Name of the Institute: Bangladesh Rice Research Institute

Plant Breeding Division

Research Progress 2013-2014

Research Progress	Expected Output
Program Area/Project (Duration): Varietal Development program (VDP)	
1. Rice Breeding	
1.1. Development of Upland rice Three promising lines were selected from regional yield trial. One advanced breeding line OM1490 with 0.5 t/ha more grain yield than BRRI dhan43 and 99 days growth duration was proposed as new variety for upland aus ecosystem	Proposed short duration aus rice variety with high grain yield will be able to increase the productivity of upland aus ecosystem of Bangladesh.
1.2 Development of T Aus rice Four most promising lines out of 9 genotypes were selected in Advanced Yield Trial	Development of short duration rice varieties is promoted with acceptable yield performance suitable for T. Aus season
1.3 Development of shallow flood tolerant rice Totally 23 segregating populations were selected and bulked. Eighteen genotypes were promoted to Secondary Yield Trial.	Development of rice varieties suitable for shallow flooded deep water environment having water level up to 1m depth
1.4 Development of rainfed lowland rice (RLR) Two advanced breeding lines were selected from Advanced Lines Adaptive Research Trials and One genotype from Proposed Variety Trial. BR7611-31-5-3-2 performed with similar grain yield and growth duration than BR11, possesses water stagnation tolerance as an addition quality.	Development of RLR rice varieties with short growth duration, acceptable grain quality like BRRI dhan39 and BRRI dhan49. A complementary variety to BR11 may be released.
1.5 Development of tidal submergence tolerant rice Four promising lines were selected from Regional Yield Trial for tidal non-saline conditions.	Development high yielding varieties adaptable to non-saline tidal submergence condition in the southern districts of Bangladesh

1.6 Development of submergence and water stagnation tolerant rice Fifteen isogenic lines of BRRI dhan33-Sub1, 6 isogenic and 9 recombinant lines from BRRI dhan49-Sub1, 12 isogenic lines from BRRI dhan44-Sub1 were selected for further screening and evaluation in PVS trial. Introgression works have been advanced to BC_3F_1 for BRRI dhan39-Sub1 and to BC_2F_1 generation for BR22-Sub1. DG1-349, Kalojoma, DSL-78-8 were identified as the germplasm having submergence tolerance similar to FR13A but do not possess the *SUB1* QTL. So, these germplasm were selected for identifying new sources of submergence tolerant QTLs.	BRRI dhan33-Sub1, BRRI dhan44-Sub1 and BRRI dhan49-Sub1 lines will be released. New submergence tolerant QTL other than *SUB1* will be identified.
1.7 Development of salt tolerant rice a. In T. Aman 2013-14, 2 lines were selected in ALART with higher grain yield, shorter growth duration and similar salinity tolerance compared to BRRI dhan53. b. In Boro 2013-14, 02 advanced breeding lines were proposed as candidate varieties with higher salinity tolerance ability at 8 dS/m (whole life), non-shattering behavior in the panicle, medium slender grain and better yield potential	Salt affected areas will come under modern rice variety; yield will increase due to salt tolerance ability
1.8 Development of premium quality rice In T. Aman 2013-14, 02 breeding lines with higher grain yield, shorter growth duration and slender grains were selected in ALART. One promising genotype BR7358-30-3-1 with premium quality, around 1.0 ton higher grain yield than BRRI dhan50 and 1.4 elongation ratio was proposed as candidate premium quality variety for Boro season.	Medium, long and extra long slender grain with or without aroma will be available for cultivation and export market.
1.9 Development of standard Boro rice One breeding line BR7988-10-4-1 with 1.0 ton more grain yield and growth duration similar to BRRI dhan28 was selected in regional yield trial.	The breeding line will be promoted to ALART in the variety releasing system and will hopefully increase the productivity of Boro season.
1.10 Development of low amylose rice Generation of breeding populations are in developmental stage	HYV rice genotypes with low amylose(<20%) contents will be available for the ethnic people
1.11 Development of micronutrient enriched rice BR7840-54-1-2-5 with 25.5 ppm zinc content and high grain yield was proposed for zinc-enriched rice in Boro season. In T. Aman 2013-14, 01 genotype while in Boro 2013-14, 02 genotypes were selected in ALART and promoted to	Development of high yielding rice variety along with high Zn (>24.0 ppm) content will be done which will enrich nutritional quality of rice.

Proposed variety Trial (PVT).	
1.12. Development of cold tolerant rice Three genotypes in RYT and 02 genotypes in PVS trials with high grain yield and cold tolerance were selected. Twenty five genotypes were selected from segregating population for cold tolerance at seedling stage. Again 22 BRRI dhan29 Near Isogenic Lines with Cold Tolerance were selected.	Cold tolerant high yielding rice variety will be developed to increase rice production in Boro season.
1.12 Development of disease resistant rice One advanced breeding line in T. Aman 2013-14 and 03 lines in Boro 2013-14 with BB resistance and high grain yield were selected in regional yield trial.	Development of BB resistant high yielding rice variety will be accomplished.
1.13 Development of insect resistant rice Three advanced breeding lines with 4.0-4.5 t/ha grain yield and tolerance against BPH were selected in SYT.	BPH tolerant rice varieties with high grain yield will be developed
1.14 Improvement of Rice Varieties/Breeding Lines for Low Water Availability The genotype PSBRC82 showed 0.5 ton higher grain yield, similar growth duration and lodging tolerance than the check variety BRRI dhan28 in all the locations under transplanted AWD condition in Boro 2013-14 season.	Development of efficient high yielding rice which will have similar yield potential under aerobic condition but will save water in irrigated ecosystem
1.15 Development of Green Super Rice In T. Aman 2013-14 one genotype and in Boro 2013-14 another one genotype was proposed for releasing as new varieties	Development of less input but high yield potential genotypes with tolerance to different stresses will be developed
1.16 Development of Drought Tolerant Rice In T. Aman 2013-14, one genotype was selected for proceeding in variety release protocol	Development of high yielding rice varieties tolerant to drought stress in the rainfed lowland rice ecosystem in Bangladesh
1.17 International Network for Genetic Evaluation of Rice (INGER) Totally 74 breeding lines were selected for yield trial and parental genotypes from nurseries	Rice varieties with diverse genetic background will be developed
1.18 Pyramiding Bacterial Blight Resistant Genes into the Genetic Background of BR11-Derived Submergence Tolerant Rice Lines (NATP) A total of 8 plants with fixed *SUB1*, *Xa21* and xa13 alleles in the background of BRRI dhan52 were selected and promoted for screening against submergence tolerance and bacterial Blight resistance	Bacterial blight resistant versions of BRRI dhan52 will be developed
1.19 Development of Rice Varieties with	

Enhanced Submergence Tolerance through Marker Assisted Breeding (BAS Project) Fifteen best BRRI dhan33-Suib1 lines were selected where the percentage of recipient genome recovery ranged from 90.7 to 95.2%.	Short duration submergence tolerant rice varieties will be developed
1.20 Pyramiding Salinity and Submergence Tolerance Genes into BRRI dhan49 through Marker Assisted Selection (ID-313) 5 BC_2F_2 best plants were selected possessing *Saltol* QTL using RM493 as foreground marker and 56 background markers covering whole genome. Recurrent parent genome recovery of selected plants ranged from 64 to 89.6%.	Pyramided BRRI dhan49-Sub1-Saltol lines will be developed which will be adaptable under submergence and salinity prone coastal areas of Bangladesh
1.21 Development of Arsenic Tolerant Rice (T. Aman & Boro) HHZ12-SAL2-YM-72, HZ23-DT16-DT1-DT1 and HHZ5-SAL10-DT1-DT1 were found to give stable yield at differential levels of arsenic in soil and irrigation water. Treatment of 1.25 ppm arsenic was found as the most responsive treatment for discriminating varieties. 53.6% polymorphism was found between BRRI dhan45 and BRRI dhan54.	Development of high yielding rice varieties tolerant to arsenic stress and least uptake in grain

Hybrid Rice Division
Research Progress 2013-2014

SL. No.	Research Progress	Expected output
	Program area/Project (Duration)	
	Development of Parental Materials	
01.	Source nursery	Two hundred fifty seven **(**257) test crosses and 166 (A x R) crosses were made
02.	Testcross nursery	Two entries have been heterotic over check variety and corresponding male parents selected as suspected restorer lines
03.	Backcross nursery	Three new CMS lines were developed in the back ground of BRRI advanced lines and exotic sources
04.	Retest cross nursery	Five new restorer lines were identified in the back ground of BRRI and IRRI
05.	CMS maintenance and evaluation nursery	One hundred eighteen (118) CMS lines were maintained by hand crossing for genetic purity and nucleus stock maintenance
06.	Maintainer and restorer improvement program	F_2 & F_2 populations are evaluating for further advancement

07.	Development of disease resistant parental lines	Crossing, inoculation and screening program is going on.
	Evaluation of experimental hybrids & parental lines	
08.	Observational nursery	Out of one hundred sixty five (165) experimental hybrids, nine hybrids were selected based on yield, duration and grain quality over standard check variety
09.	Evaluation of maintainer and restorer lines for better adaptability	Seven maintainer and five restorer lines were selected based on yield, disease reaction adaptability with seasonal variations
10.	Preliminary yield trials (PYT)	Four hybrids have been selected considering yield, duration, uniformity and grain quality
11.	Multilocation trials (MLT)	Multilocation trials of previously selected four hybrids along with new ones are going on.
12.	Screening of parental lines against BLB & BLS	Screening of parental lines against BLB & BLS is going on.
	Seed production of parental lines & hybrids	
13.	CMS lines multiplication of released hybrids	A total of eight hundred (800) kg CMS seeds were produced of the released hybrids
14.	Seed multiplication of promising CMS lines	Considerable amount of CMS line seeds were produced from seven selected promising CMS lines for subsequent use
15.	F_1 seed production of released hybrids	A total of 1500 kg F_1 seeds were produced from released hybrids
16.	Experimental seed production of promising hybrids	Considerable amount of F_1 seeds were produced from five selected promising hybrids for subsequent use
17.	Nucleus seed production of released hybrids parental lines	Considerable amount of released hybrids parental lines nucleus seeds were produced for maintaining genetic purity of released hybrids parental lines
18.	Breeder seed production of released hybrids parental lines (B & R lines)	A total of six hundred (600) kg breeder seeds were produced from maintainer and restorer lines of released hybrids
19.	Seed multiplication of promising maintainer & restorer lines	Considerable amount of seeds were multiplied from 10 selected maintainer and 12 selected restorer lines
	Distribution	
	A total of 850.8 kg of parental lines (A & R) and hybrid seeds of four released hybrid varieties distributed to 5 seed companies along with BADC	Popularization of BRRI released hybrid varieties.

Research Progress 2013 – 2014

Sl. No.	Research Progress	Expected output
Programme area/ Project (Duration)		
1.	**Project I: Development of rice variety through anther culture** **Exp.1.1 Development of rice variety through anther culture** ▪ During 2013-14, hybrid anthers (62657) of 27 F_1 populations were plated in KE and M10 media. ▪ The highest no (9) of plantlets were regenerated from BRRI dhan29/ FL478 and 3 plants from MR219/IRBB60. ▪ Total 13 green plantlets were regenerated from 330 callus (KE medium).	New stress tolerant rice variety will be developed in short time from these lines
2.	**Exp.1.2 Hybridization** ▪ In total 1792 F_1 seeds were harvested from 18 different crosses.	Boots of F_1 plants will be used for Anther culture.
3.	**Project II: Field performance of tissue culture derived lines** **Exp.2.1 Progeny selection** ▪ During T.Aman/2013, 114 lines were bulked from 383 pedigree lines. ▪ During Boro/13-14, 140 pedigree lines were grown for further evaluation. ▪ 225 plants were selected and 25 lines were bulked.	New rice variety will be develop from these lines
4.	**Exp.2.2 Observational Trial** ▪ During T. Aman/13, 52 anther culture derived advanced breeding materials were grown in 3 OTs with standard checks. ▪ From them 16 materials were selected depending on the duration and comparable yield with checks. ▪ During Boro/13-14, 123 materials were grown in 5 OTs with standard checks. ▪ 42 materials were selected depending on the duration and comparable yield with checks.	New rice variety will be develop from these lines

5.	**Exp.2.3 Primary Yield Trial** ▪ During Boro/13-14, 15 materials were grown with standard checks. ▪ Potential short duration, fine grain lines were developed through anther culture of Niamat /BR802-78-2-1-1 cross (PYT – 1).	Potential high yielding, short duration, fine grain lines will be developed
6.	**Exp.2.4. Secondary Yield Trial** ▪ Thirteen lines were selected from PYT and performed SYT (Evaluated by Plant Breeding Division).	
7.	**Project III: Rice transformation studies** **Exp.3.1 Development of salt tolerant transgenic rice** ▪ BRRI dhan28 and BRRI dhan29; gene construct having *GlyI and GlyII* were used for this experiment. ▪ 37 putative transgenic plants were confirmed by GUS test. ▪ Putative transgenic salt tolerant BRRI dhan29 having *GlyI* and *GlyII* genes were developed (T_2 generation). ▪ In T_2 generation 4 plants were confirmed by PCR. ▪ T_3 seeds were harvested.	Salt tolerant rice lines will be developed through transformation
8.	**Exp.3.2 Development of drought and salt tolerant transgenic rice** ▪ *TPSP* gene was inserted into BRRI dhan28 and BRRI dhan29 rice varieties through genetic transformation. ▪ A total of 27 selected plants from the hygromycine containing (50mg/l) medium were transferred to earthen pot after acclimatization. ▪ Putative transgenic salt and drought tolerant BRRI dhan29 having *TPSP* genes were developed (T_2 generation).	Drought and salt tolerant rice lines will be developed through transformation
9.	**Exp.3.3 Development of salt tolerant transgenic rice** ▪ BRRI dhan28 and BRRI dhan29 were used for transformation with gene construct *AeMDHAR.* ▪ About 40 and 20 putative transgenic	Salt tolerant rice lines will be developed through transformation

	plants were regenerated from BRRI dhan28 and BRRI dhan29, respectively.	
10.	**Project IV: Application of DNA markers** **Exp.4.1. Introgression of submergence tolerance gene, *sub1* in BRRI dhan44 using MAB.** ▪ A cross between BRRI dhan44/BRRI dhan52, was made to transfer *SUB1* gene in to BRRI dhan44. ▪ In BC_5F_1, background and foreground selection were done and selected 4 plants were self. ▪ In T. Aman 13, 26 homozygous plants for *sub1* gene were grown as OT with standard checks by Plant Breeding Division. ▪ S*UB1* gene introgressed into BRRI dhan44 to develop Submergence Tolerant Rice.	Submergence tolerance variety will be developed with BRRI dhan44 background
11.	**Exp.4.2 Pyramiding gene for Bacterial Blight (BB) resistance (*xa13* and *Xa21).*** ▪ A cross (BRRI dhan29/IRBB60) was made to pyramid two BB resistance genes (x*a13* and *Xa21*) in popular variety BRRI dhan29. ▪ After molecular confirmation, BB screening was carried out on BC_5F_1 progenies and 3 resistant lines were selected and bulked. ▪ Three bacterial blight resistant lines have been developed from BRRIdhan29 through Gene Pyramiding. ▪ In Boro 13-14, 3 selected materials were evaluated in OT. BB screening also carried out with molecular marker & bacterial inoculation in the field.	New BB resistance rice variety will be developed from these lines.
12.	**Exp.4.3. Identification of yield enhancing QTLs** ▪ DNA Extraction was done from 238, 209 and 208 individuals of BRRI dhan28/ *O. rufipogon* (Acc. No. 105890), BRRI dhan28/ *O. rufipogon* (Acc. No. 103404) and BRRI dhan29/ *O. rufipogon* (Acc.	Yield enhancing QTLs will be identified

	No. 103404) crosses, respectively for genotyping. ▪ 103, 33 and 25 polymorphic markers were amplified for genotyping of above 3 populations to get molecular data. ▪ Short duration, high yielding lines were generated from backcross generation of BRRI dhan28*3/ *O. rufipogon.*	
13.	**Exp.4.4 Identification of QTLs for salinity tolerance at both seedling and reproductive stage** ▪ 12 polymorphic SSR markers were amplified for genotyping of 121 individuals (F_2 population) of BRRI dhan29/ IR4630-22-2-5-1-3	QTLs for salt tolerance will be identified

Genetic Resources and Seed Division (GRSD)

Research Progress 2013-2014

Sl. No.	Research Progress	Expected Output
Program Area 01: Varietal Development Program (VDP)		
3	**Sub-program area: Rice Germplasm and Seed**	
3.1.1	**Project: Genetic Resources conservation and management** 185 germplasm were collected. 2353 germplasm were rejuvenated and 203 germplasm were characterized with 45 morpho-agronomic characters. 1039 accessions of germplasm and 340 samples of BRRI varieties were supplied.	Long term conservation of the rice germplasm and utilized them in further research. Findings of the experiments as per their objective utilized in further research.
3.1.2	**Project: Characterization of important plant genetic resources (NATP)** 266 germplasm were morphologically characterized, from which 260 germplasm were characterized at molecular level using 100 SSR markers.	Aromatic landraces morphological and molecularly characterized for utilizing in aromatic hybrid rice development.
3.1.3	**Project: Genetic enhancement of local rice germplasm towards aromatic hybrid rice variety development (NATP)** 113 aromatic rice germplasm were morphologically and molecularly (using 45 SSR markers) characterized for developing diversified source materials of A, B and R lines.	Aromatic landraces morphologically and molecularly characterized for utilizing in hybridization program to develop aromatic hybrid rice.

3.2	**Project: Seed production and variety maintenance** All BRRI developed varieties were maintained as nucleus stock. 102.15 tons Breeder seed from 12 varieties in Boro, 2 tons from 6 varieties in Aus and 33.61 tons from 25 varieties in T. Aman seasons were produced. Again, 96.55 tons Breeder seed from 12 varieties in Boro, 3.07 tons from 11 varieties in Aus and 30.73 tons from 26 varieties in T. Aman seasons were distribution.	Maintenance of pure seed stock and supply of Breeder seeds to GO, NGO and private seed producing organizations under rice seed network of BRRI
3.3	**Project: Exploratory and genetic studies** Genetic diversity of 98 entries in T. Aman, 50 entries in Aus and 53 entries in Boro seasons were studied and data analyses are under progress.	Estimated genetic variability, character associations, genetic relationships and selection criteria for yield and yield components of rice germplasm for clear understanding of genetic make up of the germplasm used.

Grain Quality and Nutrition(GQN) Division

Research progress 2013-14

Sl. No.	Research Progress	Expected output
	Programme area/Project (Duraion)	
1	Evaluation of Physicochemical Properties of newly released BRRI varieties	Determination of physicochemical and cooking qualities of recently released BRRI developed rice varieties for updating the data base.
2	Screening of germplasm for high Zn content	Identify rice cultivars with high Zn content for updating data base.
3	Fortification of Iron and Zinc in Parboiled Rice	Achieve at least the minimum suggested increase in iron and zinc content in polished rice. (+24 mg Zn and +10 mg Fe per kg polished parboiled rice)
4	Biofortification of rice grain with zinc through zinc fertilization	Identify the effect of soil and/or foliar Zn fertilizer application on grain yield and grain Zn concentration of rice.
5	Extraction and determination of chemical composition of rice bran oil extracted from different aged bran	Extract rice bran oil from different aged rice bran. `Standardization of storage life of rice bran. Determine the oil content of rice bran with the time of storage and analyze the chemical composition of rice bran oil
6	Evaluation of commercial rice bran oil and soybean oil available in the market.	Determination the peroxide value, saponification value, iodine number and fatty acid composition present in the edible oil.
7	Evaluation of genetic diversity of Waxy gene in selected Bangladeshi rice by using microsatellite marker and cleaved amplified polymorphic sequence marker	Identify amylose content at seedling stage
8	Identification of actual rice varieties	Identify the actual rice varieties processing and

	selling as different brand names are available in the market	selling as different brand names by the millers
9	Survey on BRRI modern varieties used for indigenous rice products	Find out the popular BRRI varieties used for puffed and flattened rice
10	Formulation of rice based biscuit	Making fortified/nutrient enrich food products. Provide supplement food to regular diet and introduce rice based food product as rice is abundant in Bangladesh

Entomology Division

Research Progress 2013-2014

Sl. No	Research Progress Programme area/Project (Duration)	Expected output
1.	**Project I: Survey and Monitoring of Rice Arthropods**	
	1.1 Arthropod monitoring at BRRI farm. Data collection completed from 5 different habitats of Aus, T. Aman and Boro seasons. In Aus 2013, green leafhopper was the dominant pest in seed bed, upland and irrigated rice. Grass hopper was dominant in rice ratoon and irrigated rice. In T. Aman, GH, GLH were dominant pests in irrigated rice. LBB, spider, carabid beetle and damselfly were the dominant natural enemies in all habitats. Lady bird beetle, spider, carabid beetle and damsel fly were the dominant natural enemies in seed bed, ratoon, grass fallow in irrigated (Boro) and upland rice.	Incidence patterns of insect pests and their natural enemies would be known.
	1.2 Incidence of insect pest and natural enemies in the light trap Data were collected from Gazipur, Barisal, Rajshahi, Comilla and Habiganj. During July 2013 to April 2014, brown planthopper (11663 no.), white backed planthopper (9383 no.) and green leafhopper (10791 no.) were dominant in Gazipur, yellow stem borer in Barisal (6280 no.) and in Comilla (1347 no.) and green leafhopper in Habiganj (534 no.). Among the natural enemies, green mirid bug in Gazipur (9871 no.), Barisal (1093 no.) and spider in Comilla (138 no.) and carabid beetle in Habiganj (138 no.) were the dominant species.	Long term record of light trap incidence will help to study the effect of climate change on rice insects and natural enemies.
	1.3 Collaboration network for the management of migratory rice planthoppers and associated virus diseases of rice in Asia Aerial monitoring of planthoppers with yellow sticky trap at Dobila, Hamkuria and Washin, Tarash upazila, Sirajganj showed that BPH landed in the seedbed mostly from the eastern direction	The expected outputs after the completion of this project would be- i) Concrete cooperative network in human or organizational level for interchanging epidemiology

	and higher number was caught at 2.44 m height than 4.88 m height traps.	information of rice planthoppers and viruses. ii) Improvement of scouting quality and standardization of scouting information among the member countries. iii) Enhancement of diagnosis techniques for accurate identification in field conditions iv) Elucidation of planthopper and virus migration in Asia region.
	1.4 Pest and natural enemy incidence in different rice based cropping patterns Highest leaf damage (10%) by the grasshopper was observed in Aman-Fallow-Boro cropping pattern whereas leaf folder damage was found highest (5%) in Aman-Rabi-Aman cropping pattern. Lady bird beetle (4.8%) and spider (3.3) populations found highest in the same cropping pattern (Aman-Rabi-Aman).	Incidence patterns of insect pests would be known.
2.	**Project II: Studies on rice insect pest and natural enemy ecology**	
	2.1 Climate change impacts, vulnerability and adaptation: Sustaining rice production in Bangladesh Increasing temperatures and rainfall have a negative influence on growth rate of LBB population. Temperature alone also a negative influence on the abundance of LBB population in field. Higher temperature reduces the population abundance in field. It has a positive influence on growth rate of the GMB at low to medium rainfall levels but negative at high rainfall level. So higher temperature induces to decline the GMB population in a place where changing climate leads to higher temperature and wet season.	The impact of climate change on insect pests, water resources and rice yields in the selected rice growing areas will be determined.
3.	**Project III: Evaluation of chemicals and botanicals against major rice insect pests**	
	3.1 Test of different candidate insecticides against major insect pests of rice A total of two hundred three commercial formulations of insecticides were evaluated against BPH and yellow stemborer (YSB) of which 163 (149 against BPH and 14 for YSB) were found effective. Effective commercial formulations were recommended to PTAC for registration and commercial use.	Effective pesticides will be identified against different rice insect pests for registration

4.	**Project IV: Integrated Pest Management**	
	4.1 Selection and application of BPH management technologies in Sirajganj The results showed that more yield can be obtained using double nozzle sprayer and on an average, hundred percent farmers reported that less time was required to spray by the double nozzle machine and its use is profitable.	Brown planthopper will be managed successfully.
	4.2 Validation of BRRI recommended practices for the management of major insect pest of rice. Prophylactic use of insecticide, other BRRI recommended practices and existing farmers practices were evaluated at Rangpur region (Taraganj and Pirganj). Prophylactic use of insecticide had no effect on yield rather it reduces natural enemies in rice field. Farmers' perception about pest management needs to increase in indiscriminate use of insecticide through awareness build-up.	Farmers will be benefited for controlling major insect pests of rice by using BRRI recommended practices.
	4.3 Conservation of natural enemies through ecological engineering approaches. The results showed that highest natural enemies, per cent parasitism by *Trichogramma zahiri* were observed in rice field nearby nectar-rich flowering plant. However, least natural enemies and parasitism were found in rice field where four times (continuous/ prophylactic) insecticides were applied. Moreover, there was no yield reduction observed in rice field surrounding by flowering plants compared with insecticide application.	It will help to avoid insecticide spraying in the early crop stages by enhancing the build up of different natural enemies in rice eco-system.
5.	**Project V: Host Plant Resistance**	
	5.1 Screening of elite breeding lines, germplasm and rice varieties A total of 142 materials were screened against BPH at green house condition showed moderately resistance in three breeding line, six IRBPHN materials, three BRRI released variety. Advanced line showed susceptibility to BPH but no promising material was recorded against WBPH in breeding line and BRRI released varieties whereas BRRIdhan49 react as moderately susceptible to GLH among the BRRI varieties. Among the IRBPHN materials, IR10A110 showed resistant reaction to BPH only.	Lines resistant/tolerant to different insect pests will be identified.

Sl. No.	PROGRAMME	PROGRESS
1	Evaluation of blast resistant multiline varieties under field condition	Ten blast resistant lines (NILs of IR49830) were transplanted during T. Aman 2013 in Barisal and BRRI HQ, Gazipur. Yield ranges from 3.24 – 4.23 t/ha. However, local check variety Sadamota yielded 1.82 t/ha at Barisal region. Sadamota infected severely by leaf blast whereas none of the tested materials infected by leaf blast.
2	Development of BB resistant variety	BC2F1 seeds between the crosses of BB susceptible local improved variety and IRBB60 or IRBB65 were harvested successfully in T. Aman 2013.
3	Evaluation of advanced breeding lines against BB	36 advanced breeding lines were tested in last T. Aman season with standard checks. None of the materials found resistant against BB.
4	Evaluation of INGER materials against BB	79 INGER materials were tested in last T. Aman season with standard checks. Four materials were found resistant against BB.
5	Evaluation of new chemicals against blast and ShB	30 new chemicals were tested against neck blast disease using test variety BRRI dhan34. Tricyclazole group fungicides were found effective. 20 new chemicals tested against ShB using test variety BR11 and 5 chemicals found effective. Both of these trials need to be done next year for confirmation.
6	Demonstration on blast and ShB disease management practices at farmer's field (IAPP activities)	In total 16 demonstrations were conducted successfully in Barisal and Rangpur region on blast and ShB disease management, respectively.
7	Seed multiplication of blast resistant MLs (Indica and Japonica)	54 blast resistant MLs (Japonica and Indica background) were collected from IRRI, Philippines and JIRCAS, Japan and multiplying for disease resistance studies.
8	Evaluation of advanced breeding lines against major diseases	30 advance lines from Plant Breeding Division have already transplanted for screening against BB and ShB.
9	Breeding for disease resistance (Blast, BB)	**Blast:** *Donors: Pish, Pita-2, Pi9* and *Pi40* genes of indica source *Recipients:* BRRI dhan34 **BB:** *Donors:* IRBB60 and IRBB65 *Recipients:* BRRI dhan28 and BRRI dhan29 All of the materials have already transplanted for F1 seed production

10	Evaluation of hybrid lines against BB	Parental materials and population of 11 F2 crosses (between hybrid parental lines and BB resistant materials) were evaluated. None of the parental materials found resistant against BB. However, resistant plants from F2 population were handed over to Hybrid Section.
11	Evaluation of INGER materials against blast	72 INGER materials were tested with standard checks. Four materials were found resistant against Blast.
12	Production of pure and healthy seeds of Mala through pure line selection	Selected panicles are now growing in BRRI HQ, Gazipur following head to row system.
13	Epidemiological studies of false smut	Studies on Host x Pathogen x Environment interaction has already started maintaining appropriate design.
14	Effect of False Smut on the quality of stored seed	Healthy and diseased seeds of BRRI dhan49 stored in plastic container. Regularly monitoring seed quality.
15	Development of mass inoculation technique of false smut	False smut pathogen (*Ustilaginoide virens*) has already isolated and grown on barley seeds for sporulation. Simultaneously, test plants are also growing in nethouse.
16	Demonstration on blast and ShB disease management practices at farmer's field (IAPP activities)	Two trials on ShB at Rangpur have already set up but in Barisal when blast will appear then will do.
17	Evaluation of new chemicals against blast	Seeds of BRRI dhan29 already seeded in blast nursery. Simultaneously blast pathogen is now growing on oat meal agar medium for spore production. Confirmation of the last year fungicides will be done.
18	Identification of existing races of *Pyricularia grisea* for gene pyramiding for durable blast resistance in rice (NATP)	Dominant pathotypes: U63, i0, k100, K177, ta403 Major resistant genes: *Pish, Pi9, Pita, Pita-2* **Gene pyramiding:** <u>Japonica-Indica cross:</u> Confirmed population from the cross combination BRRI dhan29 x IRBLta-2Re//BRRI dhan29/IRBLtaCP1 (191 seeds harvested and confirmed 100 seeds) <u>Indica-Indica cross:</u> Target gene *Pita-2* and *Pi9* 732; will be confirmed in next T. Aman season
19	Identification of blast resistant gene(s) in land races of rice (*PhD* student)	H100 and H129 have *Pi9* gene H122 and H136 have 4 genes except *Pi9*

Soil Science Division

Research Progress 2013-14

Research Progress	Expected output
Program Area: Crop-Soil-Water Management	
1. Project: Fertility assessment of rice soils.	
Expt. 1.1. Response of modern rice varieties and ALART to fertilizer N (T. Aman and Boro) In T. Aman 2013 season two promising lines with two check varieties BRRI dhan39 and BRRI dhan49 were tested to determine the optimum rates of N for higher yield. Nitrogen rates were 0, 40, 80 and 120 kg/ha. The advanced line BR7528-2R-19-HR10 gave higher grain yield than check varieties in all N levels. The highest grain yield of 4.95 t/ha was recorded in 120 kg N/ha which was statistically identical with 80 kg N/ha (4.67 t/ha). Similar trend was observed incase of straw yield. The experiment needs further confirmation.	Determination of appropriate N rates for some newly released BRRI varieties/ lines for optimum yield.
Expt. 1.2. Response of modern rice varieties to fertilizer K (T. Aman and Boro) Five K rates 0, 50, 100, 150 and 200 kg/ha were tested with BRRI dhan49 in T. Aman 2013. The highest grain (4.80 t/ha) and straw (5.58 t/ha) yield were obtained with the highest K dose. However, application of K beyond 50 kg/ha did not show any significant effect on grain or straw yield of BRRI dhan49.	Determination of appropriate K rates for optimum yield of newly released BRRI varieties.
Expt. 1.3. Updating fertilizer doses for five different unfavorable ecosystems of Bangladesh (NATP) (2011-13). a) Saline char area (AEZ-18): Highest yield was recorded in STB rate +25%NPK b) Haor area (AEZ-21): Yield of rice was the highest in treatment STB rate + 25% PK c) Submergence and Cold area (AEZ-3): Yield of rice was the highest in treatment STB rate + 25% NP d) Tidal Flood Ecosystem (AEZ-13): Highest production of rice was achieved in treatment STB rate + 25% N. e) Drought prone and Cold area (AEZ-26): Highest yield was recorded in Treatment 100% STB rate of NPKSZn.	Updated optimum dose of NPKSZn fertilizers for newly released varieties.

Expt. 1.4. Screening for P efficient genotypes in P deficient soil. Plant Breeding Division could not supply seeds of rice genotypes for this experiment. BRRI dhan29 was tested in P deficient condition in Boro 2013-14.	Identify rice genotype that performs better in low available soil P
2. Project: Identification and management of nutritional disorder	
Expt. 2.1. Long-term effect of some macro and micro nutrients on yield and nutrition of low land rice **BRRI Gazipur** In T. Aman 2013, rice grain yield decreased due to omission of each nutrient except Zn from complete fertilizer treatment. Complete treatment gave 4.22 t/ha grain yield which significantly decreased to 3.59, 3.82 and 3.67 t/ha due to omission of K, P and N, respectively. Application of poultry manure @ 2 t/ha with IPNS based chemical fertilizer produced slightly higher grain yield than complete fertilizer treatment. **Barisal** In T. Aman 2013, rice grain yield decreased due to omission of each nutrient from complete fertilizer treatment. Complete treatment gave 4.93 t/ha grain yield which significantly decreased to 4.19, 3.94 and 4.16 t/ha due to omission of P, N and Zn, respectively. **Rangpur** In T. Aman 2013, rice grain yield significantly decreased due to omission of N, and Zn from complete fertilizer treatment. Complete treatment gave 4.99 t/ha grain yield which decreased to 2.93 and 4.61 t/ha due to omission of N and Zn, respectively.	The limiting plant nutrient in soil can be identified. Long-term yield trend and changes in soil properties can be evaluated. Increased yield and soil health maintenance through IPNS based fertilizer.
Expt. 2.2. Effect of intensive rice cropping on rice yield under continuous wetland condition **Objectives:** To evaluate the consequence of intensive rice cropping under wetland condition and to monitor soil fertility changes over time. During 2012-13, annual grain yield of unfertilized plot was 7.81 t/ha while in fertilized plot (NPKSZn) was 12.21 t/ha and reversed control plot was 9.99 t/ha.	Increased annual rice production in wet land condition and soil health maintenance through balanced fertilization.

Expt. 2.3. Integrated nutrient management (INM) for double/triple rice cropping pattern for maximizing yield and sustaining soil fertility. Triple rice pattern gave higher yield than double rice cropping irrespective of fertilizer management treatments. Highest annual grain yield (11.70/ha) was obtained in 50% NPKS fertilizers + MM treatment.	To obtain yield of 15 t/ha/yr through integrated nutrient management approach.
Expt. 2.4. Validation of BRRI Fertilizer Management Technology (Boro, T. Aus and T. Aman rice) From the results of all locations of Barisal except one site (Amtoli) it is observed that cow dung (3t/ha) applied with IPNS based chemical fertilizer performed sound to get a maximum yield and it might be saved full dose of P, K and S fertilizer. From the results of all locations of Rangpur, it is observed that BRRI recommended fertilizer dose followed by application of rice straw (@ 4.5 t/ha) as IPNS basis with chemical fertilizer performed best to get a maximum yield. Application of rice straw save full dose of potassium fertilizer.	Dissemination of BRRI developed fertilizer mgt. packages among the farmers.
2.5. Physico-chemical properties of coastal saline soils (Collaboration with RFSD) RFS Division will present the progress report in their Program Area meeting.	Determination of soil salinity status and moisture content of soil under different cropping pattern in coastal area.
3. Project: Soil and Environmental Problems **Expt. 3.1. Effect of different level of As containing water management techniques on rice yield and its As content** Among the tested water management techniques/ practices, AWD with surface water application was the best to mitigate As content in soil as well as in rice plant.	Irrigation with surface water using AWD technique can be applied to mitigate arsenic in soil-water-plant system in As prone area.
Expt. 3.2. Effect of some organic materials as soil amendment in soil and rice plant As. Less arsenic content in straw and grain was observed with the application of organic materials as compared with the control plot treated with only inorganic fertilizer.	Organic materials like Cow dung, poultry manure can be applied in arsenic contaminated soil as they have slight effect on reducing arsenic uptake by plant system.

Expt. 3.3. Influence of As contaminated irrigation water to some BRRI rice varieties Among twelve Boro varieties, BRRI dhan47 and BRRI dhan50 showed less As uptake.	These two varieties can be suggested to grow in arsenic prone area.
Expt. 3.4. Organic and inorganic based silicon application to reduce As uptake by rice plant. Post-harvest soil arsenic was decreased after the treatment as compared to initial soil.	Application of inorganic Si ($CaSiO_3$ @ 100 kg/ha) may reduce arsenic uptake of As in rice plant.
Expt. 3.5. Carbon sequestration in soils of Bangladesh (NATP) (2010-2013) • The SOC stock (t/ha) at 0-20 cm depth was higher in lowland (except AEZ-1) compared to medium highland and highland soil in irrespective of AEZs. Among the 10 AEZs, the highest SOC stock (t/ha) was found in AEZ-1 irrespective of land types. • The rate of CO_2 emission was higher in earlier stage of incubation irrespective of organic sources in both flooding and moist condition. However, among the organic materials poultry manure emitted more CO_2 than cow dung, rice straw and rice root alone. • Continuous standing water (CSW) was more efficient to accumulate soil organic carbon (SOC) in soils. • The amount of CO_2 released was significantly higher (41.15 kg CO_2/ha/day) in rice straw incorporated soil over the rice straw surface mulch (36.96 kg CO_2/ha/day), while in control plot it was lower (27.53 kg CO_2/ha/day). • The release of CO_2 was higher in T. Aman season than Boro season. • Minimum tillage produced significantly identical grain yield to traditional tilllage in Gazipur site. • The rate of CO_2 emission increased gradually up to 9th weeks after transplanting then decreased gradually. Among the tested organic materials the rate of CO_2 emission was higher in cow dung and poultry manure treated plots.	a) Determination of present soil carbon status. b) To determine the effects of different cropping systems and management practices on soil carbon.
Expt. 3.6. Green House Gas (GHG) Emission Trial at BRRI It appears from the result of T. Aus and T. Aman 2013 that NH_4-N	Determination of the GHG emission from rice

concentration of flood water was comparatively high with urea application than UDP and NPK briquette deep placement method.	field under different water management

Plant Physiology Division
Research Progress 2013-2014

Sl. No.	Research Progress	Expected Output
1	Screening for Salinity Tolerance of Some Rice genotypes at the Seedling Stage	1. Among 100 germplasm, only 5 germplasm showed visual score 5 that is moderately tolerant. Survivability was better only for two genotypes up to 80%. 2. Among 15 anther culture lines, only 3 lines showed visual score 5 that is moderately tolerant. 3. Among 41 advance breeding lines, only 7 genotypes showed visual score 5 that is moderately tolerant and only one genotype scored 3 that is tolerant compared to check. 4. Among 41 **INGER**genotypes, only 15 genotypes showed visual score 4-5 that is moderately tolerant.
2	Evaluation of elite breeding lines for salinity tolerance at reproductive stage.	1. Two lines (IR59418 and IR78794) performed significantly better than BRRI dhan47 @ 4 & 8 dS/m and a line (BR7100) performed similar as BRRI dhan47 in all stress level, however all have added advantage with acceptable grain quality, non-shattering and at least 2 weeks earlier than BRRI dhan47. 2. None of the tested lines found better than BRRI dhan47, however all of the lines have longer growth duration than BRRI dhan47.
3	Screening for salinity tolerance of rice germplasms at seedling stage.	1. Among 200 germplasm 5germplasms identified as moderately tolerant (SES score 5) 2. Among 73 Deep water accessions Only 3 Deep water accessions (Noakhali, Jota bhaulia and Kartiksail-2) were showed moderately tolerant having SES 4.88-5.25.
4	Mapping QTLs for salinity tolerance of Horkuch at seedling stage.	1. 24 putative qtls for 5 traits were identified by preliminary analysis. Mapping will identify the causal 2. QTLs/genes that contributing the tolerance of Horkuch.
5	Investigation for salinity tolerance of some introgression lines from Boilam	1. Among 133 advance backcross inbred lines 26 introgression lines were selected as moderately tolerant having SES 3.80- 4.90.
6	Confirmation of performance regarding survival and recovery ability of previously screened rice germplasm under complete submergence condition.	4 Genebankgermplasms (Acc. 1838, 4206, 4399, and 4096) were confirmed tolerant and these are recommended for donor
7	Characterization of advance	All genotypes were non-elongating type but have

	breeding lines and varieties for medium stagnation flooding environment.	poor tillering ability to medium stagnation environment. Further investigation should be needed to confirm tolerance in terms of yield.
8	Confirmation of performance of ALART/ PVT materials under drought stress at reproductive stage	One ALART material IR87707-446-B-B-B showed better performance followed by IR82589-B-B-84-3 compared to check BRRI dhan56
9	Screening of germplasm for deep rooting ability	Chao Med Nyay produced the longest root (70 cm) followed by a ALART material IR82589-B-B-84-3 which produced 67 cm long root.
10	Confirmation of heat tolerance at reproductive phase from previously screened rice germplasms.	Based on lower percentage of spikelet sterility and greater pollen viability 5 Gene Bank accessions (acc no. 96, 97, 100, 131 and 133) were confirmed for use as parents for future heat tolerant breeding of rice.
11	Marker assisted selection for introgression of spikelet fertility loci (*qSF4.1*) from N22 in to two Bangladeshi mega rice variety BRRI dhan 28 and 29.	Heat tolerant BRRI dhan28 and BRRI dhan29 for cultivation in the high temperature condition in Late Boro and in Early Aus seasons respectively.
12	Development of heat tolerant varieties through conventional pedigree selection method.	Development of heat tolerant varieties for cultivating at late Boro and in Early Aus seasons respectively.
13	The fourtheenth international temprerate rice observational nursery (INTRON, 2013)	Temperate rice lines having good tropical adaptability and tolerance to cold in Boro season.
14	Screening for cold tolerance at seedling stage	55 accessions showed moderately tolerant at seedling stage compared to check varieties.
15	Characterization of cold tolerance of two advance breeding lines	Both advance lines were found tolerant to cold at seedling stage compared to BRRI dhan28 and BRRI dhan36, reproductive data are in compilation stage.
16	Characterization of some selected cold tolerant rice germplasms	Only Acc no 177 was found tolerant to cold at vegetative phase but highly susceptible at reproductive phase.
17	Investigation of physiological performances of some NERICA lines.	Grain yield of 2 NERICA lines are [NERICA L-8 (3.68 t/ha) and NERICA L-36 (3.57)] better than BR56 (3.22 t/ha) but are poorer than BR49 (4.30 t/ha).
18	Screening for cold tolerance at seedling stage	Out of 200 genotypes 55 genotypes showed moderately tolerance at seedling stage
19	Characterization and evaluation for cold tolerance of 2 selected advance lines	Both the advance lines were tolerant to cold at seedling stage on the basis of seedling vigor.
20	Characterization and evaluation of some selected Cold tolerant rice germplasms	Only Acc no 177 was tolerant to cold at vegetative phase but highly susceptible at reproductive phase.

Agronomy Division

Research Progress 2013-14

Sl. No.	Research Progress Program Area / Project (Duration)	Expected output
1	**Project: Seeds and Seedling**	
	1.1. Effect of seedling age on the growth and yield of rice in Aman season (on going) The experiment was conducted in Kolapara, Patuakhali to determine the optimum age of seedling for rice production. Thirty days old seedlings performed well in Aman season.	Optimum age of seedling age in Aman season
2	**Project: Planting Practice**	
	2.1. Performance evaluation of short duration rice varieties in Aman season (on going) Progress: Poor seedling establishment due to sudden rain immediately after seeding.	High yield performing varieties will find out
	2.2. Effect of time of planting on growth and yield of advanced lines both in Aman and Boro seasons (on going) Progress: None of the promising line produced higher grain yield over check variety BRRI dhan49, irrespective of planting dates.	Suitable time of planting and selection of high yield potential genotypes
	2.3. Performance of modern rice varieties in Aus season (on going) Progress: The modern rice variety BRRI dhan48 produced 18.59% higher yield compared to local variety in Aus season	Suitable variety for growing rice
	2.4. Effect of planting density on the growth and yield of rice in Aman season (on going) Progress: Planting rice variety at 20 cm×20 cm (25 hill m^{-2}) the grain yield increased 34.34% over farmer's practice in Barisal.	Optimum planting density in Aman season
3	**Project: Fertilizer Management**	
	3.1. Effect of urea splitting on yield of rice transplanted by mechanical transplanter in Boro season (new) **Progress: Application of 300kg Urea/ha in 4 splits is better in producing grain yield (6.30 t/ha) in boro season (BRRI dhan29) transplanted by mechanical transplanter.**	Suitable urea fertilizer management for rice transplanted by machine
	3.2. Effect of urea splitting on yield of rice transplanted by mechanical transplanter during Aman season (new) Progress: Application of 200kg Urea/ha in 3 splits is better in producing grain yield (4.49t/ha) in aman season (BRRI dhan49) transplanted by mechanical transplanter.	Suitable nitrogen management options for rice transplanted by machine during Aman season
	3.3. Validation of nitrogen management for yield maximization after de submerge for BRRI dhan51 and BRRI dhan52 a submergence tolerance varieties at Rangpur region in T. Aman season Progress: Additional 1 to 1.5 t ha^{-1} grain yield of BRRI dhan51 and BRRI dhan52 achieved at Rangpur region by applying 30 kg ha^{-1} additional N with recommended N within 5 to 15 days after de	Identify and recommend appropriate nitrogen management for BRRI dhan51 and BRRI dhan52 submergence tolerant varieties for yield maximization

	submerge at vegetative stage.	
	3.4. Performance of liquid fertilizer (Magic growth) on BRRI dhan28 Progress: No significant yield difference was obtained from liquid fertilizer (Magic growth) over STB rate.	Performance of the liquid fertilizer (Magic growth) as a source of N for rice cultivation.
	3.5. Evaluation of the performance of urea spray on BRRI dhan28 Progress: No significant yield difference was observed from urea spray over STB rate.	Performance of urea spray technology for rice cultivation
	3.6. Validation of the nutrient management for increasing yield of rice under standard agronomic management in Aus, Aman & Boro season (on going) Progress: Fertilizers applied in USG treated plot @ 50 kg N ha^{-1} in Aus & Aman, @ 70 kg N ha^{-1} in Boro season gave higher grain yield over farmer's practice.	Optimum level of fertilizer for growing rice
	3.7. Potentiality of urea super granule for increasing rice yield in tidal submergence-prone areas in Aman season (on going) Progress: Deep placement of USG before PI of local rice varieties gave 0.5 to 1.0 t ha^{-1} higher grain yield and profit by 5,000-15,000 Tk. ha^{-1} during Aman season in tidal submergence areas of Barisal region.	Increase of rice production through USG in tidal submergence-prone areas of Bangladesh
	3.8. Farmer's Participatory field evaluation of rice crop manager during Boro season in Barisal region (on going) Progress: Fertilizer management based on rice crop manager gave higher grain yield and reduced fertilizer cost compared to farmer's fertilizer management in Barisal region.	N and K management after recession of flash flood water
	3.9. Nitrogen management in modern T. Aman varieties (new) Progress: All the short duration varieties observed higher grain yield with USG (1.8g) application. BRRI Dhan49 achieved highest grain yield with 75kgN ha^{-1}.	Nitrogen response of newly developed T. Aman varieties from different sources and method of application
	3.10. Nitrogen management in modern Boro varieties (new) Progress: Grain yield were significant quadratic increase with increasing N rates in the range of 0 to 200 kg ha^{-1}. BRRI dhan60 obtained higher grain yield, where the remaining varieties were intermediate in yielding potential.	N response of newly developed Boro varieties from different sources and method of application
	3.11. Nitrogen use efficiencies of modern Boro varieties using prilled urea and USG applicator (new) Progress: BRRI dhan28 obtained highest grain yield with the application of USG by USG applicator. BRRI dhan29 observed highest grain yield with the application of prilled urea@ 270kg ha^{-1} by hand broadcasting in three equal splits.	NUEs of Boro varieties by prilled urea and USG applicator
4	**Project: Weed management**	

	4.1.Weed seed bank dynamics in different cropping pattern in BRRI (on going) Progress: Among twelve weed species higher species abundance was *Lindernia ciliata* (Kata henchy) (30.05%). However weed seed status was highest in upper layer (10 cm) of soil.	Abundance of weed seed population in different cropping pattern
	4.2. Screening of allelopathic potential rice varieties (on going) Progress: No allelopathic potential rice varieties were found among five local land races	Screening rice varieties having allelopathic potentiality.
	4.3. Evaluation of candidate herbicides (on going) Progress: About 39 candidate herbicides were tested during the reporting year.	Efficacy of new herbicides
	4.4. Validation of weed control options for yield maximization on BRRI dhan56 & BRRI dhan57 in drought prone area of Rangpur region during T. Aman season (new) Progress: To control weed efficiently at Rangpur drought prone area during T Aman season, Pre-emergence herbicide + one hand weeding or Post-emergence herbicide + one hand weeding or Pre emergence herbicide + Post emergence herbicide or three hand weeding treated plots gave higher grain yield compared to farmer's practice.	Appropriate weed management option for drought condition.
	4.5. Validation of integrated weed control option for yield maximization in Boro season Progress: Application of post emergence herbicide (Pyrazosulfuran ethyl) in addition to one hand weeding is effective to control weed in rice field.	Appropriate weed management option

Research Progress 2013-2014

IWM Division, BRRI.

Sl. No.	Research Progress	Expected Output
	Sub-Program: Irrigation and Water Management	
	Sub-Sub-Program I: Water Use Efficiency Improvement in Irrigated Agriculture	
01	**Water Requirement** ***Experiments:***	
	1.1. Development of Soil moisture declination model for alternate wetting and drying irrigation for Rice cultivation **Progress:** Comparison of evapotranspiration, seepage & percolation, effective rainfall, irrigation requirement and irrigation applied data indicated existence of a continuous horizontal inflow of water in the plots from adjacent field. Therefore, soil moisture declination study is not possible in this plot and the experiment will be established in other plots in the next year.	Soil moisture declination model will be develop to conduct next year experiment

	1.2 Assessment of cost effectiveness of low cost water distribution pipes for minor irrigation **Progress:** All the distribution systems consume more fuel compared to earthen canal at a specific engine speed range. Conveyance loss in all the systems is very much lower compared to the earthen canal. For 60 m (200 ft) section of earthen canal the distribution loss was found around 30 percent. For the same length of other distribution systems (polyethylene pipe, plastic pipe and cotton pipe) the conveyance loss is less than 5 percent.	Cost-effective distribution system may be determined for minor irrigatin
	1.3 Validation of crop model ORYZA2000 under AWD water management and effect of USG in rice production **Progress:** Irrigation applied by AWD method up to 15cm below soil surface produced at per yield with that of continuous standing water application. AWD method up to 20 cm water depletion below soil surface reduced rice yield significantly. USG produced slightly higher yield (but not significant) than that of prilled urea when applied in short duration BRRI dhan28. But only USG cannot increase or maintain yield of longer duration Boro rice BRRI dhan29 compare to prilled urea. Validation of model with the experimental data is ongoing.	AWD method up to 20 cm water depletion below soil surface reduced rice yield significantly. Only USG cannot increase yield of longer duration Boro rice like BRRI dhan29

	Sub- Sub Program II: Utilization of Water Resources in Rainfed Environment	
02	**Water Management for rice cultivation in climate change environment** ***Experiments:***	

	2.1 Terminal drought mitigation through integrated approaches in T. Aman cultivation **Progress:** The early transplanting of T. Aman through supplemental irrigation ensured that T. Aman effectively mitigated the terminal drought occurred at reproductive stage and at vegetative stage during T. Aman season 2011. Both short and long duration Aman varieties suffered less drought and showed good yield performance if they are transplanted during 24 to 31 July. In T. Aman 2011, suitable dates of transplanting were between 24 July and 31 July for BRRI dhan33 and BR11.	Drought effect may be reduced by shifting transplanting date of T aman rice and using short duration varities
	2.2 Determination of suitable time for application of supplemental irrigation in T. Aman rice **Progress: S**upplemental irrigation applied in water level 15cm below the soil surface is obtained better yield. But interval of irrigation application in all treatments was very close. So, these results do not indicate any suitable time of irrigation application (suitable water depth below ground surface). Based on the reporting year data and analysis, no confined findings can be drawn.	Timely application of supplemental irrigation may increase yield but the water depth when to irrigate need to be confirmed.
	2.3 Effect of drought on different T. Aman varieties **Progress:** Twelve T. Aman BRRI varieties were used for the study. Based on growth duration the varieties were divided into 3 categories as short duration, medium duration and long duration. Among the medium duration varieties, BRRI dhan31 and BRRI dhan49 were found less sensitive to drought. Among the long duration varieties (141-146 d) BR11 and BRRI dhan40 were found less sensitive	Some T. Aman varieties were found less sensitive to drought stress and drought effect can be minimized using short duration variety.

	to drought. Among the long duration varieties (153-155d), BR23 and BRRI dhan41 were found less sensitive to drought.	

	Sub–Sub Program III: Land Productivity Improvement in the Coastal Environment	
03	**Land and Water Resources Use for Sustainable Crop Production** ***Experiments:***	
	3.1 Fresh ground surface water investigation for crop production in coastal saline areas of Bangladesh **Progress:** Experiment conducted and data analysis is going-on	The mono-crop area will be converted into double crop area using fresh ground and surface water.
	3.2 Effect of long-term gropundwater extraction on the performance of STW and on crop production in coastal region of Bangladesh. **Progress: G**ood water bearing aquifer exists at a depth from 155 m to 180 m (510 ft - 590 ft). the salinity level ranged from 0.30 to 0.57 dS/m which was below the permissible maximum limit (<4 dS/m). BRRI dhan28, BRRI dhan47 and BRRI dhan55 were grown during Boro 2014 using GW. The yield of BRRI dhan28, BRRI dhan47 and BRRI dhan55 were 5.52 t/ha, 5.27 t/ha and 5.70 t/ha respectively	The mono-crop area will be converted into double crop area using fresh ground and surface water.
	3.3 Assessment of farm reservoir utilization for irrigation in the coastal area at Sonagazi **Progress:** Rainwater harvesting in a reservoir with 25 cm high embankment conserved more water than without embankment, which could increase irrigated area of Rabi crops in the coastal area.	Land productivity will be improved by cultivating rabi crops using water from farm reservoir
	3.4 Survey on surface water utilization and its scope for crop production in different Agro-Ecological Zones of Bangladesh	Irrigated area can be increased by using surface

	Progress: Survey was conducted to evaluate the present surface water utilization status and future scope of utilization in Khagrachari district only. This survey will be done in other places later on. It was observed that rain water harvesting, ring well renovation, rubber dam or river cross dam in Chegi river and Myani river, hill water conservation from small hill stream by making creek dam could be the good source of surface water in these region.	water in hill tracts like Khagrachari.

	Sub- Sub Program IV: Sustainable Management of Groundwater	
04	**Surface and Ground Water Assessment** ***Experiments:***	
	4.1 Monitoring of groundwater fluctuation and safe utilization in different geo-hydrological regions **Progress:** Weekly groundwater table monitoring data has been collected from different regional stations of BRRI and analysis is going on.	Groundwater level is declining gradually both in BRRI Gazipur and BRRI regional stations.
	4.2 Water quality assessment and its suitability for irrigation in different location in Bangladesh **Progress: Analysis has been completed.**	Assessment of suitability of water for irrigation in crop production.

Agricultural Economics Division

Research Progress 2013-14

Sl. No.	Research Progress	Expected output
	Program area/Project (Duration)	
SUB-SUB PROGRAM I: PRODUCTION ECONOMICS AND TECHNOLOGY ADOPTION		
1.1	Farm Level Evaluation of Modern Rice Cultivation in Bangladesh (Routine work)	Variety wise adoption rate of different MVs be estimated. Yield of different rice varieties be known.
1.2	Estimation of Cost and Return of MV Rice Cultivation at Farm Level (Routine work)	Per unit costs and return of MV rice cultivation in Bangladesh be estimated. Factors and income share of rice cultivation be known.
SUB-SUB PROGRAM II: AGRICULTURAL MARKETING AND PRICE ISSUES		
2.1	Value Chain Analysis of Rice in	Value chain of rice be mapped including modern

	Bangladesh	supermarket channels. Different functionaries/actors and their activities in the value chain of rice be critically assessed
SUB-SUB PROGRAM III: AGRICULTURAL POLICY AND DEVELOPMENT		
3.1	Forecasting area and production of food grains in Bangladesh: Employing ARIMA Model	Short-term forecast of area and production of food grains in Bangladesh be evaluated

Agricultural Statistics Division

Research Progress_2013-14

Sl. No.	Research Progress	Expected output
Program Area: Socio-economics and Policy		
1.	**Project: Yield Assessment through crop-cuts** ***Experiment/Study:*** Estimation of Area and Production of Rice in Bangladesh ***Research Progress:*** Two year field data are available, Boro (2013) and Aman (2012-13) data are being collected and analysis is going on.	1. Forecast the rice yield using crop-cut methods 2. Formulate a protocol that provides reliable and unique estimates on area and production of rice in Bangladesh.
2.	**Project: Stability Analysis of BRRI varieties** (In collaboration with Pl. Breeding Div., ARD and Regional Stations) ***Experiment/Study:*** Study on G x E interaction of BRRI varieties (In collaboration with Pl. Breeding Div., ARD Regional Stations) ***Research Progress:*** Season, year and location-wise data on yield of BRRI varieties at different regional stations have been generated for eight years to perform stability analysis according to the model developed by agricultural statistics division.	1. List of varieties with stability measure by season 2. List of varieties that are loosing stability over time and location 3. Bio-physical factors affecting stability of varieties identified 4. Season, year and location-wise database on yield of BRRI varieties
Sl. No.	**Research Progress**	**Expected output**
3.	**Project: Development of Computer Programme** ***Activity/Study:*** Development/modification of software for Payroll/ administration/accounting system for	1. Development of computer program for management and analysis of data 2. Development of software for administrative/accounting system

	BRRI employees ***Research Progress:*** Time to time modification of BRRI payroll system is being done on request from accounts section. We already updated the Payroll system accounting software by Win-base with the help of "IT Part Ltd". Now, we are trying to update the Payroll system administration software by Win-base.	of BRRI
4.	**Project. Multivariate Analysis of BRRI Varieties** ***Experiment/Study:*** Development and validation of producer and consumer preference model to rice varieties. (In collaboration with Agril. Econ.Div.) ***Research Progress:*** Three mathematical models already been developed for producer, consumer and producer cum consumer preference to rice varieties, to determine factors affecting producers' decision on the variety cultivation and can provide an indication of the factors affecting consumers' preference to rice varieties. For validation four districts data already been collected and analyzed and partial results already presented in the "Annual research Review workshop_2012-13". More districts data will be collected for validation of these models.	1. Factors determining producers' and consumers' preference to a rice variety 2. Functional models describing producers' and consumers' preference to a rice variety
Sl. No.	**Research Progress**	**Expected output**
5.	**Project: Genetic Coefficient of BRRI Varieties** ***Experiment/Study:*** Study on genetic coefficient of BRRI released varieties (In collaboration with Pl. Physiology Div.) ***Research Progress:*** Data have been generated for three years. DSSAT4.0 software has been collected and trying to match data with the software	1. Genetic coefficients of BRRI varieties to be used for modeling yield of BRRI varieties under different growing environment

6.	**Project: Spatial database for BRRI varieties** ***Experiment/Study:*** Suitability mapping of BRRI dhan44, 46, 47, 50 and newly released BRRI varieties including hybrid dhan4. (Collaboration with Pl. Breeding, RFS and ARD) ***Research Progress:*** Preliminary work has been done for suitability map of BRRI dhan44, 46, 47, 50 and newly released BRRI varieties including hybrid dhan4.	1. A geo-referenced database of BRRI varieties 2. Suitability maps for BRRI varieties
7.	**Project:Geographical Information System (GIS)** ***7.1 Experiment/Study:*** Identification of submergence areas for growing newly developed BRRI varieties (In collaboration with Ag. Econ. and RFS Div.) ***Research Progress:*** Spatial data has been collected for identification of submergence areas for growing newly developed BRRI varieties	1. Maps delineating submerged areas suitable for growing newly developed submergence tolerant BRRI varieties
	7.2 Experiment/Study: Sampling protocol for soil and water sampling for assessing Arsenic status in South-west Bangladesh. (In collaboration with soil science Div. and Cornell University under FFP) ***Research Progress:*** In total 4245 soil samples and 1415 water samples from 1415 location has been collected and about 2430 soil samples has been digested and 2210 soil samples analysed for As, 1124 water samples analysed for As and 839 samples analysed for Fe, Mn, P and Data entry have been completed by this time. Water As map/surface created for South-west Bangladesh. The partial results already been presented in Annual Research Review Workshop-2012-13.	1. Improve knowledge of the geographical distribution of contamination of soil and irrigation water with arsenic, in order to target arsenic management strategies to the most contaminated areas

8.	**Project: Characterization of rice environment in Bangladesh** ***Experiment/Study:*** Ground truthing of the characterization maps ***Research Progress****:* Fine tuning of rice growing environment of Bangladesh (Boro and T. Aman) in relation to BRRI varieties adjusting with new soil database.	1. Thematic and integrated maps of climatic variables and soil Properties. 2. Physical (soil and climatic) constraints to higher productivity of BRRI varieties identified. 3. Suitability maps for growing BRRI varieties
9.	**Project: Probability Mapping of Weather Variables** ***9.1. Experiment/Study:*** Probability Mapping of Maximum Temperature and rainfall and minimum temperature at different growth stages of Boro and Anam rice. ***Research Progress****:* Data has been collected and process. We already been presented partial results presented in Annual Research Review Workshop-2012-13. ***9.2. Experiment/Study:*** An application of Box-Jenkins method for forecasting of Aus, Aman and Boro rice production in Bangladesh ***Research Progress****:* Data has been collected and process. We already been presented partial results presented in Annual Research Review Workshop-2012-13.	2. Station wise probability curves of weather variables would be obtained 3. Station wise return periods of the weather variable would be obtained 4. Surface maps for the estimates of weather variables in Bangladesh 5. would be obtained 6. Effect of climate change i.e. temperature, rainfall and solar 7. radiation on rice yield would be obtained 8. Forecast the Aus, Aman and Boro rice production in Bangladesh
10.	**Project: Information and Communication Technology (ICT)** ***10.1. Activity :*** Management Information System (MIS) of BRRI ***Research Progress****:* 1. The MIS Software was developed under NATP. 2. Under HRMIS, PDS of BRRI's Scientists, Officers and Staffs already completed	1. All divisions of BRRI will be connected with global as well as with each other through network 2. Manage and maintain BRRI website, MIS and initiation of e-Governance. 3. Skype and Google Talk account has been created for Director General (DG) and Director (Admin & Common Service). 4. Created Group mail for Director General (DG) and Director (Admin & Common Service.

	and given in BRRI website. 3. Data entry process of other modules already starts in MIS Software. It is continuous process. ***10.2. Activity :*** BRRI Website Management ***Research Progress:*** 1. BRRI static website already converted into dynamic website 2. Created individual e-mail id into BRRI domain for all scientist & officer as per requirement of MoA. Now 300 users use their own email address made through BRRI web mail. ***10.3. Activity:*** Management of BRRI Network and Internet connectivity ***Research Progress:*** 1. Network is on work. We already abled to give internet connection in 300 computers. 2. At present BRRI Internet is 1mbps to 4 mbps DDN bandwidth connectivity. So, internet speed is faster than previous one.	5. BRRI website is being updated according to some requirements of BRRI
11.	**Project: Maintenance of Agricultural Database** ***Activity:*** Maintenance of rice and rice related variable database ***Research Progress:*** It is a continuous process. Data has been updated with current information. In this year we have collected up to date data on Rice (Area, Production and Yield), World Rice Statistics (Area, Production, Yield, Imported quantity and value and Exported quantity and value and Labour force), Fertilizer use and import, Irrigation (Irrigated area), Seed distribution and production, Insecticides uses, Meteorological data (Rainfall, Maximum Temperature, Minimum Temperature, Humidity, Bright Sunshine, Solar Radiation, Wind Speed, Cloud Coverage, Evaporation, Soil Temperature and Soil Moisture.)	A computerized database of rice and other minor cereal and non-cereal crops that can be queried and analyzed using data exploration and data analysis tools.

Farm Management Division

Research Progress 2013-2014

Sl. No.	Research Progress	Expected output
Program area: Socio-economic and Policy		
03.	Farm Management Division	
	3.1. Project: Rice Production Management	
	• **Expt. 1**. Sources of N and methods of weed control in respect to labor utilization for rice cultivation. Performance of USG plot with Super clean+ HW was better.	Efficient N management and weed control.
	• **Expt. 2**. Productivity and profitability of rice as affected by spacing and seedling number in relation to labor utilization**.**	Transplanted 1-2 seedling per hill with a spacing of 15 cm X 15 cm performed better.
	• **Expt 3**. Effect of foliar spray of MOP and elemental S for spot free seed production. Data of aman season are being processed. Boro experiment is in the field at maximum tillering stage**.**	Recommended fertilizer and MOP spray at heading stage and 15 days after heading may be useful for spot free seed production.
	3.2. Project: Cost of production	
	• **Expt. 1**. Cost and return of HYV rice cultivation at BRRI Gazipur Farm. Data are being processed	The cost of production per kg of rice highest in aus season followed by aman season and may be lowest in boro season.
	3.3. Project: Survey and development of data base for labor management	
	• **Expt. 1.** Labor efficiency as affected by direct supervision for rice cultivation	Labors work more efficiently when supervised directly but no significant difference with 80% direct supervision.
	• **Expt. 2.** Monitoring the laborers' wages rate for rice cultivation around BRRI Farms. Data are being collected	The average wage rate through out the year may higher than last year

	3.4. Project: Management and utilization of land and other resources. • Ten activities were done on seed production, irrigation, drainage, beautification etc. These are the continuous routine activities	These are for the better outcome from farm land and researches.

Research Progress 2013-14
Programme Area: Rice Farming Systems
Rice Farming Systems Division

Sl. no.	Title and objective	Output
01	**Project 1:** Survey **1.1.** Study of existing farming systems in the eastern hill tracts of Bangladesh (AEZ 29) **Objective:** To explore the scope of improvement of existing farming systems in hilly areas	Questionnaires have been developed and survey will be done soon.

02	**Project 2:** Development of Resource Conservation Technologies **2.1.** Crop residue and weed mgt. of permanent raised beds in rice-wheat-mungbean system **Objectives:** i) To compare the agro-economic productivity and resource use efficiency of permanent bed system and conventional method. ii) To compare the effect of crop residue retention on the productivity of permanent beds iii) To compare the effect of herbicide on weed control in permanent bed **2.2.** Evaluation of different rice based cropping patterns for their water requirement in medium highland ecosystem **Objectives:** i) To find out water requirement of different cropping patterns ii) To find out the best cropping pattern for replacing Boro-Fallow-T. Aman	In Wheat-Mungbean-DS Aman pattern, the higher grain yield of wheat was (3.38 t/ha) produced by permanent bed with 100% crop residue retention. Wheat and mungbean yield was better in different bed practices than conventional practices. In Aman season, yield of DS Aman was 4.46 t/ha in different bed practices and in conventional practice was 3.39 t/ha. Among the six tested patterns, Tomato-Mugbean-T. Aman showed the highest water productivity (8.83 kg-mm/ha). Wheat-Mugbean-T. Aman, Potato-T. Aus-T. Aman, Lentil- T. Aus-T. Aman, Chickpea- T. Aus-T. Aman and Boro-Fallow-T. Aman showed the similar water productivity of 4.94, 5.25, 4.02, 3.82 and 3.93 kg-mm/ha, respectively.
	Project 3: Development of Two and Three Crop Systems and Component Technology	
	3.1. Effect of fertilizer management on yield of double transplanted Aman and Boro rice under Boro-T. Aman cropping systems **Objective:** i) To determine optimum fertilizer management for double transplanted rice ii) To increase system productivity **3.2.** Nitrogen management options of Boro rice in Boro-Fallow-T. Aman cropping pattern **Objective:** To find out and compare the best nitrogen management option of rice in Boro-Fallow-T. Aman cropping pattern	The grain yield of double transplanted Aman and Boro rice with fertilizer in 1st transplanted plot produced higher than normal transplanting with older seedling under late transplanting situation. Three splits (1/4 at 15-20, 1/4 at 30-35 DAT and 1/2 at PI stage) and two splits N application (1/2 at 15-20 DAT and 1/2 at PI stage) resulted similar grain yield to BRRI recommended equal three splits application.

	3.3. Evaluation of poultry manure as a source of N and P fertilizer in Boro-Fallow-T. Aman cropping pattern **Objective**: To demonstrate poultry manure as a source of phosphorus and nitrogen for rice	Combination of organic and inorganic P at the ratio of 1:1 performed better than other treatment combinations.
	3.4. Long-term effect of three cropped cropping patterns on the agro-economic productivity and soil health **Objective:** To determine the long-term implications of Potato-Boro-T. Aman, Maize-Mungbean-T. Aman and Boro-T. Aus-T. Aman cropping patterns on: i) System productivity ii) Economics and iii) Soil health	In Rangpur, Highest REY was obtained from Potato-Boro-T Aman cropping pattern (17.83 t/ha) followed by Boro-T Aus-T Aman (11.36 t/ha) and the lowest was obtained Boro-Fallow-T Aman (11.03) cropping pattern. As the seeding of mungbean of Maize-Mungbean-T Aman cropping pattern was not possible due to excessive soil moisture, the REY was not compared. In Gazipur, Highest REY (13.65) was obtained from Potato-Boro-T Aman cropping pattern followed by Boro-T Aus-T Aman (13.61), Boro-Fallow-T Aman (11.56) and lowest REY (10.42) was found from Maize-Mungbean-T Aman cropping pattern.
	3.5. Evaluation of Vegetables-DS Aus-T. Aman cropping pattern in partially irrigated ecosystem **Objective:** To evaluate the productivity of Vegetables-DS Aus-T. Aman cropping pattern	The pattern Tomato-DS Aus-T. Aman resulted significantly higher rice equivalent yield (REY) of 30.40 t/ha than other tested cropping patterns, Patato-DS Aus-T. Aman, Radish-DS Aus-T. Aman, Spinach-Red Amaranth-DS Aus-T. Aman.
	3.6. Development of vegetables, fish and fruit system in mini pond **Objective:** To develop mixed farming system technology for diversifying and maximizing yield.	Stocking density of monosex tilapia @ 5 piece/m^2 integrated with aeroid gave higher gross margin than lower stocking density of monosex tilapia and monoculture of either aeroid or fish. Both summer and winter vegetables and papaya have been successfully grown on the surrounding dikes.
	3.7. Performance of different types of seed bed for the quality of seedlings and yield in Aus, Aman and Boro seasons **Objective:** To determine the performance of different types of seed bed for the quality of seedling and its performance in yield to be used under different circumstances in Aus, Aman and Boro seasons.	Maximum fresh and dry weight of seedlings and seedling length was found from wet bed Dry bed produced the highest seedling strength. Seeding density was low in floating seed bed. Because of huge seeding density in dapog, seedling quality was very poor. Though there was variation in seedling quality, however, there was no significant yield difference among the treatments except dapog seed bed.

	3.8. Evaluation of Aman rice varieties in Tomato-Mungbean-DS Aman cropping pattern under partially irrigated ecosystem **3.9.** Evaluation of BRRI prilled urea applicator in Boro rice in Boro-Fallow-T. Aman cropping pattern **Objectives:** i) To evaluate the performance of BRRI prilled urea applicator ii) To determine nitrogen use efficiency of different nitrogen application method iii) To compare the yield performance	In Rabi 2013-14 season, the yield of Tomato ranged from 47.03 to 53.80 t/ha Tomato-Mungbean-DS Aman cropping pattern. Prilled area applied by applicator gave similar grain yield to BRRI recommended N management practice and saved 30% prilled urea.
04	**Project 4: Development of fourand five Crop Systems and Component Technology** **4.1 .**Evaluation of maize intercropping in irrigated medium highland ecosystem **Objective:** To indentify thesuitable maize intercroppingfor Maize-T-Vegetables. Aus cropping pattern	Bushbean, spinach, potato and carrot yield were 4.02, 7.43, 7.87 and 1.31 t/ha, respectively while intercropped with maize. On the other hand, red amaranth and cucumber could not produce any yield.
05	**Project 5: Validation and Delivery of Farming Systems Technologies** **5.1.** Promotion of fish culture after Boro rice in Boro-Fallow-Fallow cropping pattern in low land ecosystem	About 442 kg of different types of fish was from 66 decimal area.

05	**Objective:** To increase the system productivity and income of the farmers through introduction of improved cropping patterns	
	5.2. Multilocation testing of improved cropping pattern at different locations of Bangladesh	BRRI dhan28 in Boro season and Laxmidigha in Aman season produced higher economic return than a system without B. Aman rice.
	Objective: To increase productivity of existing system through introduction of BRRI developed high yielding varieties throughout the country	
	5.3. Farmer training	Farmers' trainings were conducted in FSR&D site.
	Objective: To improve capacity building of the farmers for enhancing adoption of farming system technologies	
	5.4. Field days on different farming systems activities **objective**: To motivate farmers for adoption of technologies	Field days were conducted in FSR&D site.

Research Progress 2013-2014

Programme Area 6: Farm Mechanization and Postharvest Technology

Research Division: Farm Machinery and Postharvest Technology Division

Sl. No.	Research Progress	Expected output
1.	Project: Development of Agricultural Machineries	
1.1	Design and development of BRRI Power Hand Reaper	The performance test of BRRI hand reaper was conducted at an average speed of 2.92 m/minute. The actual cutting width was 85cm (average 3-4 lines) and field capacity of the reaper was16~22 decimal/h. The field capacity in a dry rice field was bite higher than that of wet field condition. The fuel consumption of reaper was 0.7~0.8 liter/h. The fuel consumption will be varied after long term use. But at the first operating time the mentioned amount was found.

Sl. No.	Research Progress	Expected output
1.2	Design and development of BRRI panicle thresher	A panicle thresher was designed and fabricated at FMPHT Divisional research workshop introducing cleaning and bagging facility in BRRI open drum thresher. A preliminary test was done and result found satisfactory. Rice straw remains intact like open drum thresher.
1.3	Design and development of a head feed power thresher	A prototype of a head feed thresher was design and fabricated at FMPHT divisional research workshop incorporating the threshing mechanisms of combine harvester. Thereby straw will be intact after threshing and the work is under development stage.
1.4	Effect of settling period on performance of the rice transplanter	A study was conducted at 24, 32, 36 and 48 hours' time interval on setting period of the puddle field to evaluate the performance of mechanical rice transplanter. The data of missing hills, buried hills and floating hills per square unit area were collected for the study.
1.5	Evaluate the rice transplanter under different tillage options	This study was conducted to evaluate the performance of a mechanical rice transplanter (4 rows) under minimum tillage condition at BRRI research field and farmer's fields during Boro/2012-13 season and Aman/ 2013 season. The Versatile Multi-crop Planter (VMP) was used to prepare beds and strips at Boro season whereas strip and bed was prepared using a rotary tiller powered by power tiller and manually during non-irrigated wet season, respectively. The field capacity of the rice transplanter in loam soil was significantly greater than in the conventional tillage (0.133 ha/h) followed by strip (0.122 ha/h) and zero tillage (0.120 ha/h) during Boro season whereas zero tillage showed significantly highest field capacity during Aman season.
1.6	Study on inundation period of land for mechanical transplanting under different tillage options	This experiment was conducted to evaluate the performance of mechanical rice transplanter (4 rows walk-type) under minimum tillage options and various inundation periods during Boro 2012-2013 season. The VMP machine and a rotary tiller were used to prepare the land for strip and conventional plots respectively. Two dry and one wet pass followed by one leveling operation constituted conventional puddling of soil. Strip tillage gave significantly higher yield in loam and sandy loam soil. There have no significant difference of yield between zero and conventional tillage in sandy loam soil. Inundation period showed significant effect on yield in three types of soil. Interaction of inundation period and tillage in sandy loam soil, 18 hrs for strip and 24 hrs for zero and conventional tillage gave more yields advantages.

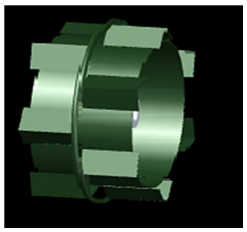
Sl. No.	Research Progress	Expected output
1.7	Development of rice transplanter for un-puddled transplanting	A 2 cm deep ×2 cm wide strip tine has incorporated in front of and in line with the rotary picker of existing rice transplanter. Engine power has conveyed to the strip tillage rotary shaft with the arrangement of a belt-pulley, worm gearing, shaft-universal joint, involutes spline shaft and bevel gear. The rpm of the rotary tine decreased to 450 rpm from engine rpm of 3600. The modified rice transplanter has evaluated for transplanting in moisture-saturated soils in un-puddled soils under minimum tillage. A 2.6 N/cm^2 force was assumed for torque calculation considering the soil specific draft 4 N/cm^2 and 35% reduction for saturated condition. It was calculated that about 1.0 Kw design power is required to make strips simultaneously with the rice transplanter operation.
1.8	Optimization of seedling density as influenced by seed rate for mechanical transplanting	This study was conducted during Boro 2012-13 season aimed to identify the optimum seed rate for quality seedlings to minimize the percentage of missing hills and to identify the suitable seedling adjustment option of the rice transplanter. Rice varieties BR3, BRRI dhan28, BRRI dhan29 and BRRI dhan50 were selected as bold, medium and slender and extra-long grain types, respectively. Seed rates were 100, 120, 130, 140, 150 and 160 gram of seeds/tray. Area of cut of the seedling mat under 9 seedling adjustment options of the rice transplanter were measured to find out the number of seedlings released stock per tray and number of trays required per hectare. Width of cut under each of the 9 seedling adjustment options was 1.2 cm whereas depth of cut started from 1.12 cm for option 1 with the increments of 0.8 cm with successive options. As seedling adjustment options changed from 1 to 9, the number of stocks per tray decreased from 1200 to 656 and the number of trays per hectare for transplanting increased from 185 to 339.
1.9	Performance evaluation of different types of reaper	The comparative performance of three different reapers (Korean self-propelled, BRRI self-propelled and BRRI PT mounted reaper) was conducted during Aman/2013 season. The field capacity of Korean self-propelled, BRRI self-propelled and BRRI PT mounted reaper was 34.31, 30.09 and 25.99 decimal/h respectively. Harvesting losses, comparative harvesting cost data is under process and detail data will be presented in next annual review workshop.
	Project: Development of stores and storage technology	

Sl. No.	Research Progress	Expected output
2.1	Study the storage quality under different degree of milled rice	BRRI dhan50 was successfully processed after 3, 6, 9 and 12 months of aging in the BRRI auto rice-mill as un-parboiled condition. Data analysis is under processed and detail result will be presented in the internal review.
	Project: Popularization of BRRI developed farm machinery and Postharvest technology	
5.1	Design and development of BRRI prilled urea applicator	A total of 50 field trials of prilled urea applicator were conducted in 12 different districts of Bangladesh during Boro /2014 season. The urea application rate was 165-180kg/ha and field capacity of the applicator was 30-32 decimal/h. BRRI prilled urea applicator saved 25 - 30% of urea without sacrificing yield.
5.2	Field Trial and Demonstration of Promising Farm Machinery and Technology to the LFS Farmers	A total 69 field demonstrations of BRRI farm machinery and technology (Seedling raising technique-7, Rice transplanter-21, BRRI USG applicaor-23, BRRI Weeder-4, BRRI reaper-6, BRRI winnower-8) at farmers' field was conducted at 8 districts of the IAPP project area. All machinery was found profitable over the traditional method of rice production.

Research Progress 2013-14

Workshop Machinery and Maintenance Division

Sl. No.	Research Progress	Expected output
1	**Project: Development of Agricultural Machineries**	
1.1	**Design and development of power transmission system of a power unit** ✓ A prototype of a power transmission system of a power unit has been developed. ✓ It will be tested.  Right View of a Power Unit	A gearbox with mechanism of two forward and a backward speed will be easy for power transmission.
1.2	**Design, development, modification and introduction of self-propelled reaper and mini-power tiller to augment crop production** ✓ Self-propelled reaper and mini power tiller have been developed. ✓ It will be tested in the farmers' field. ✓ Next proto type of Self-propelled reaper and mini power tiller will be developed.  Right View of a Self Propelled Reaper	A simple, light weight and easy to operate self-propelled reaper will be developed.
1.3	**Modification of a self-propelled field mower** ✓ Modification of the chassis of self propelled field mower was completed. ✓ Its attachment will be done.	A simple chassis of a self propelled field mower will be developed.

1.4	**Modification of reaper travelling wheel for wet-land condition** ✓ Design and drawing was completed. ✓ Fabrication will be started now. 	Wet land suited travelling wheel will be developed
2	**Assessment of Agricultural Machinery Workshop**	
2.1	**Database development for repair and maintenance of BRRI's farm machineries and automobiles.** ✓ Database was presented in annual research review workshop. ✓ it needs further study to introduce graphs automatically and others necessary option 	A database will be developed
2.2	**Development of management system for farm machinery maintenance** ✓ Maintenance schedule of farm machinery has been developed. ✓ Data sheet of spare parts of farm machinery are prepared.	Farm machinery maintenance schedule will be developed

Adaptive Research Division
Research Progress: 2013-2014

1. Advanced Lines Adaptive Research Trial (ALART)

Objectives:

- To evaluate the yield potential and adaptability of advanced breeding lines at farmers' field in different agro-ecological conditions.
- To get feedback information about the advantages and disadvantages of the advanced lines from farmers and DAE personnel.

Progress: The Adaptive Research Division (ARD) evaluated the following 8 sets of ALART in different agro-ecological regions of Bangladesh in different seasons during 2013-2014.

Sl.	Activities to Achieve the objectives	Output

No.		
1.1	**ALART (Partially Irrigated), T. Aus 2013:** Two advanced lines: BR7566-4-4-2 and BR7577-9-1-2 along with BR26 and BRRI dhan48 as checks were tested in West byde (BRRI Gazipur), Chittagong (Sitakundu), Comilla (Muradnagar), Bagerhat (Kochua), Barisal (Bakergonj), Bogra (Shahjahanpur), Moulovibazar (Srimongol) and Jhinaidah (Sadar) during T. Aus 2013. The trials were replicated thrice in each location.	Based on the growth duration, grain yield, disease infections and farmers' opinion, none of the advanced lines was found to be more suitable than the check varieties. So, none is being proposed for Proposed Variety Trial (PVT).
1.2	**ALART, Upland Aus 2013:** Five advanced lines: BR7587-2B-3, BR7182-2B-1-2-HR4, BR7178-2B-19, BR6976-2B11-1 and BR7384-2B-5 along with BRRI dhan43 as check were tested in West byde (BRRI Gazipur), Gazipur (Kapasia), Noakhali (Sadar), Feni (Sonagazi), Sylhet (Biswanath), Faridpur (Modhukhali) and Jhinaidah (Sadar) during B. Aus 2013. The trials were replicated thrice in each location.	None of the advanced lines was found to be more suitable than the check variety BRRI dhan43 based on plant height, lodging tendency and disease reactions. So, none is being proposed for Proposed Variety Trial (PVT).
1.3	**ALART (Salinity), T. Aman, 2013:** Three advanced lines: IR78761-B-SATBI-28-3-24, IR78761-B-SATBI-28-3-26 and IR78761-B-SATB2-4-25-3 along with BRRI dhan53 and BRRI dhan54 as checks were tested in West byde (BRRI Gazipur), Khulna (Batiaghata), Khulna (Dumuria), Bagerhat (Rampal), Patuakhali (Kalapara), Borguna (Amtoli), Satkhirah (Debhata) and Satkhira (Shamnagar) during T. Aman, 2013. The trials were replicated thrice in each location.	Based on the growth duration, grain yield, grain size and farmers' opinion, IR78761-B-SATBI-28-3-24 and IR78761-B-SATBI-28-3-26 were found suitable for Proposed Variety Trial (PVT).
1.4	**ALART (Drought), T. Aman, 2013:** Four advanced lines: IR83383-B-B-129-4, IR83373-B-B-27-4, IR87707-446-B-B-B and IR82589-B-B-84-3 along with BRRI dhan56 as check were tested in West byde (BRRI Gazipur), Rajshahi(Godagari), Jhinaidah (Sadar), Chapainawabgonj (Gomostapur), Naogaon (Porsha), Joypurhat (Sadar), Dinajpur (Fulbari) and Rangpur (Sadar) during T. Aman, 2013. The trials were replicated thrice in each location.	Based on drought tolerance, growth duration, grain yield, grain quality, phenotypic acceptability and farmers' opinion, IR83383-B-B-129-4 and IR82589-B-B-84-3 may be considered for Proposed Variety Trial (PVT).
1.5	**ALART (PQR and MN), T. Aman, 2013:** Four advanced lines: BR7357-11-2-4-1-1, BR7369-16-5-2-3-1, BR8417-2-1-2 and BR7528-2R-19-HR10 along with BRRI dhan37 and BRRI dhan39 as checks were tested in West byde (BRRI Gazipur), Rajshahi (Godagari), Barisal (Sadar), Chittagong (Hathazari), Comilla (Muradnagar), Rangpur (Pirgonj), Sylhet (Sadar) and Jessore (Jhikoregacha) during T. Aman, 2013. The trials were replicated thrice in each location.	Based on growth duration, grain yield, grain quality, phenotypic acceptability and farmers' opinion, BR7357-11-2-4-1-1, BR7369-16-5-2-3-1 and BR7528-2R-19-HR10 may be considered for Proposed Variety Trial (PVT).
1.6	**ALART (RLR), T. Aman, 2013:** Three advanced lines: BR7472-16-2-1-2-3, BR7622-5-1-1-1 and BR7639-68-2-1-1 along with BRRI dhan39 and BRRI dhan49 as checks were tested in West byde (BRRI Gazipur), Rajshahi (Godagari), Barisal (Sadar), Chittagong (Hathazari), Comilla (Muradnagar), Rangpur (Pirgonj), Sylhet (Sadar) and Jessore (Jhikoregacha) during T.	Based on growth duration, grain yield, grain quality and farmers' opinion, BR7472-16-2-1-2-3 and BR7622-5-1-1-1 may be considered for Proposed Variety Trial (PVT).

	Aman, 2013. The trials were replicated thrice in each location.	
1.7	**ALART(Micronutrient), Boro 2014:** Two micronutrient dense advanced lines: BR7671-37-2-2-3-7 and BR7833-11-1-1-2-1-2B5 along with BRRI dhan28 and BRRI dhan60 as checks were tested in West byde (BRRI Gazipur), Jessore (Zikorgacha), Chittagong (Hathazari), Comilla (Muradnagar), Jhalokathi (Sadar), Rajshahi (Godagari), Dinajpur (Sadar), Sylhet (Golapgonj), Faridpur (Modhukhali), Kishoregonj (Pakundia) and Khulna (Dumuria) during Boro 2014. The trials were replicated thrice in each location.	Based on grain yield, grain quality, growth duration and farmers' opinion, BR7671-37-2-2-3-7 may be considered for Proposed Variety Trial (PVT).
1.8	**ALART(Aerobic/Low water), Boro 2014:** Three advanced lines: IR83140-B-36-B-B, IR83142-B-71-B-B and PSBRC82 along with BRRI dhan28 as check were tested in West byde (BRRI Gazipur), Rajshahi (Godagari), Natore (Sadar), Lalmonirhat (Sadar), Rangpur (Sadar), Dinajpur (Sadar) and Thakurgaon (Sadar) during Boro 2014. The plot was selected in a representative Boro area and high land and free from water stagnation. It was selected in those areas where water holding capacity of soil is comparatively low and water is drained out very quickly after irrigation. The trials were replicated thrice in each location.	Based on grain yield, grain quality, growth duration, farmers' opinion and other criteria the tested entries IR83140-B-36-B-B and IR83142-B-71-B-B may be considered for Proposed Variety Trial (PVT).

2. Seed Production and Dissemination Program (SPDP) of BRRI varieties with other technologies under GOB and other projects such as IAPP, MIADP, EQSS, AFACI.

Objectives:

- To encourage the farmers for production, processing and storing of quality seeds at on-farm level.
- To enhance adoption and dissemination of BRRI varieties through exchanging seeds among the farmers.
- To get feedback information from the farmers and DAE personnel about BRRI varieties and other technologies such as USG.

Progress:

Sl. No.	Activities to achieve the objective(s)	Output			
		Total produced grains (kg)	Seed retained (kg)	Knowledge gained Farmers (no.)	Motivated Farmers (no.)
2.1 SPDP under BRRI core program.					
2.1.1	**SPDP with USG, T. Aman 2013.** SPDPs were conducted in 17 upazilas of 10 districts by using BRRI dhan49 and BRRI dhan57 as cultivars.	19854	2345	-	1845
2.1.2	**SPDP with USG, Boro 2014.** SPDPs with USG were conducted at 8 uazilas of 8	41550	6749	5044	2009

	districts by using BR16, BRRI dhan50 and BRRI dhan55.				
2.2. SPDP under Mujibnagar Integrated Agricultural Development Project (MIADP)					
2.2.1	**SPDP, T. Aus 2013.** SPDPs were conducted in 19 upazilas of 4 districts (Kushtia, Meherpur, Chuadanga, Jhinaidah) by using BRRI dhan48.	17751	1881	1069	610
2.2.2	**SPDP with USG, T. Aman, 2013.** SPDPs were conducted in 12 upazilas of 4 districts (Kushtia, Meherpur, Chuadanga, Jhinaidah) by using BRRI dhan49 and BRRI dhan57.	13836	3445	1910	1113
2.2.3	**SPDP with USG, Boro, 2014.** SPDPs were conducted in 8 upazilas of 4 districts (Kushtia, Meherpur, Chuadanga, Jhinaidah) by using BRRI dhan50 and BRRI dhan58.	20120	3120	4977	2886
2.3. SPDP under Integrated Agricultural Productivity Project (IAPP)					
2.3.1	**SPDP, Aus 2013:** A total of SPDPs were conducted in 8 upazilas of 4 districts (Barisal, Patuakhali, Jhalokathi and Barguna). BRRI dhan27 and BRRI dhan48 were used in the trials.	14306	2710	1907	591
2.3.2	**SPDP with USG, T. Aman 2013:** SPDPs with USG were conducted in 8 upazilas of 4 southern (Barisal, Patuakhali, Jhalokathi and Barguna) and 4 northern districts (Rangpur, Nilphamari, Lalmolnirhat and Kurigram). BRRI dhan41 and BRRI dhan44 were selected as cultivars in southern districts whereas BRRI dhan49 and BRRI dhan57 were selected for northern districts.	8529	1208	1361	465
2.3.3	**SPDP with USG, Boro 2014:** SPDPs with USG were conducted in 14 upazilas of 3 southern (Barisal, Patuakhali, and Jhalokathi) and 4 northern districts (Same as Aman 2013). BRRI dhan47 and BRRI dhan58 were selected as cultivars in southern districts whereas BR16, BRRI dhan50 and BRRI dhan55 were selected for northern districts of the country. A total of 56 bighas SPDP conducted in 7 districts @ 4 bighas per upazila.	39254	7736	4848	2077
2.4 Asian Food and Agricultural Co-operation Initiative (AFACI) Food Security Project in Bangladesh					
2.4.1	**Rice production by using USG**	4100	450	250	190

	applicator, T. Aman 2013. Demonstration was conducted in Chandina, Comilla using BRRI dhan 49, 52 and BRRI hybrid dhan4.	(including Hybrids)	(inbreed only)		
2.5 Enhancing Quality Seed Supply (EQSS) Project.					
2.5.1	**QSPDP, T. Aman 2013.** ARD, BRRI conducted demonstrations in 10 upazilas of 10 districts by using BRRI dhan46 and BRRI dhan57.	20770	2020	2300	641
2.5.2	**QSPDP, Boro 2014.** ARD conducted in 10 Upazilas of 5 districts under EQSS project. BR16, BRRI dhan50, BRRI dhan55 and BRRI dhan58 were selected for each upazila.	31056	3786	5419	1378

3. Adaptive trial of modern rice varieties under IAPP
Objectives:

1. To evaluate the adaptability of modern rice varieties at farmers' field in southern and northern districts of Bangladesh.
2. To get feedback information about the advantages and disadvantages of the varieties from farmers and DAE personnel.
3. Motivate farmers to cultivate modern rice varieties.

Progress:

Sl. No.	**Activities to achieve the objective(s)**	**Output**		
		Grain yield (t ha^{-1})	**Growth duration (day)**	**Suitable variety**
3.1	**Adaptive trials, T. Aman 2013 in Southern region:** Four Adaptive trials were conducted in 4 upazilas of 4 southern districts (Barisal, Jhalokathi, Patuakhali and Borguna). RCB design with three replications were followed in the trial using the varieties below:			
	BRRI dhan41	3.89	145	BRRI dhan41 & BRRI dhan44
	BRRI dhan44	4.10	142	
	BRRI dhan49	3.83	134	
	BRRI dhan53	3.37	128	
	BRRI dhan54	3.50	135	
	Sadamota (L. ck)	3.01	158	
3.2	**Adaptive trials, T. Aman 2013 in northern region:** Four Adaptive trials were conducted in 4 upazilas of 4 northern districts (Rangpur, Nilphamari, Lalmolnirhat and Kurigram). RCB design with three replications were followed in the trial using the varieties below:			

	BRRI dhan37	3.29	142	BRRI dhan49 & BRRI dhan57
	BRRI dhan38	3.38	142	
	BRRI dhan49	4.82	133	
	BRRI dhan52	4.51	147	
	BRRI dhan57	3.83	106	
	Swarna (L.ck)	4.93	144	
3.3	**Adaptive trials, Boro 2014 in Southern region:** Three Adaptive trials were conducted in 3 upazilas of 3 southern districts (Barisal, Patuakhali, and Jhalokathi). RCB design with three replications were followed in the trial using the varieties below:			
	BR16	5.58	164	BRRI dhan47 & BRRI dhan58
	BRRI dhan47	6.16	150	
	BRRI dhan55	6.01	148	
	BRRI dhan58	6.70	155	
	Bhajan (local check)	5.44	166	
3.4	**Adaptive trials, Boro 2014 in northern region:** Four Adaptive trials were conducted in 4 upazilas of 4 northern districts (Rangpur, Nilphamari, Lalmonirhat and Kurigram). RCB design with three replications were followed in the trial using the varieties below:			
	BR16	5.58	164	BRRI dhan50 & BRRI dhan58
	BRRI dhan50	6.16	150	
	BRRI dhan55	6.01	148	
	BRRI dhan58	6.70	155	
	BRRI dhan28 (L. ck)	5.44	148	

4. Yield gap minimization in rice using Integrated Crop and Resource Management (ICRM) Practice under KGF

Objectives:

- To minimize yield gap through increasing rice yield by 0.5-1.0 t/ha using Integrated Crop and Resource management practices.

Sl. No.	Activities to achieve the objective(s)	Output
4.1	**T. Aman 2013.** ARD, BRRI conducted **o**n-farm farmers' participatory adaptive research trials on ICRM practices in 5 upazilas of 3 districts (Gazipur, Kishorgonj, Norsingdi) by using BRRI dhan49.	Yield increased in ICRM over farmers' practice in T. Aman is 0.8-1.3 t/ha
4.2	**Boro 2014.** ARD, BRRI conducted on-farm	Yield increased in ICRM over farmers' practice in

	farmers' participatory adaptive research trials on ICRM practices in 5 upazilas of 3 districts (Gazipur, Kishorgonj, Norsingdi) by using BRRI dhan28 and BRRI dhan29.	Boro is 0.5-0.9 t/ha

5. Minimizing Rice Yield Gap Project (BRRI part) under Ministry of Agriculture.

Objectives:

- To minimize yield gap by using BRRI Technology package in farmers' field.

Sl. No.	Activities to achieve the objective(s)	Output
5.1	**T. Aman 2013.** Adaptive trials were conducted in 75 upazilas of 25 districts using BRRI Technologies Vs Farmers' practice.	Averaged over 75 upazilas, BRRI Technology increased yield by 0.5 t/ha over farmers' practice
5.2	**Boro 2014.** Adaptive trials were conducted in 75 upazilas of 25 districts using BRRI Technologies Vs Farmers' practice.	Averaged over 75 upazilas, BRRI Technology increased yield by 0.65 t/ha over farmers' practice.

6. Promotional activities:

progress

Sl. No.	Activities to achieve the objective(s)	Output
6.1 Farmers training **Objectives:** To enhance knowledge and skill of the farmers about modern rice production technologies		
	Farmers' training on modern rice production technologies were arranged during 2013-14. 25 farmers' trainings were arranged under MIADP, AFACI and yield Gap Minimization using ICRM project during 2013-14.	About 875 farmers and DAE field staffs were trained about modern rice production technologies.
6.2	Field day: About 70 Field days were conducted during 2013-2014 in different seasons under different projects (IAPP, MIADP, EQSS, AFACI and yield gap.	About 11000 farmers and DAE personnel and local elite people participated and gained knowledge about BRRI technologies.
Enrichment of own seed stock		
6.3	**Seed production at BRRI farm.** For conducting adaptive research trial in different locations of Bangladesh, ARD produced quality rice seeds at BRRI farm during Aus 2013, Aman 2013 and Boro 2014.	A total of 12 tons quality seeds of different BRRI varieties were produced which were used for follow up adaptive research trials.

Research Progress: 2013-2014

Training Division

l. No.	Research Progress	Expected Output
I	Program Area : Technology Transfer	

	Program Performing Unit : Training Division	
	1. Technology Transfer through training	Knowledge and skill of the trained personnel of the subject matter will be increased.
	1.1 Two months Rice Production Training for BRRI Scientists Participants: BRRI Scientist No. of participants: 30 Duration: 2- months Batch: 01 Progress: Started on 16.2.2014	Trained scientists could able to identify and solve problems of rice cultivation. Capable to do research planning, program development and report writing. They can also understand the present and future challenges of rice research and prepared themselves accordingly.
	1.2. Training on Modern Rice Production Technologies for SAAO (Regular) Participant : SAAO (DAE) No. of participants: 100 Duration: 1 week Batch: 05 (Completed)	Trained SAAO will be able to identify and solve field problems of rice cultivation and help the farmers to increase productivity.
	1.3. Training on Modern Rice Production Technologies and Office Management (IAPP) Participant: SA of the Project and SAAO of DAE No. of participants:20 Duration: 1 week Batch: 01 (Completed)	Trained SA and SAAO understood objectives and out come of the project. Also they can able to identify and solve field problems of rice cultivation and help the farmers to increase productivity.
	1.4. Integrated Rice Production Training (Mujibnagar) Participant : SSA, SA of BRRI No. of participants:20 Duration: 1 week Batch: 01 (Completed)	Trained SSA and SA will be able to identify field problems of rice cultivation and collect data efficently.
	1.5. Training on Modern Rice Production Technologies (EQSSP) Participant : SAAO (DAE) No. of participants:217 Duration: 1week Batch: 12 (Completed)	Knowledge and skill of the participants on modern rice production will be increased.

	1.6. Utilization of Bangladesh Rice Knowledge Bank Participant: BRRI scientists No. of participants:30 Duration: 3 days Batch: 2 (Completed)	Knowledge will be enriched through use of BRKB.
	1.7. Farmers training Participants: Farmers from different locations No. of participants: 117 Duration: 01 days Batch: 04 (Completed)	Rice yield at field level will be increased.
	1.8.Scheduled program (up to May 2014) **a) IAPP** Three days training on quality rice seed production Participants: CF and SAAO of DAE from project area No. of participants: 180 Duration: 3 days Batch: 8 **b) EQSSP** Three days training on quality rice seed production Participants: DAE and BADC officers No. of participants: 400 Duration: 3 days Batch: 20	Knowledge of the participants about quality seed production will be increased. They can share the knowledge with farmers and finally use of quality seed in rice production will be increased.
II	**Evaluation of imparted training program (On going)**	Training program will be improved.
	2.1. Performance of long and short term training programs. Participant :1-week trainees (On going)	This will help improvement of training course and method of training.
III	**BRKB and its improvement.**	BRKB will be enriched.

	3.1. Bangladesh Rice Knowledge Bank improvement Updated: Internet and interactive CD	Information about rice technologies will be available in internet and CD.