages at production side but other end of the market side farmers faced difficulties. However, Red cabbage and Brocolli can be grown at large scale in Natore district through establishing contract farming system with committed buyers from urban and up-scale urban markets in the country.

Soil analysis: To recommend the fertilizers doses for the involved horticultural crop production, representative 36 soil samples were collected from 18 project communities in Natore, Pabna and Rajshahi districts for analysis at reputed soil analytical laboratory in the country.

Representative soil samples were collected by the project staff in collaboration with group coordinators and lead farmers at 18 communities in 3 project districts. Collected 36 soil samples were processed at AAS, office for analysis at reputed soil analytical laboratory in the name of representative farmers of the project communities of 3 project districts.

Lead farmer's training on Brinjal production practices: Day-long farmers' participatory training conducted on sustainable commercial Brinjal production practices by AAS in collaboration with PRICE on 10 January 2010 at training room, AAS, Bonpara, Baraigram, Natore. Total of 9 group coordinators and lead farmers participated in the participatory day-long training course from Natore, Pabna and Rajshahi districts. Six relevant field staff of AAS participated in the training course. The participatory training course was conducted by Specialists of PRICE and participatory approaches were followed during day-long training course on sustainable commercial Brinjal production practices. Day-long training on sustainable commercialized Brinjal production included various issues such as (i) Existing Brinjal cultivars and their cultivation period, (ii) Sustainable Brinjal production practices, (iii) Sustinable Brinjal seed production practices, (iv) Cost and return analysis for Brinjal production, (v) Safe pest management and (vi) Marketing channels for Brinjal produces for Natore, Pabna and Rajshahi districts. Compilation of the participatory training were incorporated in the production guidelines of Brinjal for conducting farmers' training at project 18 communities in 3 districts on sustainable Brinjal production practices.

Training on zero-tillage Garlic production: Day-long farmers' participatory training on zero-tillage garlic cultivation conducted at 6 communities in Gurudaspur and Baraigram upazilas of Natore district during the active project period. Total of day-long 6 events of farmers' participatory training on zero-tillage garlic cultivation were conduced at 6 communities in Natore district where farmers are grown garlic in large scale using zero-tillage techniques. Zero-tillage garlic technology is the innovation of farmers in Natore district. Day-long training was divided into two sessions-such as (i) cultivation techniques along with cost of production analysis and (ii) crop health management. Project field supervisors and relevant field staff of AAS implemented the training on zero tillage garlic cultivation at 6 communities in Natore district. A total of 270 farmers (15 female farmers) were participated at day long 6 training events.

Field advices: Project working team, headed by horticultural specialist of PRICE provided in-field advices on (i) Brinjal production practices, (ii) Zero-tillage garlic production practices including plant health management; (iii) Plant health management on Onion production; (iv) Onion seed production practices including plant health management; (v) Nut weevil of Jujube. During field visit of the horticultural specialist and other team members distributed the prepared fact sheets on the major plant health problems of the above crops among the group coordinators and lead farmers at 18 project communities in 3 project districts.

Farmers training on Brinjal production and marketing: Before conducting farmers training, horticultural specialist of PRICE and working team collected relevant information on Brinjal production practices and techniques with existing cultivars in 3 project districts. Existing Brinjal cultivars and their production cycles of 8 communities are documented. Variety-wise sowing and transplanting period for 8 locations in 3 project districts and year round Brinjal production plan and tentative price (Tk./maund) with suitable cultivars of Brinjal are summarized. Farmers' participatory day long training on sustainable Brinjal production techniques implemented by AAS in collaboration with PRICE at 11 communities in Pabna and Natore districts during April-May 2010. Total of day-long 11 events of farmers' participatory training on sustainable Brinjal production techniques were conducted at 11 communities in 2 project districts. Before implementation of 11 day long training events on sustainable Brinjal production techniques, guidelines and flipcharts were prepared on sustainable Brinjal production techniques giving

special emphasis on quality seedlings production, plant health management practices, year round Brinjal cultivation with locally adopted varieties, seed production practices and safe pest management. A total of 330 farmers were attended at day long 11 training events on sustainable Brinjal production techniques at 11 communities in Pabna and Natore districts.

Trichoderma introduction: Trichoderma spp. is most prevalent antagonistic soil fungi reproduce asexually by conidia born on phialides of branched conidiophores. The most important antagonistic mechanisms of the fungi are mycoparasitism, antibiosis and competition. Trichoderma spp. parasitizes a good number of soil-borne fungi and is used as bio-control agents against phytopathogeniic fungi, such as Phythium, Phytophthora, Rhizoctonia, Fusarium and Verticillium. Trichoderma spp. play major role as biocontrol agents, owing to their capabilities of ameliorating crop-yields of multiple role, such as bio-pesticide and plant growth promotion. Accordingly, AAS in collaboration with PRICE was undertaken an initiative to demonstrate healthy seedlings production of Brinjal among the PRICE trained farmers in Pabna and Natore districts through treating the seedbed soils. Monitoring on seedbed was undertaken through using developed format. Performance of Trichoderma on healthy seedlings production of Brinjal was summarized by the project staff and not found acceptable among the demonstrated farmers.

(II) Fishery Project

(a) Initial initiatives in Natore district

Fish play a crucial role in the Bangladesh diet and contribute about 60% of the total protein intake of animal sources. It contributes about 4.43% in GDP, second largest source of foreign exchange earnings and provides employment opportunities for millions. Accordingly, production and consumption of fish therefore has important implications for national food and nutrition security, poverty and growth. However, average about 52gm fish consumed per person per day in the country.

Bangladesh has extensive and highly diversified fisheries resources. According to Department of Fisheries (DoF) statistics, total fish (including shrimp and prawn) production during 2010-11 is reported about 3.06 million tones, of which inland fisheries account for 82.16% (47.71% for inland closed water culture fisheries and 34.45% for inland open water capture fisheries) and only about 17.84% for marine capture fisheries (0.55 million tones). In case of inland closed water culture produces total about 1460769 MT of fish from 678724 ha of closed water body, of which about 1219736 MT fish (83.50%) produces in 371309 ha fish pond. Moreover, pond fish culture contributes about 40% of the total fish production with an average yield 3285 Kg fish per ha in the country. According to DoF statistics, the fishery sector as a whole grew at more than 5% per annum from 1984 to 2009, with inland fisheries and marine capture fisheries each expanding at around 4%, while culture fisheries enjoyed a growth rate more than 9%, which is much higher with pond fish culture alone. Thus, pond fish culture represents the mainstay of aquaculture production in the country.

In general, there are three forms of pond fish culture; they are (a) traditional pond fish culture; (b) entrepreneurial pond fish culture and (c) commercial semi-intensive carp poly culture. Presently, semi-intensive carps and other fishes' polyculture in pond is getting popularity among the commercial fish farmers across the country due to its high fish biomass production and high net-profit. Current pond fish production can be reached more than double through introduction of intensive carps and other relevant fishes polyculture with cost-effective quality feed, ideal fish pond management, ensuring year round irrigation facility at the pond site and other relevant

management practices. Profitability of cultured fish is heavily depending on the market price of the harvested fish.

Aquaculture (Pond fish culture) is mostly a rural economic activity that addresses food security, family earnings and opportunistic employments in rural Bangladesh. Most of the aquacultured water bodies are under traditional fish culture (aquaculture), which fish farmers typically have limited access to improved technology on pond fish culture, quality fish seeds and other inputs that consequently lead to low fish yields. Sharing on fish farmers innovations has great limitation among the fish farmers in the country. Moreover, there is very weak business linkages and market information for marketing the harvested fish with better price from production sites in the country.Most of the fish farmers of the country are very much lack in knowledge on improved fish culture techniques to achieve higher fish production per unit water body. Accordingly, practical training on improved pond fish culture is crucial for the involved fish farmers all over the country. As per MOU between PRICE and AAS, fish farmers training programme has been undertaken to improve key production and management practices for improved pond fish culture in Gurudaspur upazila of Natore district during 1 July-31 December 2010.

Before imparting the training on improved pond fish farming, working team of AAS and PRICE formed 10 fish farmers groups as 10 CBOs at 10 pond fish farming clusters in Gurudaspur upazila of Natore district. Each group formed with 50 fish farmers from the same community with a fish farmer group coordinator. Thus, 500 commercial fish farmers' from10 Machh Chasi Groups as 10 CBOs are involved with AAS-PRICE aquaculture project activities in Gurudaspur upazila of Natore districts with 10 group coordinators.

Aquaculture expert in collaboration of other members of the working team conducted day-long training on improved pond fish farming system management at the involved 10 project communities in Gurudaspur upazila of Natore district. Each group has received 3-days training on improved pond fish farming system management. Three-days training course covers various demand-led relevant issues such as (i) Pre-stocking fish pond preparation/management; (ii) Stocking management practices; (iii) Post stocking management and (iv) Inputs supply and output marketing strategy. Both theoretical and practical events were included in the improved pond fish farming management. Aquaculture expert also conducted pre and post evaluation with the participated fish farmers before and after execution of the training. Total of 500 enlisted fish farmers from 10 Machh Chasi groups in Gurudaspur upazila of Natore district participated in 3-days training course on improved pond fish farming management during 1 July-31 December 2010. Out of 500 participants of the training, 7 were female fish farmers from 10 Machh Chasi groups in Gurudaspur upazila of Natore district.

(b) New initiatives in Magura and Jhenaidah districts

AAS and PRICE signed a MOU to provide technical and business assistances on fish productivity improvement initiatives for 1000 fish farmers with 20 fish farmers' enterprises in Jhenaidah and Magura districts during 1 January-31 December 2012. As per MOU between AAS and PRICE, AAS agreed to perform the relevant tasks under the joint initiatives of AAS and PRICE and they are: (a) Baseline, assessments and enlistment; (b) Technical and business training;(c) Demonstration, exposures trips, marketing and business linkage, pond site advices, lesson learning capture etc To perform the enlisted tasks, AAS implemented the following activities in collaboration with PRICE:

Three members working team and additional staff of AAS in collaboration with 40 coordinators of 20 commercial fish farmers' groups were undertaken the assigned intervention/activities under the overall supervision of Aquaculture Consultant (Short term) and in consultation with

team leader, Aquaculture, PRICE during the approved project cycle (1 January-31 December 2012) in Magura and Jhenaidah districts.

At the beginning of the project cycle the working team in collaboration with AAS staff, a total of 70 communities were identified and later 20 communities were selected for implementation of the approved aquaculture project on improved fish culture system management in eight upazilas of Jhenaidah (6 upazilas) and Magura (2 upazilas) districts. After selection of 20 communities' project group organizers and AAS relevant assigned staff were enlisted 50 relevant and interested fish farmers at each selected communities for conducting 3 days training and follow-up activities in Jhenaidah and Magura districts.

Project staff in collaboration with AAS assigned staff conducted group meeting on the pre-decided issues and selected 1000 fish farmers participated in the meeting (50 fish farmers/group) at 20 selected communities in Jhenaidah and Magura districts. At the end of the meeting, participated members of the commercial fish farmers group selected two group coordinators for each group. Later project staff finalized the training schedule (date, venue, time etc) for 3 days for each group on improved fish culture system management and resolved the group meeting at each community.

The Aquaculture consultant (K.M. Alauddin) in collaboration with group organizers, group coordinators and assigned AAS staff conducted 3 days participatory training on "Improved fish culture system management" on pre-decided schedule at the selected venues for 20 fish farmers groups in Magura and Jhenaidah districts. In the participatory 3 days training course, the important topics covered relevant to intensive pond psiciculture and they are: (a) Fish pond and their management, (b) Fish fingerlings stocking; (c) Pre and post fingerlings stocking fish pond management; (d) Indentification of symptom and cause of various problems and their solution during pond fish culture; (e) Fish health management; (f) Fish harvesting and post harvesting management; (g) Fish cultural methods: (i) Fish fattening; (ii) Improved carp polyculture; (iii) Improved Thai Koi culture; (iv) Improved Mono-sex Tilapia culture; (iv) Improved Pangas culture, and (v) Improved fish fingerlings production method. Among those five methods of fish culture, special emphasis was given to introduce the fish fattening method in Jhenaidah and Magura districts. Post training, pond site advice, demonstration and monitoring were administered at the 20 project communites in Magura and Jhenaidah districts by the project group organizers and AAS assigned staff. It is reported that about 100 fish farmers have undertaken initiative to introduce fish fattening strategy in their fish ponds with selected fish carps with several limitations (Lack of desirable pond water depth, lack of confidence on fish fattening technology, lack of security for rearing in fish pond, risk for higher investment for long time etc).

(c) Follow-up initiatives in Natore district

AAS in collaboration with PRICE trained 1000 fish farmers at 20 communities in Gurudaspur upazila of Natore district during 1 July-31 December 2011. As follow up activities, AAS was undertaken the following initiatives in Natore district during 1 January-31 December 2012.

Monitoring, motivation and scale-up: AAS assigned field staff has undertaken for routine monitoring in collaboration with PRICE assigned consultants. AAS staff also undertaken motivational activities on fish fattening strategy in other potential pond fish culture areas within Natore district. Large number of fish farmers visited the fish fattening ponds and exchanged experience from Bogra, Pabna, Rajshahi and Natore districts through exposures visit arranged by PRICE as well as by AAS assigned staff. AAS also distributed leaflet and guidelines on pond fish fattening strategy.

Economics of fish fattening technology: Fish fattening technology with carps' polyculture evolved in chaplia union of Gurudaspur upazila under Natore district during 1985-1995. This pond fattening technology was evolved by the innovative fish farmers as higher fish biomass production with higher profit and large size of harvested fishes in comparison with the existing carp polyculture method. In case of fish fattening technology, fish farmers in Natore district stcok small fish (average about 200gm/fish) of the selective carps (Rohu, Catla, Silver Carp, Marigal, Common Carp, Grass Carp, Kalibaus etc) and provide improved fish pond management practices. AAS has been working with those innovative fish farmers for documenting the production practices package for fish fattening techniques with an objective to fine-tune the fish fattening technology from 2010. As part of the documentation and production package improvement, AAS has undertaken a comparative economic analysis for fish fattening method and intensive carps polyculture methods during 2011-12 fish farming season. The net-income for fish fattening method is estimated about 50.33% and 566.87% higher than intensive carp polyculture (Method-II) and traditional carp polyculture (Method-III) respectively. Total cost for fish fattening method is estimated about 63.05% and 115.13% higher than method-II and method-III respectively. Total reported fish production for fish fattening method is estimated about 7.48% lower than method-II and 55.76% higher than method-III. But average fish price for fish fattening method is estimated about 41.93% and 79.27% higher than method-II and method-III respectively. Gross income for fish fattening method is estimated about 58.57% and 177.90% higher than method-II and method-III respectively. Comparative cost, fish production, average fish price, gross income and net-income of three pond fish culture methods are provided in Table.2.

Table.2: Comparative cost, fish production, average fish price, gross income and net-income of three pond fish culture methods (AAS, 2012)

SL #	Cost Item	Method-I[2/]	Method-II[3/]	Method-III
1.	Total Fish Production (Kg./ha)	11565	12500	7425
2.	Total Cost (Tk./ha) on full cost basis	1127845	691740	524253
3.	Average Fish Price (Tk./Kg)	147	85.36	82
4.	Gross Income (Tk./ha)[1/] (Total fish sale)	1692000	1067020	608850
5.	Net-Income (Tk./ha)	564155	375280	84597
6.	Benefit-cost ratio	1.50	1.54	1.16

[1/] Excluding income from embankment of horticultural crops (eg. Banana, Jujube etc)

[2/] Average of 3 sources data

[3/] About 31% Tilapia production estimated of the total fish production

Method-I: Fish fattening with stocking of small fish of carps (Rohu, Catla, Silver, Mrigal, Common Carp, Grass Carp, Kalibaus etc) and improved fish pond management practices and average small fish weight is about 200 gm/fish with ranging from 150-350gm/fish

Method-II: PRISM Bangladesh's pond fish cultural practices for carps & other fishes with improved management practices

Method-III: Carps poly culture with stocking of fingerlings with improved fish pond management practices

An Agricultural Study in Dinajpur District

An agricultural study was conducted to assess the current agricultural situation for developing projects on sustainable high value agricultural programs on crops and fish in Phulbari, Parbotipur, Birampur, Nawabganj, Hakimpur and Ghoraghat upazilas of Dinajpur district under the funding support from Research & Development Centre (RDC) during June-October 2012. As per the approved study design, major data and information collected from farmers through administering 23 FGDs (Focus Group Discussions) at 23 communities in Phulbari, Parbotipur, Birampur and Nawabganj upazilas during 11 June 2012 to 7July 2012 and other relevant information/data collected from public sector key informats (DAE, Department of Fisheries, BMDA, BADC, Department of Food) along with the inputs suppliers and outputs buyers, Rice Millers, innovative farmers etc in Phulbari, Parbotipur, Birampur, Nawabganj, Hakimpur and Ghoraghat upazilas of Dinajpur district.

A total of 440 farmers including 59 female farmers (13.41%) participated at 23 FGDs in 4 study upazilas in Dinajpur district. Day long 23 FGDs were conducted at 23 communities through open discussion at plenary and participatory maner. During open discussion at plenary, the relevant data/information was collected and recorded on the basis of participated farmers' opinion, claimed, suggestion, recommendation etc at 23 FGDs. Moreover, each FGD was conducted following the AAS developed "Process and Approach" of FGD along with the pre-decided fixed discussion guidelines and under the two stages of implementation of FGD such as (a) Pre-implementation process and (b) implementation process of FGD. Later, the study team analysed and summarized the collected data and information for report preparation. However, the consultant of the study team prepared the final report for submission to RDC.

The study team collected data for cost and return analysis of the selected 34 crops and their 65 varieties using AAS developed standard format at the selected communities in 4 study upazilas of Dinajpur district. The study team administered the data compilation, data summarization and analysis of 23 FGDs. Similarly, the team members cleaned the cost and return field data of the 34 crops. Collected relevant data including cost and return analysis data were entered in MS Excel spread sheet and analysis was done using MS Excel and SPSS. After analysis the cost and return data, the study team members prepared the summary tables for the report prepartion for submission. However, the consultant prepared the report on cost and return analysis of the existing crops in six upazilas of Dinajpur district.

Effectiveness of Food Grain Procurement System of Bangladesh

A research was undertaken to further investigate the effectiveness of public food grain procurement system by Agricultural Advisory Society (AAS) in collaboration with Department of Agricultural Statistics, Shere-e-Bangla Agricultural University (SAU) with the assistance of PRODIP (Promoting Democratic Institutions and Practices) program (Contract: LOC-2012/April, 2012 and Duns # 731575598) of The Asia Foundation by The United State Agency for International Development (USAID) and The United Kingdom's Department for International Development (UKaid).

Domestic food grain procurement serves the major two fold purpose building rice safety stocks for the public food grain distribution system (PFDS) and of providing support price to farmers safeguarding a minimum level of income from rice production. The National Food Police Plan of Action (2008-2015) recognizes the importance of enhancing the effectives of the public procurement system and providing effective support to producers' prices, while ensuring stable prices of the food for the consumers.

The purpose of the study was to inform the members of parliament (MPs) and other stakeholders about the efficacy, transparency and accountability of the existing food grain procurement system in supporting food grain prices and actually supporting farm incomes, and there by help MPs to perform their legislative responsibility and play oversight roles in their respect based on field-level research and accompanying policy recommendations. This was a survey based exploratory as well as explanatory social research that accommodates the role played by the officials of DG Food, farmers, traders, millers and members of civil societies. For relevant data collection several methods were used such as interview, content analysis, internet search, sample survey, focus group discussion (FGD), and key informants interviews (KII) etc in the study areas. The research was conducted during 1 April-31 December 2012.in five districts (Dinajpur, Bogra, Tangail, Netrokona and Mymensingh) where food grain production is reported surplus Field study (research data/information collection) was conducted during May to August 2012. The survey was conducted with 800 respondents, of which 500 farmers, 100 traders, 100 millers and 100 officials of DG food in five project districts. Since all activities of procurement as per domestic procurement policy is centred on LSDs (local supply depots). Hence LSDs has taken as unit of analysis and accordingly 30 LSDs were selected for the survey surrounded by 90 villages within 90 unions in five project districts.

Effectiveness was analyzed at 5 levels of operations such as 1) Farmers, 2) Traders, 3) Millers, 4) LSDs, and 5) National levels. Their performances are as follows:

- Direct purchase of paddy from farmers was found only in10 LSDs out of 30 sample LSDs. Among 500 farmers only 90 farmers (18%) supplied on an average only 23.31 monds per farmer ranging from 6-65 monds. Records showed that small and medium farmers supplied more as compared to marginal and large farmers.
- No direct supply was observed from traders. They supplied some paddy through millers, It is observed that on an average a trader supplied 102.49 monds in the whole to LSDs during whole season while their weekly average transaction is 514.6 monds
- Millers supplied rice as per contract with them
- Performance of LSD is highly satisfactory. It was observed that 10 LSDs fulfilled 100% procurement targets and the rest varied from 60-95%
- Time series data showed that procurement of food grain varies from 40 to 95%. Performance was satisfactory in 1996, 1999, 2000 and 2012 only

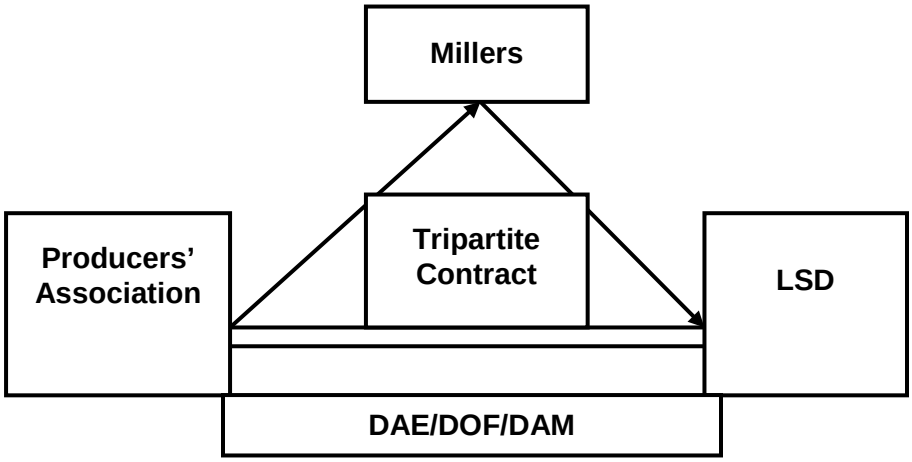
In course of investigation and review of literature the researchers identified three alternative system of procurement viz.

1) Present System: Fine-tuning the systems,
2) Direct procurement of only rice from the millers through competitive bidding system,
3) A tripartite contract production and supply system (farmer $\Rightarrow$ millers $\Rightarrow$ LSDs) from procurement centre established in specific production site

to perform the task in time and quality and assessed their support among different stakeholders of procurement system. Findings are as follow: It is observed that 68.52% farmers, 83.00% traders, 32.00% millers and surprisingly 43.00% procurement staff were in favor of this option. Among those who (502) favor Contract Production and Procurement 68.52% were farmers,

16.53% traders, 6.32% millers and 8.56% procurement staff. Out of total 800 respondents, 62.75% respondents supported for a tripartite contract production and supply system, 33.75% supported for present system with fine-tuning and only 3.50% supported for direct rice procurement through bidding.

Tripartite contract rice production and supply system (Model)



Baseline Survey for AAPI-Walmart Foundation Activity

The baseline survey conducted at 329 villages within 69 project clusters, spread across 32 upazilas in 12 districts under Barisal, Khulna and Dhaka divisions. The 12 project districts are divided into two geographic locations for the AAPI Walmart Foundation Activity. These are FtF districts (Barisal, Pirojpur, Bagerhat, Khulna, Satkhira, Jessore, Jhenaidah, Chuadanga, Meherpur and Rajbari districts) and M&S districts (Mymensingh & Sherpur districts). The baseline survey was conducted at 69 villages by a trained 15 member survey team under the leadership of the consultant. The primary data of baseline survey were collected from 970 female respondents (658 respondents in FtF districts and 312 respondents in M&S districts) through interviewing and using a questionnaire under the guidelines and supervision of the consultant during 12-27 September 2013.

After receiving the reviewed and completed questionnaires were primary checked by a trained enumerator followed by final checking by the Data manager under the overall supervision of the consultant before entering the data.The recorded data were coded in code sheets according to a comprehensive code plan. The data were edited rigorously by the data manager to make correction of any inconsistencies in data during their entry and to minimize non-sampling error of the study. Data was further edited to have complete, consistent, accurate and homogenous data after their entry. Edited and coded data were processed in the Microsoft Access. The entire analysis of data was performed by using a computer package, called Statistical Package for Social Science (SPSS.11.5). A simple tabular technique was used in the study for presentation of the data and to classify the data into meaningful categories with estimation of statistical parameters and for presentation in require purposes including final report preparation. Consultant of the baseline study team prepared the final report for submission to AAPI, IFDC, Dhaka.

Scaling up of CIMMYT videos in Bangladesh

As per agreement between the International Maize and Wheat Improvement Centre (CIMMYT) and Agricultural Advisory Society (AAS), CIMMYT was engaged AAS to scale-up and disseminate the video “Grow More, Save More, Earn more and associated CSISA-BD released videos on rice seed health to increase farmer and tillage service provider awareness of appropriate-scale machinery, conservation agriculture, Rabi season crop intensification, and good agricultural practices in the 11 project districts of the four CSISA-BD innovation hubs of Jessore, Khulna, Barisal and Faridpur within FtF zone in the south of Bangladesh. During implementation of the video show research project, the emphasis has given on the scaling-up the video “Grow More, Save More and Earn More” in 11 southern districts under Jessore, Khulna, Faridpur and Barisal CSISA-BD hubs. The project on the CIMMYT videos show was coducted in 11 districts under 4 CSISA hubs (Faridpur hub**:** Faridpur, Gopalganj & Rajbari districts; Jessore hub**:** Chuadanga, Meherpur & Jessore districts; Khulna hub**:** Khulna & Satkhira districts; and Barisal hub**:** Barisal, Patuakhali & Bhola districts) during 1 September to 31 December 2012.

Total of 86194 audiences (22% female audiences) watched video shows at 332 events at 332 communities in 151 unions in 44 upazilas of 11 districts under 4 CSISA-BD hubs. The project coordinator prepared the final report on the accomplished activities of video show project for submission to CIMMYT.

Scaling up of CIMMYT and CSISA-BD videos in Bangladesh

As per agreement between the International Maize and Wheat Improvement Centre (CIMMYT) and Agricultural Advisory Society (AAS), CIMMYT Was engaged AAS to scale-up and disseminate the video “Scaling up the video Save More, Grow More, Earn More and selected videos under CSISA-MI project to promote the use of the CSISA-MI machineries and irrigation pumps through increasing awareness and motivation on CSISA-MI’s resource-conserving machines such as seeder-fertilizer drills (PTOS), raised bed planters, reapers and surface water low lift irrigation pumps such as the Axial Flow pump in combination with lay flat hose pipe (LFHP) among the farmers through video show and practical machinery demonstration in 11 Feed the Future (FtF) districts (Implemented in 16 districts) within Jessore, Khulna, Faridpur and Barisal CSISA-BD hubs in southern regions of the country. The project on CIMMYT videos show was conducted in 16 project districts under 4 CSISA-BD hubs (Jessore hub: Chuadanga, Meherpur & Jessore districts; Khulna hub: Bagerhat, Khulna & Satkhira districts; Faridpur hub: Rajbari, Faridpur & Gopalganj districts and Barisal hub: Barisal, Pirojpur, Jhalokathi, Patuakhali, Borguna, Bhola & Madaripur districts) during 15 October 2013-15 February 2014.

Total of 25835 audiences (8% female audiences) participated at 150 video show-cum training events at 150 communities (149 villages) in 111 unions in 52 upazilas of 16 project districts under 4 CSISA-BD hubs. The project Central Coordinator prepared the final report on the video show cum training project for the period of 26 September 2013-31 March 2014 for submission to CIMMYT.

Cost and Return Economic Analysis of Existing Crops in Dinajpur District

Large number of crops is grown in Dinajpur district, the latest information from farmers on yield, cost and return, and price of those existing crops should be available for developing the project on high value irrigated intensive cropping system in Dinajpur district. Accordingly, the study

team has undertaken initiative to collect the relevant primary data for cost and return economic analysis of the existing crops and their varieties in four upazilas of Dinajpur district.

The study team collected primary data for costs and returns of 37 crops including seed production with one crop and their 68 varieties using one page structured questionnaire developed by Agricultural Advisory Society (AAS). Data were collected from the successful farmers at the selected communities in Phulbari, Nawababganj, Parbotipur and Birampur upazilas of Dinajpur district. Collected data were cleaned for analysed and entered in MS Excel spread sheet and analysis was done using MS Excel and SPSS.

Summary report on 37 crops with their 68 varieties was prepared for developing project on high value irrigated intensive cropping system Phulbari, Nawababganj, Parbotipur and Birampur upazilas of Dinajpur district. Summarizing costs and returns analysis for 37 crops (36 crops and 1 seed crop) and their 68 varieties is presented in the report. Out of total 37 crops, the highest crops were with vegetables (22) followed by cereal (4), Spices (3), Pulses/oil seed crop (2), and vegetable seed/Fiber crop/Fruit/Root crop (1). The highest number of varieties involved with vegetables (33) and least with four crop types (1).

Cost and return analysis was conducted for (a) 22 vegetable crops (Bringal, Taro-Mukhi, Taro-Loti, Cucumber, Country Bean, Tomato, Couliflower, Pumpkin, Radish, Bitter gourd, Cabbage, Potato, Bottle gourd, Okra, Spinach, Yard Long Bean, Ribbed gourd, Pointed gourd, Amaranth Lalshak, Amaranth Katoa Danta, Indian Spanach and wax gourd), (b) 4 cereal crops (Boro rice, T. Aman rice, Maize and Wheat), (c) 3 spices (Chili, Onion and Turmeric) (d) 1 vegetable seed (Bitter gourd), (e) 1 fibre crop (Jute), (f) 1 fruit crop (Banana), (g) 1 root crop (Sweet Potato), (h) 2 pulse crops (Mash Kalai and lentil) and (i) 2 oil seed crop (Soybean and Mustard).

Cost and Return Economic Analysis of Non-Rice Crops in Southern Regions

Large number of non-rice and cash crops are grown in the southern regions of Bangladesh, the latest information from farmers on yield, cost and return, and price of those targeted crops should be available for the benefit of extensionists, traders, exporters, farmers, policymakers, bureaucrats, project staff and the relevant other users. Accordingly, AAS has undertaken initiative to collect the relevant primary data for cost and return analysis of those targeted crops and their varieties in 15 districts within 20 FtF districts in southern regions during May-July 2012.

AAS staff collected primary data for costs and returns of 62 crops including seed production with 9 crops and their 129 varieties from 889 farmers using one page structured questionnaire developed by AAS. Data were collected from the successful farmers at the selected communities in 15 districts in southern regions of Bangladesh: Meherpur, Chuadanga, Jhenaidah, Magura, Jessore, Khulna, Satkhira, Bagerhat, Faridpur, Barisal, Patuakhali, Bhola, Gopalganj, Madaripur and Narail districts. These 15 districts are among USAID's Feed the Future (FtF) targeted 20 districts in southern regions of Bangladesh. Collected data were clean for analysis and entered in MS Excel spread sheet, and analysis was done using MS Excel and SPSS.

Summary report on 62 non rice crops with their 129 varieties was prepared for distribution among the interest persons, projects and organizations. Major findings of the cost and return economic analysis of 62 non-rice crops are presented in the final summary report. Out of total 62 crops, the highest crops were with vegetables (33) followed by seed crops (9), spices (6), fruits (4), pulses/oil seeds (3), cereals (2) and fibre/sugar crops (1). The highest number of

varieties involved with vegetables (75) and least number of varieties involved with sugarcane (1). Crop type-wise number of crops and their number of varieties and the number of farmers interviewed are provided below:

Cost and return analysis was conducted for (a) 33 vegetable crops [Brinjal, Winged yam, Pointed gourd, Bitter gourd (large), Bitter gourd (small), Radish, Ribbed gourd, Yard long bean, Turnip, Green papaya, Spinach, Elephant foot, Teasle gourd, Snake gourd, Knolkhol, Amaranth (Lalshak), Amaranth (Data), Taro (Mukhi), Cauliflower, Wax gourd, Potato, Country bean, Cucumber, Plantain, Tomato, Pumpkin, Bottle gourd, Indian Spinach, Taro (Loti), GimaKolmi, Okra, Sponge gourd and Cabbage], (b) 4 fruit crops (Papaya, Melon, Banana and watermelon), (c) 6 spices (Corriander, Fennel, Chilli, Onion, Garlic and Turmeric), (d) 3 pulses (Lentil, Mungbean and Chickpea), (e) 3 oilseeds (Mustard, Seasame and Groundnut), (f) one fibre crop (Jute), (g) One sugar crop (Sugarcane), (h) two cereal crops (wheat and maize) and (i) 9 seed crops [Onion, Yard long bean, Spinach, Bottle gourd, Ribbed gourd, GimaKolmi, Indian Spinach, Amaranth (Lalshak) and Okra].

Case Study on Mechanical Seeders in Bangladesh

Dr. Jeffery Bentley, Agro Insight and harun-Ar-Rashid, Agricultural Advisory Society (AAS) conducted the case study with 12 groups of people and organizations those received copies of CIMMYT DVD and six leaflets on the subject in Faridpur, Rajbari, Chuadanga and Meherpur district during 10-25 July 2013. The case study was conducted with funding support from MEAS/USAID in collaboration with CIMMYT, Agro Insight and AAS. The published MEAS case study # 6, entitled “The Story of a Video on Mechnical Seeders in Bangladesh: If we are convinced, we will buy it.

Women in Seed Entrepreneurship (WiSE), Project

As per agreement between AAS and RDA, AAS has been implementing a project on “Women in Seed Entrepreneurshipe (WiSE) at 15 communities in Gangni upazila of Meherpur district since October 2013 for producing quality seed for about 15 type of open pollinated (OP) vegetable crops through technical support under the funding support from IFC/SEDF in collaboration with RDA, Bogra and in association with Krish Sheba.

AAS in collaboration with RDA, Bogra and in association with Krishi Sheba conducted 3 days training for 15 women seed farmers’ commercial groups on seed production of targeted 14 OP vegetables (Indian Spinach, Leafy Amaranth, String bean, Bottle gourd, KangKong, Spinach, Country bean, Snake gourd, Stem Amaranth, Sweet gourd, Brinjal, Okra, Bitter gourd and Sponse gourd) at 15 communities in Gangni upazila of Meherpur district during November-December 2013 on seed production, Seed processing and Seed preservation. Total of 600 seed farmers (300 women and 300 men) received the participatory training as half family approach (Husband & Wife) at their communities in Gangi upazila of Meherpur district.

AAS has established 300 seed production plots with selected nine OP vegetables (Leafy Amaranth, Indian Spinach, Bottle gourd, Kangkong, Snake gourd, String bean, Spinach, Sweet gourd and Country bean) at 15 communities in Gangni upazila of Meherpur district. Project supported for seed and Chemical fertilizers for the involved seed production vegetable crops Agronomist/Seed Production Specilaists of AAS and Krishi Sheba have been providing in field technical advice along with administering the field monitoring at seed production plots of the trained seed farmers in Gangni upazila of Meherpur district.

AAS in collaboration with Krishi Sheba has been helping the seed farmers to sell their producing seed through the existing marketing channels in the country. Besides, the existing marketing channels, Krishi Sheba in collaboration AAS have been procuring the project produced seed from the project trained seed farmers for selling trhough the selected seed companies (e.g. Mallika Seed Co.) and large seed dealers all over the country mainly as bluk (2-100 Kg Pack) on demand-led and contractual agreement. In this regards, after procurement of the quality seed, Krishi Sheba have been delivering the required quantity of seed to the seed company/dealer after processing and declaring the seed quality as per seed standard. AAS claims that such bluk seed supply chain for the OP vegetable seed would be a model for quality seed supply in the country.

Delivery of High Zinc Rice in Bangladesh

An Agreement Between Centro Internacial de Agricultura Tropical ("CIAT'') and the International Food Policy Research Institute (IFPRI)-HarvestPlus Challenge Program and Agricultural Advisory Society (AAS) (the Collaborator) was made to demonstrate and Create awareness on adopting high Zinc rice cultivars among the end users in Magura (Salikha and Sadar upazilas) and Kushtia (Mirpur and Kushtia Sadar upazilas) districts for the 7 months project period during 15 November 2013 to 15 June 2014.

The summary progress of the approved activities of the approved project on Delivery High Zinc Rice in Bangladesh from 15 November 2013 to 31 March 2014 is presented below:

1. Selected and enlisted 100 farmers at 4 clusters (26 villages) in Salikha & Sadar upazilas of Magura district and Mirpur & Sadar upazilas of Kushtia district in collaboration with DAE by the end of November, 2013.
2. Collected and distributed 400 kg seed of High Zinc Rice Line 2 (HZRL2) among 100 selected farmers in 4 upazilas of Magura and Kushtia districts in collaboration with DAE.
3. Established and monitored 100 seedbeds of HZRL 2 with 100 selected demo farmers in 4 upazilas of Magura and Kushtia districts
4. Established 100 demo plots with 100 demo farmers at 26 villages (4 clusters) in 4 upazilas under Magura and Kushtia districts.
5. Placed 100 digital signboards at 100 demo plots in 4 upazilas of Magura and Kushtia districts
6. Implemented one day training for100 demo farmers (25 farmers /training) during 27 January 2014 - 2 February 2014 in 4 project upazilas of Magura (Salikha & Magura sadar upazilas) and Kushtia (Mirpur & Kushtia sadar upazilas) districts.
7. Implemented 3 field monitoring (one on seedbed and two on the established main field) by the project staff of AAS

Future scope of activities

AAS has short and long term plan to implement demand-led various agricultural project/program activities in future in its working areas on the basis of fund resources availability. The major plans of activities of AAS under various demand-led issues are mentioned below:

(I) Extension of working areas

Besides the existing working areas, AAS will give emphasis to implement its project activities in coastal regions (Southwest, South central and Southeast), non-coastal chars in various rivers (e.g. Tista, Jamuna, Padma etc), hill tracts and haor areas in greater Sylhet districts, Netrokona and Kishoreganj districts.

(II) AAS partner NGO network

AAS has been strengthening and expanding its "partner NGO network" all over the country since 1989. On the basis of 30 years experience, AAS has developed its strategy on partner NGO network to work with small local grass root level NGOs those who are close to rural farmers at its surrounding communities.

(III) Community based organizations (CBOs)

AAS has developed its strategy to work with CBOs for implementation of various project activities as cost-effective and sustainable way. In this regards, AAS will give emphasis more in coastal regions, hill tracts, non-coastal chars, haors and high value agricultural (crops, fish, livestock) production pockets in the country to develop CBOs network for implementation of the project activities in sustainable way and cost-effective manner. AAS has planned to establish a CBO foundation as an umbrella or apex organization under the support of AAS.

(IV) Farmers group formation

Besides the existing farmer groups with PNGOs, AAS will establish resource poor farmer groups on the basis of donor funded future projects. Each established and developed farmers group will be transformed as CBO on long term sustainable basis on the participation of group members and their demand-driven basis.

(V) Developing skill of farmers

AAS will take initiative to develop skill of partner farmers on agricultural activities in collaboration with PNGOs and member CBOs of the established network in the working areas of the country under the external funding support.

(VI) Uptake high value crop varieties

(i) Introduction of high value crop varieties in collaboration with private seed companies in AAS working areas;
(ii) Introduction of high value crop varieties in coastal and non-coastal chars;
(iii) Introduction of high value homestead agriculture including attached and detached small plots;
(iv) Introduction of high yield crop demonstration and production practices strategy;
(v) Introduction of irrigated intensive crop production management system

(VII) Uptake of high value fruits

(i) Establishment and development of orchard for Jujube, Litchi and Mango with the high yielding and better quality varieties along with improved management practices including human health hazard free plant health management;

(ii) Improved Banana and watermelon production practices;

(iii) Improved post-harvest management practices

(VIII) Seed production

(i) Selected OP vegetables seed production, processing and preservation in Chuadanga and Meherpur districts for bulk marketing to seed companies and dealers using the involved and trained contract farmers;

(ii) Scale-up improved Onion seed production (Both Taherpur and Shuksagor Varieties) through contract farming system for private seed companies and dealers;

(iii) Scale-up FARMSEED approach for rice and non-rice crops;

(iv) Commercial seed production of inbreed and hybrid rice through contract farming on contractual basis with seed companies;

(v) Finalize seed production manual of F_1 rice hybrids

(IX) Irrigation and water management

(i) Scale-up improved in-field irrigation technique through demonstration;

(ii) Demonstration of best-practice in command area development;

(iii) Scale-up small scale irrigation with Buried Pipe irrigation system (BPIS) using LLP with intensified cropping preferably in south central and southwest coastal regions;

(iv) Piloting AFP and STW irrigation in southwest and extreme south;

(v) STW irrigation system with lay flat hose pipe for non-coastal chars in major rivers

(X) Aquaculture

(i) Improved management for fish seed production;

(ii) Improved nursery management for quality fish fingerling production;

(iii) Intensive pond carp poly culture;

(iv) Intensive pangus culture;

(v) Intensive GIFT Tilapia pond culture;

(vi) Intensive shrimp culture;

(vii) Rice shrimp/fish culture;

(viii) Intensive Koi, Shing and Magur culture;

(ix) Improved fish culture in large closed water body

(x) Scaling-up pond fish fattening method

(XI) Promotion of hybrid rice

(i) Manual preparation on hybrid rice seed production;

(ii) Demonstration on yield maximization of F_1 rice seed production;

(iii) Varietals performance farmers' participatory field trial;

(iv) Yield maximization trial on rice hybrids;

(v) Supporting for policy recommendations for enhancing rice hybrid technology through large scale dissemination in the country such as development of demand-led rice hybrids, rice hybrid release guidelines, hybrid rice seed production system development etc

(vi) Conducting study on demand driven issues on hybrid rice technology

(XII) Plant health management initiative

(i) Scale-up plant clinic operation using selected 4 methods/approaches with the relevant local service providers with donor funding support;

(ii) Fact sheets preparation and distribution for most of the crops as soft copy & hard copy among the trained community plant doctors (CPDs) and interested farmers preferably on cost basis ;

(iii) Trained more than 3000 CPDs on plant clinic operation under external funding support;

(iv) Validating safe pest management recommendations through farmers participatory demonstration as block basis at community;

(v) Developing strategy for commercialization of plant clinic operation at community in Bangladesh.

(XIII) Scale-up integrated plant nutrient management (IPNM)

(i) BRRI/AAS/PETRRA developed farmers' participatory IPNM approach with minimum soil test can be scale-up nation-wide through long term donor funding support to increase the productivity of rice-based cropping.

(XIV) Coastal agricultural production system

(i) Farmers' participatory sustainable rice production management package(s) development through blending the practices from formal and informal sources and scale-up in unfavorable saline areas of southwest coastal region of Bangladesh;

(ii) Farmers' participatory introduction of salt tolerant crop cultivars in south coastal regions in Bangladesh;

(iii) Participatory sustainable production management package(s) development for non rice crops in south coastal regions;

(iv) Introduction of high value cash crops through farmers' participatory field demonstration in CDSP protected chars in southeast coastal region;

(v) Scale-up floating bed high value and health hazard free crop production and marketing through validation in selected areas in south central and southwest coastal regions;

(vi) Scale-up high value vegetables cultivation on the embankment of shrimp enclosure in southwest coastal region through demonstration.

(XV) Contract farming system

(i) Establishment of model and trusted (between producers and buyers) contract farming system for commercial crops, seed, fish and livestock along with marketing avenues for the farmers

(XVI) Promotion of fine and aromatic rice

(i) Scale-up as a high value fine and aromatic rice including BRRI dhan 34 through establishing linkages between farmers and millers on incentive basis

(XVII) Scale-up zero tillage Garlic production

(i) Fine tune farmer innovative zero tillage Garlic production package need to be scale-up in other similar land type areas of chalan beel as a high value crop through training by the innovative farmers and farmers' participatory demonstration.

(XVIII) Crop yield maximization

(i) AAS will undertake initiative on farmers' participatory yield maximization demonstration on location specific demand-led crops including rice in its working areas all over the country.

(XIX) Soybean introduction

(i) Soybean introduction initiative in Bangladesh is found as very discouraging during last more than 3 decades due to several reasons. Accordingly, AAS has strategic plan to introduce high yielding soybean varieties through establishing linkages between trained soybean farmers and commercial processing plant (solvent extraction plant) with donor funding support on long term basis.

(XX) Private R&D in Agriculture

(i) Private sector research in agriculture is at rudimentary stage due to several reasons. Under this circumstance, AAS would like to take initiative to motivate private sector players, public sector actors, GOB policy makers and donors to start research in agriculture with clear understanding about research outputs and business incentive for the private sector investors through arranging seminars/workshops with donor supports.

(XXI) Livestock program

(i) Introducing homestead small scale black Bengal Goat rearing with trained rural entrepreneurs mainly in southwest highland areas;

(ii) Scaling-up small scale cow fattening and milking cow rearing on commercial basis

(XXII) Value chain and supply chain

(i) Value chain and supply chain strategy for agricultural products such as crop, livestock and fishery

(XXIII) Agricultural research and development

(i) Climate change and its impact issues;
(ii) Agricultural issues;
(iii) Environmental issues;
(iv) Socio-economic issues;
(v) Coastal resources management issues;
(vi) Non-saline char land management issues

(XXIV) Climate change mitigation and adaptation strategy

(i) AAS will take initiative to develop adaptation and mitigation strategy addressing the impact of climate change in Bangladesh in short term and long term basis.

(XXV) Project inception, formulation, designing, benchmarking, implementation, monitoring, evaluation and impact study

(i) AAS will undertake such activities on the basis of contractual agreement with national and international organizations.

(XXVI) Training

(i) Intensive crop production management system;
(ii) Seed production technology;
(iii) In-field irrigation techniques for crop production;
(iv) Plant health management practices and approaches;
(v) Safe pest management practices;
(vi) Nursery and orchard establishment and management;
(vii) Homestead agricultural production system management;
(viii) Fish seed farm management;
(ix) Nursery management for fingerling production;
(x) Intensive pond and closed water body aquaculture management;
(xi) Dairy farming management;
(xii) Onion and Onion seed production;
(xiii) Zero tillage garlic production;
(xiv) Small scale Goat farming management

(xv) Practical salinity management in crop production;

(xvi) Hybrid rice seed production practices;

(xvii) CAD for irrigation system;

(xviii) Value chain and supply chain management for agricultural produces

(xix) Pond fish fattening management practices

(XXVII) Workshop and seminar

AAS conducts workshop and seminars for its projects and also with and on behalf of third parties on a contractual basis on the relevant and demand-led issues.

(XXVIII) IT center

AAS has a plan to establish IT centers at its working 3 zonal offices under donor funding support.

(XXIX) Technology transfer through video show

(i) AAS has plan to prepare motivational and training video on demand-led technologies
(ii) Conduct video show cum training on the selected technologies for their transfer

(XXX) Promotion of High Zinc Rice

(i) Promotion of high zinc rice varieties through field demonstration;
(ii) Scale-up the seed of high zinc rice varieties through FARMSEED approach;
(iii) Promotion of high zince rice through various motivational activities in the countries

(XXXI) Scale-up of Shuksagor Onion

(i) Scale-up of Shuksagor Onion through its seed production and distribution using FARMSEED approach;
(ii) Scale-up of Shuksagor Onion through demonstration of sustainable production practices with the strategies for bulb onion yield maximization

(XXXII) Study on privatization and commercialization on Agriculture

(i) Conduct study on the current status of agricultural production in country;
(ii) Conduct study on the contribution of relevant sectors in transformation of agriculture since 1990;
(iii) Conduct study on the current status of privatezation and commercilization on agriculture

Organizational Particulars

Year of Establishment: 1989

Chief Executive: Md. Harun-Ar-Rashid

Contact Person: Md. Harun-Ar-Rashid

Mailing Address

Head Office
Agricultural Advisory Society (AAS) House # 1/6 (Ground Floor), Block - G, Lalmatia, Dhaka-1207 Phone: 880-2-8113645 Mobile: 01712094218 E-mail: harunaas@gmail.com Web: www.aas-bd.org

Zonal Office	Area Office	
Northwest		
Agricultural Advisory Society (AAS) Mission Gate Bonpara, Boraigram Natore	Agricultural Advisory Society (AAS) College Road, Tarash Sirajganj	Agricultural Advisory Society (AAS) Ashutospur, Dipchar, Sadar, Pabna
	Agricultural Advisory Society (AAS) House # 19, Road # 1, C.S Road, Rangpur	Agricultural Advisory Society (AAS) Rangpur Road, Bangali Pur Saidpur, Nilphamari
	Niloy, Koigari, Gohail Road, Bogra-5800	
Southwest		
Agricultural Advisory Society (AAS) Sheikh Hati, Bablatola, Jessore Sadar Jessore	Agricultural Advisory Society (AAS) Abul Kashem Shorok, Sadar, Chuadanga	Agricultural Advisory Society (AAS) Adarsha Para, Jhenaidah Sadar Jhenaidah
	Agricultural Advisory Society (AAS) House # 7, Road # 113, Khalispur Housing Estate, Khulna-9000	Agricultural Advisory Society (AAS) WAPDA Building Satla, Uzirpur, Barisal
Northeast		
Agricultural Advisory Society (AAS) Siraj Nagar (Fakir Bari) P.O: Narain Chara-3211 Srimangal, Moulvibazar	Agricultural Advisory Society (AAS) Motkhola Road, Pakundia Bazar Pakundia, Kishoreganj	Agricultural Advisory Society (AAS) College Road Jamalpur
	Agricultural Advisory Society (AAS) 18 Mohilla College Road Sadar, Habiganj-3300	Agricultural Advisory Society (AAS) House # 12, Road # 5, Noakhali House Estate Noakhali

Legal Status

AAS's Registration information:

Organization / Authority	Registration's #	Date
i) NGO Affairs Bureau	No. 1015	Date: 4.3.1996/04.03.2011 (renewed)
ii) Society Registration, Joint Stock Companies	No. 1379 (13) 91	Date: 5.2.1991
iii) Seed Wing, Ministry of Agriculture	SPMI/0432/2000	Date: 3.1.2000

Partnership Status with Forum

Sl. No.	Status	Forum	Address
1	Apex NGO (AAS)	AAS partner NGOs Network (100 partners NGOs)	House # 1/6, Block - G, Lalmatia, Dhaka-1207 Phone: 880-2-8113645, E-mail: harunaas@gmail.com Web: www.aas-bd.org
2	Member	Bangladesh Seed Association (BSA)	145, Siddique Bazar (1st floor), Dhaka-1000 Phone: 880-2-9569677, 7112986 Fax: 880-2-956977, 9566196 E-mail: bsa7222@yahoo.com
3	Member/ Chairman	Bio-Village Forum (BVF) (50 members NGO forum)	House # 1/6, Block - G, Lalmatia, Dhaka-1207 Phone: 880-2-8113645, E-mail: harunaas@gmail.com Web: www.aas-bd.org
4	Member	Bangladesh Rice Foundation (BRF)	Flat No. B-1 (1st floor), House No. 7/5, Block-C, Lalmatia Dhaka-1207 E-mail: bsiddiqui04@yahoo.com
5	Member	Bangladesh Paribesh Andolon (BAPA)	9/12, Block-D, Lalmatia, Dhaka-1207 Tel: 8128024, 8113469 E-mail: bapa2000@gmail.com

District NGO Coordination Committee Membership:

Natore, Moulvibazar and Kishoreganj districts

Bankers

1. Arab Bangladesh Bank Limited, Dhanmondi Branch, Dhaka
2. Agrani Bank, Farmgate Branch, Dhaka
3. Islami Bank Bangladesh Limited, Dhanmondi Branch, Dhaka

Financing Institutions

List of financing institution for AAS's project activities support since 1989:

1. USAID/PRIP/PACT
2. PRICE/USAID
3. DSC
4. ASSP/DFID
5. CARE Bangladesh
6. PETRRA/IRRI/DFID
7. IRRI/EU
8. CABI, UK
9. GROS, Belgium
10. IRRI/BMGF (STRASA)
11. IFAD
12. DFID
13. Rutgers University, USA/BMGF
14. JOBS
15. Jamalpur Seed
16. HarvestPlus-BD
17. IFPRI
18. Mollika Seed Co.
19. PRISM Bangladesh/UNDP
20. PROVA/CIMMYT/University of Wales, UK
21. RDC
22. Ispahani Bio-tech
23. CIAT
24. IFDC
25. CIMMYT
26. PRODIP
27. The Asia Foundation
28. Agro Insight
29. MEAS
30. IFC
31. ACDF
32. SDC

Collaborating and sponsoring agencies

1. USAID	2. PRIP	3. PACT	4. DSC
5. ASSP	6. DFID	7. CARE Bangladesh	8. IRRI
9. PETRRA	10. EU	11. CABI, UK	12. GROS, Belgium
13. BMGF	14. STRASA	15. IFAD	16. Rutgers University, USA
17. JOBS	18. CIAT	19. PRICE	20. RDA
21. IFPRI	22. Mollika Seed Co.	23. PRISM Bangladesh	24. University of Wales, UK
25. PROVA	26. CIMMYT	27. RDC	28. Ispahani Bio-tech
29. BRRI	30. DAE	31. SAU, Dhaka	32. BAU, Mymensingh
33. BRF	34. CDSP	35. Seed Wing MoA	36. RDRS
37. BSMRAU	38. BADC	39. DLR	40. BARI
41. BINA	42. Northern University	43. BARC	44. Dept.of Fishery
45. Dept. of Forestry	46. Agro-Concern	47. Getco	48. PRODIP
49. Sarker Eng. Works, Bogra	50. Bangladesh Flower Society	51. Rashid Agro	52. Siddiquis Seed
53. BMI	54. SEDF/IFC	55. Hortex Foundation	56. IDE Bangladesh
57. ABSP-II, USAID	58. Innovation	59. Crop Protection Association	60. Jamalpur Seed
61. HarvestPlus-BD	62. Academy of Sci.	63. IPM CRSP	64. IFDC
65. World Concern	66. The Asia Foundation	69. WRC, Dinajpur	70. TCRC, Dabiganj
71. Agro Insight	72. MEAS	73. SDC	

The AAS Executive Committee (EC)

Name of Persons	Designation	Years of Term of Office	Occupation
Mr. Harun- Ar- Rashid	President	1991- till today	ED, AAS
Mr. Bazlur Rahman	Vice-President	September 2009- till today	Consultant, Hortex Foundation
Mr. Muktadir Ahmed	General Secretary	1995- till today	Proprietor, Brothers Polymar & Modern Pipe Industry
Mr. Khandoker Anisur Rahman	Assistant General Secretary	2004- till today	ED, PRISM Bangladesh
Mazibur Rahman	Treasurer	2010- till today	Proprietor, Jamalpur Seed
Md. Robiul Islam	Member	2010- till today	Associate Project Officer, UNFPA
Dr. Humayun Kabir	Member	2013- till today	Chief Technical Advisor, IPM Project, FAO, Afganistan

The AAS Advisory Board

Name of Persons	Designation	Occupation	Years of Term of Office
Dr. A. J. M. Azizul Islam	Director	Former DG BRRI	1996-till today
Prof. Dr. Shamsul Haque	Director	Vice Chancellor, Northern University	1996-till today
Carol M. Derrickson	Director	Educationist	1991- till today
William H. Derrenger	Director	Business Consultant	1991- till today
Md. Harun- Ar- Rashid	Director	Executive Director, AAS	1991- till today

Summary project/program activities

AAS has implemented large number of project/program activities since its inception in 1989 under funding support from various donors, relevant public organizations, private organizations, NGOs and AAS's own fund in collaboration with PNGOs, CBOs, farmers' groups, relevant organizations, civil society organizations all over the country. Major activities of AAS for last more than 10 years starting from 2003 are provided in Annex. II.

Staff strength

Besides its permanent staff, AAS employs from the enlisted personnel as per the requirements of its individual projects. Moreover, AAS also utilizes personnel on a voluntary basis and part time basis from its enlisted staff list. The personnel of AAS are posted at district, upazila, union and village levels to work in close contact with its client farmers, the resource poor.

AAS has a total of 71 staff, of which 30 full time and 41 part time and volunteer staff for implementing its program activities in 36 districts. Among the 41 part time staff, 9 consultants and 2 advisors, as well as volunteer and seasonal staff. Out of 71 enlisted staff, most of them are technical staff, specialized in Agriculture, Irrigation and water management, Environment, Seed technology, Aquaculture, Business Management, BDS, VC, SC etc. AAS personal are all experienced, highly qualified professionals in their own field, who contribute to the success of its projects and the development of Bangladesh's agricultural capacity. The AAS staff is fully committed to building the skill and technical capacity of poor farmers; to create wealth for them in order to improve their livelihoods. Our dedicated staffs play a key role in this and the list of staff and Key Staff assignments of AAS are provided in Annex. III & IV.

Gender Issues and Target beneficiaries

Resource poor farm families (RPFFs) in particular are the principal beneficiaries of AAS in its working areas. In general, all classes of farmers within the working areas are benefited from the AAS project activities. AAS provide the services on the basis of needs of RPFFs for increasing their agricultural production through introducing demand-led sustainable agricultural production strategy in their small plots. Thus AAS address the needs of RPFFs within the working areas. AAS sharply focuses its projects/programs in order to have a maximum impact on livelihood of rural resource poor female farmers. About 30% of the farmers groups' are women-led and their skill has developed by AAS in the working areas. It focuses the full weight of the resources in the exact areas, where rural women are able to participate most freely and be their most productive.

Thus the target beneficiaries are women, children and vulnerable section of the community of the rural area. The women section is selected considering their vulnerability in the rural community. The policy of the organization is to address the vulnerable issues in the community where the women and children are given top priority in getting the service of the organization to alleviate their poverty and ensuring their food security in general and wealth for in particular.

Management of AAS

The project Activities of AAS and policy planning are done by the Executive Committee headed by the president of the society. The Executive Committee is elected and approved by the General Committee. The Executive Director of AAS implements the activities of projects and programs through AAS staff and its partner organizations in the working areas. The Executive Director carries out the activities of AAS with the assistance of a group of professionals appointed by him and approved by the Executive Committee. The Executive Director is accountable to the Executive Committee, General Committee and Advisory board of the AAS. The hierarchy is strictly maintained according to the **organogram** of the organization. An **organogram** of AAS is provided in **Annexure.V.** The plan of activities is implemented according to the guideline of the organization through the field personnel and assures the best quality of outputs.

Monitoring, Evaluation and Reporting

The input and output is continuously monitored by the program personnel and evaluated according to the result oriented monitoring indicators (ROMI). The outputs are also evaluated by the sponsors according to their guidelines. Moreover, the donor-funded projects are monitored and evaluated on basis of agreed indicators at Goal, Purpose, Outputs and Activities levels of the logical framework of the projects. The monitoring and evaluation of the projects are implemented through using participatory approach. The monitoring and evaluation team is ensured, the participation of the primary beneficiaries during monitoring and evaluation of the progress and impact of the projects.

The monitoring, evaluation and reporting requirements for AAS's program initiatives are always carefully specified in each project's contract documentation and are usually based on the log frame that defines the level of resources being committed to each project and the expected, verifiable outcome of the project. Accordingly, AAS is accustomed to doing its work in the context of the customary, international standards of Monitoring, Evaluation and Reporting that are currently prevailing in the multi-national donor community.

In this regard, AAS is known to rigorously follow the Monitoring/Evaluation and Reporting requirements specified by each of its donor sponsors. Generally speaking, there is a brief inception/need assessment or benchmark survey report which describes the beneficiaries to be served; the work to be done, the resources being committed to the work, the specific work sites and activities to be undertaken during the course of the project (Work plan/Time Line). Consideration is given here to areas where problems may be encountered how these might be mitigated and also to whether subsequent phases of the project are contemplated. Finally, the initial report sets out the agenda of clearly defined; achievable and objectively verifiable project result/outputs to which AAS is committed.

With this as the backdrop, AAS normally provides its sponsoring funding agencies with quarterly progress reports that compare its projected results with the actual results achieved for each reporting period. AAS is accustomed to providing its donor sponsors with an externally prepared Certified Financial Report on an annual basis. At mid-term in each project (usually annually) AAS is accustomed to submitting its fourth quarter report as an internal evaluation report, which summarizes the project's achievements to date; detailing its successes and

failures. In addition, AAS is accustomed to giving its full cooperation to a mid-term or end of phase external evaluation which is initiated/scheduled and funded by the sponsoring donor

AAS Publications

AAS has published lot of its findings/outputs in various forms such as manual, reports, popular and scientific articles, published papers in scientific journal, proceedings, completion reports, progress reports, case study reports, seasonal reports, survey reports, study reports, assessment reports, performance reports, need assessment reports, workshop and seminar reports, research progress reports, mission reports, annual reports etc. The list of the selected publications of AAS since its inception in 1989 is provided in Annex. VI.

Financial status, experience and management

The financial transactions are maintained following the international accounting standards and rules of the government of Bangladesh. An annual audit is conducted at the close of every calendar year by the reputed audit firm.

The internal audit team periodically checks the financial transactions and justifies the utilization of fund and report to the Executive Director. The accounts and finance personnel control the fund utilization according to the budget and physical output. The external audit team of registered audit firm usually checks the books of accounts and records and report to the CEO. The Executive Committee, the Advisory Board and the General Committee of AAS approve the financial Audit report.

AAS Resources

Various resources of AAS have been using and accumulated in three working zones since its inception in 1989 and the list of various resources are provided in Annex. VII.

Benchmark survey

List of major Benchmark survey conducted by AAS is provided in Annex.VIII.

List of current referees

The following lists of current clients who can confirm AAS's competency in the designated areas are provided in Table.3.

Table.3: List of current or former referees

Dr. Noel P. Magor Head, Training Center International Rice Research Institute (IRRI) Los Baños, Laguna, Philippines E-mail: N.Magor@cgiar.org	Dr. Paul Van Mele Director, AGRO Insight Fuchsiastraat 112 9000 Ghent, Belgium E-mail: paul@agroinsight.com
Dr. Eric Boa Plant Clinic Head CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY-UK Phone: 01491-829069 E-mail: e.boa@cabi.org	Paula Kelly Plant Pathologist, Global Plant Clinic CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY-UK Phone: 01491-829069 E-mail: plant.clinic@cabi.org
Dr. Forrest E. Cookson Director, Research & Development center House # 14, Road # 25, Block-A Banani, Dhaka-1213 Phone: 8823011 E-mail: rdcenter@bol-online.com	Dr. David Gisselquist Independent Consultant 29 West Governor Road Hershey, PA 17033, USA Phone: (202) 473-3834, Fax: (202) 522-1159 E-mail: david_gisselquist@yahoo.com
Dr. Jeffery Bentley Agricultural Anthropologist & Consultant Global Plant Clinic, CABI Bakeham Lane, Egham, Surrey, TW20 9TY United Kingdom bentley@albatros.cnb.net	David J. Spielman Research Fellow International Food Policy Research Institute (IFPRI) 2033 K. Street, NW Washington, DC 20006-1002,USA Tel: +1.202.862.5600 E-mail: D.SPIELMAN@cgiar.org, www.ifpri.org
Dr. Elon H. Gilbert Consultant in Agricultural Development 27044 Graywolf Dr. Ariee, MT 59821 Tel/Fax: 1-406-726-3212 E-mail: elongilbert@me.com	Edward Mallorie Consultant, IFAD Via Paolo di Dono 44 00142 Rome ITALY Email: EMALLORIE@aol.com
William H. Derrenger Managing Director, Webex Ltd House # 8/7, Block - B, Lalmatia, Dhaka-1207 Phone: 880-2-8113645, Fax: 880-2-8117781 E-mail: webexltd@bangla.net	WILLIAM J. COLLIS House 22B, Road 7, Block-F, Banani, Dhaka 1213, BANGLADESH Tel: (+880-2) 881 3250, (+880-2) 881 4624 Fax: (+880-2) 881 1151 E-mail: wjcollis@gmail.com
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Prof. Shamsul Haque Vice Chancellor Northern University 19, Kazi Nazrul Islam Avenue EDB Bhaban, Kawran Bazar, Dhaka Mobile: 01713114732	Prof. Dr. Mahbubur Rahman Head, Department of Entomology BSMRAU, Salna, Gazipur Phone: 8122012 (Res), Cell: 0191340387 E-mail: dmr@bangla.net
Dr. Wais Kabir Executive Chairman BARC Farmgate, Dhaka Tel: 01713063781 Email: waiskabir@hotmail.com	Dr. Mohammed Zainal Abedin IRRI Representative for Bangladesh 104 Masjid Road, Banani DOHS, Dhaka 1206 E-mail: m.z.abedin@cgiar.org Phone: 8711991-2 Mobile: 01713069598

Dr M. Shahidul Islam Ex. Director General, BARI Gazipur, Bangladesh Phone: 8614661, Mobile: 0173002180	Dr. Mohammad Abdul Baque Ex. Director General, BRRI & Visiting Professor, Agro Processing, BSMRAU Tel: 880-2-8963465 Cell: 01922-870854 E-mail: baquiabdul@yahoo.com
Dr. Uma Shankar Singh South Asia Regional Project Coordinator, STRASA International Rice Research Institute (IRRI) 1st Floor, CG-Block, NASC Complex Dev Prakash Shastri Marg, Pusa New Delhi-110012, India Tel: +91-11-25843347, 25843801 Email: u.singh@cgiar.org	Dr. G.P. DAS Country Coordinator Agril. Biotechnology Support Project II (ABSP II) House #18, Road # 4, Sector 4, Uttara, Dhaka Phone: 8913064 Ext-109 E-mail: gpdas@agri.com
Dr. S.M. Monowar Hossain Managing Director, Hortex Foundation Sech Bhaban (3rd Floor, Western side) 22, Manik Mia Avenue Sher-e-Bangla Nagar, Dhaka-1207 E-mail: hortex@citechco.net; hortex@hortex.org Phone: 9125181 Mobile: 01199103344, 01711565731	Dr. Arun Kumar Saha Project Implementation Officer (Agriculture), Bangladesh Resident Mission, ADB Plot # E 31, She-e-Bangla Nagar Dhaka-1207, Bangladesh Tel: 815600 to 6016
Dr. M.A. Hamid Miah House 9, Road 23, Block-B, Banani Dhaka-1213 Phone: 8817639-40 E-mail: h_miah@bdonline.com	Dr. Sheikh Abdul Quader Proprietor, Agriconcern 67, Purana Paltan Line (2nd Floor), Dhaka-1000 Email: shaikh@aitlbd.net Tel: 9347921, Mobile: 01713015119
Dr. S.B. Naseem Vice President, EAL 25, New Tejgaon I/A, Dhaka-1208 Email: naseem.agro@energypac.com Tel: 9863334, 9863335 Mobile: 0171344327	B. I. Siddique Proprietor, Siddiquis Seeds Plot # 7, Block # A, Section # 11 Harun A1-Rashis Mollah Sarak, Mirpur, Dhaka 1216 Email: gdc@bol-online.com Tel: 8115697-8, Mobile: 01817141756, 01711545000
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Mr. A.K.M. Zakaria Director, Agriculture Rural Development Academy, Bogra Phone: 73601, 73602 E-mail: rda_bg2003@yahoo.com	Dr. M. A. Razzaque Executive Director, Lal Teer Seed Ltd Anchor Tower 1/1 B, Sonargaon Road, Dhaka 1205 Email: lalteer@multimodebd.com Tel: 8619521-2 Mobile: 01552372988
Md. Abdur Rahim President, Bangladesh Flower Society Godkhali, Jhikargacha, Jessore Email: nfs_bd2008@yahoo.com Tel: 04225-71611 Mobile: 01915468566	Mr. MA Kashem Mondol Managing Director Kashban Nursery 85, Indira Road, Farmgate, Dhaka Email: kashban11@yahoo.com Mobile: 01731807893
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Dr. Mofarahus Sattar Freelance Consultant Ottawa, Canada E-mail: mofasattar@gmail.com	Professor Dr. Alok Kumar Paul Department of Soil Science Sher-e-Bangla Agricultural University Sher-e-Bangla Nagar, Dhaka-1207 Cell: 0088-01715213083 E-mail: alokpaulsau@yahoo.com

Annex. I: Working areas (Villages, unions, upazilas and districts) of AAS and involved PNGOs

District	Name of Upazila	Nr. of Union	Nr. of Village	PNGOs (Nr.)
Zone-I: Southwest				
Satkhira	Kolarua, Sadar, Tala, Debhata, Kaliganj, Shamnagar, Ashashuni	27	61	9
Khulna	Fultola, Daulatpur, Sadar, Terokhada, Dumuria, Boitaghata, Dacop, Paikgacha, Koyra	21	56	7
Bagerhat	Sadar, Chitolmari, Fokirhat, Mollahat, Morolganj	16	46	5
Pirojpur	Motbaria, Najirpur, Sadar	3	5	1
Chuadanga	Sadar, Damurhuda, Jibonnogar, Alamdanga	13	23	5
Meherpur	Sadar, Gangi, Mujibnagar	6	19	3
Jhenaidah	Sadar, Kaligonj, Sailkupa	10	26	5
Jessore	Sadar, Bagherpara, Jhekorogacha, Kesobpur, Minirampur	8	12	4
Magura	Sadar, Salikha, Mohammadpur	13	22	4
Kushtia	Sadar, Mirpur	8	20	4
Barisal	Agailjhara, Babuganj, Banaripara, Sadar, Gouranadi, Muladi, Uzirpur	15	20	1
Barguna	Amtali	2	4	-
Bhola	Sadar, Borhanuddin, Charfassion, Daulatkhan, Lalmohan	12	20	2
Jhalokathi	Sadar, Nalchithi	2	4	-
Patuakhali	Dumki, Kalapara, Sadar	9	20	2
Faridpur	Bhanga, Boalmari, Sadar Madhukhali, Nagarkanda	20	50	4
Madaripur	Kalkini	1	2	-
Gopalganj	Kashani, Muksudpur, Sadar	6	12	1
Rajbari	BaliaKhandi, Goalanda, Pangsha, Rajbari	15	32	3
Narail	Sadar	1	2	1
Zone-II: Northwest				
Gaibandha	Polashbari	2	4	3
Rangpur	Pirgonj, Mithapukur	2	4	1
Thakurgoan	Sadar, Pirgonj	2	5	2
Dinajpur	Birampur, Birganj, Bochaganj, Chirirbandar, Ghoraghat, Kaharole, Sadar, Phulbari, Parbatipur	10	25	5
Sirajgonj	Tarash, Shahzadpur, Ullapara, Raiganj	12	26	6
Natore	Sadar, Gurudashpur, Boraigram, Lalpur	22	52	8
Pabna	Atgharia, Ishurdi, Chatmohor	10	25	4
Rajshahi	Putia, Bagmara, Charghat	6	15	3
Bogra	Sadar, Shibhanj, Sherpur, Kahalu, Santahar, Sonatola	7	12	2
Nilphamari	Saidpur, Sadar	3	9	3
Zone-III: Northeast				
Moulvibazar	Srimangal	2	6	4
Habiganj	Madhobpur, Chunarughat, Sadar	6	6	2
Kishoregonj	Pakundia, Kotiadi, Bajitpur	3	5	5
Netrokona	Purbadhala, Atpara, Madan, Mohanganj	4	5	1
Mymensingh	Bhaluka, Fulbaria, Gaffargaon, Sadar, Muktagachha, Gauripur, Trishal	15	18	4
Tangail	Modupur, Dhonbari, Kalihati, Sadar	6	7	1
36	**134**	**320**	**680**	**115**

Annex. II: Major Activities for last 10 years of AAS

Project/Program: Activities	Duration	Working district (Nr)	Partner Organization			Donor
			NGOs (Nr.)	Public Sector	Private Sector	
Farmers group formation	2003-05	28	72	-	-	AAS & Projects
Developing/skills/capacities of partner farmers via participatory training/FGDs	2003-05	28	75	-	-	AAS & Projects
Building the capacities of the partner organizations	2003-05	28	82	-	-	AAS & Projects
Uptake of sustainable intensive cropping with high value cash crop.	2003-05	16	30	DAE, BARI, BRRI, BADC	JS, MSC, GSC, Agro concern	AAS & Seed co.
Foundation/Quality rice Seed production and distribution among resource poor farmers	2003-05	12	38	BRRI, DAE, BADC	-	AAS & Projects
Irrigation systems for intensive cropping with various high value cash crops.	2003-05	5	10	DAE, BARI	JS, MSC, GSC, Agro concern	AAS & Seed co.
Aqua-culture program management (Hatchery, Nursery & table fish production)	2003-05	3	6	-	Private hatchery	AAS Fish Hatchery
Plant Health Services *Initiative*	2004-05	3	10	DAE, BRRI, BARI, BSMRAU	Pesticide Co.	CABI, UK
Post flood agri-rehab programme management for resource poor farm families.	2004	7	25	BADC, DAE, BRRI	-	IRRI/ GROS, Belgium, & Paul's family
Strengthening farmer-to-farmer seed exchanging system (FARMSEED): Rice	2003-05	12	30	BRRI, BADC	-	PETRRA/ IRRI-AAS
Promotion of rice hybrids through farmer's participatory field trial.	2003-05	15	22	BRRI, BADC, DAE	MSC, Aftab co. Chens co. SSC, BRAC etc	PETRRA/ IRRI-AAS
Participatory Integrated Plant Nutrient Management for intensive rice based cropping.	2003-05	2	15	BRRI, DAE, BADC	-	PETRRA/ IRRI-AAS

Project/Program: Activities	Duration	Working district (Nr)	Partner Organization			Donor
			NGOs (Nr.)	Public Sector	Private Sector	
Production and marketing of Fine, Aromatic and Glutinous (FAG) rice in northeast Bangladesh	2003-05	5	16	BRRI, DAE, BADC	-	PETRRA/ IRRI-AAS
Verifying the extension efficiency of the System of Rice Intensification (SRI)	2003-05	3	12	BRRI, DAE	-	PETRRA/IRRI
Piloting community based integrated Rice-Duck farming.	2004-05	2	8	BRRI,DAE	-	PETRRA/IRRI
Investigation of Arsenic Contamination of ground water irrigation and food chain.	2003-05	9	2	BRRI, DAE	-	PETRRA/IRRI
Establishment of Information and Technology Transfer Center (ITTC)	2004	2	-	BRRI, DAE	-	PETRRA/IRRI
Need assessment on Bangladesh Rice Knowledge Bank content in Northeast Bangladesh	2004	2	15	DAE, BRRI, BADC	-	PETRRA/IRRI
Piloting Bangladesh Rice Knowledge Bank concept and content in Northeast Bangladesh	2004	2	15	DAE, BRRI, BADC	-	PETRRA/IRRI
Agricultural technological materials collection and documenting for Knowledge Bank	2004-05	20	16	DAE, DLS, DoF, NARS etc	Private Co.	IRRI/EU
BRKB content development on rice and its validation	2005	4	12	BRRI	-	IRRI
Production and marketing of high yielding maize	2003-05	5	9	-	BRAC, KS, Aftab Co.	AAS/CIMMYT
Extension of short duration rice cultivars	2004-05	5	6	-	-	PROVA/CIMMYT/ UW, UK
Women-led good seed initiative	2004-06	10	18	RDA	-	CABI, UK
Promotion of irrigated intensive crop production system.	2003-05	2	6	-	-	AAS
Introduction of high value cash crop varieties.	2003-10	2	6	-	JS, MSC, AC, LT, EAL, BRAC, Metal, SS etc	AAS

Project/Program: Activities	Duration	Working district (Nr)	Partner Organization			Donor
			NGOs (Nr.)	Public Sector	Private Sector	
Good Seed Initiative (GSI)	2007-10	4	7	RDA	-	CABI, UK
Scale-up salt tolerant rice variety through FARMSEED	2008-10	4	22	BADC, DAE, BRRI	EAL	BMGF/IRRI
FARMSEED for non-rice and rice	2006-10	15	40	BADC, DAE, BRRI	JS, MSC, AC, LT, EAL, BRAC, Metal, SS etc	GROS, AAS
High value cash cropping in non saline chars	2006-10	1	5	BADC	JS, EAL	JOBS
Plant clinic Operation	2006-10	5	21	DAE, BARI, BRRI etc	Pesticides Co. & Dealers	CABI, UK
Study on poly shed summer tomato	2007-08	1	CBO-1	DAE, BARI etc	EAL, Supreme, LT etc	SEDF/IFC
Intensive F_1 rice seed production through contract farming	2008-10	2	-	DAE, SCA, RDA	EAL	Winnal High-Tech, China
Intensive vegetable seed production through contract farming	2008-10	6	-	BADC, SCA, BARI etc	EAL	EAL
Guidelines for intensive vegetable seed production practices: Manual	2007-08	-	-	-	EAL	SEDF/IFC
Guidelines for intensive F_1 rice seed production practices: Manual	2008-09	-	-	-	EAL	EAL
Measuring Private Research and Innovation in South Asia and Sub-Saharan Africa	2009	-	Few	Many	Many	Rutgers University/BMFG/ IFPRI, McGill University
Workshop on Agricultural Innovation and R&D in Bangladesh: Private and Public Initiatives	2009	-	Few	Many	Many	Rutgers University/BMFG/ IFPRI, McGill University
Study on Issues in Food Prices Determination in Bangladesh	2007-10	-	-	-	-	RDC/DFID
Exotic Jujube Extension	2006-09	10	32	-	MHC	AAS
High yielding Litchi Introduction	2005-09	6	12	BARI, BSMRAU	RMMKSSL	AAS
Intensive flower cultivation	2005-09	1	3	-	BFS	AAS
Post Sydr Tree Plantation in South Costal	2008	2	3	BADC	Plant Nurseries/ EAL	JOBS/Save the children, USA
Study on potential salt tolerant cropping in CDSP chars in Southeast	2009	3	10	DAE/BARI/ BRRI etc	-	IFAD/Nether land Embassy
High value crop options for high land and char area	2006	-	-	-	-	IDE
Demand-led Horticultural Crop Production and Marketing	2009-10	3	-	DAE/BADC	Jamalpur Seed/EAL/ L.al Teer	PRICE/USAID

Project/Program: Activities	Duration	Working district (Nr)	Partner Organization			Donor
			NGOs (Nr.)	Public Sector	Private Sector	
Safe pest management for horticultural crops demonstration	2009-10	4	4	DAE	Ispahani Bio-tech	PRICE/ Ispahani Bio-tech
Vermiculture and vermicomposting demonstration	2009-10	3	3	DAE	Ispahani Bio-tech	PRICE/ Ispahani Bio-tech
Exotic crop variety demonstration	2009-10	3	-	DAE	-	PRICE
Scale-up zero tillage Garlic Production	2006-10	3	6	-	-	AAS/PRICE
Mites and their management in Garlic production	2006-10	2	-	BARI/ BSMRAU	-	CABI, UK
Research on Nut Weevil and Tube Spittle Bug pests of Jujube	2008-11	2	-	BARI	-	CABI, UK
High value added crops introduction in non-saline chars	2007-10	3	6	-	EAL/JS	JOBS
Trichoderma demonstration for horticultural seedling & crop production	2009-10	1	1	BARI	Aftab Fertilizer Dealer	AAS
Innovation collection on vegetable seed production	2006-10	10	20	RDA	Inputs Dealers	CABU, UK
Documentation on cultivation of local cultivars of Brinjal	2009-10	3	-	-	Farmers Groups	PRICE/AAS
Commercialized year round Brinjal production and marketing strategy	2009-10	3	-	-	Farmers Groups	PRICE/AAS
GIS-mapping on salinity status for adoption of BRRI dhan 47	2009-10	3	22	BRRI	Farmers Groups	IRRI/BMGF
Commercial processing Potato production and marketing through contract farming	2010	1	-	DAE	BMI	PRICE
Pond carp poly culture and marketing through technical assistant	2010-11	1	20 CBOs	-	-	PRICE
A study on hybrid rice in Bangladesh	2010-11	-	2	Many	Many	IFPRI
Farmers' participatory rice hybrids yield maximization demonstration	2010-11	1	1	BRRI, BADC	EAL, SSC, Aftab	AAS
Impact study on good seed initiative of WRC	2010	5	4	DAE	Farmers groups	CABI, UK
Study on Plant Clinic Operation in Bangladesh: Performance and impacts	2009-10	3	2	RDA	Plant Clinics	CABI, UK
Comparative field performance of BINA dhan 8 & BRRI dhan 47	2010-11	3	20	BRRI, BINA	CBOs	IRRI
Study on floating bed crop culture in south central coastal region	2011	2	1	-	22 CBOs	AAS/PRISM
Effectiveness of Public Food grain Procurement System	2012-13	5	-	DG Food, DAE, LGED, SAU	Rice Mills & Association	PRODIP, USAID, UKaid, TAF, SUNY/CID
Intensive Pond Polyculture and marketing through technical assistant	2010-13	3	50 CBOs	DoF	-	PRICE/USAID

Project/Program: Activities	Duration	Working district (Nr)	Partner Organization			Donor
			NGOs (Nr.)	Public Sector	Private Sector	
Scaling-up the video of Grow More, Save More, Earn More and additional CSISA-BD videos in Bangladesh	2012-13	11	332 CBOs	DAE	Equipment Dealers	CIMMYT, CSISA-BD, USAID
Scale-up of the video Save More, Grow More, earn More and other selected videos under the CSISA-Mi	2013-14	17	150 CBOs	DAE	ACI, RFL, Equipment Dealers etc	CIMMYT, CSISA-BD, USAID
A case study on DVDs and Leaflets used	2013	4	20 CBOs	DAE	-	Agro Insight, MEAS, USAID
An Agricultural Study in Dinajpur district	2012-13	1	20 NGOs, 23 CBOs	DAE, DoF, BMDA, BADC, DG Food, DAE	Inputs companies & Dealers	RDC
Cost and Return Economic Analysis of Existing Crops 9Dinajpur district)	2012-13	1	-	DAE	-	RDC
Cost and return Economic Analysis of Non-Rice Crops in southern regions	2012-13	15	-	DAE	-	RDC
Baseline Survey: AAPI-Walmart foundation Activity	2013-14	12	-	DAE	-	AAPI-Walmart, IFDC, USAID
Regional Trade in Seed Fertilizers and Stregic Grains in Bangladesh (USAID EAT Project	2013	-	-	-	25 Seed Companies	USAID Fintrac
Women in Seed Entrepreneurship (WiSE) Priject	2013-14	1	20 CBOs	DAE	Krishi Sheba (Seed Co.)	RDA, SDC, SEDF)
Delivery of High Zinc Rice in Bangladesh	2013-14	2	4 CBOs	DAE	-	HPBD, CIAT, IFPRI
Fish Farmers' Participatory Pond Fish Fattening	2010-13	3	30 CBOs	DoF	-	PRICE
Micronutrients	2014	20	-	DAE	Fertilizers' Importers, Companies & Dealers	PreFER, IFDC, USAID

Annex. III: List of staff (Full time, Part time/ Volunteer, Consultant & Advisor)

Sl. No.	Name	Designation	Qualification	Full Time	Part Time[1]
1	Md. Harun-Ar-Rashid	Executive Director	MS (Ag)	✓	
2	William H. Derrenger	Advisor	MA		✓
3	Mr. Bazlur Rahman	Consultant, Value Chain	MS (Ag)		✓
4	Mrs. Azima Sultana	Admin. Officer	M.A.	✓	
5	Mr. Ziaur Rahman	Finance Manager	M.Com (A/C)	✓	
6	Dr. M. Nasir Uddin	Consultant, Seed & Research	Ph.D		✓
7	Dr. Tariful Islam	Consultant, Environment	Ph.D		✓
8	Dr. Humayun Kabir	Consultant, Climate Change	Ph.D		✓
9	Dr. Jalal Uddin Iqbal	Advisor-Health	MBBS		✓
10	Kbd. Rakibul Islam	Zonal Coordinator, South	B.Sc. Ag (Hons)	✓	
11	S.M. Mobarok Hossain	Irrigation Engineer	B.Sc Ag (Eng)		✓
12	Ratan Kumar Bhowmik	Agronomist	M.Sc.Ag (Marketing)		✓
13	Kamrul Hassan	Seed Technologist	MS (Ag)		✓
14	K.M. Alauddin	Fishery Specialist	M.Sc (Fishery)	✓	
15	Fazlul Rahman	Zonal Coordinator, South	MS	✓	
16	Md. Kamrul Hasan	Farm Machinery Specialist	MS (Farm Structure)		✓
17	Shaiful Ahsan Kabir	Seed Agronomist	MS (Ag)		✓
18	Md. Mohafez Ali	Consultant, Food Security	M.Sc.Ag	✓	
19	Khandaker Aminul Kabir	Advisor, Food & Nutrition and Zonal Coordinator, Northwest	M.Sc (Chemistry)	✓	
20	Alok Kumar Biswas	Entomologist	MS (Entomologist)		✓
21	Kbd. AKM. Rabiul Islam	Consultant, Poultry	MS (AH), MBA		✓
22	Shahedur Rahman Syem	Horticulturist (Nursery)	MS (Ag)		✓
23	AHM Asadur Rahman	Plant Pathologist	Ph.D		✓
24	Kamal Kanti Roy	IT Coordinator	H.S.C		✓
25	Imamul Islam	Field Coordinator	BSS	✓	
26	Dr. Rathi Mahamud Morshed	Consultant (Horticultural)	Ph.D		✓
27	Md. Ashraful Alam	Finance Officer	MBA		✓
28	Md. Rezaul Islam	Field Coordinator	BS		✓
29	Md. Jasim Uddin Biswas	Logistic Specialist	M.A (English)		✓
30	Zahid Iqbal	Community Development	MA	✓	
31	Manotosh Roy Akash	IT Coordinator	H.S.C		✓
32	Mostafa Kamal	Seed Specialist	Diploma (Ag)	✓	
33	Rajib Roy	Field Coordinator	H.S.C		✓

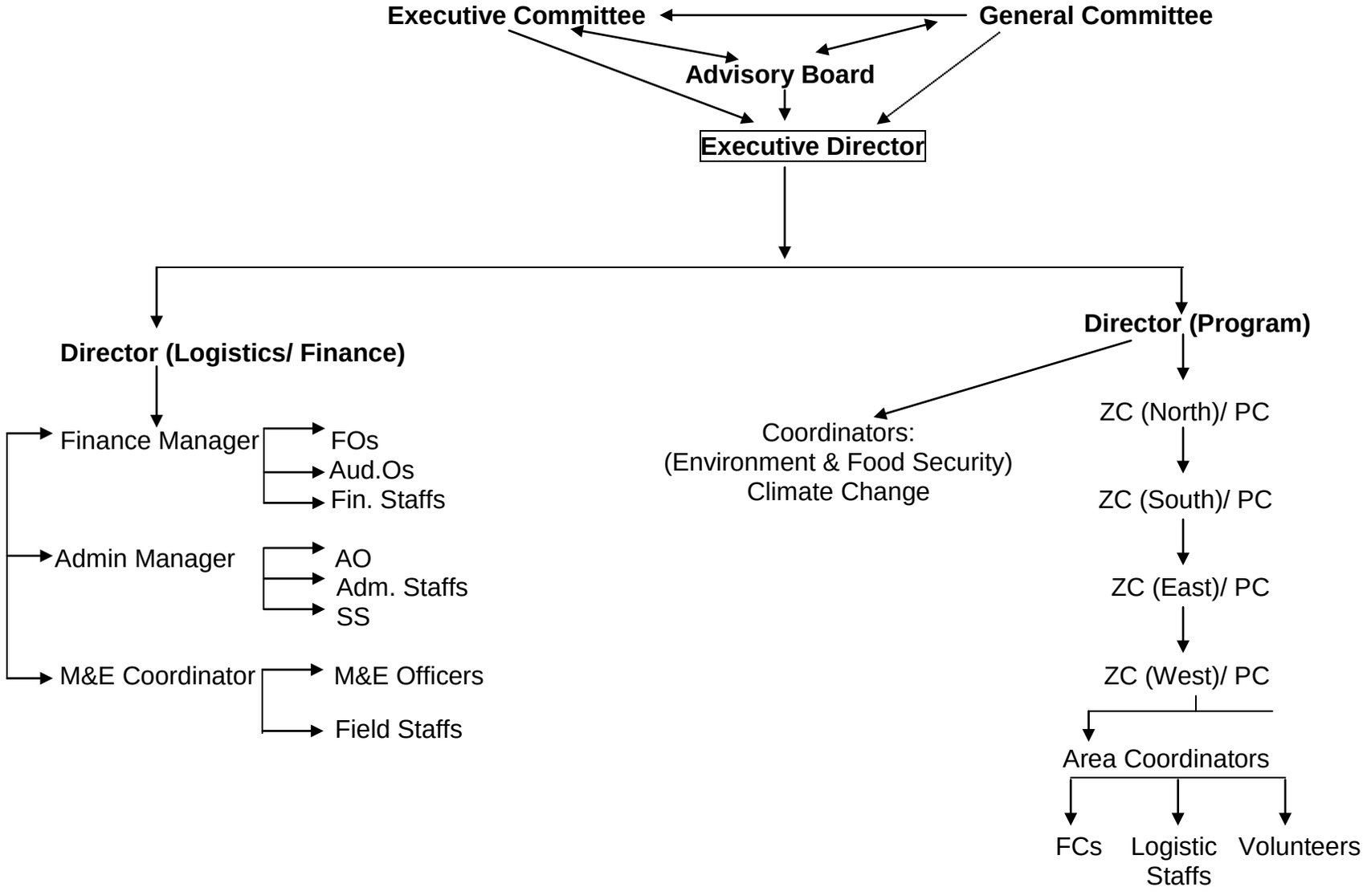
[1] Volunteer

Sl. No.	Name	Designation	Qualification	Full Time	Part Time[1]
34	Rafiqul Islam Shanto	Computer Specialist	BSc. (Hons.)		✓
35	Protap Mallik	Field Coordinator	H.S.C		✓
36	K.M. Nuruzzaman	Agro Business Officer	B.B.A (Agri. Business)	✓	
37	Nazmul Hossain	Field Coordinator	H.S.C	✓	
38	Md. Asaduzzaman	Computer Operator	MA		✓
39	Murshid Alam	IT Coordinator	Diploma in Agricultural	✓	
40	Syed Gulam Mastafa	Agronomist	B.Sc. Ag (Hons)	✓	
41	Abdul Hakim	IT Coordinator	H.S.C	✓	
42	Md. Abdul Momin	Agronomist	B.Sc. Ag (Hons)	✓	
43	Md. Nazrul Islam	Area Coordinator	Diploma in Agricultural		✓
44	Indrajit Roy	Horticulturist	B.Sc. Ag (Hons)		✓
45	Md. Ashiqur Rahman	Statistics Officer	M.S (Statistics)		✓
46	Md. Mahmudul Hasan	Agronomist	B.Sc. Ag (Hons)	✓	
47	Md. Anowar Hossain	Field Coordinator	H.S.C	✓	
48	M.S. Muktadir	Agronomist	B.Sc. Ag (Hons)	✓	
49	Md. Aminul Islam	Computer Operator	MA		✓
50	A.K.M. Badruzzaman Satu	Enumerator	M.S (Seed Technology)		✓
51	Md. Toufiqur Rashid	Agronomist	B.Sc. Ag (Hons)	✓	
52	Dr. M. Eusuf Harun	Consultant	Ph.D		✓
53	Md. Abdul Latif	Statistics Specialist	MS (Statistics)		✓
54	Md. Abid Hasan	Agronomist	B.Sc. Ag (Hons)		✓
55	Md. Arman Hossain	Computer Operator	MA		✓
56	Swaran Jit Ray	Field Coordinator	Diploma in Agricultural		✓
57	Johir Raihan	Agronomist	B.Sc. Ag (Hons)		✓
58	Md. Sajidul Islam	Coordinator	MSS (Sociology)	✓	
59	Md. Shohagh Parvez	Zonal Coordinator	MSS		✓
60	Parvez Ahmed	Agronomist	B.Sc. Ag (Hons)		✓
61	Md. Babul Aktar	Field Coordinator	Diploma in Agricultural		✓
62	Md. Jahid Hasan	Agronomist	B.Sc. Ag (Hons)		✓
63	Md. Moinuddin Ahamed	Area Coordinator	H.S.C	✓	
64	Subrota Kumar Ghosh	Field Coordinator	H.S.C	✓	
65	Md. Anarul Islam	Agronomist	B.Sc. Ag (Hons)	✓	
66	Md. Abdus Salam Monju	Field Coordinator	H.S.C	✓	
67	Md. Ibrahim Hossain	Computer Operator	S.S.C	✓	
68	Md. Shaiful Islam	Area Coordinator	H.S.C	✓	
69	Abdul Malek	Caretaker	S.S.C	✓	
70	Pubon Kumar Shadhukhan	Agronomist	B.Sc. Ag (Hons)	✓	
71	Meer Md. Muniruzzaman	Consultant	MS		✓

Annex. IV: Key Staff of AAS and their assignments

Section Name	Name of person in charge of the section.	Number of staff in section	Qualification of Section head (briefly describe)	Expertise of Section Head (briefly describe)	Main Responsibility of the Section	Number of permanent staff	Number of temporary staff	Number of Male staff	Number of Female staff	Number of staff working in head office	Number of staff working in field
A. Program (Director)	Khandaker Aminul Kabir	4	MS	Specialist in rice technology & Chemistry	Project management	3	1	3	1	2	2
A.1. Zonal Coordinators											
A.1.1: Southwest	Kbd. Fazlur Rahman	12	MS	Agri. Extension	Zonal project management	7	5	10	2	-	12
A.1.2: Northwest	KM Alauddin	6	M.Sc (Fishery)	Specialist in Pisciculture	Zonal project management	3	3	6	-	-	6
A.1.3: Northeast	Md. Shohagh Parvez	4	MSS	Social Development Specialist	Zonal project management	2	2	4	-	-	4
A.1.4: North central	Zahid Iqbal	5	MA	Community Development	Zonal project management	3	2	5	-	-	5
A.1.5: (Coordinator-Environment & Food Security)	Kbd. Mohafez Ali	5	M.Sc Ag (Soil Chemistry)	Environment , Climate change, Food technology , management & Security	Environment & national food management issues & their implications	2	3	4	1	3	2
B. Logistics/ Finance (Director)	AHM Asadur Rahman	3	MS	Plant Pathologist	Admin, M&E & Financial management	2	1	2	1	2	2
B.1. Manager (Finance)	Mr. Ziaur Rahman	5	M.Com. (AC)	Finance & Account	Financial management	3	2	4	1	3	2
B.2. Manager (Admin)	Ms Azima Sultana	6	MA	Admin & Logistics	AAS Administration	3	3	3	3	2	4
B.3. Coordinator (M&E)	Md. Sajidul Islam	4	MSS (Sociology)	Monitoring & Evaluation	M&E management	2	2	4	-	1	3

Annex. V: ORGANOGRAM OF AAS



Annex. VI: List of publications of AAS

- Banana Production Manual, 1989.
- Continuous Cropping System with Irrigation Manual, 1990.
- Irrigated Diversified Cropping Manual, 1990.
- Intensive Duckweed Production Manual, 1993.
- Intensive Pond Pisciculture Manual, 1992.
- Cost and Economic Return Analysis of Different Crops with High Inputs Practices and Irrigation under Demonstration and Farmers Improve Management Practices, 1991. 1994, 1998 and 1999.
- Proceedings on Irrigated Intensive Cropping System Demonstration in Char Land, 1991.
- Fish Seed Production Farm Management Manual, 1993.
- Zinc and its Management in Crop Production, 1996.
- Boron and its Management in Crop Production, 1996.
- Small Scale Poultry Farming Manual, 1996.
- In-Field Irrigation Technique Manual, 1990.
- Seed Production Manual, 1991.
- Nursery and Orchard Establishment and Management Manual, 1989.
- Homestead Agricultural Production Management, 1990.
- Arsenic Hazard Abatement Manual, 1997.
- Intensive Crop Production Management Manual, 1998.
- Proceedings of the Workshop on Arsenic in the Food Chain: Assessment of Arsenic in the Water-Soil-Crop Systems, 2004
- Family approach in extension. In Innovations in Rural Extension: Case study from Bangladesh, 2005
- Village soil fertility maps. In Innovations in Rural Extension: Case study from Bangladesh, 2005
- FARMSEED: putting farmers at the heart of the seed system. Innovations in Rural Extension: Case study from Bangladesh, 2005
- Breaking down barriers: village women spread the word. In Innovations in Rural Extension: Case study from Bangladesh, 2005
- Performance of 22 Cultivars of FAG rice in Srimangal and Sadar Upazilas of Moulvibazar district, 2002 T. Aman Season
- Performance of 7 Cultivars of FAG Rice in Srimangal and Sadar Upazilas of Moulvibazar District, 2002-3 Boro Season
- Performance of 28 Cultivars of FAG Rice in Moulvibazar and Habiganj Districts**,** 2003 T. Aman Season

- Performance of 7 Cultivars of FAG Rice in Moulvibazar and Habiganj Districts, 2003-4 Boro Season
- Proceedings of Benchmark Survey: Plant Health Problem of Rice: Earthworm (*Chera*) 2003-04 Boro Season
- Report on Participatory Qualitative Survey on Plant Health Problems, Season: Summer-I, 2004
- Report on Participatory Qualitative Survey on Plant Health Problems, Season: Summer-II, 2004
- Report on Participatory Qualitative Survey on Plant Health Problems, Season: Winter, 2004
- Brief description of farmer innovative method (FIM) for plant health management
- Summarized Survey of Local Plant Health Knowledge, 2005
- Food Security for Sustainable Household Livelihoods (FoSHoL) Project, 1 December 2004 - 31 May 2005: Summary
- Performance of Six Rice Hybrids Under Bangladesh Conditions, 2003-04 Boro Season
- Prospects and Potentials of Rice Hybrids in Bangladesh, 2004
- Performance of Rice Hybrids Under Bangladesh Conditions, 1998-99 Boro Season
- Participatory Integrated Plant Nutrient Management in Intensive Rice-based cropping, Seasonal Report of Aus 2002
- Participatory Integrated Plant Nutrient Management in Intensive Rice-based cropping, Seasonal Report of T. Aman 2002
- Report on Specific rice knowledge need assessment for BRKB content (Northeast region), August 2004
- Interim Technical Report: Experimentation on ways of using the Bangladesh Rice Knowledge Bank (BRKB): 15 February 2007
- Report on Pilot testing of Bangladesh Rice Knowledge Bank (BRKB) with farmers and secondary stakeholders (Northeast region), June 2005
- Final Technical Report: Experimentation on ways of using the Bangladesh Rice Knowledge Bank (BRKB), 06 August 2007
- Selected Technological Materials for Food Security for Sustainable Households Livelihood (FoSHoL) Project, 2005
- Documented Technological Materials for Food Security for Sustainable Households Livelihood (FoSHoL) Project, 2005
- Proceedings: Introductory-planning Workshop on Technology identification and documenting for knowledge Bank for FoSHoL project: 15 December 2004
- Proceedings of the workshop on Identification and Recommendation of Location Specific Rice Technologies for FoSHoL Project (BRRI, Gazipur): 9 January 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Sunamganj District): 12 January 2005

- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Satkhira and Khulna districts): 18 January 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Faridpur, Rajbari, Madaripur & Shariyatpur districts): 9 February 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Jamalpur district): 24 February 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Gazipur district): 9 March 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Bogra district): 17 March 2005
- Proceedings of the participatory workshop on Technology Identification and Recommendation for FoSHoL Project (Noakhali district): 6 April 2005
- Narrative Progress Report: Scale-up salt tolerant rice variety through FARMSEED: 1 June 2008-30 April 2009
- Narrative Progress Report: Scale-up salt tolerant rice variety through FARMSEED: 1 May 2009-October 2009
- Good Seed Initiative (GSI) in South Asia, Survey Report: Knowledge, Attitude and Practice (KAP) On Rice Seed Post Harvest Practices, 31 January 2006
- Survey Report: Assessment of Farmers' Need for Vegetable Seed Information, 25 January 2007
- Survey Report: Assessment on Additional Impact of Video Show on Rice Seed Post Harvest Practices, 6 February 2007
- Uptake Pathway Research Report: Uptake Pathways for dissemination of rice post harvest practices, April 2007
- Survey Report: Impact of video show on rice seed post harvest practices, 19 July 2007
- Private Innovation and R&D in Bangladesh Agriculture: Description, Impact, and Policy Options, 1 October 2009
- Use of Farmers' Empirical Knowledge to Delineate Soil Fertility-Management Zones and Improved Nutrient-Management for Lowland Rice: 6 February 2008
- International Plant Nutrition Colloquium (University of California, Davis): An evaluation of nutritional constraints on irrigated rice yield, Year 2009 Paper 1083
- Guidelines for Vegetable Seed Production 2008
- A Special Study on Poly Shed Summer Tomato: Adoption and farmers' innovations, November 2008
- Completion Report on Skilled family member extension approach for rice knowledge adoption, June 2004
- Training Report on Skilled family member extension approach for rice knowledge adoption, June 2004
- Completion Report on Women Led Group Extension Method for rice and rice seed drying and storage technology, June 2004

- Completion Report on Strengthening FARMSEED (farmer to farmer seed exchange System) Extension Method, June 2004
- Zinc and it's management in crop production, January 1996
- Boron and it's management in crop production, December 1995
- Proceeding on Technology Development Workshop, 23-24, May 2004
- Proceeding on National Uptake Workshop, 17-18, April 2004
- Village Soil Fertility Maps: IRRI 2005
- Narrative Progress Report: Scale-up salt tolerant rice variety through FARMSEED (Farmer-to-farmer seed exchange system): 1 June 2008-30 April 2009
- Narrative Progress Report: Scale-up salt tolerant rice variety through FARMSEED (Farmer-to-farmer seed exchange system): 1 May 2009-31 October 2009
- Use of Farmers' Empirical Knowledge to Delineate Soil Fertility-Management Zones and Improved Nutrient-Management for Lowland Rice
- Issues in Food Prices Determination in Bangladesh: February 2009
- Cost and Return Analysis: Selected crops and their varieties 2006-2007 and 2007-2008 Cropping Seasons
- Impact Study: CABI-WRC Wheat seed activities for the Good Seed Initiative in Bangladesh: 31 October 2010
- A study on hybrid rice in Bangladesh: History impact and current status of hybrid rice research, development and delivery in Bangladesh: January 2011
- Farmers' participatory yield maximization trial on potential rice hybrids during 2010-11 Boro season: July 2011
- An Agricultural Study in Dinajpur district: December 2012
- Cost and Return Economic Analysis of Existing Crops in Dinajpur district: December 2012
- Cost and Return Economic Analysis of Non-Rice Crops in Southern regions:December 2012
- Final Technical Report: Scaling-up the video of Save more , Grow more, , Earn more and additional CSISA-BD video in Bangladesh: January 2013
- MEAS Case Study # 6: The Story of a video on Mechanical Seeders in Bangladesh: If we are convienced, we will buy it: November 2013
- Final report: Baseline Survey: AAPI-Walmart Foundation Activity: December 2013
- Final Technical Report: Scaling-up the video Save more, Grow more, Earn more and Selected Videos under CSISA-MI project: March 2014
- Potassium-Constrained High Yields in Irrigated Rice, Published in Journal of Plant Nutrition, September 2013
- Role of Members of Parliament in Ensuring Effective Food grain Procurement System in Bangladesh: March 2013

Annex. VII: List of various resources of AAS

SL #	Item	No
1	Head Office (Rented)	1
2	Zonal Office (Rented)	3
3	Area Office (Rented)	3
4	Area Office (Sharing with PNGOs)	10
5	Training Center (Rented)	1
6	IT Center (Dhaka)	1
7	Fish Hatchery (Rent out)	1
8	Computers (Sets)	10
9	Laptop	2
10	Multimedia	2
11	AC	4
12	IPS	5
13	Vehicles (Members-EC/Board)	2
14	Motor Cycles	5
15	By Cycles	5
16	Tables (All)	25
17	Chairs (All)	120
18	Moisture Meter (All)	5
19	Digital Camera	3
20	Generator	1
21	Fans (All)	30
22	Telephone	3
23	Steel Almirah etc	12
24	Balance Normal	5
25	Electronic Scale (in grams)	1
26	Sealing Machine (All)	10

Annex. VIII: List of Benchmark survey conducted by **AAS**[1/]

1. Study on pilot project potentials for SHOGORIP (Dhaka: Swiss Development Cooperation-SDA, 1991)
2. Rice MVs uptake sub-project: in Kishoreganj district: Benchmark survey under PETRRA project of IRRI funded by DFID (2001)
3. Rice MVs uptake sub-project: in Habiganj, Moulvibazar, Sunamganj and Sulhet districts: Benchmark study under PETRRA project of IRRI funded by DFID (2002)
4. Benchmark survey: Participatory Integrated Plant Nutrient Management for Intensive Rice-based Cropping in Moulvibazar and Habiganj districts under PETRRA project of IRRI funded by DFID (2003)
5. Participatory qualitative survey on plant health problems in Natore, Norsingdi and Moulvibazar districts during summer-I, 2004 under plant health services initiative (PHSi) in Bangladesh funded by CABI, UK/DFID (2004)
6. Participatory qualitative survey on plant health problems in Natore, Norsingdi and Moulvibazar districts during summer-II, 2004 under plant health services initiative (PHSi) in Bangladesh funded by CABI, UK/DFID (2004)
7. Participatory qualitative survey on plant health problems in Natore, Norsingdi and Moulvibazar districts during winter, 2004 under plant health services initiative (PHSi) in Bangladesh funded by CABI, UK/DFID (2004)
8. Benchmark survey: Plant health problem of Rice on Earthworm (Chera) during 2003-04 Boro season in Natore district funded by CABI, UK/DFID (2004)
9. Specific rice knowledge need assessment for BRKB content in Northeast region under PETRRA project of IRRI funded by DFID (2004)
10. Technology Identification and Documenting for Knowledge Bank (FoSHoL/IRRI/EC, 2005)
11. Private Innovation and R&D in Bangladesh Agriculture: Description, Impact and Policy Options (AAS/Rutgers University/BMGF/IFPRI/McGill University, 2011).
12. An Agricultural Study in Dinajpur District funded by RDC (2012)
13. Baseline survey: AAPI-Walmart Foundation Activity funded by AAPI, IFDC, Dhaka, (2013-14)
14. Household Survey on Rice Production during 2014 T.Aman season for AAPI project of IFDC/USAID (2014-15)

[1/] *The enlisted reports can be available upon request*

Annex. IX: Existing Potential horticultural crops list for 18 Communities of Natore, Pabna and Rajshahi districts (PRICE/AAS)

Crop	Location (Communities)[a] / (Crop potentiality Scale: 1-5)																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**Freq**
1. Brinjal	5	5	5	-	4	5	5	5	5	4	5	4	-	5	4	5	5	5	16
2. Radish	5	5	5	-	-	-	4	5	5	5	5	5	5	5	4	5	5	-	14
3. Country Bean	-	4	5	5	5	-	4	5	5	4	5	5	4	5	-	-	-	-	12
4. Banana	5	-	4	5	5	5	5	5	5	4	-	-	-	-	-	4	4	5	12
5. Onion	-	4	4	4	-	-	-	4	-	4	5	-	4	5	5	5	5	5	12
6. Garlic	5	-	5	4	-	5	5	5	5	4	-	-	-	-	4	4		4	11
7. Tomato	-	5	-	4	5	-	4	4	-	5	4	4	4	5	-	-	-	-	10
8. Ash gourd	-	5	-	4	-	-	-	4	4	4	5	5	5	5	-	-	-	-	9
9. Bottle Gourd	4	-	-	4	-	-	-	4	4	4	-	-	4	5	4	-	-	-	8
10. Jujube	4	4	4	4	5	4	-	-	-	-	-	-	4	4	-	-	-	-	8
11. Onion (seed)	4	-	4	-	-	-	4	4	-	-	-	-	-	-	4		5	5	7
12. Chilli	4	-	-	-	-	-	-	4	-	4	5	5	5	5	-	-	-	-	7
13. Pumpkin	-	4	-	-	-	-	-	4	-	5	4	5	-	5	4	-	-	-	7
14. Papaya	-	-	-	4	-	-	-	-	-	-	-	4	-	4	4	4	5	4	7
15. Mango	-	-	4	-	-	-	-	-	-	-	-	-	4	-	5	4	5	5	6
16. Tumeric	4	-	4	-	-	-	-	-	-	-	4	4	4	5	-	-	-	-	6
17. Cauliflower	-	5	-	-	5	-	-	-	-	5	-	5	5	5	-	-	-	-	6
18. Bitter Gourd	-	-	-	-	-	5	-	-	4	-	5	5	5	5	-	-	-	-	6
19. Ridge Gourd	-	-	-	-	-	-	-	4	4	-	4	4	4	5	-	-	-	-	6
20. Red Amaranth	-	-	-	-	4	-	4	4	-	-	4	-	-	-	-	4	-	-	5
21. Betel leaf	-	-	-	5	-	-	-	-	-	-	-	-	-	-	5	5	5	5	5
22. Cabbage	-	-	-	-	4	-	-	-	-	5	4	5	-	-	-	-	-	-	4
23. Coriander	-	4	4	-	-	-	-	-	-	-	-	4	-	4	-	-	-	-	4
24. Snake Gourd	-	-	-	-	-	-	-	-	-	-	5	5	5	5	-	-	-	-	4
25. Carrot	-	-	-	-	-	-	-	-	-	-	5	5	4	5	-	-	-	-	4
26. Coriander Leaf	-	-	-	-	-	-	-	-	-	-	4	4	5	5	-	-	-	-	4
27. Jackfruit	-	-	4	-	-	-	-	-	-	-	-	-	-	5		-	4		3
28. Pointed Gourd	-	-	-	-	4	-	-	-	4	-	-	-	-	-	-	4	-	-	3
29. Cucumber	4	-	-	-	-	-	-	-	-	-	-	4	-	5	-	-	-	-	3
30. Litchi	-	-	4	-	-	-	-	-	-	-	-	5	5	-	-	-	-	-	3
31. Teasle Gourd	-	-	-	4	4	-	-	4	-	-	-	-	-	-	-	-	-	-	3
32. Stem Amaranth	-	-	-	-	-	-	-	4	-	-	-	-	-	5	-	4	-	-	3
33. Indian Spinach	-	-	-	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	2
34. Kholrabi	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	-	-	-	2
35. Taro	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	-	-	-	2
36. Sweet Potato	-	-	5	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	2
37. Khira Cucumber	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	4	-	-	2
38. Elephant foot	-	-	-	-	-	-	-	-	-	-	-	4	4		-	-	-	-	2
39. Bitter Gourd (Small)	-	-	-	-	-	-	-	-	-	-	-	4	-	5	-	-	-	-	2
40. Potato	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4		2
41. Yard Long Bean	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	1
42. Fenugreek	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
43. Black Cumin	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
44. Leaf Onion	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
45. Okra	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
46. Katua Amaranth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	1
Total Listed Crops	**10**	**10**	**17**	**12**	**10**	**5**	**8**	**19**	**10**	**14**	**16**	**23**	**18**	**26**	**10**	**14**	**10**	**8**	

Crop potentiality Scale: 1= Very low, 2= Low, 3= Moderate, 4= High, 5= Very high

[a] Location (Communities):

Natore: 1 = Khamar Pathuria Akandopara, 2 = Kodim Chilan, 3 = Purbo Noyapara, 4 = Dhola, 5 = Manikpur, 6 = Khamar Pathuria Madrashapara, 7 = Lakshimipur, 8 = Modhya Noyapara, 9 = Poschim Noyapara, 10 = Dhulia

Pabna: 11 = Char Gorgoria, 12= Gorgoria, 13= Rahimpur, 14 = Kamalpur

Rajshahi: 15 = Nondonpur Fozdari Para, 16 = Chak Bhitapara Bhalukgachi, 17 = Majpara Bhalukgachi, 18 = Telipara Bhalukgachi