Research Achievement 2014-2015

Plant Breeding Division

Research Achievement 2014-2015
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
1.	BRRI dhan63: National Seed Board (NSB) of Bangladesh has approved BRRI dhan63 as premium quality rice for Boro season. BRRI dhan63 can produce 7.0 t/ha grain yield with 148 days growth duration. BRRI dhan63 is matured by 6 days earlier than BRRI dhan50 with yield advantage of 0.9 t/ha. BRRI dhan63 has export quality extra-long slender grain with 24.0% amylase content.	People can be able to consume quality rice and rice production of the country will be increased in Boro season.
2.	BRRI dhan64: National Seed Board (NSB) of Bangladesh has approved BRRI dhan64 as Zinc (Zn) enriched high yielding rice variety for Boro season. This rice variety can produce 6.0-6.5 t/ha grain yield with 151 days growth duration. In addition, the variety has 24 mg/kg Zn content which is 8 mg/kg higher than any regular rice.	Malnutrition is caused by Zinc deficiency. Zn deficiency will be reduced among poor people if rice of this variety is consumed regularly.
3.	BRRI dhan65: National Seed Board (NSB) of Bangladesh has approved BRRI dhan65as drought tolerant rice variety for B. Aus season. The grain yield potential of BRRI dhan65 is 3.5 t/ha with 99 days growth duration. BRRI dhan65 is matured by 5 days earlier than BRRI dhan43 with yield advantage of 0.5 t/ha.	Rice production will be increased in B. Aus season in drought prone areas.

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
4.	BRRI dhan66: National Seed Board (NSB) of Bangladesh has approved BRRI dhan66 as a high yielding drought tolerant rice variety for T. Aman season. BRRI dhan66 can give 4.5 t/ha grain yield with 113 days growth duration. BRRI dhan66 is matured by 5 days later than BRRI dhan56 with yield advantage of 0.79 t/ha.BRRI dhan66 has medium bold grain with 23.0% amylose content.	Rice production will be increased in the drought prone areas of the country in T. Aman season.
5.	BRRI dhan67: National Seed Board (NSB) of Bangladesh has approved BRRI dhan67 as a salt tolerant rice variety for Boro season. BRRI dhan67 can produce3.8-7.4 t/ha yield depending on salinity level with 145 days growth duration. BRRI dhan67 can tolerate 12dS/m salinity in seedling stage and 8 dS/m salinity in its whole life cycle. Rice grain is medium slender and white.	Rice production will be increased in the saline prone areas of the country in Boro season.
6.	BRRI dhan68: National Seed Board (NSB) of Bangladesh has approved BRRI dhan68 high yielding rice variety for Boro season. This rice variety can yield 7.3 t/ha on average, however up to 9.2 t/ha can be obtained at optimum management condition with 151 days growth duration.	Rice production will be boost up in the Boro season.
7.	BRRI dhan69: National Seed Board (NSB) of Bangladesh has approved BRRI dhan69 as high yielding rice variety for Boro season. This rice variety can yield 7.3 t/ha in an average. Its growth duration is 153 days and this variety requires lesser amount of nitrogenous fertilizer.	Rice production will be increased in Boro season and input cost for fertilizer will be reduced.

Biotechnology Division

Research Achievement 2014-2015

Sl. No.	Technology Developed	How country/ Farmer/ User will be benefited
1	Seven, three, 16, four and 33 green plants were regenerated from the hybrid anthers of MR219/BR16, BRRI dhan28/BRRI dhan61, BRRI dhan29/FL478, BRRI dhan50/Tepiboro (Ac. No. 930) and BRRI dhan29/Kalizira cross, respectively.	This line will be used for developing high yielding, salt tolerant and premium quality rice variety that ultimately benefit the farmers.
2	During T. Aman/14, 29 doubled haploid lines were evaluated as OT and among them 16 lines were selected depending on the duration and comparable yield with checks. During Boro/14-15, 42 materials were evaluated as OT and among them 17 materials were selected depending on the duration and comparable yield with checks.	From this study high yielding new rice variety will be developed that ultimately benefit the farmers.
3	During T Aman/14, 29 advanced lines were evaluated with standard checks as PYT and among them 19 lines were selectedfor further evaluation. During Boro/14-15, 41 lines were evaluated with standard checks as PYT and among them 19 lines were selected depending on the duration and comparable yield with checks.	These lines will be used to developed short duration and high yield new rice variety that ultimately benefit the farmers.
4	During Boro 2014-15, six advanced breeding lineswere evaluated at 10 regional levels as RYT and among them three lines were selected for ALART trial.	These lines will be used to developed short duration and high yield new rice variety that ultimately benefit the farmers.
5	BRRI dhan29 was transformed with salt tolerant gene *Gly1 and GlyII.* T_4 seeds of salt tolerant putative transgenic BRRI dhan29 having *GlyI and GlyII* genes were harvested.	These lines will be used to developed salt tolerant transgenic rice variety that ultimately benefits the farmers in coastal areas of Bangladesh.
6	Genotyping and QTLs analysis of population (BR28*3/ *O. rufipogon* (Ac. No. 103404) having population size 210 have been completed. Two major QTLs for yield and yield contributing traits were identified.	Identified high yielding QTLs will be used for enhancing grain yield of elite Bangladeshi rice variety.
7	Genotyping of QTL mapping population (BRRI dhan29/ IR4630-22-2-5-1-3) having population size 121 was done with 17 polymorphic markers. Rest of genotyping work is going on.	QTLs for salt tolerance both at seedling and reproductive stage will be identified that will be used for developing salt tolerant rice variety for areas of Bangladesh.
8	Seventeen bacterial blight (BB) pyramided	These lines will be used to

	BRRI dhan29 lines were evaluated during Boro 2014-15 seasons with standard check as OT. Among them eight lines were selected depending on the phenotypic acceptability and yield. These eight lines were confirmed by PCR with specific primers.	developed bacterial blight resistant variety that ultimately benefits the farmers.

GRS Division

Research Achievement 2014-2015
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
Program Area 01: Varietal Development Program (VDP)		
3	Sub-program area: Rice Germplasm and Seed	
3.1.1	Germplasm Collection: Two hundred and sixty eight rice germplasm were collected from different districts of Bangladesh. Among them, 47 were collected in Aus, 204 in T Aman and 17 in Boro seasons.	These germplasm would be utilized in breeding program for varietal improvement.
3.1.2	Characterization: Characterization of 136 germplasm including 49 new collections was performed against 53 morpho-agronomic characters. Rejuvenation of 1770 accessions including 14 new collections was conducted.	Characterized germplasm would be utilized in trait specific breeding program
.1.3	Evaluation against biotic and abiotic stresses: 1. Muktahar (Acc#156) and Kohabinni (Acc#208) were recorded as moderately resistant to resistant against Gall midge at glasshouse condition out of 63 tested germplasm.	Insect resistant landraces could be utilized as parents in resistant breeding program.
	2. Three germplasm (Lambra, Bazaildhan and Kechrail) were found tolerant to salinity at reproductive stage. Moreover, 25 germplasm (Kaisha binni (2), Aushaboro, Nariabuchi, Gojolgoria, Kala jira, Joluya, Bhogh, Depa, Lalmughi, Jolokoia, Sapahar, Malshira, Bhat raj, Mugi, Sindurkowta, Boron dhan, Indar sail, Mutaganji, Loha dang, Sona sail, Badadhan, Buchi, Rowaldoh, Mohini sail) showed moderately tolerant against salinity.	These potential landraces would be used as parent (s) for salinity tolerant variety development.
3.2	Seed production and variety maintenance: During reporting year, 116.98 tons of Breeder seed were produced and 106.13 tons of Breeder seed were distributed. Again, 5.21 tons of quality seed were distributed.	Faster dissemination of quality seed to the end users and increased production of rice accordingly.

3.3	Exploratory and genetic studies: Genetic divergence studies with 31 rice varieties of Boro season and 54 Biruin rice genotypes in T. Aman season were performed.	The genetic variability and relationships i.e. genetic makeup of the studied germplasm could be well understood.

Hybrid Rice Division

Research Achievement 2014-2015

Sl. No	Technology Developed	How country/farmer/user will be benefited
01.	A total of 1438 kg of parental lines (A & R) and hybrid seeds of four released hybrid varieties distributed to 7 seed companies along with BADC	Popularization of BRRI released hybrid varieties.
02.	Two potential hybrid rice combinations were selected for National Hybrid Rice Yield Trial (NHRYT) and registered under Seed Certification Agency (SCA). The combination (IR79156A/BRRI20R) was selected for T. Aman season and successfully completed 1st year evaluation trials and 2nd year evaluation under SCA is going on. Another combination (BRRI7A/BRRI31R) was selected for Boro season. Two seasons evaluation under SCA has been completed and expressed promising results. This variety will be come out as BRRI hybrid dhan5 within this year	New hybrid combination with desirable grain quality will fulfill farmers demand
03.	One promising combination (IR79156A/BasmatiR) was selected for T Aman season having aroma with excellent grain quality and good seed production potentiality from Preliminary Yield Trials. This combination will be tested under ALART (Advance Line Adaptive Research Trial)	New hybrid combination having aroma with desirable grain quality, high yield and duration will fulfill farmers demand in T Aman season
04.	Two promising restorer lines (PL-1R & BAU521R) were identified from local elite advance lines	These two restorer lines performed well in both Aman and Boro season. Hopefully it will able to produce good heterotic hybrid combinations with short duration and desired grain quality.
05.	F_1 seed production package development of the selected hybrids	Seed production of the newly selected hybrids have been fine tuning and farmers can easily make seed production with this combinations

Grain Quality & Nutrition Division

Research Achievement 2014-2015

(Technology Developed)

Sl.No.	Technology Developed	How Country/farmer/user will be benefited
1.	Zinc and iron fortification during rice parboiling process	Micronutrient deficient population

Agronomy Division

Research Achievement 2014 – 2015
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
01.	Agronomic packages for submergence tolerant varieties (BRRI dhan51 and BRRI dhan52) for Rangpur Region. 1. 45-day old seedling 2. Using 20 x 20 cm spacing 3. Four seedlings per hill 4. Transplanting on 3rd week of July 5. AEZ fertility based recommended nutrient management and 6. Applying 30 kg ha^{-1} additional N with at 15 days of de submerge during vegetative stage.	Farmer may achieve more than 1 to 1.5 t ha^{-1} additional grain yield adopting the technology. More submergence prone land of Rangpur region may come under rice cultivation.
02.	Agronomic packages for Drought tolerant varieties (BRRI dhan56 and BRRI dhan57) for Rangpur Region. a. Transplanting should be done on 4th week of July b. Using less than 25 days old seedling c. Spacing should be 20 x 15 cm d. Two seedlings per hill and e. Weed management by any one of the following: i. Pre emergence herbicide + one hand weeding ii. Post emergence herbicide + one hand weeding iii. Pre emergence herbicide + Post emergence herbicide	Farmer may obtain additional 1 t ha^{-1} grain yield. Winter crops like as potato, mustard, wheat, vegetables may also establish earlier for better price and yield. Not only that, income generation opportunities also may generate for 'Monga' effected people during 'Monga' time.
03.	Production packages for short duration BRRI dhan62 variety for Rangpur Region. a. Using less than 25 days old seedling b. Two seedlings per hill and	Farmer may obtain additional 1 t ha^{-1} grain yield. Winter crops like as potato, mustard, Wheat,

	c. Spacing should be 20 x 15 cm d. Transplanting should be done on 4th week of July e. Weed management by any one of the following: i. Pre emergence herbicide + one hand weeding. ii. Post emergence herbicide + one hand weeding. Iii. Pre emergence herbicide + Post emergence herbicide	vegetables may also establish earlier for better price and yield. Not only that, income generation opportunities also may also generate for Monga effected people during Monga time.

Irrigation and Water management Division

Research Achievement 2014-15
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/ User will be benefited
1	Demonstration of Irrigated Early Transplanting of BRRI Dhan48 as a Braus Crop in Rangpur Region Potato-Late Boro-T. Aman is a favourite cropping pattern in the medium highland of Rangpur region. Generally 50-70 days old seedling of BRRI dhan28 is transplanted in the mid-March after harvest of Potato. This practice was modified by using younger seedlings (25-30 days) of BRRI dhan48. Both the varieties were harvested in June. The yield advantage of BRRI dhan48 as late Boro (Braus) indicates that Potato-Braus (BRRI dhan48)-T. Aman might be the potential and profitable cropping pattern in medium lowland to medium highland area (about 80%) of Rangpur region. The present dominant cropping pattern in medium highland area of Rangpur region is Boro-Fallow-T. Aman which is not feasible and profitable as because of high irrigation water demand in Boro and less productivity. During Braus cultivation about 28 % rainwater effectively used while only 10-12 % rainwater effectively used in Boro cultivation. In Braus cultivation, 37 percent less water required compare to Boro cultivation.	Farmers can grow more rice with less water if they use BRRI dhan48 as a Braus variety in Potato-Braus-T. Aman cropping pattern in Rangpur region. Production cost can be decreased by using less irrigation water. Dependency on groundwater will be reduced by cultivating Braus rice.

Plant Physiology Division

Research Achievement 2014-2015
(Technology Development)

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
1	Considering better performance under severe drought stress one advance line IR82589-B-B-84-3 was released as drought tolerant T. Aman variety (BRRI dhan71) during reporting year.	Farmers could cultivate BRRI dhan71 at drought prone area (where drought remains about 3 weeks)
2	Based on physiological performance under net house condition among six breeding lines, genotype IR78761-B-SATB1-28-3-24 showed 8 dS/m salinity tolerance at reproductive stage which was released as salt tolerant T. Aman variety (BRRI dhan73) during the reporting year.	Farmers could cultivate BRRI dhan73 at medium saline prone area (4 to 8 dS/m)
3	Among 5 salt tolerant varieties BRRI dhan67 and BINA dhan10 showed the best tolerance ability at 8 dS/m salinity level and irrespective of variety sowing time was the best at late December.	This information will be helpful for the researcher as well as farmers
4	Higher level of proline and soluble sugar accumulation lead to osmotic adjustment of rice genotypes that might contribute to the higher stress tolerance under drought stress condition.	This information will be helpful for the researcher as well as farmers

Soil Science Division

Research Achievement 2014-15

Technology Developed

Technology Developed	How country/Farmers/User will be benefited
Mitigation of nitrous oxide (N_2O) and nitric oxide (NO) emission from rice field • Use of USG:USG needs to be applied at 10-15 days after transplanting (DAT) in Boro season and 7-10 DAT in T. Aus& T. Aman season at 8-10 cm depth in between four hills of alternate rows. • Water management:Continuous standing water inhibits N_2O andNO emissions. • Fertilizer management:Broadcasting N fertilizer enhancesN_2O and	This technology will help in mitigating environmental pollution. Moreover, N use-efficiency could be increased by 20-25% N and grain yield by about 15-20%.

NOemission; so broadcasting of N fertilizer should be avoided. • Land management:Paddy soil after transplanting should be left undisturbed as much as possible.	
Fertilizer recommendation for low input rice variety (BRRI dhan69) • Grain yield of BRRI dhan69 was statistically identical up to 20% less of recommended dose • 20% less of recommended dose are 240-72-102-48-4.8 kg/ha Urea-TSP-MOP-Gypsum-$ZnSO_4$,	This technology will help to reduce about 20% recommended chemical fertilizer in rice soil

Entomology Division

Research Achievement 2014-15
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benefited
1.	Nineteen, 12 and 2 entries showed moderate resistance against BPH, WBPH and GLH respectively. The cross combination of BINA dhan10/ASD-7 and BRRI dhan55/ASD-7 showed the moderately resistant reaction against BPH among the seven F_2 materials. 189 rice germplasm were screened against GM, among them Koha Binni (Acc# 208), Lal Mughi (Acc# 339) and Muktahar (Acc # 156) were recorded as highly resistant (0.01% OS) to resistant (<5% OS) against GM at glasshouse condition.	This material has been given to Plant Breeding Division for resistance breeding programme.
2.	Prophylactic application of insecticides at 15 days intervals failed to show any significant yield advantages both in Barisal and Rangpur regions. Therefore, indiscriminate use of pesticide should be avoided.	Insecticide application will be reduce and environmental pollution will be minimize.
3.	Least number of natural enemies and rate of parasitism observed in rice field where prophylactic insecticides were used.	Insecticide application will be reduce.

4.	A total of 147 commercial formulations of insecticides were evaluated against brown planthopper (BPH) and 17 against yellow stemborer (YSB). Of which 125 were found effective against BPH and 5 were found effective against YSB.	Farmers will be benefited by using these new effective insecticides.

Plant Pathology Division

Research Achievement for 2014– 2015

(Technology Development)

Sl No.	Technology Developed	How Country/Farmer/User will be benefited
01	Identification of major blast resistant gene/s (*Pish, Pita, Pita-2* & *Pi9*) in land races of Bangladesh	Molecular analysis indicates that highly blast resistant materials are in *Aus* sub group, this information helps plant breeder to develop blast resistant rice variety.
02	Identification and development of disease resistant advanced breeding lines against bacterial blight disease	Disease resistant variety will increase the productivity of the country
03	Development of FLYER model for rice false smut disease	Yield loss due to false smut disease can be easily estimated by using this model.
04	Management of seedling blight disease in seedling raising for mechanical transplanter	Seed treatment with pyracloztrobin (0.2%) for 20 hrs was found effective in mechanical transplanter.
05	Effective fungicides against sheath blight disease management	Six new fungicides recommended for sheath blight management. Effective management of sheath blight disease will enhance rice productivity.
06	Effective fungicides againstblast disease management	Five new fungicides recommended for blast disease management. Effective management of blast disease will enhance rice productivity.

Rice Farming Systems

Research Achievement 2014-2015

(Technology Developed)

Agricultural Statistics Division

Research Achievement 2014-2015

(Technology Developed)

Technology Developed	How Country/Farmer/ User will be benefited
Data envelopment analysis for efficiency of rice growing farmers in Bangladesh Description: The objective of this study was to understand the existing rice growing farmer's efficiency in selected areas of Bangladesh and to formulate recommendations for improving rice growing farmer's efficiency in both technical and environmental point of views and sustaining rice production systems in the study area. Through the use of Data envelopment analysis tools to estimate the technical efficiency of 420 rice growing farmers in selected areas of Bangladesh several conclusions are drawn.	This study was help to deepen understanding of the beneficial impacts of adopting advanced rice growing farmers to rice production. They may help local policy makers in crafting policies that are conducive to increasing technical efficiency in rice production. On a more practical level, the results can also be used as guide in advising farmers on appropriate strategies for increasing their productive efficiency and addressing areas of inefficiency. Therefore to gain the TE score of rice growing farmers, the government should focus on encouraging rice growing farmers to produce more efficiently.
Effects of climate change on rice yield in Bangladesh Description: The objective of this study was to investigate the impacts of climate change (viz. changing in maximum temperature, minimum temperature, rainfall, humidity and sunshine) on the yield of three rice seasons (viz. Aus rice, Aman rice and Boro rice) in Bangladesh. Using annual data of rice yield and climatic factors spanning from	The concerned body thus should take proper initiative to combat against climate change impacts on agriculture in the country for ensuring food security for the ever increasing population through implementing sustainable agricultural development.

1974-2014, a time-series multivariate regression model and Spatial Analysis were employed to assess the impact. Heteroskedasticity of national level time series data has been converted to normal data using transformation method. Regression and spatial analysis were conducted to achieve the objective.	
Groundwater depletion with expansion of irrigation in Barind Tract: a case study of Rajshahi district of Bangladesh Description: • The objectives of the study were find out suitable and vulnerable area of Boro rice with respect to groundwater fluctuation of the study area, to understand groundwater depth and variability of study area and the future recommendation of rice production with groundwater fluctuation and variation The study was based on groundwater monitoring wells data of Bangladesh Water Development Board (BWDB) from 2000-2013. Lithology of the study area was studied from borehole logs data collected from Public Health Engineering Department (DPHE). Mapping software ArcGIS-10 was used for contouring and others mapping. Then aquifer variability map or hydro stratigraphic cross-section generated by bore log data through RockWorks software, then correlation between aquifer variability and irrigated (Boro) rice production has been conducted.	Groundwater depilation is sever problem in northern part of Bangladesh. This study is helpful for find out vulnerable area for irrigated rice i.e. boro rice as well as the area where boro rice might be conducted as there groundwater recharge condition is relatively better.

Agricultural Economics Division

Research Achievements for 2014- 15

Sl. No.	Activities/studies/technology developed	How country/farmer/user will be benefited
1.1	Farm Level Adoption and Evaluation of Modern Rice Cultivation in Bangladesh • BRRI dhan28 and BRRI dhan29 were the most popular varieties covering around 69% of area in Boro season, whereas in T. Aman season, BR11 and BRRI dhan49 were the dominant varieties that covered 23% area. In Aus season, the area coverage of BRRI dhan28 was the highest (21%)	• Higher adoption of more yield potential varieties resulted in increased total production and attaining rice self-sufficiency.

	followed by BR26 (9%). • Among BRRI varieties, BRRI dhan29 was the top yielder in Boro (5.81t/ha) season followed by BRRI dhan28 (5.30 t/ha). In T. Aman season, BRRI dhan49 ranked the top position in terms of per unit yield (4.81 t/ha) followed by BR11 (4.77 t/ha) and BRRI dhan44 (4.77t/ha). In Aus season, BRRI dhan28 also produced higher yield (4.04 t/ha) followed by BRRI dahn48 (3.93 t/ha). • Farmers faced constraints like higher wage rate and irrigation cost, lower market price of their product, non-availability of quality seeds, etc.	• Higher adoption of modern rice varieties and their better performance might assist extension department in priority setting for varietal promotional programs.
1.2	Domestic Vs Indian *Aman* Variety Cultivation in Border Region of Bangladesh: A Field Level Investigation • Due to lack of sufficient suitable domestic Amanvarieties, farmers of the border region used to cultivate Indian varieties in this season. Unless and until development of suitable domestic varieties for Aman season, cultivation of Indian varieties would continue. • Breeders should consider the agro-climatic conditions and socio-economic demand of farmers in the process of variety development. In this regard, short to medium growth duration stress tolerant varieties associated with higher milling out-turn and market demand should be given due consideration.	The findings of the study would guide policy makers to formulate rice seed policy for developing higher yield potential varieties for the frontier region.
1.3	Estimation of Costs- Return, Factor and Income Shares of MV Rice Cultivation at Farm Level • Rice farmers still using more seeds and urea fertilizer than the recommended rate irrespective of cropping seasons; but applied comparatively lower amount of MoP. • Although, Boro growers obtained higher yield, T. Aman growers gained higher gross return due to lower cost of production and higher market price. • Factor and income share revealed that the human labour contributed the highest effort to the production process; and on the other hand, farmers earned the highest share of income among all other	The findings would help planners and policy makers to formulate proper guideline for setting procurement price, price support and input subsidy on MVs rice production.

	production participants. • There are lot of opportunities in rice production but not risk and threat free.	
1.4	Technical Efficiency of Rice Production: A Case Study in Dinajpur District • Yield can significantly be improved without increasing the level of inputs, and cost can noticeably be reduced without reducing the current level of outputs. • Farmers could reduce inputs application in Boro and Aman season by around 20% ([(100 – 83.25)/ 83.25] × 100) and 18 % ([(100 – 85.15)/ 85.15] × 100), respectively without compromising production simply by improving technical efficiency. • Farmers age, education, training, access to micro-credit, and extension facilities were the important factors influencing the level of technical efficiency.	The results of this study would help to formulate appropriate policy for ensuring effective use of agricultural inputs.
1.5	Value Chain Analysis of Rice in the Hilly Areas of Bangladesh • Farm-retail price spread was 30-32% of consumers' price, which is not justified; although the middlemen performed varieties of facilitative functions to move the product from the farm gate to the consumers. • Producer's share was much lean compared to other actors of the value chain of rice in the hilly areas of Bangladesh.	The findings of the study may help the policy makers and researchers to formulate proper policy and guideline for rice marketing system in the hilly areas of Bangladesh.
1.6	Impact Assessment of Seed Production and Demonstration Program (SPDP) on Quality Seed and Rice Production • Farmers did not show further interest to grow BRRI dhan55 as it was not a quite good in terms of yield and amylose content. The grain of BRRI dhan48 is coarse; so it is difficult to popularize where Aus rice is not widely cultivated.	The findings would help researcher and policy makers to take necessary steps in variety dissemination program as per farmers need and local adoptability.
1.7	Food Habit and Dietary Intake Pattern of Garment Workers at Gazipur Area • Most of the garment workers belonged to farming community (78%) and majority (58%) of them were migrated in search of job for extreme poverty.	The results of the study would help policy planners to formulate strategies how the garments worker could get food and other daily necessities at low and

	• Cereals, notably rice, constitute the most important food item consumed by the garment workers, which essentially dominated daily food intake per person at 443 gm thrice a day, and rice was also being consumed as snacks in different forms as well.	subsidized prices.

Farm Management Division

Research achievement 2014-2015
(Technology developed)

SL. No.	Technology Developed	How Country/ Farmers/User will be benefited
Program Area: Socio-Economics and Policy		
03	Farm Management Division	
	3.1. Seed quality of different T. Aman rice as affected by rainfed condition in ripening phase. The seed quality such as germination percentage (GM %), seedling vigor index (SVI), high density grain (HDG %), shoot dry weight (SDW) and root dry weight (RDW) were significantly reduced due to rainfed / unavailable moisture during ripening phase.	This finding may be useful for the rice growers and researchers.

	3.2. The influence of seedling age on tiller production, yield and yield components of rice. Fifteen days old seedling produced the highest number of tiller per hill from 15 to 120 DAT which was statistically identical with the tiller number produced from 20 and 25 days old seedling. The lowest number of tillers was recorded in 40 days old seedling which was statistically similar to the tiller number produced from 35 days old seedling. Yield and yield components was higher in younger seedling used plot that produced more tillers and panicles. The plants those are produced from younger seedlings translocated more carbohydrate from source to sink might be the reason of higher yield in younger seedling used plot.	This finding may be useful for the rice growers and researchers/ production farm.
	3.3. Effect of foliar spray of MOP and elemental S for spot free seed production. BRRI recommended fertilizer (RF)+ 60 g MOP + 60 g Thiovit in 10 L water apply in 5 decimal area at milking and dough stage gave the lowest incidence (17.33%) of grain spot of rice (Var. BR3).	This findings may be useful for the rice farmers and production farm.
	3.4. Laborers' wage rate in rice production farm: Laborers' wage rate at rice production farm was monitored throughout the year at different locations of Gazipur sadar. The wage rate varies from Tk. 375 to 415 day^{-1}. The wage rate in peak periods of the year was Tk. 385 to 440 in May, Tk. 385 to 420 in July-August and Tk. 440 to 495 in December -January. In Habiganj, Rangpur, Rajshahi, Barisal, Sonagazi, Comilla Satkhira and Khulna the wage was Tk. 250-300, 275-300, 275-300, 250-300, 250-300, 325-350,325-350 and 300-350, respectively.	The Laborers' wage rates will help to estimate rice production cost and thus determine the retailer price of rice for the market.

Farm Machinery and Postharvest Technology Division

Research Achievement 2014-2015

(Technology Developed)

SI. No.	Technology Developed	How Country/ Farmer/ User will be benefited
1.	Development of a power operated chopper Engine operated chopper Motor operated chopper	BRRI has developed a power chopper machine for chopping straw in a specific size to use briquette materials, cattle feed, mushroom bed etc. The machine operated by 4 hp diesel engine or 2 hp electric motor by two labours. It can be chopped at least 1.5cm length of straw or others materials. The machine was manufactured with locally available materials i.e. MS sheet, Angle bars, casting iron, SS cutting blade. The main parts of the machine are frame, feeding tray, feeding cylinder, driver gear, cutting blade and output channel. On the consideration of ergonomics and safety is the main advantage of BRRI power chopper. The chopping capacity of chopper found 750~1000 kg/h for rice straw. Besides this, maize trunk, all kinds of fodder, small branches of tree etc. is also possible to chop.

Workshop Machinery and Maintenance

Research Achievement 2014-15

(Technology Developed)

Sl. No.	Technology developed	How Country/Farmer/User will be benefited
1	Modified travelling wheel of reaper for wet-land condition Complete design and drawing of self-propelled reaper wheel have been done with the help of AutoCAD and its fabrication has been completed at BRRI research workshop. It has been tested in the wet paddy field at BRRI farm Gazipur. It performed well in semi-wet land condition due to the increased contact area between the reaper travelling wheel and soil.	It can be used in semi-wet land as well as dry land condition.

Adaptive Research Division

ResearchAchievement 2014-2015
(Technology Developed)

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	Project_1 Validation of Technologies	
	1. Advanced Lines Adaptive Research Trial (ALART): The Adaptive Research Division (ARD) evaluated the following ten sets of ALART in different agro-ecological regions of Bangladesh in different seasons during 2014-2015. 1.1 ALART, Upland Aus 2014 Four advanced lines along with BRRI dhan43 as check were tested in eight locations of Bangladesh. Among the tested advanced lines, BR6848-3B-12 gave the highest yield and also found to be lesser infected by disease and had about 1.0 t/ha yield advantage over the check variety BRRI dhan43. Although BR6848-3B-12 showed some extent suceptible to sheath blight in some areas, considering the yield advantage, grain size, growth duration and phenotypic acceptance BR6848-3B-12 was recommended for Proposed Variety Trial (PVT). 1.2 ALART (Tidal Submergence), T.Aman 2015 Four advanced lines along with three checks (BRRI dhan44, Sadamota, Dudkalam) were tested in eight locations at southern coastal region of Bangladesh. Average seedling height of all the tested advanced lines ranged 64-74 cm which was longer than the standard check variety BRRI dhan44 (54 cm). Among the tested advanced lines, BR7941-116-1-	It is an important step before releasing a new variety Farmers of Bangladesh cultivating upland areas will be benefitted by using this variety having higher yield and shorter growth duration. Farmers in tidal non-saline ecosystem areas will be benefitted by using tidal submergence tolerant varieties having higher yield and reasonable growth duration along with tall seedling height.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	2-1 gave the highest yield followed by BR7941-41-2-2-2-4. Considering seedling height, grain yield, grain size and growth duration, BR7941-116-1-2-1 and BR7941-41-2-2-2-4 were recommended for PVT.	Farmers in salt affected areas of coastal region will be benefitted by using salt tolerant varieties having higher yield and shorter growth duration.
	1.3 ALART (Salinity), T. Aman, 2014 Six advanced lines along with BRRI dhan41 and BRRI dhan54 as checks were evaluated in seven locations of Bangladesh.Considering the grain yield, grain size, growth duration, salt tolerance and farmers'opinion, IR77092-B-2R-B-10 and BR9377-9-21-3B were recommended for PVT.	Farmers of rainfed lowland rice ecosystem, which covers a vast area of the country, will be helpful benefited by using this variety. It may cost to sustain food security of the country.
	1.4 ALART (RLR), T. Aman 2014 Three advanced lines along with BRRI dhan32 and BRRI dhan49 as check were tested in ten locations of Bangladesh. None of the advanced lines gave higher yield than the check variety BRRI dhan49 but BR7638-7-2-5-2 entry showed less infection of false smut disease. Considering the yield, growth duration similar to BRRI dhan49 and less infection of false smut disease and farmers' opinion, BR7638-7-2-5-2 was recommended for PVT.	Premium quality rice variety will satisfy the growing demand of consumers and exporters. On the other hand, farmers will be economically benefited by getting the high market value of PQR grains.
	1.5 ALART (PQR), T. Aman 2015 Four advanced lines along with BRRI dhan37 as check were tested in eight locations of Bangladesh. Based on grain yield, grain size, grain quality, growth duration, phenotypic acceptance and farmers' opinion, BR7697-15-4-4-2-2 was recommended for PVT.	Information gained from this ALART will be used to design the next experiment of ALART for Deep Water Aman.
	1.6 ALART (DWR), T. Aman 2015	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	Two advanced lines along with Gabura and different Locals (ck) as checks were evaluated in five suitable deep water locations of Bangladesh. Farmers did not prefer the advanced lines due to its poor yield and longer duration. They preferred their respective local varieties. So, none of the advanced lines was recommended for PVT.	Premium quality rice variety will satisfy the growing demand of consumers and exporters. On the other hand, farmers will be economically benefited by getting the high market value of PQR grains.
	1.7 ALART (PQR), Boro 2015 Three advanced lines along with BRRI dhan50 and BRRI dhan63 were evaluated in twelve locations of Bangladesh. Among the tested genotypes, BR7781-10-2-3-2 gave the highest yield. Considering grain yield, growth duration, grain size, phenotypic acceptance and farmers' opinion, BR7781-10-2-3-2 was recommended for PVT.	Information gained from this ALART will be used to design the next experiment of ALART for micronutrients (Zn) enrich variety. This type of variety is essential for nutritional status of our children and pregnant women, especially who are suffering from Zn deficiency.
	1.8 ALART (Micronutrient), Boro 2015 Three micronutrient enrich advanced lines along with BRRI dhan28 and BRRI dhan64 were evaluated in twelve locations of Bangladesh.In terms of grain yield and growth duration, none of the advanced lines was found suitable compared to check varietiesConsidering all required characteristics, none of the advanced lines was recommended for PVT.	Short duration variety of rice is very much essential in all rice growing seasons of Bangladesh. In the area where farmers cultivate boro rice after harvesting rabi crops will be economically benefited by getting the early harvest of short duration variety.
	1.9 ALART (Short duration), Boro 2015 One advanced lines along with BRRI dhan28 and BRRI dhan45 as checks were evaluated in twelve locations of Bangladesh where farmers used to cultivate rabi crops after boro harvest.Considering several aspects, NERICA Mutant was recommended for	Information gained from this ALART will be used to design the next experiment of ALART for Cold Tolerant.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	PVT. 1.10 ALART (Cold Tolerant), Boro 2015 Three cold tolerant advanced lines along with BRRI dhan28 and BRRI dhan36 as checks were evaluated in nine cold prone areas of Bangladesh where seedling is stunted with yellowish leaf color at seedbed and transplanting is delayed due to cold spell. The tested lines gave higher yield than the check varieties, BRRI dhan28 and BRRI dhan36. But the growth duration of the lines was much higher than the checks. Considering grain yield, growth duration, grain type, disease reaction, phenotypic acceptance and farmers' opinion, none was recommended for PVT.	
	Project_2: Dissemination of Technologies	
	Seed Production and Dissemination Program (SPDP) were conducted under different funding sources during 2014-15.	Wide dissemination of BRRI varieties may be expected throughout the country.
	2.1 BRRI Core Program 2.1.1 SPDP, T. Aus, 2014 SPDPs were conducted in 28 upazilas of 14 districts (Sherpur, Faridpur, Jessore, Rajshahi, Naogaon, Bogra, Dinajpur, Thakurgaon,Sylhet, Moulovibazar, Comilla, Rangamati, Chittagong and Cox,s Bazar) under GOB. BRRI dhan48 and BRRI dhan55 were used as varieties in that program. Demonstration plot size was 1 bigha for BRRI dhan48 and 2 bighas for BRRI dhan55 in each upazila. Total production of BRRI dhan48 and BRRI dhan55 were 16363 kg and 30289 kg respectively from which 2502 and 1744 kg were retained by the farmers as seeds for next year use. About 4725 farmers acquired awareness and knowledge about the	Wide dissemination of these short duration Aus varieties may be expected in those areas.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	varieties. Around 865 farmers were motivated and showed their interest to cultivate the varieties in next Aus season. 2.1.1 SPDP with USG, T. Aman, 2014. SPDPs with USG were conducted in 24 upazilas of 12 districts (Rajbari, Khulna, Bagerhat, Jessore, Chapainawbgonj, Dinajpur, Gazipur, Comilla, Sylhet, Rangamati, Chittagong and Cox's Bazar) under GOB core program. Nine modern rice varieties (BRRI dhan38, BRRI dhan41, BRRI dhan46, BRRI dhan49, BRRI dhan53, BRRI dhan54, BRRI dhan57, BRRI dhan62 and BRRI hybrid dhan4) were used. A total of 37593 kg grains were produced from all demonstrated plots and 7715 kg quality seeds were retained by the farmers for next year use. A total of 5583 farmers gained awareness and knowledge and 910 farmers were motivated and showed their interest to practice these technologies in next year. 2.1.2 SPDP with USG, Boro, 2015. SPDPs with USG were conducted in 14 upazilas of 10 districts (Gopalganj, Rajbari, Khulna, Sherpur, Netrokona, Kishoreganj, Brahman Baria, Rangamati and Cox's Bazar) under GOB. Seven modern rice varieties (BRRI dhan47, BRRI dhan50, BRRI dhan58, BRRI dhan59, BRRI dhan63, BRRI hybrid dhan2 and BRRI hybrid dhan3) were used. A total of 37,320 kg grains were produced from all demonstrated plots and 8210 kg quality seeds were retained by the farmers for next year use. A total of 4741 farmers gained awareness and knowledge and about 1056 farmers were motivated to practice the technologies in next year.	Wide dissemination of these Aman varieties may be expected in those areas. USG was found useful for efficient use and management of N fertilizer and it will help farmers in saving urea fertilizer. Wide dissemination of these Aman varieties may be expected in those areas. USG was found useful for efficient use and management of N fertilizer and it will help farmers in saving urea fertilizer.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	2.2 Integrated Agricultural Productivity Project (IAPP) 2.2.1 Seed Production and Dissemination Prorgam (SPDP) under IAPP 2.2.1.1 SPDP, T. Aus 2014. SPDPs were conducted in 14 upazilas of 7 districts (Barisal, Jhalokathi, Patuakhali, Borguna, Kurigram, Nilphamari and Lalmonirhat). BRRI dhan48 and BRRI dhan55 were used in both Barisal and Rangpur regions. Total production of BRRI dhan48 and BRRI dhan55 were 7059 and 12661 kg respectively from which 2140 and 1272 kg were retained as seeds by the farmers for next season cultivation. About 2390 farmers gained awareness and knowledge about the varieties and 627 farmers were motivated to practice the technologies in next year.	Wide dissemination of these short duration Aus varieties may be expected in those areas.
	2.2.1.2 SPDP with USG, T. Aman 2014. SPDPs with USG were conducted in 14 upazilas of 7 districts (Barisal, Jhalokathi, Patuakhali, Borguna, Rangpur, Nilphamari, and Lalmonirhat). BRRI dhan41, BRRI dhan44, BRRI dhan49 and BRRI dhan52 were used in Barisal region while BRRI dhan49, BRRI dhan56, BRRI dhan57 and BRRI dhan62 were used in Rangpur region. Total production of all varieties in Barisal region were 18392 kg in 8 upazilas from which 2677 kg was retained as seeds by the farmers for next season cultivation. A total of 2302 farmers gained awareness and knowledge about the varieties and about 532 farmers were motivated to cultivate the varieties. In Rangpur region a total of 32431 kg grains were produced from which 4702 kg were retained as seeds. Total 3933 farmers gained awareness and knowledge about the varieties and 1082 farmers were	Wide dissemination of these T. Aman varieties and USG application may be expected in Barisal and Rangpur region of Bangladesh. USG application was found suitable for efficient use and management of N fertilizer and it will help farmers in saving urea fertilizer.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	motivated to adopt the technologies in Rangpur region.	
	2.2.1.3 SPDP with USG, Boro 2015. SPDPs with USG were conducted in 6 upazilas of 6 districts (Borguna, Jhalokathi Patuakhali, Nilphamari, Lalmonirhat and Kurigram). BRRI dhan47, BRRI dhan55 and BRRI dhan61 were used in Barisal region while BRRI dhan50, BRRI dhan58 and BRRI dhan59 were used in Rangpur region. In Barisal region, a total of 6525 kg grains were produced from those 3 varieties and farmers retained 679 kg seeds for next season cultivation. About 579 farmers acquired awareness and knowledge about the varieties and 139 farmers were motivated to cultivate the varieties. In Rangpur region a total of 5157 kg grains were produced from those 3 varieties and farmers retained 495 kg seeds for next season cultivation. About 510 farmers gained awareness and knowledge about the varieties and some 136 farmers were motivated to cultivate these varieties.	Wide dissemination of these Boro varieties and USG application may be expected in Barisal and Rangpur region of Bangladesh. USG application was found suitable to save urea and to reduce cost of cultivation.
	2.2.2 Adaptive trials under IAPP 2.2.2.1 T. Aus 2014 in Barisal region: Four adaptive trials were conducted in 4 upazilas of 4 southern districts (Barisal, Jhalokathi, Patuakhali and Borguna). BR24, BRRI dhan27, BRRI dhan48, BRRI dhan55 and local checks (Mala, Suryamoni and Gota IRRI) were used with three replications. Based on overall performance BRRI dhan48 was found as the most suitable in Barisal region.	BRRI dhan48 was indified as the suitable T. Aus variety for Barisal regions. Farmers will be benefitted by cultivating this variety.
	2.2.2.1 Adaptive trials, T. Aman 2014 in Barisal and Rangpur regions under IAPP Seven adaptive trials were conducted in 7	BRRI dhan41 were found suitable to cultivate in the Barisal region and local popular variety Swarna was found as the most popular variety and thereafter BRRI dhan49 and BRRI dhan62 in Rangpur region. Farmers will be benefitted by cultivating

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	upazilas of 4 southern and 3 northern districts. The southern districts were Barisal, Jhalokathi, Patuakhali and Borguna and the northern districts were Nilphamari, Lalmonirhat and Kurigram. BRRI dhan41, BRRI dhan44, BRRI dhan49, BRRI dhan52 and local check (Jafor IRRI, Sadamota etc.) were used in Barisal region and BRRI dhan49, BRRI dhan56, BRRI dhan57, BRRI dhan62 and local check (Swarna, Bina dhan-7) were used in Rangpur region with three replications. Based on grain yield, growth duration and overall performance BRRI dhan41 was found suitable to cultivate in Barisal region and local popular variety Swarna was found as the most popular variety and thereafter BRRI dhan49 and BRRI dhan62 in Rangpur region. 2.2.2.2 Adaptive trials, Boro 2015 under IAPP Sixteen adaptive trials were conducted in 8 districts of Barisal and Rongpur regions under IAPP during Boro 2015. Southern districts were Barisal, Jhalokathi, Patuakhali and Barguna and the northern districts were Rangpur, Nilphamari, Lalmonirhat and Kurigram. BRRI dhan47, BRRI dhan55, BRRI dhan58, BRRI dhan59, BRRI dhan61 and Bhajan (local check) were used in Barisal region while BRRI dhan29, BRRI dhan50, BRRI dhan55, BRRI dhan58, BRRI dhan59 and BRRI dhan28 (Farmer's seed as local check) were used in Rangpur region. Based on grain yield and growth duration and farmer's choice BRRI dhan58 and BRRI dhan47 were found suitable for Barisal region and BRRI dhan58 and BRRI dhan50 would be suitable for Rangpur region.	suitable varieties in those respective locations. Suitable Boro varieties were identified for Barisal and Rangpur regions. Farmers will be benefitted by cultivating suitable varieties such as BRRI dhan58 & BRRI dhan47 in Barisal region and BRRI dhan58 & BRRI dhan50 in Rangpur region of Bangladesh.
	2.3 Mujibnagar Integrated Agricultural	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	Development Project (MIADP) 2.3.1 SPDP, T. Aus 2014. : SPDPs were conducted in 19 upazilas of 4 districts (Kushtia, Meherpur, Chuadanga and Jinaidah) using BRRI dhan48 and BRRI dhan55. Total grain production was 12598 kg from which farmers retained 2335 kg seeds for next season cultivation. About 1309 farmers gained awareness and knowledge about BRRI dhan48 and 676 farmers were motivated to cultivate in the next year. Again for BRRI dhan55, total grain production was 22731 kg from which farmers retained 2565 kg seeds for next year cultivation and 583 farmers were motivated. 2.3.2 SPDP, T. Aman 2014. SPDPs were conducted in 19 upazilas of 4 districts (Kushtia, Meherpur, Chuadanga and Jinaidah) using BRRI dhan49, BRRI dhan56 and BRRI dhan62. Combining all varieties total grain production was 42329 kg from which 7265 kg was retained as seeds, total knowledge sharing farmers were 4832 and motivated farmers were 2052. 2.3.3 SPDP with USG, Boro 2015. SPDPs were conducted in 12 upazilas of 4 districts using BRRI dhan50, BRRI dhan58 and BRRI dhan59. Combining all varieties total grain production was 30488 kg from which 5052 kg was retained as seeds, total knowledge sharing farmers were 4491 and motivated farmers were 2915.	Wide dissemination of BRRI dhan48 and BRRI dhan55 may be expected in those areas. Farmers will be benetifited by cultivating those varieties in T. Aus season in those areas. Wide dissemination of BRRI dhan56, BRRI dhan62 and BRRI dhan49 may be expected in those areas. Farmers will be benetifited by cultivating those varieties in T. Aman season in those areas. Wide dissemination of these Boro varieties may be expected in those areas. USG was found useful for efficient use and management of N fertilizer and it will help farmers in saving urea fertilizer.
	2.4 Enhancing Quality Seed Supply Project (EQSS) 2.4.1 Quality Seed Production and Dissemination Program (QSPDP), T. Aman	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	2014. QSPDPs were conducted in 10 upazilas of 6 districts. BRRI dhan49, BRRI dhan56, BRRI dhan57 and BRRI dhan62 were used in each upazila and total production were 6722, 6084, 6010, 5481 kg and retained seeds by the farmers were 1275, 795, 670 and 650 kg respectively. A total of 955, 750, 594 and 637 farmers gained awareness and knowledge about those varieties and about 524, 357, 304 and 344 farmers were motivated to cultivate those varieties. 2.4.2 QSPDP, Boro, 2015. QSPDPs were conducted in 10 upazilas of 5 districts. BR16, BRRI dhan50, BRRI dhan55 and BRRI dhan58 were used in each upazila and total production were 8206, 7979, 8434 and 9317 kg and retained seeds by the farmers were 940, 750, 1165 and 935 kg respectively. A total of 357, 410, 391 and 364 farmers were motivated to cultivate those varieties.	Wide dissemination of these T. Aman varieties may be expected in those areas. Farmers will be benetifited by cultivating those varieties in T. Aman season in those areas. Wide dissemination of these Boro varieties may be expected in those areas. Farmers will be benetifited by cultivating those varieties in Boro season in those areas.
	Project- 3	
	Farmers' training and promotional activities	
	3.1. Farmers training during 2014-15 A total of 28 farmers' training was conducted under different programs in which 930 trainees (844 farmers and 86 DAE personnel) participated. 3.2. Field Day/ Farmer's Rally ARD conducted 75 Field days at different locations of the country under different projects and GOB during the reporting period. A total of about 12350 persons participated in those occasions.	Farmer's knowledge and skill in modern rice cultivation technologies will be increased. Farmers were motivated to adopt improved rice production technologies.
	Project_4	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	Enrichment of own seed stock	
	4.1. Production of quality seeds of BRRI released recent varieties during 2014-15 A total of 4050 kg quality seeds of the current rice varieties were produced at BRRI farm, Gazipur for adaptive trials in different locations of the country in Aus, Aman and Boro seasons.	Farmer will get the quality seeds of the latest BRRI released varieties. This is an effective way for quick dissemination of newly released varieties among the farmers.

Training Division

Research Achievement 2014–2015

	Technology Developed	**How country /Farmer/User will be benefited**
I	1. Capacity Building and Technology Transfer Through Training	Knowledge and skill of the trained personnel on the subject matters were increased.
	Total training conducted : 74 No. of participants : 1,249 Duration: 1 day to 1 week Participants: Extension personnel of DAE, GO/NGO officers and scientists of BRRI	1. Knowledge and skill of the participants on rice production technologies were enriched. 2. Rice yield and production of the country will be increased.

BRRI Regional Station Comilla

Research Achievement 2014-2015
(Technology Development)

Sl. No.	**Technology Developed**	**How country/ Farmer/ User will be benefited**
	None	

BRRI Regional Station Barisal

Research Achievement 2014-2015
(Technology Developed)

Sl no.	Research Achievement/ Technology Developed	How Country/Farmer /User will be benefited
1	A total number of 1016 seeds were produced from 12 crosses. Five out of 12 F_1's were selected and confirmed. A total number of 90 plants from F_2 population, 67 plant progenies from F_3 progenies and 51 plant progenies from F_7 population were selected.	Better genotypes developed would lead to new variety.
2	Total 15 uniform and homogeneous lines were selected in observational trial (OT). On the basis of yield and seedling height, 6 entries from PYT1 and 2 from PYT2, 7 from SYT and 4 from AYT were selected for further evaluation.	Better genotypes developed would lead to new variety.
3	In the proposed variety trial for salt tolerant line IR7861-B-SATB1-28-3-24, Zn enriched line BR7528-2R-19-HR10, rainfed lowland rice BR7622-5-1-1-1 and BR7472-16-2-1-2-3, and PQR line BR7357-11-2-4-1-1 produced higher yield than their corresponding check variety during Aman2014. In Boro 2014-15, Zn enriched line BR7671-37-2-2-3-7 and BR7833-11-1-1-2-1-2B5 produced higher yield than their corresponding check variety and growth duration of those advanced lines was 2 to 8 days shorter than that of the check variety BRRI dhan64.	Better genotypes developed would lead to new variety.
4	Three ALART were conducted in farmers' field out of those, BR7781-10-2-3-2 from premium quality, BR7833-11-1-1-3-4 from micronutrient and NERICA Mutant were selected for proposed variety trial.	Better genotypes selected which lead to new variety.
5	Higher disease incidence (DI) and disease severity (DS) of blast were observed in Boro 2014-15 (33.9% and 3.3, respectively) than those of T. Aman 2014 (16.2% and 1.7). Maximum 70% DI and 7 DS on Kumragoir was recorded during T. Aman while maximum 90% DI and 9 DS on BRRI dhan61 were recorded during Boro in Barisal region. Trooper 75WP and Nativo performed better in reducing (about 80%) leaf and neck blast disease incidence over control at farmers' field under natural field condition.	Efficient management practices for blast disease was established
6	The rainwater harvest technique was found efficient to stabilize the yield of T.Aman rice in drought prone areas. The mean grain yield was increased by 5.09% under researcher managed plots compared to farmers' managed plots.AWD method saved 15.23% to 31.06% irrigation water depending on the soil texture. It also saved about 22.68 % irrigation cost over the farmers' practice when using diesel operated LLP during Boro season. Three to four supplemental irrigations at early stage increased yield up to 18% compared to farmers' practice in Aus. Average water productivity also increased marginally from 0.42-0.43 kg/m^3 following researcher managed practice.	Irrigation water and cost would be saved
7	BRRI developed HYV of rice viz. BRRI dhan43, BRRI dhan44, BRRI dhan48, BRRI dhan49, BRRI dhan53, BRRI dhan54, BRRI dhan59, BRRI dhan60, BRRI dhan62, BRRI dhan64 were demonstrated in farmers' field in view to popularize those variety in Barisal region under IAPP, PGB-	Dissemination of new varieties in the farmers field leading to higher

	IADP, Harvest Plus and EQSS projects.	productivity achieved
8	A total of 5.92 ton breeder seed in T. Aman and 18.50 ton breeder seed in Boro were produced.	Farmers would get seeds of new varieties

BRRI Regional Station Sonagazi

Research Achievement 2014-15
(Technology Developed)

Sl. No	(Technology Developed)	How Country/Farmer/User will be benefited
	No Technology was developed during 2014-15	Not applicable

BRRI Regional Station Rajshahi

Research Achievement: 2014-2015
(Technology Development)

Technology Developed	How country /Farmers/Users will be benefited
1. Provided major contribution in development of BRRI dhan66, BRRI dhan69 and BRRI dhan71 BRRI dhan66 and BRRI dhan71 are drought tolerant variety. BRRI dhan69 is a input saving variety	By cultivating these drought tolerant varieties, farmers of drought prone areas may get higher yield comparing with other traditional varieties. Fertilizer use may reduce by 20% through cultivating BRRI dhan69.
2. **Development of seed germination technique in cold environment 'Ankuri'** **"ANKURI"** is a successful seed germinating technology. In this method a frame with a heat insulating cover is prepared where 25-35^0 C temperature and high humidity is induced through vapor therapy. Seeds are soaked in a pot for 22-24 hours within the frame. After soaking, water is	Rice seed germination in low temperature is a challenge during Boro season especially in Northern Region. Low seed germination or germination failure is a general scenario due to poor maintenance of proper temperature and humidity

poured from the pot. All seeds are then filled in a sac and covered with another moist sac or cloth. After 24 hours seeds are sprouted completely and become ready for sowing in the seed bed after another 12 hours.	after seed soaking in the traditional Zag-method. By using this method farmers can be easily benefited.
3. Profitable conservation tillage specially power tiller operated strip tillage and bed planting technology under rice-maize-mungbean system. Cost of cultivation was reduced by 25% and gross margin was increased by 10% with these conservation tillages under rice-maize-mungbean system.	Profitability of farmers will be increased

BRRI Regional Station Satkhira

Research Achievement 2014-15
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benifited
	None (Technologies are developed centrally, from BRRI Gazipur)	-

BRRI Regional Station Rangpur

Research Achievement 2014-15
(Technology Developed)

Sl. No.	Achievements	How Country/Farmer/User will be benefited
1	For the development of submergence and medium stagnant water tolerant variety with improved plant type a total of 54 progenies from F_2 population, 14 PS from BC_1F3 population, 73 PS from F_3 generation, 42 PS from F_4 generation, 48 from F_5 generation, 63 PS from F_6 generation, 27 PS from F_7 generation, 12 PS from F_8 generation and 14 bulks from F_8 generation were selected in T. Aman season.	New submergence tolerance T. Aman varieties will be developed for Rangpur region
2	Potato (Cardinal) - Mungbean (BARI 6) - T. Aus (BRRI dhan48) - T. Aman (BRRI dhan62) gave the highest rice	These two cropping patterns are profitable and

	equivalent yield (yearly total= 30.1 t ha^{-1}) with highest economic return followed by Farmers' improve practice: Potato (Cardinal) - Maize (NK40) - T. Aman (BR11) (yearly total= 23.4 t ha^{-1}).	recommended for practicing in medium high land in Rangpur region.
3	BRRI dhan48 showed better performance in respect of farmer's preference and grain yield potential in most of the demonstrations and field trials (IAPP) during T. Aus season. It gave higher grain yield compared to BRRI dhan28 in late Boro condition after potato and tobacco harvest.	Farmers will get higher yield with rapid dissemination of BRRI dhan48 in Rangpur region
4	BRRI dhan52 showed better performance in respect of submergence tolerance, farmer's preference and grain yield potential in most of the demonstrations and field trials (Integrated Agricultural Productivity Project, Enhanced Quality Seed Supply Project) during T. Aman season.	Farmers will get higher yield with rapid dissemination of BRRI dhan52 in submergence prone areas of Rangpur region
5	IAPP activities in Rangpur region created significant impact in variety development (short duration, submergence, drought and favorable Boro) and technology dissemination (newly released rice varieties and DSR) during T. Aus, T. Aman and Boro season.	Farmers' income will be increased by adopting suitable HYV & technology
6	In Boro, BRRI dhan58 showed better performance in respect of grain yield and it creates farmers interest to cultivate in larger area in this region (Demonstration activities of EQSSP and varietal trial of IAPP).	Farmers of Rangpur have got suitable alternative of BRRI dhan28
7	For the purpose of quality seed production and dissemination at farmers' level, a total of 3857 kg TLS and 4318 kg Breeder seed was produced during T. Aman and 5717 kg TLS and 4290 kg Breeder seed was produced during Boro season.	National seed demand will be meet up to some extend

BRRI Regional station Bhanga

Research Achievement 2014-2015

(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benifited
	None	-

BRRI Regional Station Habigang

Research Achievement 2014-15
(Technology developed)

Sl No.	Technology developed	How Country/ Farmer/User will be benefited
1	High yielding with short duration advanced line BRH11-9-11-4-5B has been developed for flood prone haor	Farmers can save crop from early flash flood in haor areas by using this .high yielding (7.5 t/ha) line which 7-

	areas in Boro season.	10 days earlier than BRRI dhan29.
2	Advanced line BR9390-6-2-2B and BR10260-2-19-2B have been developed for shallow flooded deep water areas.	Farmers of shallow flooded deep water areas will get more yield (4.0 - 4.5 t/ha) than local deep water rice.
3	Advanced line BR7178-2B-19 has been developed for direct seeding in Aus season	Farmers will get early (90-100 days) and high yielding direct seeded rice variety.
4	Integrated nutrient management as a tool for reducing fertilizer cost.	Farmers able to save 50% chemical fertilizers cost by using cowdung @ 2 t/ha.
5	Double transplanting of Boro rice is a good technology for escaping flash flood in haor areas.	Double transplanted rice matured earlier (7-10 days) than normal transplanted rice. It saved Boro rice from early flash-fiood in haor areas without sacrificing yield.

BRRI Regional station Kushtia

Research Achievement 2014-2015

(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/User will be benifited
	None	-