KGF NATP CGP Research Progress

Implementation Progress with Research Highlights of the on-going NATP CGP Projects under 2nd Call

A total of 35 CGP Projects are under implementation in 2012-13 in two phases under 2nd call. With NATP fund now 35 on-going CGP projects are being implemented and managed by KGF in different NARS institutes and universities. These projects are mostly of 36 months duration. Twenty one projects of phase-I have already completed 21 months whereas 14 projects of Phase-II have completed 17 months of their project period. For proper implementation of these projects, periodical concurrent M&E are being carried out by KGF professionals at an interval of 5-6 months. In addition, KGF Board has engaged an independent external team in January, 2013 to carry out concurrent M&E of these projects.

- Implementation progress of these projects made up to February, 2013 with research highlights are given below:

Research Highlights of CGP Phase-I Projects

1. Project Code with title: C-1.12: Rice Production in Drought Prone Areas of Bangladesh

Location: Chapai Nawabganj, Rangpur, Rajshahi, Bogra,Joypurhat and Naogaon distric

Coordinator: Dr. Md. Safiul Islam Afrad, Associate Professor, Dept. of Agri. Extension and Rural Development. BSMRAU, Gazipur

Lead Organization: BSMRAU

Duration: 36 months

Implementation progress:
Field survey on climatic factors like rainfall, temperature including soil temperature and organic matter has been conducted. Focus Group Discussion (FGD) completed. Data have been analyzed. GPS readings have been taken from 64 sites of 6 districts and 24 map has been prepared. Conducting of 21 field trials completed, 54 field trials have been run using 12 potential HYV and local rice varieties and 18 trials with minimum tillage. AWD has been applied to all the trials. For soil fertility improvement, 21 field trials have been completed. 54 trials have been conducted using 18 poultry manure and 18 green manure. Field assistants and farmers have been trained.

Financial: A total of Tk. Tk 97, 89,000.00 was approved for the entire project period (36 months) of which Tk. 65,94,200.00 has been released.

Highlight of Research Achievements:
1: Rice production increased by 10-15% BRRI dhan 49 in T. Amon gave 4.87MT and in boro season BRRI dhan 29 gave 6.14 MT Narica variety did not perform well.
2: Drought tolerant rice varieties has been selected these are BRRI dhan-49 and BRRI dhan-29
3: Soil fertility improved-organic matter: 0.5%
4: Farmers awareness on rice production under climate stress condition and adaptive capacity increased up to 10%

2. <u>Project Code with title:</u> C-1.21: Yield gap minimization in rice using Integrated Crop and Resource Management (ICRM) practices at selected locations in Bangladesh

Coordinator: Dr. Md. Safiqul Islam Mamin ,PSO & Head, Adaptive Research Division, BRRI,Gazipur
PI: Mr. Rafiqul Islam ,SSO
Adaptive Research Division, BRRI,Joydebpur,Gazipur

Lead Organization: Bangladesh Rice Research Institute(BRRI), Gazipur

Location:

Madargonj of Jamalpur; Sherpur Sadar, Nalitabari, Nokhla of Sherpur; Kapashia of Gazipur; Pakundia and kotiadi of Kishoregonj; Monohordi and Polash of Narsingdi.

Duration: 36 Months

Specific Objectives:

1. To minimize yield gap through increasing rice yield by 0.5-1.0 t/ha using Integrated Crop and Resource Management(ICRM) practices
2. To enhance skill and knowledge of participating and associated farmers as well as DAE field staff

Implementation Progress:
The potential yield of rice is the maximum yield (Y_{max}) limited by climate and rice variety only, with all other production factors at optimal levels. In reality, the yields of HYVs obtained at farmers' fields are often substantially lower than economic yield target because of constraints other than climate and variety such as inefficient fertilizer use or nutrient imbalances, use of low quality seeds and over aged seedling, late planting, inadequate pest management measures and water supply.

It is now a challenge for researchers and extension personnel to determine the causes of this yield gap and to reduce this yield gap for increased production and benefit of farmers and the country as a whole.

The ICRM practices have great potential to reduce the yield gap in rice. The component technologies of ICRM package are the best available recommended rice production technologies – like quality seed, healthy seedlings, planting optimum aged seedling in optimum time, balanced nutrition, improved water and pest management etc. The project was designed to validate ICRM practices at farmers' field in 9 upazilas of 5 districts.

On-farm farmers' participatory research trials on minimization of yield gap using ICRM practices, were conducted in 9 upazilas (Madarganj, Sherpur Sadar, Nalitabari, Nokhla, Kapasia, Pakundia, Kotiadi, Mohordi and Polash) of 5 distrcts (Jamalpur, Sherpur, Gazipur Kisorganj andNorshingdi) during Tman 2011, Boro 2012 and Taman 2012. Bangladesh Rice research Institute (BRRI) and an NGO named Social Progress services (SPS) implemented these trials in 3 (Gazipur, Kisorganj and Norshingdi) and 2 (Jamalpur and Sherpur) districts respectively. Ten farmers' fields, each measuring 1 bigha in area, were selected in a village and 3 villages from each of the selected upazila were included in the study. Thus, there were 30 trial fields in 3 villages of each of the selected 9 upazilas. Each farmers' plot was divided into two equal halves for deploying 2 different treatments viz farmers practice(FP) and ICRM in them. The basic design of the trials remained the same for all the trials irrespective of season and varieties.

Plots having ICRM package showed higher yield in comparison to those of the plots grown under farmers' practice. The same trend was observed in all the plots irrespective of seasons and varieties. The yield of BRRIdhan 49, ranged from 4.5 – 5.4 and 3.6 – 4.3 t/ha for ICRM and FP plots respectively in Taman 2011. Rice production increased by 0.9 t/ha which in turn minimized 25 % yield gap in T.Aman season. Similar result was also obtained in Boro season of 2012. An yield increase of 0.9 – 1.6 and 1.2 – 1.7 t/ha for BRRIdhan 28 and BRRIdhan 29 respectively, were observed when grown under ICRM package. The average yield increase was 1.31 and 1.48t/h for BRRIdhan 28 and BRRIdhan 29 respectively.
Data coming from T.Aman 2012 fields could not be analyzed till the time of last reporting. That will be presented in the next report.

A total of 750 farmers, 75 DAE staffs and 50 project employee were trained on ICRM technologies in 25 training programs, arranged during the reporting period and 3000 farmers attended the field days in this connection.

Financial: A total of Tk. Tk 8700000.00 was approved for the entire project period (36 months) of which Tk. 5227800.00 has been released.

3. Project Code with title: C-2.11: Crop intensification in northern region of Bangladesh through up-scaling the production of short duration rice and mungbean

Principal Investigator: Dr. M. Moynul Haque, Prof. Dept. of Agronomy, BSMRAU, Gazipur

Lead organization: BSMRAU

Location: Rangpur, Gaibandha, Nilphamari, iLalmonirhat, Kurigram, Dinajpur, Thakurgaon, Panchagarh, Tangail.

Implementation Progress:
1: Testing of 4 crops is under trial:
Amon (short duration)—Potato/mustard----Mug bean---Aus (parija)
2: Monitoring of farmers activities in existing pattern
3: Data collection is in progress
4: Soil samples has been collected and under laboratory analysis
5: Five hundred (500) farmers from eight northern and one central districts have been included with this project. .

Financial: A total of Tk. Tk 98, 00000.00 was approved for the entire project period (36 months) of which Tk. 54, 81 000.00 has been released.

Highlight of Research Achievements:

1: In 8 northern districts 2000 farmers adopted alternative cropping system in last year ie Amon (short duration)—Potato/mustard----Mug bean---Aus (parija)
2: Cropping intensity has increased by at least 25% through incorporation of mung bean in the system
3: System productivity enhanced by growing an additional crop (mungbean) and short duration variety of aus (Parija) and aman rice
4: Irrigation water saved to the extent of 20%
5: Additional employment opportunity generated round the year
6: Seasonal food insecurity alleviated through advancing aman rice harvesting time by one month ie in October instead of November.

4. Project Code with title: C-3.1: Validation and up-scaling of maize after T.Aman rice in two southern districts

Coordinator: Dr. M. Jalal Uddin Sarkar ,CSO & Head OFRD, BARI,Joydebpur,Gazipur

Lead Organization: Bangladesh Agricultural Institute, Gazipur

Location: Dumuria, Paikgachha of Khulna district and Satkhira Sadar, Kaliganj, Kalaroa of Satkhira district.

Duration: 36 Months

Specific Objectives:

1. To increase cropping intensity and system productivity through adoption of hybrid maize in fallow-rice cropping system in Satkhira and Khulna districts
2. To increase yield of T.Aman rice introducing high yielding varieties
3. To increase knowledge and skill of the farmers on the production practices of improved cropping systems

Implementation Progress:

More than 30% of the cultivable area of Bangladesh lies in the coastal region of the country and remains fallow in most of the time of a year. The dominant cropping pattern of the area is Fallow-Fallow-T.Aman. Salinity, use of local varieties, Irrigation water scarcity, low soil fertility, use of traditional production technologies and exposure to natural calamities etc. are the adverse factors affecting the agriculture of the whole area. As a result, the cropping intensity of the area is low in comparison to the copping intensities of the other parts of the country.

At this context On Farm Research Division, BARI, Khulna initiated a research program to increase the cropping intensity and thereby system productivity by introducing maize, a new crop for the area and high yielding varieties of rice along with improved management practices for their husbandry.

Adaptive trials for maize were conducted in 65.25 bighas of land belonging to 30 farmers of two upazilas, Satkhira Sadar and Kaliganj of Satkhira district, in 2011. Three hybrid maize varieties viz. BHM 5, HM 849 and HM 8255 were included in the trials. HM 8255 at Satkhira Sadar and BHM 5 at Kaliganj showed the highest yields which were 6.98 and 5.44 t/ha respectively. Maize was a new crop for the area. Accommodation of maize in the cropping pattern helped increasing system productivity.

On Farm Research Division of BARI, Daulatpur, Khulna conducted Adaptive trials of T.Aman rice at Satkhira Sadar, Kalaroa and Kaliganj upazilas of Satkhira district in T.Aman seasons of 2011 and 2012. About 71.50 bighas of land of 27 farmers of Satkhira Sadar and Kalaroa and 75 bighas of land belonging to 30 farmers of Satkhira Sadar and Kaliganj, in 5 blocks at each upazila, were taken to conduct the trials of HYV T.Aman rice in 2011 and 2012 respectively. Two HYVs along with one local variety were grown in the T.Aman seasons of the two years. BINA dhan 7 and BRRI dhan 39 along with one local, Jamaibabu were grown at Satkhira Sadar and Kalaroa in Taman 2011. Similarly, BINAdhan 7, BRRIdhan 49 (in place of BRRIdhan 39) and Jamaibabu were grown at Satkhira Sadar and Kaliganj in T Aman 2012. Except these two changes, mentioned above in case of one site and a variety, all other experimental conditions remained the same.

BINA dhan 7 showed the highest yield at both the sites in both the years. The yield was 5.64 (Kalaroa) and 5.06 (Satkhira Sadar) t/ha in T.Aman 2011 and 2012 respectively. However, the yield difference observed for BRRI dhan 49 and BINA 7 in T Aman 2012 was not statistically significant. Jamaibabu, the local variety, had the lowest yield, 4.45 t/ha, which was significantly different.

Financial: A total of Tk. Tk 9072000.00 was approved for the entire project period (36 months) of which Tk. 2644200.00 has been released.

5. Project Code with title: C-4.1: Intensification of rice based cropping system incorporating short duration oilseed mustard varieties

Location: Haluaghat, Muktagacha and Mymensingh Sadar (Mymensingh), and Bagha (Rajshahi), Ishurdi and Pabna Sadar (Pabna)

Name of PI/ Coordinator and Address: Prof. Dr. Lutful Hassan, Department of Genetics & Plant Breading, BAU, Mymensingh

Up to date Progress Summary (Technical & Financial)

1: Aman-Fallow-Boro rice production is a common cropping pattern in most of the areas of Bangladesh. An attempt was taken to change this pattern into Aman-Mustard- Boro cropping pattern that produce high yielding of mustard varieties in shortduration.
2: Three hunderd farmers have been selected and trained on this production technology in six upazilas. All of the farmers have been supplied with one kg seeds of the mustard varieties such as BARI Sarisha-15 and Unnata Tori-7.
3: All the farmers used insecticides and fungicides for protecting their crop from insects (aphid) and diseases (alternaria blight) and an average cost of production of mustard ranged from Tk 20714 to 37799/ha area with an average of Tk. 25158/ha for BARI Sarisha 15. On the other hand average cost of production for Unnata Tori-7 was 23443 Tk./ha. On an average the varieties BARI Sarisha-15 and Unnata Tori-7 matured at 85.32 and 76.00 days respectively, and produced 1130 and 893 kg seeds/hectare. Thus, net income were Tk. 38565 and 28032/ha from the varieties BARI Sarisha-15 and Tori-7 respectively. All the farmers grew Boro rice after harvesting mustard, most of them (88.33%) gave positive response about the cropping pattern (Aman-mustard-boro) and the varieties of mustard they grew. Therefore, the cropping intensity of the 300 selected farmers is 285% of this year.

Financial: A total of Tk. Tk 82, 86,300.00 was approved for the entire project period (36 months) of which Tk. 56, 26,778.00 has been released.

Highlight of Research Achievements:

The concept of crop intensification with mustard in between T.aman and Boro rice has been established in the proposed areas. High yielding short duration mustard varieties/advanced lines viz., BARI SHARSHA 14 and 15 and BINA SHARSHA 4, BAU advanced lines and Tori-7 has been introduced for the expansion of oil seed plantation areas in the selected Upazilla. During the process of on-farm trail, adaptation trial and scaling up of the materials the popular varieties gave yield 185 Kg per bigha (33 decimal) .

6. Project Code with title: C-4.9: Yield gap reduction through short duration rapeseed-mustard and sesame varieties under existing cropping system

Principal Investigator: Dr. Md. Abdul Latif Akanda, SSO (Plant Bleeding), Oilseed Research Centre, BARI, Gazipur

Lead Organization: BARI

Location: Sadar, Ullapara, Sahjadpur, of Sirajganj; Nakla, Nalitabari, Sadar of Sherpur; Chargut, Godagari of Rajshahi Singa, Durgapur of Natore; Nachol of Chapai Nawabgonj

Implementation Progress:
For rapeseed-mustard trials, there were six sites, three in Sirajgonj district namely the Sadar, Ullapara and Sahajadpur upazila and three in Sherpur district namely the Sadar, Nakla and Nalitabari upazila. T. aman-mustard-boro rice cropping pattern based land was selected for rapeseed-mustard trials. Three short duration modern varieties of BARI viz., BARI Sarisha-9, BARI Sarisha-14 and BARI Sarisha-15 and local variety Tori-7 as check were selected and grown in 13.0 ha land at six locations of two districts within optimum period from 31 October to 15 November, 2011 comprising 59 farmers. Thus the trial area comprised of 13.0 ha of land including 59 farmers at six locations.

Similarly a total of 16.20 ha of land were cultivated by 121 trained farmers with modern varieties BARI Sarisha-14 and 15 as up scaling. Four field days were arranged at four locations in order to disseminate the technologies to the neighboring farmers, DAE personnel and NGOs. After harvesting mustard varieties, farmers cultivated boro rice.

For sesame trials, there were four sites, two at High Barind Tract in Rajshahi district at Gudagari upazila. In Chapai Nowabgonj district at Nachol upazila and two in Rajshahi district at Durgapur and Charghut upazila. Three modern varieties BARI Til-3, BARI Til-4 and BINA Til-1 and local variety T-6 as check were selected and grown at four locations of two districts in Kharif-1 season in 7.10 ha of land comprising 53 farmers within optimum period from 10 March to 19 April , 2012.

Financial: A total of Tk. Tk 39, 58,000.00 was approved for the entire project period (36 months) of which Tk. 28,, 62,00.00 has been released.

Highlight of Research Achievements:

1. Among short duration modern varieties of BARI Sarisha-9, BARI Sarisha-14 and BARI Sarisha-15, variety 15 gave highest yield 1600-1800 Kg/hect in 2012

2. Among the three modern sesame varieties BARI Til-3, BARI Til-4 and BINA Til-1; the BARI til -4 gave the highest yield 1025Kg -1230 Kg/hector

7. Project Code with title: C – 5.5: Variety selection and integrated crop management for yield gap minimization in mustard and sesame in the high Ganges river floodplains

Coordinator: Dr. Md. Sirajul Islam
PSO, OFRD, RARS, BARI, Jessore
Lead Organization: BARI

Lead Organization: Bangladesh Agricultural Institute

Location: Monirampur & Jhikargargachha Upazila in Jessore; Shalikha Upazila in Magura; Kaligonj Upazila in Jhinaidah; Narail sadar Upazila in Narail; Madhukhali Upazila in Faridpur; Kushtia sadar upazila in Kushtia

Duration: 36 Months

Specific Objectives:
1. To identify the suitable high yielding varieties of mustard and sesame to be fitted in the specific cropping pattern
2. Adaptation of integrated crop management(ICM) in mustard and sesame production compared to farmers practice to reduce the yield gap
3. To increase the knowledge and skill of farmers in mustard and sesame production technology

Implementation Progress:
Mustard and sesame are the most important oilseed crops in Bangladesh. It covers 242,208 ha and 35,567 ha of land, respectively in 2009-10. The national mean yield of mustard is only 1.05 t/ha and 0.86 t/ha for HYV and local varieties, respectively. The yield of sesame is about 0.91 t/ha only. The potential yields of HYV mustard and sesame varieties are much higher. In on-farm trials, BARI sharisha-11 produced 2.24 t/ha seed yield in Jessore region in 2009-10 and BARI til-3 gave 1.46 t/ha seed yield in Faridpur region in 2008. A big yield gap remains in between the potential yield of mustard and sesame and farmers' yield. There is an ample scope of increasing the yields of both the crops

Four short and four long duration mustard varieties were screened in trials conducted at 5 upazilas of 5 districts of high ganges river floodplains in 2011 -12. The upazilas were Jhikargacha, Shalikha, Kaliganj, NarailsadarandKushtiasadar of Jessore, Magura, Jhenaidah, Narail and Kushtia Districts respectively. The trials were conducted to find out the suitability of the varieties to be fitted in the dominant cropping patterns of the region. The cropping patterns found dominant in the regions were Boro –Taman – Mustard, Mustard – Sesame – T aman, Mustard – Jute – T aman and Mustard – Mungbean – T aman. In addition to these, Adaptive trials of short duration (BINA sarisha 4, BARI sarisha 9, BARI sarisha 14, and BARI sarisha 15) and Long duration (BINA sarisha 7, BINA sarisha 8 BARI sarisha 11 and BARI sarisha 16) mustard varieties were also conducted in 8.60 and 5.46 ha of lands in 6 and 5 districts, respectively, in the same period. A total of 155 farmers got involved with the program. BINAsarisha-4 and BARI sharisha-15 among the short duration and BARI sharisha- 11 and BARI sharisha- 16 among the long duration varieties of mustards were found most promising for the patterns in terms of yield and duration. The short duration variety was suitable for Mustard-Boro-T.Aman pattern. The long duration variety was good for the above mentioned other patterns. The Average yields were 1.51, 1.35, 1.76 and 1.64 t/ha respectively for the above mentioned four promising varieties.

Similarly, BARI Til-4 and BARI Til-3 were found to produce the highest (1.68 t/ha) and the 2nd highest (1.48 t/ha) yield, respectively, in the screening and adaptive trials conducted on the varieties of sesame in the region (JJhikargacha, Narail, Shalikha and Kaliganj) . The tested Til varieties were BARI Til-3, BARI Til-4, BINA Til-1 and BINA Til-2.Two hundred forty five farmers were trained on modern production technologies of mustards during the period.

Financial: A total of Tk. Tk 65, 00000.00 was approved for the entire project period (36 months) of which Tk. 24, 24700.00 has been released.

8. <u>Project Code with title:</u> C-6.8: Validation and up-scaling of mungbean and lentil technologies in the rice based cropping system in Bangladesh

Coordinator: Dr. Md. Ashraf Hosain, SSO, Pulses Research Sub-station, BARI, Madaripur

Lead Organization: BARI

Location: Gopalganj, Jessore, Jhenaidah, Gaibandha, Rangpur and Kurigram

Implementation Progress:

1: Trial of short duration lentil line has been established in Ishwardi pulse research centre

2: Relay cropping of lentil with rice has been established at Gopalganj, Jhenai-dah, Jessore,Gaibandha and Rangpur

3: Training of three hundred farmers in 10 batches has been completed

4: Farmers took training in Twenty two (22) batches before sowing the pulses (lentil and mung bean) seeds at project area. Total 30X22=660 farmers were trained in project area and 1500 farmers participated in field day for large scale technology dissemination.

Financial: A total of Tk. Tk 1, 30, 00,000 was approved for the entire project period (36 months) of which Tk. 72,46,900 has been released.

Highlight of Research Achievements:

1: Capacity building among the contract farmers which will help to disseminate short duration lentil and mungbean technology in new niches growing areas quickly towards replacement of the traditional varieties

2: Identification of super-early lentil with yield potential and diseases resistance

3: Farmer validation of technology for lentil relay sowing +/- short duration lines

4: Farmer validation of short duration mung technology

5: Large number farmers adopt the mung bean in their cropping system

6: Awareness building among the pulses crop growers for adoption of short duration varieties will be created

7: To established the technologies as sustainable in the dominant cropping pattern where productivity, soil fertility and nutritional security will be improvement expansion income generation of the local contact and neighboring farmers will be benefited. Pulses crop included as component crop. This will ultimately help as a model for boosting countries average lentil and mungbean production by vertical. Farm

9. Project Code with title: C-6.9: Validation and up-scaling of improved pulse production technologies for crop intensification

Principal Investigator: Dr. Md. Harunor Rashid, SSO

Lead organization Bangladesh Agricultural Institute, Gazipur

Location: Sadar and Rajor of Madaripur, Babuganj and Bakerganj of Barisal Sadar, District:Jhalakati Sadar, Rajapur and Nalchiti of Jhalakati Shakipur of Tangail Muktagacha and Fulbari of Mymensingh

Duration: 36 months (26.05.2011-25.05.2014)

Specific objectives:

1: To identify disease resistant high yielding pulse varieties (lentil,chickpea,mungbean and blackgram)

2: To validate improved pulse production technologies for mungbean,lentil,chickpea and blackgram

3: Upscaling of improved pulse production technology (mungbean,lentil,chickpea and blackgram) in Barisal,Madaripur,Jhalakati,Tangail and Mymensingh districts.

Implementation progress: Lentil (200 lines) have been planted for screening of sclerotium/fusarium of wilt. Chickpea (200 entries) have been planted in the field for screening against botrytis gray. mold. Six farmers and one SAAO training have completed**.** Five hundred farmers were involved in lentil, chickpea, mungbean and blackgram. 200 lentil, 200 chickpea, 200 mungbean and 21 blackgram promising lines have been evealuated against Fusarium/Selerotium wilt and Stemphylium bligh of lentil, BGM against chickpea, YMV of mungbean and blackgram, pod borer and thrips of mungbean at Regional Agricultural Research Station, BARI, Rahmatpur, Barisal during rabi season (2011-2012) and late rabi season (2012). Nine experiments have been conducted at Jhalakathi districts under supervision of Agrarian Research Foundation. Upscaling of BARI mash-3, BARI masur-7, BARI chhola-5 and BARI mung-6 have conducted in Tangail and Mymensingh district under the supervision of Trinamul Manabik Unnayan Forum. Four varieties of lentil and chickpea (not listed here) have been validated under on farm trial at farmer's field of Barisal and Madaripur district.

A baseline survey conducted for identifying th bio-physical constraints for pulse production at Barisal and Jhalakathi districts. Thirty six batches of farmers training program conducted on modern production technologies of lentil, chickpea, mungbean and blackgram. One thousands eighty farmers have well trained through this project.

Financial: A total of Tk. 133.88 was approved for the entire project period (36 months) of which Tk. 75.24 has been released

Research Highlight : 06, 22, 16, 31, 33, 03, 47 and 19 promising entries of lentil foot rot, lentil stemphylium blight, chickpea BGM, mungbean YMV, mungbean CLS, blackgram YMV, mungbean thrips and pod borer respectively, have identified form Ist years research work and repeated 2nd year for conformation at RARS, Rahmatpur, Barisal. Out of four lentil, chickpea, mungbean and blackgram varieties BARImasur-7, BARIchhola-9 and BARImung-6 have been identified for high yielding, disease and insect tolerant varieties from Ist year validation program and lentil & chickpea have demonstrated 4 upazilas of 2 districts. Bio physical constrains of pulses in the southern region have identified. The manuscript will be submitted very soon for publication. Two MS thesis have done from screening program on lentil and submitted to the Dept. of Plant Pathology, PSTU, Dumki, Patuakhali (July-Dec session, 2012). 21 farmers training program have done during this period. Screening of chickpea genotypes for tolerance to soil submergence.

10. <u>Project code with Title:</u> C-7.12: Standardization of protocol, and in vitro production of BARI kala-3 & BARI kala-4 plantlets and their validation trial at hilly areas.

Duration: 36 months; May 2011 to April 2014

Project Background: Banana is a common fruit of Bangladesh and BARI kola 3 and BARI kola 4 are very popular to the people of Chittagong Hill Districts. But the area under this crop has decreased by about 23% on the average with a rage of 11 to 47% in 3 Hill districts during the period from 2003 to 2008. Bunchy top disease is considered as the main reason for such decrease in areas and yield. Vegetative propagation through infected suckers further aggravates the situation.

Tissue culture technique is considered as an appropriate option for producing sufficient number of disease free planting materials within a limited time & space. These materials are genetically homogeneous, resistant to bunchy top disease for several ratoon crops and harvestable at one time with 10-15% higher yield. The project is therefore undertaken to standardize the existing protocol for in vitro plantlet production of BARI kola 3 and BARI kola 4 and to evaluate their yield and economic performance in the Chittagong Hill Districts.

Implementation progress: The project is being implemented through collaborative approach. Both lab. and field studies were undertaken for implementation of project activities. *In vitro* studies were initiated at Biotech Lab of Biotechnology Division, BARI for standardization of protocol and mass production of quality banana plantlets (BARI Kola-3 and BARI Kola-4). Forty eight On-farm participatory validation trails with tissue cultured plantlets were planned to be established in eight upazilas of two Hill Districts (Khagrachari and Rangamati) by two Hill Agricultural Research Stations of BARI. Plant Tissue Culture Lab of Mustafa Group of Industries, at Nagirhat, Chittagong was linked with BARI as collaborative partner for subsequent disease free quality plantlets production for Chittagong Hill Districts. Forty eight farmers, each with about 30 decimal area of land were selected from 8 upazilas of two Hill Districts for conducting on-farm validation trial on tissue cultured banana production. Necessary research inputs and capital items have been procured following PPR-2008. Two Scientific Assistants (SAs) for BARI Biotechnology lab. have been recruited. Four SAs of BARI Biotechnology lab. and two technicians of plant tissue culture lab. of a private sector organization (Mustafa Group of Industries) were given a hand on training on tissue culture techniques for mass production of banana plantlets.

Financial: A total of Tk. 98,00,000.00 was approved for the entire project period (36 months) of which Tk.5247698.00 has been spent.

Research Highlights: A standardized protocol for *in vitro* plantlet production of BARI kola 3 and BARI kola 4 has been established. More than 15,000 plantlets have been produced, hardened and their validation trials have been established in 17 farmers' fields of eight upazillas of Khagrachari and Rangamati Hill Districts. Another eighteen validation trials are going to be established by April-May, 2013. Hundred percent plantlets survived when plantlets were transplanted in poly bag and kept 7 days under polythene tunnel house. Thirty four farmers (two from each trial) have been trained on banana production technology for better management of the field trials. Also, sixteen Sub-Assistant Agriculture Officers (SAAO) from eight upazillas have been trained to help the farmers.

11. <u>Project Code with title:</u> C-9.6: Rhizome Rot Disease of Ginger and Its Management

Principal Investigator: Dr. Mahbub Uddin Ahmed, PSO, Plant Pathology Division, BARI, Joydebpur, Gazipur

Lead Organization: BARI

Location: Rangpur, Bogra, Tangail, Mymensingh, Bandarban, Chittagong, Khagrachhari, Rangamati, Pabna, Gazipur

<u>Up to date Progress Summary (Technical & Financial;</u>

Ginger (Zingiber officinale Rosc.) is one of the most essential spices in Bangladesh and is cultivated more or less all over the country. Major limiting factor for ginger cultivation is rhizome rot disease caused by Pythium aphanidermatum. As the crop is cash crop, so it is prime need to identify the causal agents of rhizome rot through intensive survey which will help to modify the existing technology for managing the disease in future. A survey was conducted in five ginger growing districts namely; Rangpur, Nilphamari, Bogra, Khagrachari and Tangail to identify the microorganisms associated with rhizome rot. Project personnel visited farmer's fields of above mentioned districts and documented necessary information through questionnaires. A total of 20 farmers fields were surveyed in each district. Around 120 large fields of five districts were surveyed in the mean time. Microorganisms associated with rhizome rot were isolated and identified following tissue plating method in the laboratory. Three pathogens viz Fusarium, Sclerotium and Pythium were identified in the rhizome rot disease of ginger.

Financial: A total of Tk. 45,00,000.00 was approved for the entire project period (36 months) of which Tk. 19,53,600.00 has been released

Highlight of Research Achievements:

1: Disease free ginger will be produced in ginzer growing areas.
2: Ginger production will be increased and farmer income will be enhanced
3. Import of ginger will be less and foreign currency will be shaved

12. Project Code with title: C-9.6: Management of coconut mite.

Principal Investigator: Dr. Md. Nazirul Islam, Plant Physiology Section, Horticulture Research Center, BARI,Gazipur

Lead Organization: BARI

Location: Jessore Sadar, Upazila:Jessore Sadar, District:Jessore.

Duration: 36 Months

Specific Objectives:

1. To determine the best management practices for controlling coconut mite
2. To enhance the technical skills and knowledge of the participating farmers

Implementation Progress:

Coconut mite (*Aceria guerreronis*) has become the most important pest of coconut fruits in Bangladesh. The pest is serious in the southwestern region of the country where coconut farming is considered as one of the most important homestead agriculture.

Participatory approach had been adopted to involve farmers in the study. A pre-prospecting survey was conducted for demarking the study area as well as identifying the infected palms. The study area had been selected in the proximity of RARS/BARI, Jessore covering an area of around 576 hectares of land and 438 households and 3229 coconut palms. The whole area was divided into five sub-sectors. Thirty farmers had been selected strategically for assigning treatments and replications. Six different treatments of Omite, Neem oil and combinations of Omite, Neem oil, Neem cake and Trichoderma based compost had been applied on 90 plants in between November, 2011 and March, 2012. In addition to this, other palms possessed by other farmers were treated by omite and neem oil cake following a cleaning operation of the infested parts of the plants. Harvest of quality nuts was the indicator of success of the project The number of coconuts on the treated plants ranged from 40-300/plant. On an average, 70 coconuts had been found on the treated plants. On the other hand, almost nothing was found on the untreated control palms. The Base line found from the FPRA, completed at the beginning of the activities indicated that the infested plants produced 0- 5 deformed nuts per year, virtually nothing and that was the trend of the last 10 years.

Farmers, extension workers, researchers and policy makers had been oriented about the specific activities of the project through an inception workshop. Farmers' perception on coconut mite infestation was collected through a participatory survey. Around 100 farmers have been trained on production/management of coconut. So far, most of the plants of the selected sectors (total plants 3229), aside from the selected ones fixed to have scheduled treatments, received treatments.

Financial: A total of Tk. 3140000.00 was approved for the entire project period (36 months) of which Tk. 1813500.00 has been released

13. Project ID with Title: C – 11.1 Management of Coconut Mite.

PI: Dr. Md. Nazirul Islam
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Lead Organization: HRC/BARI, Gazipur

Head of Organization: Director (Research) BARI, Joydebpur,Gazipur-1701
Cell:01716-315277 ,Email:dres.bari@bari.gov.bd

Location: Jessore Sadar, Upazila:Jessore Sadar, District:Jessore.

Duration: 36 Months From: 25-05-2011 To: 24-05-2013

MoU Signing date: 25-05-2011

Total budget: Tk. 3140000

Fund released till to date: Tk. 1813500

Specific Objectives:

1. To determine the best management practices for controlling coconut mite
2. To enhance the technical skills and knowledge of the participating farmers

Implementation Progress:

Coconut mite (*Aceria guerreronis*) has become the most important pest of coconut fruits in Bangladesh. The pest is serious in the southwestern region of the country where coconut farming is considered as one of the most important homestead agriculture.

Participatory approach had been adopted to involve farmers in the study. A pre-prospecting survey was conducted for demarking the study area as well as identifying the infected palms. The study area had been selected in the proximity of RARS/BARI, Jessore covering an area of around 576 hectares of land and 438 households and 3229 coconut palms. The whole area was divided into five sub-sectors. Thirty farmers had been selected strategically for assigning treatments and replications. Six different treatments of Omite, Neem oil and combinations of Omite, Neem oil, Neem cake and Trichoderma based compost had been applied on 90 plants in between November, 2011 and March, 2012. In addition to this, other palms possessed by other farmers were treated by omite and neem oil cake following a cleaning operation of the infested parts of the plants. Harvest of quality nuts was the indicator of success of the project The number of coconuts on the treated plants ranged from 40-300/plant. On an average, 70 coconuts had been found on the treated plants. On the other hand, almost nothing was found on the untreated control palms. The Base line found from the FPRA, completed at the beginning of the activities indicated that the infested plants produced 0- 5 deformed nuts per year, virtually nothing and that was the trend of the last 10 years.

Farmers, extension workers, researchers and policy makers had been oriented about the specific activities of the project through an inception workshop. Farmers' perception on coconut mite infestation was collected through a participatory survey. Around 100 farmers have been trained on production/management of coconut. So far, most of the plants of the selected sectors (total plants 3229), aside from the selected ones fixed to have scheduled treatments, received treatments.

14. Project Code with title: C-13.2: Selection and application of BPH management technologies in Sirajgonj district.

Principal Investigator: Dr. Md. Fazle Rabbi PSO and Head, Entomology Division, BRRI, Gazipur

Lead Organization: BRRI

Location: Tarash (Sirajganj)

Implementation Progress:

1: BRRI Dhan-29 seeds have been sown in the seedbed
2: Survey work initiated in time
3: To run the project smoothly the recruitment of Expert Professional and Field Assistant have already been done. DAE personnel and some development workers (76 nos.) were trained on BPH management technologies. Besides the project personnel involved in benchmark survey were also given training before interview of the stakeholders.
4: To monitor the BPH and WBPH incidence, three light traps were installed in three project sites. Yellow sticky traps were also used weekly in the project's sites.
5: Activities of farmers in farmers managed field were also monitored regularly. One application each of fungicide and herbicide were applied in farmers managed fields.

Financial: A total of Tk. 41, 50, 000.00 was approved for the entire project period (36 months) of which Tk. 22, 77,800.00 has been released

Highlight of Research Achievements:

1: After controlling BPH the yield of T. Amon (Local) rice has been increased: in control plot 3.97MT, using single nozzle : 4.20 MT, in using double nozzle 4.55MT
2. Incase of Boro rice (BRRI Dhan-29) after controlling BPH the yield increased: in control plot 8.7 MT, using single nozzle : 8.9 MT, in using double nozzle 9.15MT
3: Abount 250 farmers in Tarash Upazilla are adopting improved management practices for controlling BPH

15. Project Code with title NR-15.22: Validation of drought management techniques for sustainable crop production in the high barind tract

Principal Investigator : Md. Abdus Salam , SSO & Station In-charge, OFRD, BARI, Barind Station, Paramedical Road, Laxmipur, Rajshahi

Lead Organization: BARI

Location: High Barind Tracts – Nahole (ChapaiNawabganj), Godagari (Rajshahi) and Shapahar (Naogaon)

Implementation progress:

1: The Project activities were undertaken in three locations of rainfed area in High Barind Tract viz. Nachole (Chapai-Nawabganj). Godagari (Rajshahi) and Shapaher (Naogaon) with the objective to increase cropping intensity and land productivity, to increase crop yield through appropriate drought management techniques and also to increase farm level income and to increase knowledge and skill of the farmers on drought management techniques. The study was carried out in a participatory approach in 3 locations with 90 farmers. BINA Dhan 7 was transplanted on 20-25 July. Thirty farmers were selected in each location ie, total farmers were 90 and land was 12.0 ha in three locations under rain fed condition. Base line survey and an orientation workshop were conducted with different stakeholder. Training programs for

farmers and extension personnel on drought management has been conducted and Field day on short duration T. Aman rice (var. BINA Dhan-7) has been arranged. BINA Dhan-7 was harvested on 15-20 October 2011. and average yield of BINA Dhan-7 was 4.7 t/ha which was 30% yield increase over farmers plot. This early maturity could help the establishment of rabi crops in proper time due to available residual soil moisture. In Rabi season (2011-2012), wheat (var. BARI Gom 26)/ Chickpea (var. BARI Chola 5) and potato (var. Diamont) has been sown using residual soil moisture after harvest of short duration T. aman rice. The trials were conducted in 90 farmer's field in 3 locations in 12.0 ha of land and seeds of Chickpea, wheat and potato were sown on 20-25 November 2011, 24-30 November 2011 and 15-19 November, respectively. Average yield of wheat, chickpea and potato of trial plot were 4.26 t/ha, 1.68 t/ha and 23.4 t/ha, respectively which was 30 to 40% yield increase over farmers plot. Field days on wheat (var. BARI Giom 26), Chickpea (var. BARI Chola 5) and potato (var. Diamont) has been arranged in three locations. Cropping intensity of the project area was increased from 188% to 230% due to fallow land utilization after harvest of T. Aman rice.

Financial: A total of Tk. **39, 92,000.00** was approved for the entire project period (36 months) of which Tk. 26, 88,000.00 has been released

Highlight of Research Achievements:

1: Suitable drought management practices/options in HBT developed
2: Yield gap through adoption of modern/appropriate technology
3: Cropping intensity increased by 20%
4: Farmers income increased by 10%

16. Project Code with title NR-16.15: Testing, validation and up-scaling of Water Saving Technology in Rice Production (TWST)

Principal Investigator: Dr. Md. Towfiqul Islam, SSO, Irrigation Water Management Division, BRRI, Joydebpur, Gazipu-

Lead organization : BRRI, Gazipur

Location **:** Dhamurhat of Naogaon
Hossainpur of Kishoreganj

Duration : 36 months (26.05.2011-25.04.2014)

Specific objectives :
1: Harvesting and ponding of rain water for utilization in mitigating drought affected rice
2: Minimizing conveyance loss and increasing water use efficiency in rice production
3: Increase irrigated area coverage by adopting water saving technologies and
4: Avoiding repeated priming in STW

Project Background :
The northwest region is the driest part of Bangladesh. The average rainfall ranges from 800 mm to 1500 mm in this region. Drought occurs very often and affects Aman rice (monsoon rice). Especially terminal drought (occurs during reproductive and ripening period of Aman rice) reduce yield of Aman by 5o to 60% even more. But this reduction of yield depends on severity of drought. Dhamurhat Upazilla (selected site of the project) under northwest region is also drought prone area. It was found from survey that light and moderate drought occurs almost every alternate year, and the return period of severe and very severe drought is 5-year and 10-year at the selected Upazilla. Harvesting excess rainfall on-farm reservoirs (OFRs) may play a crucial role in mitigating drought in rainfed rice. There are numbers of fallow and abundant water bodies in this Upazilla and those can be used for supplemental irrigation in increased productivity and farmer income. But there is lack of understanding of the physical,

hydrologic, and socio-economic factors that critically affect successful operation and performance. So, there is an urgent need to mitigate the problem by harvesting and ponding of rain water for utilization in mitigating drought affected rice and minimizing conveyance loss and increasing water use efficiency in rice production.

Implementation progress: This project was started in two Locations namely Dhamurhat Upazila of Naogaon and Hossainpur Upazila of Kishoreganj districts with an aim to validate and upscale three water saving technologies in rice production addressing the problems in the project area. About 160 farmers, of them 50% are participatory and the rest are associated, were selected. A land area of 0.148 of each selected farmer was taken for experiment. Before project activities commence, an inception meeting of the project was held both in the locations, and different stakeholders joined in this meeting. Moreover one-day training on water saving technologies was given to the selected project farmers and DAE personnel both in the locations. During Aman season 2011, BRRI dhan49 was transplanted. Rain water was harvested in the selected two farm reservoirs at Dhamurhat of Naogaon district and water of these reservoirs were used as supplemental irrigation for T.Aman production. Average yield of supplemental irrigated and rainfed Aman rice were 5.52 t/ha and 4.33 t/ha, respectively. About 21.33% yield was increased and average benefit was 11948 Tk/ha due to supplemental irrigation. During Boro season 2011-12 The PVC pipe water distribution system (PWDS) technology was tested and also upscalled in a DTW under BMDA at Dhamurhat Upazila of Noagoan district. In upscalling, problem of back pressure has been solved, an iron made shutter has been developed to remove problem of end cap detaching and problem of single plot irrigation has been overcome. About 99% conveyance loss was reduced in PWDS. After introducing PWDS irrigated area was increased by 20% (2 ha). For using PWDS irrigation cost per Bigha under head, middle and tail could be reduced by 316.8 Tk, 422.4 Tk and 4.22 Tk respectively. Check valve (CV) nonuser wasted 131 hours and CV user wasted only 2.5 hours for starting pump. The most important thing was that the CV user could save 3000.00 (Three thousand) Taka in STW operation per season.

Financial: A total of Tk. 3995000.00 was approved for the entire project period (36 months) of which Tk. 21,68 000.00has been released

Research Highlight : During Aman season 2011, BRRI dhan49 was transplanted. Rain water was harvested in the selected two farm reservoirs at Dhamurhat of Naogaon district and water of these reservoirs were used as supplemental irrigation for T.Aman production. Average yield of supplemental irrigated and rainfed Aman rice were 5.52 t/ha and 4.33 t/ha, respectively. About 21.33% yield was increased and average benefit was 11948 Tk/ha due to supplemental irrigation. During Boro season 2011-12 The PVC pipe water distribution system (PWDS) technology was tested and also upscalled in a DTW under BMDA at Dhamurhat Upazila of Noagoan district. In upscalling, problem of back pressure has been solved, an iron made shutter has been developed to remove problem of end cap detaching and problem of single plot irrigation has been overcome. About 99% conveyance loss was reduced in PWDS. After introducing PWDS irrigated area was increased by 20% (15 Bigha). For using PWDS irrigation cost per Bigha under head, middle and tail could be reduced by 316.8 Tk, 422.4 Tk and 4.22 Tk respectively. Check valve (CV) nonuser wasted 131 hours and CV user wasted only 2.5 hours for starting pump. The most important thing was that the CV user could save 3000.00 (Three thousand) Taka in STW operation per season.

17. Project Code with Title: L-17.4; Development of cost-effective complete feed formula for the productive and reproductive performances of buffaloes

Principal Investigator: Prof. Dr. Md. Ruhul AminDept. of Animal Science, BAU, Mymensingh

Lead Organization: BAU

Location : Mymensing, Pabna, Rajshahi, Sylhet and Noakhali

Duration: 36 months (From May 29, 2011 to May 31, 2014)

Project background: Bangladesh is one of the world's most densely populated countries with approximately 150 million people, 49 percent of whom live below the national poverty line and child malnutrition rates of 48 percent are the second highest in the world. Animal protein from milk and meat are very crucial where the daily requirement of milk and meat for an adult person is 250ml/h/d and 120g/h/d but the availability in Bangladesh is only 45ml/h/d and 22g/h/d, respectively with more than 80% deficit (DLS, 2010). In this regard, buffalo can contribute to increase milk and meat but the role of buffaloes was not emphasized and the species did not receive the attention of the policy makers and the researchers in accordance with its merits. The present research program is therefore undertaken to investigate the productivity of milk and meat and the reproductive performances of buffaloes with improved feeding and management system to exploit the potentialities for the welfare of the rural poor and village community as well for the total nutritional status of the populace and the economy of Bangladesh.

Technical progress/Summary (upto February 2013):

- Launching workshop involving collaborating organizations.
- Training of the selected farmers.
- Conducting baseline field survey.
- Conducting Husbandry practices (administration of air tag, vaccines and anthelmintics, etc)
- Training of Field Assistant on husbandry practices, methods of feeding, data collection and record keeping, etc.
- Preparation of formula for feeds.
- Feeding and digestion trial.
- Record keeping and data collection.

(As per inception report these activities were supposed to be accomplished in the 1st year of the project but unfortunately it could not be done in the 1st year and in the 2nd year of the project these activities are

Financial: A total of Tk. Tk. 59, 03,659.00 was approved for the entire project period (36 months) of which Tk. 22,23509.00 has been released.

Research highlights (upto February 2013):

- Knowledge gained on feeds and fodder, existing feeding system and management practices, current production of milk and meat, and reproductive status of buffaloes in Mymensingh, Noakhali, Natore and Rajshahi.
- Created motivation and awareness of two hundred (200) buffalo farmers through training.
- Cost effective feed in corporating nutrition value formula developed for milk production and growth of buffaloes.
- Buffalo feeding system improved and practiced by the buffalo farmers.

18. Project Code with Title: L-19.2: Investigation on calf diseases and development of mitigation measures

Coordinator: Prof. Dr. A. S. Mahfuzul Bari, Vice-Canceller, CVASU, Khulsi, Chittagong

Lead organization: CVASU

Location: Belkuch and Shahjadpur (Sirajganj); Rangati and Komol Nagar (Luxmipur); and Char Fasson and Lalmohon (Bhola)

Project Duration (months): 36 months; From June, 2011 to May, 2014

Project Background:

About 22.3 million Cattle and 1.5 million buffaloes in Bangladesh are reared under integrated agricultural production system (DLS, 2009). Out of the total cattle and buffaloes around 19% are cow calves and less than 15% are buffalo calves. Both group of calves are stunted in growth acquiring 150-250 gm per day growth resulting in delayed puberty consequently causing few offspring (5-7 in the productive life cycle) and reduced milk production in the life cycle time. Reduced number of calves has serious consequences in replacing the adult cattle/Buffalo (Rahman, 2002). Calf mortality in the country stands around 15% which is estimated 15% and is considered much higher among cross- breed calves and buffalos calves (Livestock Policy, 2007).

Several authors like Ahmed (2007), Akbar (2008), Alam (2008), Rahman (2009) and Baki (2010) have indicated that major causes of calf mortality are diseases, inadequate nutrition and poor rearing practices. Important diseases are mentioned by these authors are Foot and Mouth Disease (FMD), calf scour and parasitism. Whereas, lack or limited skills of farmers in feeding practices viz. a viz feeding resume for calves is also considered as a serious factor impacting on calves resistance as well as growth. Other factors are poor hygienic and health care management practices. Since, 70% of the rural household's rear cattle/buffalo for milk, meat, fuel, fertilizer and income effect of calf mortality seriously hampers poverty reduction and food security. Therefore, this project was undertaken to determine the various causes of calf mortality, their effect on the herd dynamics, and identify the technologies that could be practiced as remedial measures.

Technical progress:

- Inception workshop held on 9 August 2011 at CVASU and 29 participants attend the inception workshop from DLS,KGF, BLRI,CVASU and NGOs.
- Baseline survey completed in all target villages.
- Data collection with standard questionnaire completed in all target and control villages. 547 questionnaires from target villages and 497 questionnaires from control villages were filled up by the Research Assistant. There were 547 calves less than one year of age in target villages and 497 in control villages reared by respectively 471 and 411 owners.
- A total of 543 samples were collected from target villages. Microscopic examination of feces completed. Multiplex PCR for detection of virus, and bacteriological examination by culture is in progress. Feces examination (parasitic egg determination) was completed.
- De-worming and vaccination programs were organized. De-worming & vaccination of 1221 calves & cattle in project areas
- Samples from diarrheic, pneumonic and navel ill infected calves were collected and laboratory diagnosis is going on in BLRI.
- Different training programs were organized. In total 38 training/field day were organized from which 1243 farmers were trained up.
- Two workshops held at Upazila level where 57 participants attended.

Financial: A total of Tk. Tk. 99, 53,900.00 was approved for the entire project period (36 months) of which Tk. 35,56,595.00 has been released.

Research Highlight

- Diarrhea, FMD, pneumonia, navel ill, skin diseases were found as predominant calf diseases.
- Following parasitic and protozoan egg, cyst & oocyst were identified through microscopic examination of fecal samples using different techniques, diseases among calves-B. coli, Eimeria sp.,Taenia sp., Moniezia sp., Stongyloides sp., Toxocara sp., Parmphistomam sp., Trichuris sp., Fasciola sp.
- B. coli, Toxocara sp and Eimeria sp. were found during microscopic examination of diarrheic feces.
- **Inadequate de-worming and vaccination**: Data analysis form pre-tested standard questionnaire revealed, 31.12 % (141) calves fed de-worming tablet in target villages and 26.93% (101) calves fed de-worming tablet by the farmers in control villages. In target villages only 3.97% (18) calves were found vaccinated and in control villages 2.13% (8) calves were found vaccinated.
- **Lack of vitamin mineral and balanced ration feeding practices**: Data analysis form pre-tested standard questionnaire revealed, only 5.42% (25) calves fed vitamin, mineral supplement and 27.38% (69) fed balanced ration by the farmers in target villages. In control villages 1.6% (6) calves fed vitamin, mineral supplement and 15.2% (57) fed balanced ration by the farmers.
- **Lack of knowledge about calf diseases:** Data analysis form pre-tested standard questionnaire observed that 13.32% (53) farmers had knowledge about calf diseases in target villages. In control villages 6.31% (19) farmers were found who knew about calf diseases
- **Unhygienic management of calf**: Data analysis form pre-tested standard questionnaire found that only 3.52% (14) farmers had knowledge about hygienic management of calf in target villages. In control villages 9.97 % (30) farmers had knowledge about hygienic management of calf.
- **Poor housing system**: Data analysis form pre-tested standard questionnaire revealed, most of the cattle sheds were poorly constructed. In target villages 83.61% (301) and in control villages 87.38% (263) cattle sheds were found poorly constructed.
- Out of 543 samples collected from target villages, 240 fecal samples were tasted which preliminarily reveled that 154 calf (64.17%) were effected by parasitic and protozoan infection, 32 diarrheic samples tasted out of which 24 (75%) were found affect by parasitic and protozoan infection.

19. <u>Project Code with title</u>: L-20.4: Clinicopathological and serological surveillance of *Foot and MouthDisease* (FMD) and *Peste des Petits Ruminants* (PPR) and adopt preventive measures against them at Shakipure and Madhupure Upozilla

Principal Investigator: Coordinator: Prof. Dr. Md. Abu Hadi Noor Ali Khan, Dept. of Pathology and Proctor, Bangladesh Agricultural University, Mymensingh

Lead Organization: BAU

Location : Shakhipur and Modhupur (Tangail)

Duration: 36 months

Background information: Foot and Mouth Disea (FMD) and *Peste des Petits Ruminants* (PPR) are the most important endemic viral diseases of ruminants in Bangladesh and responsible for huge economic loss in livestock industry due to morbidity, mortality, and trade restriction. FMD

principally affect cattle, buffalo, sheep, and goats where as PPR affect goats and sheep only. In Bangladesh FMD is said to be a number one calf killer and PPR killed about 35-70% infected goats and sheep. Moreover most of the animals in village condition are affected with worms. Immunization against type specific FMD and PPR vaccine can enable farmer to reduce morbidity and mortality. In addition to vaccination deworming may increase weight gain and could have provided better protection following vaccination. This study was, therefore, designed to deworm and immunized cattle and buffaloes with FMD vaccine.

Technical progress summery up to February 2013: For conducting project work,particu larl .four sites at Shakipure Upozilla and four sites at Madhupure Upozilla were selected ,site selectionA data based surveillance system was done to know the occurrence of FMD and PPR infectivity at Shakipure and Madhupur Upozilla.After selection of site s ,1000 c attleof Shakipure upozilla were dewormed and immunized with FMD vaccine and 500 cattle of Madhupur Upozilla were dewormed only as control study More than .200 buffaloes of Solakuri Union, Madhupure Upozilla were dewormed and immunized with FMD Vaccine and 50 buffaloes of Solakuri Union were dewormed only as control study. O0n day ,30 , 60, 150 and 365of immunization sera were collected Oral .ed serum immune response using ELISAmeasur ,(in each group 20 =N)from selected individuals vesicular fluid and tissues from interdigital spaces from the naturally infected cases of FMD were PCR-collected and identify FMD virus subtype using RT (Reverse Transcriptast-Polymerase Chain Reaction)From the field outbreaks of PPR collected pharyngial and cervical .protocol PCR-lymphnodes and adopt RT (Isolation of FMD and PPR .assay to identify PPR viruses involved .viruses in culture is in progress

Financial: A total of Tk. Tk. 88,49,000.00 was approved for the entire project period (36 months) of which Tk. 50,85913.00 has been released.

Research highlight: The occurrence of FMD in ruminants prior vaccination was 20% in cattle and 14% in buffaloes with 7-10% calf mortality. Vaccination of cattle and buffaloes with FMD trivalent vaccine confer absolute protection in 90% animals. Only 7-10% vaccinated animal showed mild infectivity but there was no mortality. The overall weight gain was increased upto 15-20% following deworming. Results of RT-PCR showed that cattle and buffaloes in the study areas was infected with Seroty "O" FMD virus. PPR vaccination in goat was found to reduce infectivity (14% infectivity) in vaccinated goat with a morbidity to mortality of 28%.

20. <u>Project Code with title</u>: F-22.1: Diversification of Carp Polyculture Integrating Snail (*Viviparus sp.)*, and *shing* (*Heteropneustes sp.*) Culture in Cage in Ponds of *Adivasi* Households

Principal Investigator: Dr. Mohammad Mahfujul Haque, Associate Professor, Dept. of Aquaculture, BAU, Mymensingh

Location: Nalitabari, Shepur
Lead Organization: BAU
Duration: 36 months from May 2011 to April 2014

Project background: The proposed project is to use of diverse recourses including poor human capital (e.g. *adivasi* people) natural resources (pond) and biological resources (e.g. fish and snail) toward productive purposes. The *adivasi* people traditionally depend on hunting and collection of natural resources, which are now in scanty undermining their livelihoods. In this context, it is inevitable to find an alternative way out for combining the uses of resources to support their livelihoods. The Department of Aquaculture, BAU has already developed carp on-station based polyculture based snail production technology appropriate for feeding *shing* in cage. Anthropologically *adivasi* people have the relationships with collection and consumption of snails. In *adivasis'* accessed ponds, traditionally carp polyculture is being practiced and freshwater snail is being produced. Converting snails to artificial fish feed, cage based *shing* (*Heteropneustes fossilis*) production is being carried out towards increasing

productivity of pond. Being the outcomes of the participatory research, it is expected to be disseminated by farmer-to-farmer approach increasing cost-effectiveness of the overall project.

Technical progress summary (upto February 2013): During the period of starting the project to date, initially an inception meetingand a financial magement related workshop organized by KGF, were attented by PIalong withthe staff of the project implementing NGO (BISHAL)For . conducting intitual project work,particualr ly site selection was carried out in the proposed implementation area staffs were recruited considering qualificationn ,After selection of site .needed for the project activities The minor capital items in project proposal were purchased in time as per . KGF permission and farmers selection and their traning has been carried ,By this time .BAU rules .outDuring the training, farmers were given a leaflet that describes all the technicalities of fish and snail culture in Bengali. After the training, farmers were given cages installed in their ponds. In the cages, overwinter large size shing fingerling has already been stocked. Along with *shing* in cage, farmers also stocked carps fingerling in their ponds. The growth of carps in the ponds was satisfactory and the productivity was found at the rate of 15kg/decimal. As with carps, initially the growth of *shing* was found satisfactory, later the growth of *shing* was slow and the production level was at 2-2.5 kg/cage.

Financial: A total of Tk. 39,95,000.00 was approved for the entire project period (36 months) of which Tk. 20,68,556.00 has been released.

Research highlights: The major highlights of the research findings include adoption of given technology at the farmer level and information gathering regarding fish growth, production and water quality parameters. The growth of carps in pond was satisfactory, however the growth of *shing* was not at the expected level due to poor quality *shing* fingerlings supplied by the hatchery. For the following year, quality fingerlings supplies will be ensured. The production of snail was variable due to disturbance of household domestic duck. To overcome this problem, farmers are suggested to protect the snail producing area in pond surrounding by net.

21. Project Code with title: CC-25.1: Development of an integrated rice-fish production system in lower Meghna river flood plain of Noakhali and Lakshmipur districts

Principal Investigator: Dr. Mohammed Amin ,CSO, BARI, Hathazari, Chittagong

Lead organization: BARI

Location: Sadar, Sonaimuri, Begumoanj and Subornerchar of Noakhali; Ramgoti of Laxmipur

Duratio: 36 months (29.05.2011-28.04.2014)

Specific objective:

1: To adapt rice-fish and rice + fish upland crop production system in single Boro and T.Aman system in lower Meghna flood plain area
2: To improve traditional cropping pattern through adaptation of short duration and long stature transplanted Aman rice varieties and quick growing fish species in lower Meghna flood plain area.
3: To improve knowledge and skill of the farmers on production technology of the newly developed production system saving technologies and
4: Avoiding repeated priming in STW

Project Background : This report reflects the progress of the project implemented during May, 2011 to May, 2012 funded by KGF. Both water logging and soil salinity are the impact of climate change and mitigation is difficult and expensive and thus calls for adaptation.

Seasonal floodplain of Noakhali has significant unrealized potential for aquaculture development specially for prawn culture about 45000 hactor of seasonal flood plains have been identified as suitable for nursing and culture of fish and prawns as well as indigenous brood fish rearing through the establishment of community-based fish sanctuaries for biodiversity conservation. In Southern Noakhali districts livelihood options are limited and the introduction of rice cum fish and prawn culture in these waterlogged areas is a promising one. The proposed project seeks to develop integrated rice-fish production system and up scaling program for waterlogged areas greater Noakhali and Lakshmipur districts.

Implementation progress : Project was implemented during May, 2011 to May, 2012 in collaboration with Noakhali Science and Technology University (NSTU). Rice production was conducted by OFRD, BARI, Noakhali and fish production by NSTU in the four upazilla's of Noakhali districts. Rice variety BRRI dhan-49 was cultivated and fingerlings of (Rui, Catla, Mrigel, Grass-carp and Common carp) from recognized hatchery farm were supplied among the 8 locations covering 1592 decimal and 46 farmer following participatory approach. Among the eight locations four locations were T. Aman rice + fish culture and other four location's. were tested Fish-Boro pattern and one location in Lakshmipur in only boro rice in the farmers field. Both Rice and fish were harvested. The Yield of HYV Aman ranged from 3.98 t/ha to 4.65 t/ha, and average yield was 4.39 t/ha. In .T.aman rice based pattern, yield of fish ranged from 1.13 t/ha to 1.52 t/ha. The average yield was 1.35 t/ha considering 4 locations. In boro based pattern, the yield of boro rice (var. BRRI dhan-29) ranged from 5.57 /ha to 6.28 t/ha and the average yield was recorded 5.97 t/ha which was 4% lower than existing local variety (Hybrid Heera). Also, in the boro based pattern due to adoption of improved fish culture yield of fish increased 211% than the existing farmers practice. The average gross margin was Tk 45351 and Tk. 116410 higher in the aman based and boro based pattern respectively.

Financial: A total of Tk. 75.00 was approved for the entire project period (36 months) of which Tk. 34.29 has been released

Research Highlight: From the one and half year result it may be concluded that among the aman and boro based two patterns BRRI dhan-49 and BRRI dhan-40 in aman gave 34% and 27% higher yield than local variety Kajalshail. Though BRRI dhan-29 gave the 4% lower yield than local popular variety (Heera) but gross margin and BCR was higher in tested variety BRRI dhan-29 due to its high market price. Fish yied in boro pattern gross return, gross margin and BCR found higher than aman based pattern.

Research Highlight of CGP Phase-II

1. Project ID with title: C-1.2 :Testing,Validation and Up-scaling of cotton-rice intercropping in Chittagong Hill districts

PI **:** Dr. Md. Farid Uddin , Additional Director
Lead organization : Cotton Development Board(CDB)

Location **:** 28 locations at Raicha, Bakhichara, Dolupara of Bandarban
6 locatios at Kawkhali of Rangamati
6 locations at Matiranga of Khagrachari
Duration : 36 months (28.09.2011-27.09.2014)
Specific objectives :

1. To develop improved crop production practices Incorporating hill cotton and rice substituting traditional jhum system
2. To improve system productivity and
3. To reduce soil erosion

Project Background:
Cotton (*Gossypium arboreum*) is an important crop for hill farming. It has been cultivated since the prehistoric time in hill districts of Bangladesh. Cotton is important to tribal people not only for their source of income but also in their religious rites. Hill cotton is a long duration crop and generally hilly farmers grow cotton in Jhum system i.e they cultivate cotton with other crops like rice, maize, chilies, sesame, okra, marpha, pigeon pea etc. in the same pit at a time in hill slope. As a result every crop has to compete to each other for nutrient, moisture, sunshine, air and other growth factors. For intra and inter species competition the yield of cotton, rice and other component crops is low and unstable. On the other hand, in Jhum cultivation environmental pollution and soil erosion is very high. So, there is an urgent need to develop crop production technology incorporating cotton and rice instead of jhum cultivation

Implementation progress: The project was taken to test, validate and upscale of cotton-rice intercropping technology. The project activities was undertaken in the three hill districts to find out suitable production system for maximizing yield of cotton and rice and also reduce soil erosion. Three treatments viz. (1) 1 row rice + 1 row cotton (2) 2 row rice + 1 row cotton (3) Farmer's practice (Jhum) were used in this experiment. This experiment was carried out in 40 locations of three hill districts of Bandarban, Rangamati and Khagrachari. The field experiments were conducted in farmer's field of three hill districts during the period of May 2012 to November 2012 to test validate of cotton-rice intercropping technology. Local rice (Shere) intercropped with hill cotton (*G. arboreum*) was set at 21 locations, while BRRI dhan27 with hill cotton were set at 09 locations. Hybrid upland (*G. hirsutum*) cotton with BRRI DHAN-27 was tested for 05 locations and Hybrid upland cotton with local variety of rice (Shere) was tested for 05 locations. From the experimental result it was observed that one row cotton and two row rice gave higher yield. Results indicated that changing of crop geometry and reducing the number of crops in an intercropping system tends to increase yield.

Financial: A total of Tk. 34, 41000.00 was approved for the entire project period (36 months) of which Tk.1621200.00 has been released.

Highlight:
One row Hybrid cotton (*Gossypium hirsutum*) and two rice (BRRI dhan27) showed highest yield of 2713 kg/ha in case of rice and 1060kg/ha in case of seed cotton as compared to one row rice and one row cotton and Jhum (farmers' practice. Net gross income (Tk. 43958.00) and BCR (1.6) were recorded from 1 row Hybrid cotton (*Gossypium hirsutum*) and 2 row rice (BRRI dhan27 over Jhum cultivation where gross income was Tk. 11228.00 and BCR was 1.17 respectively.

2. <u>Project Code with title:</u> C-1.11: Improvement of appropriate rice based cropping systems in Barind areas

Principal Investigator: Md. Feroz Hossain ,Director Rural Development Academy (RDA), Sherpur,Bogra

Lead Organization: RDA

Location: Sherpur, Shajahanpur and Shibonj upazila of Bogra

Duration: 36 months

Implementation progress:
1: The proposed project aims at improving system productivity by increasing yields of rice and component crops of major cropping systems in selected areas of three upazila of Bogra (Shibganj), Shajadpur and sherpur district. The objectives of this study are to maximize yields of potato, rice, maize and vegetables using improved management practices and to expand the improved technologies in the farmer's field. On station trial at demonstration farm, RDA, Bogra followed the three cropping pattern and accordingly is in progress.
2: Selection and appointment of scientific staff has been completed and program planning workshop/inception workshop completed. Selection of sites and Focus Group Discussion (FGD) completed. Selection of farmers for field trials have already completed of three upazilas.
3: The selected farmers of Shibgonj upazila are CIG farmers. Training of the farmers are on progress and two sites already completed. All the farm trial are in progress according to season and schedule. Field day completed in shibgonj upazila on potato production field. Potatoes have already been harvested in shibgonj upazila.
4: Training on Potato production and Field day on potato have been completed. On station trial of potato at Demonstration farm of RDA, have already harvested and marketable yield was found 25.8/ha

Financial: A total of Tk. 70,00,000.00was approved for the entire project period (36 months) of which Tk. 33,68,000.00 has been released.

Total Budget: Tk. out of which Tk. has been released

Highlight of Research Achievements:
1. The proposed cropping pattern : (Amon-potato-maize) found suitable for Barind highlands after the completion of the trials.
2. Net income from proposed pattern :(Amon-potato-maize) is Tk. but in the previous pattern (Amon- potato-boro) is Tk

3. <u>Project Code with title:</u> C-1.26: Minimizing yield gaps in rice-based cropping systems three northern districts.

Coordinator: Dr. S.M. Mahabubur Rahaman Khan, PSO, OFRD, BARI, Gazipur

Lead Organization: BARI

Location: Rangpur, Kurigram and Bogra districts

Duration: 36 months

Implementation progress:
The project aims at improving system productivity by increasing yields of rice and component crops of major cropping systems in the selected locations of three upazilas of Shibgonj, Bogra, Mithapukur, Rangpur and Ulipur Kurigram districts. Focus Group Discussion (FGD) was conducted to identify the reason of yield gaps in rice and component crops of the patterns with 15 farmers in each location. Based on the results of FGD and review of literature, on-farm trials were established in each location. Farmer's involved in FGD reported that mustard, potato and boro rice were all planted late due to late harvest of the previous crop. Farmers in all three locations applied imbalanced and low doses of fertilizers that resulted in low yields. Most of the farmers took loan from NGOs- ASA, Grameen bank, relatives and friends. Only few farmers took loan from Krishi bank due to the requirement for collateral. Results of the on-farm trials indicated that at Mithapukur (Rangpur), average yield of potato in farmer's plot was 18.44 t/ha whereas it was 29.58 t/ha in the trial plot showing the yield gap of 37.66%. In case of boro rice, average yield with farmers' plot was 4.60 t/ha whereas it was 5.90 t/ha in the trial plot (yield gap of 22.03%) during the reporting period. Similarity, at Ulipur (Kurigram), average yield of potato and boro rice was 17.87 t/ha and 4.82 t/ha in farmers' plot and 27.06 t/ha and 5.85 t/ha in trial plot respectively during the same period. Yield gap was 33.96 % in potato and 17.61% in boro. Likewise , yields of mustard and boro rice managed by farmers were 0.78 t/ha whereas yields were 1.55 t/ha and 5.76 t/ha in the trial plots respectively at Shibganj, Bogra during the period. Yield gap was 49.7% in mustard and 16.67% in boro rice. Gross margin of potato, mustard and boro in trial plots were found higher compared to those of farmers's practices at all 3 locations. Training programs were also organized for 30 farmers and SAAOs at each of the three locations on the production technology of mustard, potato, boro rice and T.aman rice in the reporting period. Field days were well organized at these locations for the farmers and extension personnel to build awareness about the new technologies on mustard, potato and boro rice. Besides, one workshop on program planning was held at the beginning of the reporting period with 20 participants from DAE, BADC and NARS

Financial : Total budget. Tk. 66, 00,000.00 out of which. Tk. 27, 31,000.00 has been released.

Highlight of Research Achievements:
1: Training, field days and workshops are expected to enhance their knowledge and skill on production technology and strategies to reduce yield gaps in the potato, mustard and rice
2: The knowledge thus obtained may enable the farmers to increase yields of rice, potato and mustard by 30%,30% and 40% respectively.

4. Project Code with Title: C-1.27 Enhancement of Crop Productivity through Improved Management Practices, Tools and Techniques

Principal Investigator: Dr. Dilwar Ahmed Choudhury, SSO, OFRD, BARI, Gazipur

Lead Organization: BARI

Duration: 36 months

Location; Dhamrai, Dhaka and Singair, Manikganj

Project Background: Mustard, wheat, maize, vegetable crops, boro and transplanted aman rice are the major crops of Dhamrai upazila of Dhaka district and Singair upazila of Manikganj district. But the farm level yields of these crops are in general low compared to the yields obtained in research stations. Reasons for low yield are many. Most farmers use power tiller for land preparation. Usual depth of tillage with power tiller is very shallow, usually 3-4 inches, causing restrined root growth. Most farmers in the area use local variety of mustard with low yield potential (700-800 kg/ha). In aman season, farmers use long duration variety of rice BR 11, fairly old one whose yield potential is likely to be degenerated. Because of delay in harvesting transplanted aman rice, planting of subsequent rabi crops – mustard and wheat is usually delayed resulting in low yield. Farmers also do not apply recommended doses of fertilizers and seldom use organic manures. These cause deterioration of soil fertility rendering the soil gradually less productive.

There exist opportunities for improving soil productivity and enhancing crop yields. Crop yields can be increased at least by20-30% adopting modern varieties, improved tillage and recommended production practices. Use of appropriate tillage implement helps not only timely planting of crops but also ensures better soil environment for crop production. Power tiller operated with mould board plow and disc suitable for both wet and dry land conditions can plow the land as deep as 15 cm allowing enough root development of most crops. Other agricultural implements like USG applicator, maize sheller, seed drill, weeder etc. could be utilized in different intercultural operations. Application of IPNS approach will improve soil health and soil fertility which are the prerequisite for sustainable higher yield. Replacement of old degenerated variety with short duration HYV T.Aman will not only increase crop yield but also ensure timely planting of the succeeding crops. Adoption of recommended practices of crop production will increase crop yields and reduce yield gaps.

Implementation progress:

The project is being implemented by OFRD, BARI in collaboration with an NGO-Social Upliftment Society (SUS). An inception workshop involving the relevant stakeholders was organized to review and discuss the research activities to be implemented through the project. A quick bench mark survey was conducted before conducting field research to know the existing farmers' practices along with corresponding crop yield and system productivity. Necessary inputs, field and office equipments were procured following PPR 2008. Five on-farm adaptive trials (2 on single crop and 3 on cropping pattern based) were conducted at Dhamrai upazila of Dhaka and Singair upazila of Manikganj Districts. Selection of appropriate variety and evaluation of improved management practices on crop yield and system productivity were the main focus of these on-farm trials. Ten farmers, each with 20 decimal of land were selected for conducting each trial. Before establishment of these trials, farmers' training was organized on the contents of the trails at both upazilas. At the end of the trial, field days, involving cooperating and neighbouring farmers were also organized.

Financial: Total approved budget of the project is Tk.44,96,000.00. Expenditure made so far is Tk.16,33,000.00and financial progress is 36%.

Research Highlights:

- About 15% higher seed yield of mustard, maize Boro and T.aman rice was obtained from deep tillage compared to normal tillage.
- In varietal evaluation trial, about 35% higher seed yield of mustard was obtained in BARISarisha 15 and BARI Sarisha-14 compared to local variety Tori 7.
- Yield of Mustard, Wheat, Maize, Boro, jute and T.aman rice increased about 20% in IPNS based fertilizer recommendations compared to Inorganic fertilizer and Farmers' practice.

5. Project Code with Title: C-2.19: Crop intensification through incorporating quick growing fruits and vegetables into existing cropping systems in Jhalakati and Patuakhali districts

Principal Investigator: Md. Khairul Bashar. SSO, OFRD, BARI, Patuakhali

Lead organization : Bangladesh Agricultural Research Institute (BARI)

Location **:** Sadar and Dumki Upazila of Patuakhali

Sadar, Upazila of Jhalakhati

Duration : 36 months (10.10.2011-09.10.2014)

Specific objectives :

1: To improve cropping systems incorporating quick growing high-value fruits and vegetable crops into existing cropping systems in tidal floodplain of Patuakhali and Jhalakati districts

2: To increase farm income through production and marketing of fruits and vegetables and

3: To develop skill, knowledge and awareness

Project Background : Majority farmers in the southern coastal districts including Patuakhali and Jhalakati are poor. Ecological conditions do not favor practicing multiple cropping or achieving high yields. Cropping intensity is low and 41-66% of arable land remains fallow during rabi and kharif I seasons. Delay in soil drying process, lack of irrigation in dry season and early visit of tidal water made the tidal ecosystem in Jhalakati and Patuakhali districts less productive with least diversification of cropping pattern. From baseline survey, it was observed that late T.aman harvest, high soil moisture and high land is the main problem for vegetable production. From secondary data, it is reported that 40-60% yield reduces due to proper management i.e; used local variety, poor management, natural hazard and imbalance use of fertilizer. Ultimately cropping intensity is low. Looking at the immense problem it was important to improve cropping systems incorporating quick growing high-value fruits and vegetable crops into existing cropping systems in tidal floodplain.

Implementation progress : Two selected villages were representing each upazila making 6 villages in the project. Nine vegetables i.e; Cabbage, Knolkhol, Okra, Spinach, Tomato, Brinjal, Bitter gourd, Sweet gourd, Cucumber including summer tomato production and four fruits i.e; Papaya, Ber, Guava and Muskmelon/ Watermelon were tested in 150 farmers in 3 locations. A base line survey was conducted and co-operative farmers have been selected with the help of DAE personnel. Before initiation of action plan, an inception workshop was arranged at DDAE office, Khamarbari, Patuakhali with different stakeholders. During 2011 kharif season, quick growing fruits viz; Papaya, Ber and Guava have been distributed in farmer's field in 3 locations. Participating farmers have done all the field operations regarding production. Regular monitoring of crop performance, weather and crop data and farmers reaction have been recorded by scientist and SA/SSA of OFRD, BARI, Patuakhali. Training programs for farmers and SA/SSA/SAAO/NGO personnel on different management practices were conducted. Field day on summer tomato production was arranged. Knowledge and skill

of the farmers on proper management techniques of vegetables production have been increased due to training and motivational programs. It was observed that in most cases yield increased about 30-50% over the farmars practice. T.aman rice boro is now in the field at reproductive stage.

Financial: A total of Tk. 46,25000.00 was approved for the entire project period (36 months) of which Tk. 16,21800.00 has been released.

Research Highlight:

Evaluation effective and efficient tillage system for growing upland crops during dry season: Three types of tillage i.e. 2 passes, 3 passes and 4 passes tillage was done with country plough. In each of the three cases, two type of planting method i.e. bed planting and flat planting method was followed. The whole experiment was replicated twice, one for brinjal and another for tomato. BARI Begun 4 for brinjal, BARI Tomato 14 for tomato was used in this experiment. Transplanting was done on 11-14 December 2011 and Harvest started on tomato 25 February 2012 and brinjal 07 March 2012. Yield was higher in bed planting system compared to flat system. Again yield increased in most cases in deep tillage system with bed planting compared to others.

Screening of vegetables and quick growing fruits for growing after T.aman rice harvest in coastal districts: The crops screened in this year were brinjal, tomato, spinach and okra. BARI Begun 4 for brinjal, BARI Tomato 14 for tomato, BARI Dheros 1 for Okra and locally available spinach were used in this experiment. The crops were planted in between 15 to 20 December 2011. Unit plot size was 4m x 5m. All improved agronomic managements were practiced. Among the four crops tomato gave the highest yield (72.66 t/ha) next to brinjal, spinach and okra.

Adaptive trial of different tomato varieties: Three winter varieties viz; BARI tomato 2, BARI tomato 3, BARI tomato 14, BARI tomato 15 and a locally available hybrid variety sofol /wonderful were planted on 15 November to 01 December 2011. The unit plot size was 4m x 5m with spacing of 60 cm x 40 cm. The fruits harvesting started on 20 January 2012. Hybrid Sofol/wonderful produced highest yield (95.66 t/ha) followed by BARI tomato 14 (70.16 t/ha). The lowest yield was produced in BARI tomato 2 (59.0 t/ha)

Validation trial on summer tomato varieties: Two summer tomato varieties viz; BARI Hybrid Tomato 4 and BARI Hybrid Tomato 8 were planted on 21 June 2012 and 26 June 2012. The unit plot size was 1 decimal with a spacing of 60 cm x 40 cm. Yield per hectare was 39.19 t/ha in BARI Hybrid Tomato 4 and 36.80 t/ha in BARI Hybrid Tomato 8. Notable that, it is a new, off season and highly profitable crop in this region

6. <u>Project Code with Title</u>: C-4.5 Maximization of Crop Yield in T. Aman-Mustard-Boro Cropping Pattern By Agronomic Manipulation

Principal Investigator: Prof. Dr. M. Rafiqul Islam, Department of Soil Science, BAU, Mymenshingh

Lead Organization; BAU

Location: Dhanbari & Kalihati upazila of Tanigail district

Duration: 36 Months

Project Background: The expansion of HYV Boro rice in the country has decreased the area under different rabi crops. Mustard is an important oil seed grown in the rabi season. But the area under mustard cultivation has been declining due to late harvesting of high yielding T. Aman rice varieties like BR11. Thus the gap between the production and consumption of edible oil is widening day by day with increasing population. To fulfill this gap, Bangladesh has to import a large quantity of edible oil every year at the cost of huge amount of foreign exchange.

The existing dominant cropping pattern in the study area is Boro (Bridhan 29)- Fallow-T.Aman (BR11), both varieties are of longer duration. Scientists of BINA and BRRI developed shorter duration (95 days field duration) HYV T.Aman rice varieties. On the other hand BARI and BINA developed HYV oil seed crops (85 days field duration) which can easily be grown if a short duration high yield rice variety is grown in the T.Aman season. The mustard crop may be established as sole crop or mixed crop with boro rice after harvesting of short duration HYV T.Aman rice. Therefore, the present research project is designed to grow mustard varieties in between T. Aman and Boro rice as well as mixed with Boro rice to increase cropping intensity and system productivity against the existing dominant cropping pattern with longer duration rice varieties, such as Boro-Fallow-T.Aman.

Up to date Progress Summary (Technical and Financial): The project is being implemented by the Department of Soil Science, BAU, Mymensingh in collaboration with Concern On National Problems (CONP), a non-government organization (NGO). On-farm participatory adaptive trials were conducted in Dhanbari and Kalihati upazilas of Tangail District. Ten farmers, each with 30 decimals of land from each uapzila were selected with the help of collaborating local NGO and DAE personnel. From T.Aman season of 2012, two blocks, each with 5 acres of land (28 farmers) at Dhanbari and one block with 4 acres of land (17 farmers) at Kalihati upazila were selected for on-farm trial. Necessary research inputs, lab. field and office equipments were procured following PPR-2008. Before initiation of the trials, all participating farmers, project field staff, NGO personnel and local level DAE personnel were given training on the production practices of the desired cropping pattern. On-farm adaptive trials with T.Aman rice (BINA dhan7)-Mustard (BARI sharisha 14)- Boro rice (Bridhan29) using appropriate management practices were conducted in all 3 crop sesames at both upazilas. Relevant data on input use, production cost, yield and product price were colleted from both participatory and non-participatory farmers. At the end of each cropping season, field days with the involvement of all participating and neighboring farmers were organized for each upazila.

Financial: Total approved budget of the project for the entire period is Tk.27,00,000/-. Expenditure made so far is Tk. 11,14,554/- and financial progress is 41%.

Research Highlights: Mustard (BARI sarisha 14) was successfully grown both at Dhanbari and Kalihati upazila after harvest of the T.Aman rice (BINAdhan 7). The crop may be established as a sole crop as well as mixed crop with boro rice. The seed yield of mustard decreased with delay in seeding date. The highest seed yield of mustard as a sole crop was 1462 kg ha^{-1} and 1383kg ha^{-1} at Dhanbari and Kalihati, respectively. There was 25% lower yield when seeding was delayed by 10 days at Dhanbari and 28% lower yield with 18 days delay in seeding at Kalihati.

Direct seeded boro rice with mustard showed on an average of 458kg ha^{-1} higher grain yield at Dhanbari and 416kg ha^{-1} at Kalihati upazila.

The mean net income from sole mustard cropping and transplanted boro was Tk. 1,18,367 ha^{-1} and Tk. 91,971 ha^{-1} at Dhanbari and Kalihati upazila, respectively. The mean net income from direct seeded boro rice with mustard cultivation was Tk. 1,24,015 and Tk. 105,227 ha^{-1} at Dhanbari and Kalihati upazila respectively.

Under the appropriate management practices, total rice grain yield obtained from T.Aman (BINA dhan7)-Mustard (BARI sarisha 14)-Boro (BRRI dhan29) pattern was almost same with total rice grain yield of the existing cropping pattern of T. Aman (BR11)-Fallow-Boro (BRRI dhan29) with farmers' practice. Besides, cultivation of BARI sarisha14 after BINA dhan7 harvest, it is possible to get about 1100 kg ha^{-1} seed yield and about 4400 kg ha^{-1} straw yield. The price of the mustard seed is about 2.5-3 times higher than the price of the rice grain. Thus, the cropping intensity, system productivity and net income of the farmers can be increased by the adoption of T.Aman (BINA dhan7)-Mustard (BARI sarisha14)-Boro (BRRI dhan29) cropping pattern instead of the present Boro (BRRI dhan29)-Fallow-T. Aman (BR11) cropping pattern.

7. Project Code with Title: C-5.2 Yield Maximization of Mustard and Sesame through Improved Package of Production Practices in Some Selected Areas of the Country

Coordinator: Dr. M. Raisul Haider, PSO and Head, TC&P Division, BINA, BAU Campus, Mymenshingh

Lead organization: BINA

Location: Jessore Narail, Jhenaidah, Faridpur, Kushtia and Chuadanga Districts

Duration: 36 Months

Project Background: Among the oil crops grown in Bangladesh, rapeseed-mustard, sesame and groundnut are the major both in area and production. Out of the total cropped area of 13.53 million ha, at present oil crops occupy 0.560 million ha, which is about 4% of the total area producing 0.47 million tons. Rapeseed-mustard is the main source of edible oil in Bangladesh and it covers 60% of the total oil crop area. Sesame (*Sesamum indicum* L.) is the second largest source of edible oil in this country and it covers 15% of the total oil crop area. It is grown in both Kharif-1 and Kharif-2, but two-third of it is grown in Kharif-1 season. In our country black and brown colored seeds are mainly grown. A recently developed sesame variety having white seed has thinner seed coat, more oil content and suitable for direct use in confectionaries can be consumed without peeling. Rapeseed-mustard and sesame produced in almost all districts of Bangladesh but greater Khulna, Faridpur, Pabna, Rajshahi, Jessore, Kushtia, Comilla, Noakhali, Dhaka, Tangail, Patuakhali, Rangpur districts are major growing areas. The national average yield of mustard and sesame is 0.74 t/ha and 0.63 t/ha respectively, which are very low compared to potential yield of 1.8 and 1.4 t/ha. Use of traditional varieties, imbalanced fertilizers and late planting due to long duration t.aman variety are the main constraints of maximizing yield of oilseeds. However, recently developed short durative t.aman rice varieties like Binadhan 7 and Bri dhan33 have created a golden opportunity to cultivate high yielding mustard varieties in proper time. The project is therefore designed to select one high yielding oil seed crop variety for inclusion in the cropping pattern and to validate improved package of production practices for increasing yield and system productivity.

Up to date Progress Summary (Technical and Financial): The project is a coordinated one and is being implemented by a lead organization-Bangladesh Institute of Nuclear Agriculture (BINA) in association with two NGOs namely, Jagorani Chakra Foundation (JCF) and Muslim Aid Bangladesh Field Office (MABFO). On-farm participatory adaptive trials on varietal selection of mustard (4), sesame (5), boro(3) and t.aman (3) rice varieties were conducted in 6(six) upazilas under 6(six) districts for developing an improved cropping system. Twenty five farmers, each with about 30 decimals of land were selected from each upazila to conduct these adaptive trials. Prior to establishment of the trials, farmers' training on production technology of the crops under study was organized. Research inputs, field and office

equipments were procured following PPR-2008. Relevant crop data were collected and economies of crop yield and cropping system productivity were carried out.

Financial: Total approved budget for the entire project period is Tk. 40, 00,000/-. Expenditure made so far is Tk. 18, 88,000/- and financial progress is 47%.

Research Highlights: Out of 4 mustard varieties, BINAsarisha 4 produced high seed yield (1638kg/ha) followed by BARI sarisha-14 (1402 kg/ha). In case of sesame, all 5 varieties tested produced almost similar yield (1464kg/ha). In boro varies, Bridhan29 and BINA dhan-5 yielded significantly higher than Bridhan 28, but the growth duration of Bridhan 28 is considerably shorter than other 2 varieties. For t.aman season, BINA dhan-7 proved to be the best in terms of yield and growth duration. Considering seed yield, field duration and farmers' preference, BINA sarisha-4, BARI sarisha-14, BINAtil-1, BINAtil-2, Bridhan 28 and BINAdhan-7 were selected for inclusion in the cropping patterns and their subsequent up scaling in the selected upazilas. Based on economic analysis, 3 alternative cropping patterns with higher profitability than the existing ones are recommended for up scaling in six sleeted upazilas. These are

1. BINAdhan 7 - BINAsarisha 4/BARIsarisha 14 -Bridhan28 (76% higher profitability)
2. BINAdhan 7 – BINAsarisha 4/BARIsarisha 14 -tosa jute (41% higher profitability)
3. BINAdhan 7 - BINAmasur 5 – BINAtil 1/BINAtil 2 (67% higher profitability)

8. <u>Project Code with Title</u>: C-7.9: Validation and up-scaling of year round pineapple production technology in hilly areas

Principal Investigator: Dr. Madan Gopal Saha ,CSO

Lead organization: Bangladesh Agricultural Research Institute (BARI)

Location: Doluchara, Sreemangal, Maulavibazar; Bolipara, Ramgarh, Khagrachari Harinathpara and Pratap Para, Sadar, Khagrachari; Bogachari, Naneer Char, Rangamati; HRC, BARI (on-station)

Duration : 36 months (08.09.2011-07.09.2014)

Specific objectives :

1: To evaluate the validity of the year round pineapple production technology in selected hilly areas
2: To increase farmer's income by producing and marketing of pineapple round the year and
3: Up-scaling the year round pineapple production technology in selected hilly areas
4: To find out the difference of chemical composition between treated and non-treated fruits and residue analysis for ethrel.

Implementation progress : Ten farmers in each chosen district were selected for conducting validation trials. Suckers of two promising varieties of pineapple viz. Honey Queen and Giant Kew were provided to the selected farmers. Experiments on validation trials were set up in a total of 30 selected farmers' field using 1100 (550+550) suckers of two pineapple varieties to each of the farmers. A total of 33,200 (27,700 suckers for farmers' field and 5500 for on station trial at Gazipur) suckers of two pineapple varieties and required amount of fertilizers and manures were provided to the selected farmers for setting up of the experiments. For each of the trial a minimum 0.10 bigha of land was used for each selected farmers in their field by proper tillage operation, providing optimum manuring and fertilization. Thus the trial area comprised of 3.0 bighas of land including 30 farmers at 3 districts. Selected farmes were informally trained by PI and Co-PIs on improved production technology of pineapple before setting up the trials in their field. The first planting was accomplished within the optimum period from October 27,2011 to Junuary 2012. Second planting was completed

on August 2012. All intercultural operations and necessary field operations are being carried out for better crop stand. Crops are in good condition and in early growth stage. Four inception workshops were held at BARI Head Quarter, Gazipur, RARS, Akbarpur for Moulvibazar site, HTARS, Ramgarh for Khagrachari site and HARS, Khagrachari for Rangamati site. One TOT was held at HARS, Khagrachari for Rangamati and Khagrachari sites. Three farmers' training programs were conducted at RARS, Akbarpur for Moulvibazar site, HARS, Khagrachari for Khagrachari site and Naniarchar for Rangamati site.

Financia: A total of Tk. 4500000.00 was approved for the entire project period (36 months) of which Tk. 15,01020.00 has been released.

9. Project Code with Title: C-8.14: Integrated Management of major diseases of brinjal and tomato in Jamalpur and Sherpur districts

Principal Investigator: Dr. Biresh Kumar Goswami, CSO,T&C, BARI, Gazipur

Lead Organization: BARI

Location: Jamalpur & Sherpur districts.

Duration: 24 Months

Project Background: Brinjal (*Solanum melongena*) and tomato (*Lycopersicon esculentum*) are the most two important vegetable crops grown widely in Jamalpur and Sherpur districts. But these two crops suffer heavy economic and yield loss of about 30-40% in every year due to severe infection by foot root, bacterial wilt and virus diseases. Appropriate technologies for management of these diseases are not available to the farmers to save these two crops from such a heavy loss. This research project is therefore designed to develop/validate integrated management technology to control the major diseases of brinjal and tomato.

Up to date Progress Summary (Technical and Financial): This project is of 22 months duration and is being implemented by BARI Regional Station, Jamalpur. Two integrated packages of practices for management of major diseases of Brinjal and Tomato were developed by BARI scientist from their previous studies. These two improved packages (one for Brinjal and one for Tomato) were validated/ evaluated in four upazilas of Jamalpur and Sherpur Districts through participatory on-farm trials against the farmers' practice. Twenty five farmers' fields, each with 20 decimals of land area for each year were selected with the help of local extension personnel for such on-farm trials. Out of 25 trials, 14 were used for Brinjal and 11 for Tomato disease management. First year trials were completed in May, 2012. Relevant data on growth, yield, disease incidence and economies were recorded and analyzed. Second year's trials are in progress with another group of 25 farmers' field.
Research inputs, lab. and field equipments were procured following PPR2008. Farmers trainings on disease management of Bringal and Tomato were organized prior to establishment of on-farm trials. Field days were organized during pick period of harvesting of Brinjal and Tomato.

Financial: Total approved budget for the entire project period is Tkk 17,97,000/-, of which Tk. 13,86074/- has been spent so far. Financial progress is 77%.

Research Highlights: Results indicated that all parameters like plant height (cm), number of fruits plant^{-1}, weight of fruits plant^{-1} and yield t ha^{-1} were significantly higher under improved management practices than farmer's practice both in Brinjal and tomato trial. Disease incidence of Brinjal was reduced up to 80-90% by improved practice. But in case of wilt disease (major devastating disease of brinjal), it was reduced even 95-98%. Benefit cost ratio was 2.35 in improved practice where as it was 1.72 in the farmer's practice. On the other hand disease incidence of tomato was also reduced up to 75-85% by improved practice but in case

of wilt disease (also major devastating disease of tomato), it was reduced even 95-98%. Benefit cost ratio was 2.86 in improved practice where as 1.99 in the farmer's practice
On-farm validation trials conducted so far clearly showed that improved disease management practices are very effective in controlling major diseases of Brinjal and Tomato and farmers of Jamalpur and Sherpur districts are very much eager to adopt these practices for large scale production of these two vegetable.

10. Project Code with Title: C-12.1:Development of Management Package for Powdery Mildew of BAU Kul and Apple Kul

Principal Investigator: Prof. Md. Rejaul Islam, Agrotechnology Discipline, Khulna University, Khulna

Lead Organization: Khulna University

Location: Dumuria, Keshobpur and Baraigram of Khulna, Jessore and Natore districts respectively.

Duration: 24 Months From: 01-09-2011 To: 30-08-2013

Specific Objectives:
1: To identify the disease occurrence and severity of Powdery Mildew from the study area
2: To characterize the pathogen of Powdery Mildew of jujube.
3: To find out the appropriate control measures of the disease

Implementation Progress:
Jujube is one of the most common fruit in Bangladesh. The introduction of BAU KUL and Apple Kul has got a great acceptance among the farmers and has expanded very fast in our country. The cultivation of BAU Kul and Apple Kul is increasing day by day in southern and northern districts of Bangladesh. Now it is a very popular fruit in Bangladesh. Unfortunately, its cultivation is being threatened by a devastating disease – the Powdery mildew, in recent years.

A management package for the control of the disease is urgently needed. A research program was carried out to develop an effective management package against the disease studying the causal organism in detail. Agrotechnology Discipline of Khulna University implemented it with the support of KGF..

A series of Experiments had been conducted both in Laboratory and in fields (orchards) for developing a management package against powdery mildew of Jujube. The studies on morphological characters of the causal organism and species identification had been completed in the laboratory of Agrotechnology discipline of Khulna University. The field trials, planned to be conducted in the 1st year in relation to chemical and cultural measures, had been accomplished already and those meant for the second year, was established in 15 (5 orchards at each site) Jujube orchards of Dumuria, Keshobpur and Baraigram of Khulna, Jessore and Natore districts respectively in 2013. The number of the plants of the orchards varied widely. It ranged from 108 to 1832. Either 54 or 84 plants were selected randomly from an orchard to make a total of 338 plants (from 5 orchards) for a site for deploying treatments. Data on weather parameters and the percent disease incidence (PDI) for the study of epidemiology had also been collected.

The causal organism of the powdery mildew was identified as *Oidium ziziphi*. The study on the morphological characterization of the pathogen was completed. Epidemiological information of the disease had been collected. Epidemiological pattern of the disease will be given after the analysis of the data at the time of submitting completion report. Out of 12 chemical control agents viz. fungicides, botanicals, biopesticides and an inorganic salt, tested

in the field, 8 fungicides having Sulphur, Difenoconazole, propiconazole and an inorganic salt (Potassium Bi-carbonate) were found effective against the disease. Out of these 8 chemicals, Mc SULPHUR 80 WP and Gaivet 80 DF were found most cost effective. Prunning at the end of March along with 4 – 5 spray applications of an effective fungicide at 15 days interval, from the day of 1st visible appearance of the disease symptom, helped achieving 30 – 35% higher yield over the control.

Financia: A total of Tk. 4500000.00 was approved for the entire project period (36 months) of which Tk. 3814050.00 has been released.

11. Project code with title: L- 17.1: Least cost feed formulation for poultry through the production of fermented yeast product from locally available feed resources

Principal Investigator: Md. Ashraf Ali Biswas, Professor and Director (E/A), Dept. of AS&N,CVand ASU, Khulshi, Chittagong

Lead Organization: CVASU

Project duration (months): 36 months; From September, 2011 to August, 2014

Project Background:
Yeast is very rich in nutritive value of protein and has no toxic substance like other microorganisms i.e. bacteria. Baker's yeast (*Saccharomyces cerevisiae*) is also interesting as a single protein because it could provide 53% proteins from molasses substrate (Wainright, 1992). It is also good sources of essential amino acids and vitamins. So we are willing to make a low cost feed by using yeast fermented molasses as a source of energy, protein and vitamins.
Implementation Progress: Maize samples, rice polish with crude fiber and with crude protein, which samples, rubber seed samples and concentrate feed samples mixed with beneficial organisms were tasted in laboratory.

Financia: A total of Tk. 2948000.00 was approved for the entire project period (36 months) of which Tk. 1083161.00 has been released.

Highlight of research findings:

- The crude protein level is increased in case of maize samples (9% to 12%).
- The amount of crude fiber is decreased in case of rice polish samples (18% to 12%).
- The crude protein level is increased in case of rice polish samples (10.5% to 12.65%).
- The crude protein level is increased in case of wheat samples (11.0% to 14.5%).
- The crude protein level is increased in case of rubber seed samples (17.0% to 20%).
- The crude protein level is increased in case of concentrated feed samples (14.5% to 20%).

12. Project code with title: L-19.7: Calf mortality in large and small holder cross bred dairy cattle: epidemiological and pathological investigation and mitigation

Coordinator: Prof. Dr. Emdadul Haque Chowdhury, Professor, Dept. of Pathology, Faculty Veterinary Science, BAU, Mymenshingh

Lead Organization: BAU

Location: Muktagacha-Mymensingh, Sahjadpur-Sirajganj

Duration: 36 Months

Background: Expected number of dairy industry has not been developed in Bangladesh due to various limiting factors. Calf morbidity and mortality are of great concern of dairyman, because most of the dairy farms are confronted with acute problems of calf morbidity & mortality (Gitau *et al*., 2010; Wudu *et al*., 2008; Samad *et al*., 2001). Calf mortality up to 12 months of age with an estimate of 9% under rural (Debnath *et al*., 1990) and 13.4% under a farm conditions have been reported in Bangladesh (Debnath *et al*., 1995). Diseases and some risk factors are considered as causes of calf morbidity and mortality in Bangladesh (Samad *et al*., 2001). It is also well established that exotic and crossbred cattle are highly susceptible to diseases in comparison to local zebu cattle; and higher calf mortality in crossbred (20.3%) than zebu (8.7%) calves have been reported (Debnath *et al*., 1995). Considering these facts, this work is designed to: (a) identify epidemiological factors (b) isolate and characterize the etiological agents of calf morbidity and mortality and (c) development of methods & their application to prevent morbidity and mortality.

Progress summary: Epidemiological and pathological investigation on calf morbidity and mortality and development of mitigation plan funded by KGF is going on Muktagacha Upzilla of Mymensingh District and Shajadpur Upzilla of Sirajgonj District of Bangladesh since October'2011. So far, 250 beneficiaries from each area have been selected; questionnaire developed, pretested and distributed to research area to find out the risk factors that directly or indirectly influence the calf morbidity and mortality. The farmers in each area are being visited regularly by two research assistant appointed in Muktagacha and Shajadpur and collecting data on health status of cows and calves. Sick animals are being identified and treated either by veterinary surgeon or PI/PC. In addition, all animals were vaccinated as necessary as required and routine de-worming was done by fecal egg count. A total of 250 filled questionnaires have been received so far from Shajadpur, Sirajgonj while 236 in Muktagacha, Mymensingh and were analyzed by Chi- square test. Samples collected from sick/dead animals were tested in the laboratory to identify the causes of diseases. In Shajadpur, Sirajgonj a total of 309 cows & heifer and 447 calves were suffered from different diseases and treated accordingly. In Muktagacha, Mymensingh, a total of 182 cows, 39 heifer, 36 bull and 117 calves have been affected by different diseases and treated accordingly. A total 1030 fecal samples were examined where 656 samples were positive for different helminths and protozoa parasites. Six etiological agents were detected from diseased calves. Before inception, it was observed that overall mortality was 24.6% and 44% in Muktagacha and Shajadpur, respectively. During study period calf mortality was reduced to 2.5% in Muktagacha and 3.64% in Shajadpur; was probability due to better management practices, early diagnosis and treatment of sick calves. Our data revealed that farmer's education, herd size, parturition hazard, kacha floor, and poor physical condition influenced significantly calf morbidity and mortality in Muktagacha ($P<0.05$). On the other hand, in Shajadpur; farmer's education, occupation of farmer, production purpose, herd size, poor physical condition, milk feeding practice, new introduction of animals into herd and parturition hazard influenced calf morbidity and mortality significantly ($P<0.05$). Study is going on.

Financia: A total of Tk. 6000000.00 was approved for the entire project period (36 months) of which Tk. 23, 09,283.00 has been released.

Highlight of Research Findings:

- 1130 diseased animals identified and treated.
- Calf mortality was reduced to 2.5% in Muktagacha and 3.64% in Shahjadpur.
- 1030 animals examined for parasites, 656 found infected with 13 types of helminths and 4 protozoan parasites.
- *E. coli, rotavirus, corona virus, Cl. Perfringens, Cryptosporidium and Giardia spp.* identified as cause of diarrhea in calves.
- 7 risk factors identified which significantly influenced calf morbidity and mortality.
- Fifty farmers trained on calf health management

13. Project Code with Title: F-21.20: Adaptation of High Valued Fish Species Shing (*Heteropneustesfossilis*) Culture Technology for Maximizing Production in Different Agro-Ecological Zones of Bangladesh

Coordinator & PI: Dr. Md. Jahangir Alam, Professor & Head, Department of Fisheries Technology, BSMRAU, Gazipur

Lead Organization: BSMRAU

Location: Narsingdi, Gazipur and Sirajgong

Commencement Date: 25 September 2011

Project Background: Among the air-breathing catfishes, stinging catfish (*Heteropneustes fossilis*), locally known as Shing is very popular and high priced fish in Bangladesh. This species have gradually been declining from the natural ecosystems, due to various manmade and natural causes destructing its natural habitat. With the attempt of conserving the biodiversity and increasing fish production, there has been a success in developing captive breeding and pond culture of shing fish. Despite of the potentials of shing farming in different areas of the country, it is at present largely in Mymensingh region due to the easy availability of hatchery bred seed and technological interventions in the area. However, for wider adoption of shing farming technology and to ensure sustainability, on-farm participatory adaptive trials are required for refinement and standardization of the technology at different agro-climatic regions.

More than 90% of fish ponds in the country are in rural areas, most of which could be used in shing farming, as the species can tolerate adverse ecological conditions due to its air-breathing functions. However, the culture technology, particularly the stocking density and management practices might not be same in all areas at all pond conditions. The present research has, therefore, been undertaken for field level adaptive trials at different locations (Narshingdi, Gazipur districts) to standardize the shing culture techniques for wider adoption and building awareness on shing farming as well.

Up to date Progress Summary (Technical & Financial): The project was designed to implement by three organizations through coordinated approach. Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) is the lead organization responsible for coordination and providing technological backup, laboratory services, data analyses, report preparation etc. Chinishpur Dipshikha Mohila Samity (CDMS), a local NGO is responsible for conducting field level adaptive trials on shing culture technology. Center for Agriculture, Sustainable Environment and Entrepreneurship Development (CASEED), a private organization is responsible for organizing farmers' training, stakeholders' workshop and other relevant activities. In the first year of the project, as was outlined in the original project proposal, on-farm participatory adaptive trial of shing culture was conducted in Shibpur and Sadar upazila of Narshingdi district. Nine farmers including 3 CIGs were selected for

conducting the trial in their ponds. Nine ponds having a total area of 217 decimal, ranging an individual pond area from 20-40 decimal, were selected, prepared and stocked with shing fingerling at three different stocking densities *viz*., 500/dec (T-1), 600/dec (T-2) and 700/dec (T-3). Each treatment was replicated 3 times. The shing grow-out period was about 7 months (October 2011-May 2012) and was managed through regular feeding, monitoring of water quality, growth, etc.

Research inputs, field, lab. and office equipments were procured following PPR-2008. Prior to establishment of the adaptive trial in the pre selected ponds, participating and neighboring interested farmers (25) were trained on improved Shing culture technology. Two field days, one at the growing period and the other at harvest were organized to show the benefit of improved shing culture technology. During the trial period, shing growth rate and water quality paramers were recorded at fortnightly interval. At the end of the culture period (224 days), fish production was recorded and food conversion ration (FCR), survival rate and economics of shing culture technology were calculated.

The 1st annual implementation progress report of the project was reviewed and based on the recommendations of the reviewer, the original project proposal has been revised to repeat the first year's trial at Narshingdi district in the second year to validate the results and also to conduct the trial simultaneously at Gazipur district. Farmers and ponds in both Narshingdi and Gazipur districts have been selected. Pond preparation is underway. Official process has been initiated to procure shing fingerlings with a target of stocking in mid-March 2013.

Financial: Total approved budget of the project for the entire period is Tk.79,89,000/-. Expenditure made so far including committed ones is Tk. 32,00,800/- and therefore, financial progress is 40%.

Research Highlights: Among the water quality paremers, dissolved oxygen, P^H and total alkalinity were significantly affected by stocking densities. Highest dissolved oxygen concentration (8.8±0.04 mgL^-), lowest P^H value (7.91±0.04) and lowest total alkalinity (129.31± 5.20 mgL^-) were associated with lowest stocking density (500/dec).
The final weight of shing fish (g/fish) at harvest was significantly affected by stocking densities, the highest weight (57.17±1.63g/fish) was with lowest density (500/dec). Similarly, the fish yield was also highest (5426±386kg/ha) with the same density.
An economic analysis showed that highest net return of Tk. 8,89,524/- may be obtained with Benefit cost Ration of 1.69:1 from the lowest stocking density of 500/decimal.

14. <u>Project Code with Title: F-25.2:</u> Development of integrated crop-fish production system using ditch-and-dyke method in low lying areas of Jhalakati and Bogra region

Principal Investigator: Prof. Mofazzal Hussain, Deptt. oof Horticulture, BSMRAU, Salna, Gazipur

Lead organization : BSMRAU, Gazipur

Location **:** Jhalakati Sadar and Rajapur, Jhalakati Gabtoli, Bogra

Duration : 36 months (28.09.2011-27.09.2014)

Specific objectives :

1: To increase resource productivity of low lying areas through ditch-and-dyke system with crop and fish culture

2: To increase farm income through these interventions

3: To increase knowledge and skill of farmer on this innovation

Project Background **:** Majority of the people living in low lying areas in greater districts of Barisal and adjacent areas are in low productivity trap due to lack of multiple cropping system. In Bogra region, about 10% land remain under water for 6-8 months where only one crop is possible. Therefore, crop production in those low lying areas is neither feasible nor profitable. Considering this, adaptation methods such as Ditch-Dyke system need to be developed at Jhalokati and Bogra district, and it may have a widespread use to control flooding as the climate changes and water levels rise. The ditch-dike system is a circuit where the components are complementary, while no waste is produced, because everything is recycled and transformed. Therefore, crop and fish culture method was designed using Ditch-Dyke system at Jhalokati and Bogra districts

Implementation progress : Ten (10) farmers agreed to modify their low lying lands into ditch-dyke system have been selected. Vegetables like cucumber, bitter ground, sweet ground, indian spinach and papaya were cultivated in the dyke and harvested. Low lands have already been connected into ditch-dyke system Fish stocking (tilapia, shing etc) in the ditch has been started. Average daily growth and specific growth rate were calculated for the cultivation of growth performance. Two training program have already been conducted.

Financial: A total of Tk. 49.76 was approved for the entire project period (36 months) of which Tk. 20.80 has been released.

Research Highlight **:** The yield of Indian spinach was the highest (49.4 t/ha) was well as profitable according to BCR among various summer vegetables grown in the first year.