Research Achievement 2015-2016

Plant Breeding Division

Technology Developed	How Country/Farmer/User will be benefited
Program Area: Varietal Development program (VDP)	
1 Rice Breeding	
BRRI dhan70: National Seed Board (NSB) of Bangladesh approved BRRI dhan70 as a rice variety for *T. Aman* season. BRRI dhan70 has 4.8- 5.0 t/ha grain yield with 130 days growth duration. BRRI dhan70 has long slender type grain with colored tip and pointed awn. Rice grain is premium quality and aromatic type. 	Premium quality and aromatic rice production will be increased in areas of the country in *T. Aman* season.
BRRI dhan71 : BRRI dhan71 was released as drought tolerant HYV variety for T. Aman season. It can produce about 0.5-1.01.0 t/h higher yield than BRRI dhan56 with similar growth duration. 	It is a high yielding drought tolerant variety. Farmers of drought prone areas will be benefited.

BRRI dhan72 (BR7528-2R-19-HR10); Zinc enriched T. Aman variety: BRRI dhan72 was released in 2014. It is Zinc enriched rice variety for T. Aman season and 3-7 days late than BRRI dhan39 but showed approximately 1.20 t/ha higher yield than BRRI dhan39. Broad flag leaf, tall in plant height and long bold grain, minor awn in some grains at the top of the panicle.  	It is a high yielding (5.7 t/ha) rice variety with 125-130 days growth duration. It has long-bold grain and contains 22.8 mg/kg Zn in polished rice.
BRRI dhan73: National Seed Board (NSB) of Bangladesh approved BRRI dhan73as a salt tolerant rice variety for *T. Aman* season. BRRI dhan73 has 3.5- 6.0 t/ha grain yield depending on salinity level with 125 days growth duration. It can tolerate 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 *T. Aman* season.
BRRI dhan74 (BR7671-37-2-2-3-7); Zinc enriched Boro variety: BRRI dhan74 was released in 2014. It is Zinc enriched rice variety for Boro season and 4-5 days early than BRRI dhan64 but showed approximately 1.00 t/ha higher yield than of BRRI dhan64. Medium bold grain, strong plant type, lodging tolerant, moderately resistant to blast.  	It is a high yielding (7.1 t/ha) rice variety with 145-147 days growth duration. It has medium bold grain and contains 24.2 mg/kg Zn in polished rice.

BRRI dhan75 : (HUA565) was released as variety for T. Aman season. It can produce about 1.0 t/h higher yield than BRRI dhan33 with similar growth duration.  	It is a high yielding rice variety with short duration. It can be grown after harvesting T Aus or Jute. This variety can increase cropping intensity and will fit into four crop model.
BRRI dhan76: National Seed Board (NSB) of Bangladesh approved BRRI dhan76 as variety for T. Aman season. This variety can produce up to 5 ton/ha yield in tidal non saline wetland condition.  	Rice production will be increased in the tidal non saline wetland areas of the country in *T. Aman* season.
BRRI dhan77: National Seed Board (NSB) of Bangladesh approved BRRI dhan77 as variety for T. Aman season. This variety can produce up to 5 ton/ha yield in tidal non saline wetland condition.  	Rice production will be increased in the tidal non saline areas of the country in *T. Aman* season.

Biotechnology Division
Research Achievement 2015-2016

Sl. No.	Technology Developed	How country/ Farmer/ User will be benefited
1	Thirty one, 21, 23, 26, 40 and three green plants were regenerated from the hybrid anthers of BRRI dhan29/Kanaklata, MR219/Kanaklata, MR219*^{4}/BR16, Kanaklata/MR219, BRRI dhan50/Bashful, BR8072-AC5-4-2-1-2-1\ NERICA7 cross, respectively.	This line will be used for developing high yielding, low glycemic index and premium quality rice variety that ultimately benefits the farmers.
2	During T. Aman/2016, six doubled haploids were evaluated with standard checks in a PYT and three lines were selected for further evaluation. During Boro/2016-17, 14 lines were evaluated with standard checks in a PYT. Seven lines were selected for SYT.	These lines will be used to develop short duration and high yield new rice variety that ultimately benefits the farmers.
3	During Boro/2016-17, seven lines developed from QTL mapping population of BRRI dhan29/IR4630-22-2-5-1-3) were evaluated. Four lines were selected for RYT.	These lines will be used to develop high yield Boro rice variety that ultimately benefits the farmers
4	During T. Aman 2016, two lines developed from QTL mapping population of BRRI dhan29*^{3} / *O. rufipogon* (Ac. No. 103404) cross were evaluated as ALART. One line was selected for PVT	These lines will be used to develop high yield T. Aman rice variety that ultimately benefits the farmers.
5	During Boro, 2016-17, four materials developed from QTL mapping population of BRRI dhan28*^{3} / *O. rufipogon* (Acc. no. 105890) cross were evaluated a s RYT. Two lines were selected for ALART	These lines will be used to develop short duration and high yield Boro rice variety that ultimately benefits the farmers.
6	Four materials developed from QTL mapping population of BRRI dhan29*^{3} /*O. rufipogon* (Acc. no. 103404) cross were evaluated as ALART. One line was selected for PVT	These lines will be used to develop high yield Boro rice variety that ultimately benefits the farmers.
7	Five Bacterial Blight resistance gene pyramided BRRI dhan29 rice lines having *Xa4* and *Xa21* were evaluated as RYT and among them three lines were selected. Twenty one Bacterial Blight resistance gene pyramided BRRI dhan28 lines having *Xa4*, *xa13* and *Xa21* were evaluated as observational yield trial and among them nine lines were selected depending on the phenotypic acceptability, yield, growth duration and molecular confirmation.	These lines will be used to developed bacterial blight resistant variety that ultimately benefits the farmers.
8	For the gene cloning study, *Porteresia coarctata* plants were treated with 100 mM NaCl salt for seven days. cDNA were synthesized from RNA of *P. coarctata* and *DREB1* genes were isolated.	Salt tolerant transgenic rice variety will be develop that ultimately benefits the farmers

GRS Division

Research Achievement 2015-2016

(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 fifty two rice germplasm including Jhum varieties were collected from different districts of Bangladesh.	These germplasm would be utilized in breeding program for varietal improvement.
3.1.2	**Morphological Characterization:** Characterization of 188 accessions was performed against 53 morpho-agronomic characters. Rejuvenation and conservation of 2,395 accessions were completed and 37 new germplasm were registered (from accession 8045 to 8081) in BRRI Genebank.	Characterized and as well as conserved germplasm would be utilized in trait specific breeding program.
3.1.3	**Molecular characterization:** Molecular characterization of 31 Aus germplasm was completed using 36 SSR and 11 ILP (intron length polymorphism) markers for varietal protection.	Characterized germplasm would be protected regarding varietal identification and intellectual property rights (IPR's).
3.1.3	**Evaluation against biotic and abiotic stresses:** Tepi Boro, Kali Boro, Natel Boro, Shita Boro, Panpiaz, Laldinga, Rata, Sada Boro, Lal Boro and Lara were identified as highly heat tolerant (>80% fertility) Boro rice germplasm.	Highly heat tolerant germplasm could be utilized as parents in resistant breeding program.
3.2	**Seed production and variety maintenance:** During reporting year, 177.71 tons of Breeder seed were produced and 149.44 tons of Breeder seed were distributed among 906 (GO, NGO and PS) 'Rice Seed Network' partners. Again, 1,544 kg of quality seed were distributed.	Faster dissemination of produced quality seed, as well as its variety to the end users and increased production of rice accordingly.
3.3	**Exploratory and genetic studies:** Genetic diversity was pronounced in 50 Aus germplasm on the basis of 15 morpho-agronomic characters and the varieties were grouped into five clusters.	The genetic variability and relationships i.e. genetic makeup of the studied germplasm could be well understood.
	Molecular diversity and DNA fingerprinting regarding IPR's of 50 Aus germplasm and 26 BRRI varieties were performed using 50 and 52 SSR markers respectively.	Characterized germplasm would be protected regarding varietal identification and intellectual property rights (IPR's).

Hybrid Rice Division

Research Achievement 2015-2016

(Technology Developed)

Sl. No	Technology Developed	How country/farmer/user will be benefited
01.	A total of 3395 kg of parental lines (A & R) and hybrid seeds of five released hybrid varieties distributed to 13 seed companies along with 40 farmers	Popularization of BRRI released hybrid varieties.
02.	One potential hybrid combination (BRRI7A/BRRI31R) has released as BRRI hybrid dhan5 for Boro season having long bold grain with yield potentiality 8.0-8.50 t/ha and growth duration within 145 days. It is released for cultivation all over Bangladesh. Another potential hybrid rice combination 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 & 2nd year evaluation but result yet not published	Newly released BRRI hybrid dhan5 has immense yield potentiality with desirable grain quality will fulfill farmers demand
03.	One promising combination (IR75608A/BRRI31R) was selected for T Aus season having slight aroma with excellent grain quality and good seed production potentiality from Preliminary Yield Trials. This combination will be tested under National Hybrid Rice Yield Trials (NHRYT) in upcoming Aus season	New hybrid combination having aroma with desirable grain quality, high yield and duration will fulfill farmers demand in T Aus season
04.	Two promising restorer lines (BR7358-36-2-2-1R & BR7881-25-2-3-12R) 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

GQN Division

Research Achievement 2015-2016

(Technology Developed)

Sl. No.	Technology Developed	How Country/farmer/user will be benefited
1.	Newly developed 226 breeding lines were evaluated for superior grain quality based on physicochemical properties. We recommended 9 lines for further advancement.	Breeders
2.	Among the Boro varieties, 33 BRRI HYVs were analyzed for mineral profiling of zinc, iron, calcium and phosphorus content at the level of $mgkg^{-1}$ by AAS (Atomic Absorption Spectrophotometer) to explore mineral composition.	Breeders
3.	In order to assess the effect of differently processed rice, we found that glycemic index (GI) of unparboiled milled rice reduces towards parboiled milled rice then pressure parboiled milled rice then double per boiled milled rice and the lowest is in the brown rice.	Consumer
4.	Six rice varieties were found field grown and characterized for physicochemical traits in relation to popping ability. BRRI dhan28 recorded the highest percent popping (55%).	Consumer
5.	Among the rice cultivars glutelin had the highest amount but prolamin had the lowest amount of protein fraction. Albumin was significant and positive correlated with protein content of rice cultivars.	Consumer

Agronomy Division

Research Achievement 2015-2016

(Technology Developed)

Sl. No.	**Technology Developed**	**How Country/Farmer/User will be benefited**
01.	**Shallow DWR+ Fish mixed culture: A promising technology for utilization of Fallow land in Aman season of Gopalganj area** Existing Cropping Pattern: Boro – Fellow – Fellow Proposed Cropping Pattern: Boro (HYV) – Aman (Bashiraj) + Fish Fish: Ruhi, Mrigal, Telapia, Silver carp, Sorputi, Katla	Farmers can be benefited with Proposed Cropping Pattern of Boro (HYV) - Aman (Bashiraj) + Fish. In this pattern net return will be Tk. 72322 ha^{-1}. So farmers as well as country will be benefited if they practice this cropping pattern with BCR of 1.68 in Pirojpur-Gopalganj and Bagerhat area.

	Net return= 58395 Tk ha^{-1}, BCR = 1.65 Average fish yield 992 kg ha^{-1} Average rice (Bashiraj) yield : 2.75 t ha^{-1}	
02.	**Application of USG: A potential technology for N- management of short duration variety in rainfed condition** Season: T. Aman, Variety: BRRI dhan62 N dose as urea: USG (110 kg), Prilled urea (150 kg), Farmers dose (180 kg), Control (0 kg) Technology adoption area: Drought prone NW area Urea save: 27% , Yield increase: 15%	Application of USG just after transplanting (2-3 DAT) in short duration varieties in NW Bangladesh, farmers can save 27% urea without sacrifice yield.
03.	**Agronomic package for drought tolerant (BRRI dhan56 and BRRI dhan57) and short duration (BRRI dhan62) varieties in Rangpur region** a. Using less than 25 days old seedling b. Two seedlings per hill c. Spacing should be 20 × 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.	If farmers follow the prescribed agronomic packages, they can obtain additional 1 ton 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' affected people during Monga time.

Plant Physiology Division
Research Achievement 2015-16

Sl. No.	Technology/Useful Scientific Information	How Country/Farmer/User will be benefitted
1	**IR77092-2R-B-10** was found tolerant having yield reduction 43.8% to the applied stress 8 dS/m, however the actual salinity remain 5.8 dS/m in saturation paste extract released as BRRI dhan78.	Farmer could cultivate BRRI dhan78 at medium saline prone areas.
2	Less uptake of Na^+ and maintaining a healthy ratio of K^+/Na^+ in shoot could govern the tolerance of BRRI dhan67.	This information will be helpful for the researcher.
3	Two BRRI Gene Bank germplasm **Acc. No. 1838** and **Acc. No. 4096** was identified as submergence tolerant similar to BINA dhan11 having survivability ~80% after 18 days of complete submergence.	This two germplasm could be used as a donor parent for developing submergence tolerant variety.

4	GSR genotype **HHZ15-DT4-DT1-Y1** performed better under low water condition.	This information will be helpful for the researcher as well as farmer.
5	A genotype called **Bhutan** showed better tolerance against cold stress both for seedling and reproductive stage.	This genotype could be used as a donor parent for developing cold tolerant variety.
6	**BRRI dhan54** was found most suitable for delay planting compared to BR22 and BR23 in T. Aman season.	Farmer could cultivate this variety after flash flood as late planting.
7	Bangladeshi rice germplasm could be a good source of CO_2 responsiveness useful for developing future varieties suited for higher yield in elevated CO_2 environment.	This information will be helpful for the researcher as well as farmer.

Soil Science Division

Research Achievement 2015-16

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 and NO emissions. • **Fertilizer management:** Broadcasting N fertilizer enhancesN_2O and NO emission; so broadcasting of N fertilizer should be avoided. • **Land management:** Paddy soil after transplanting should be left undisturbed as much as possible.	This technology will help in mitigating environmental pollution. Moreover, N use-efficiency could be increased by 20-25% and grain yield by about 15-20%.
Fertilizer recommendation for low input rice variety (BRRI dhan69) • Low input rice variety, BRRI dhan69 required 20% less fertilizers than recommended dose for satisfactory grain yield. • 20% less fertilizer of recommended dose e.g., 240-72-102-48-4.8 kg/ha Urea-TSP-MOP-Gypsum-$ZnSO_4$, respectively was enough for achieving the highest grain yield of BRRI dhan69.	This technology will help to cut down chemical fertilizer requirement for rice production along with reduction in greenhouse gas emission.

Irrigation and Water management Division

Research Achievement 2015-16

(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/ User will be benefited
1	**Technology: Replacing T. Aman- Boro-Fallow cropping pattern by Aman-Rabi-Braus for irrigation minimization and productivity improvement** **Benefits:** Experimental results showed that 46% higher rice equivalent yield (REY) can be achieved with 33% less irrigation water from Aman-Rabi-Braus pattern compared to the T. Aman- Boro-Fallow. **Technology implementation:** Transplantation of BRRI dhan28 or BRRI dhan48 in early March (as Braus) after harvest of Potato reduced irrigation requirement significantly compared to BRRI dhan29 (as Boro). The REY of BRRI dhan62-Potato-BRRI dhan28, BRRI dhan62-Potato-BRRI dhan48 and BRRI dhan49- BRRI dhan29-Fallow patterns were 18.00, 17.90 and 12.29 t/ha, respectively. The total irrigation requirement for the above mentioned cropping patterns were 760, 760 and 1125 mm, respectively. **Precautions:** T. Aman rice must be harvested within 1st week of November to provide the opportunity for planting Potato within 3rd week of November. This will provide opportunity to transplant 20-25 days old seedlings of Braus within 1st week of March.	This cropping pattern can be recommended for water scarce areas due to groundwater depletion. It will minimize the amount and cost of irrigation.

Plant Pathology Division

Research Achievement for 2015– 2016

(Technology Development)

Sl No.	Technology Developed	How Country/Farmer/User will be benefited
01.	Comparative study on pathogenicity of rice and wheat blast pathogen	Comparative pathogenicity test indicates that wheat blast pathogen does not infect rice plants; conversely, rice blast pathogen does not infect wheat plants.
02.	Identification of new blast races across the country	Four races of *P. oryzae* have been identified from population study. Pathologist can include these races for screening purposes to identify new blast resistant line/s.
03.	Evaluation of blast resistant	NILs of IR49830 harboring blast resistant genes

	multiline varieties of IR49830 in tidal non-saline ecosystem of Barisal	*Pish*, *Pi9, Pita-2* and *Sub-1* that showed resistance against natural rice blast incidence under tidal non-saline condition. Disease resistant multilines will be used as donors for the development of varieties.
04.	Screening for rice root knot (*Meloidogyne graminicola*) resistance (ADB Project)	Among 13 tested rice genotypes, one genotype (IR 97153-B-55) was found to be resistant against root knot nematode. Disease resistant line will be used as a donor for the development of variety.
05.	Evaluation of new chemicals against sheath blight disease of rice	Five new fungicides (Avtar, Mactivo, Novera, Bravo and Seltima) recommended for sheath blight management. Effective management of sheath blight disease will boost up rice production.
06.	Evaluation of new chemicals against blast disease of rice	Six new fungicides (Pazodi, Azox, Novera Bravo, Seltima and Azonil) recommended for blast disease management. Effective management of blast disease will increase rice yield.
07.	Management of Sheath blight disease utilizing *Trichoderma harzianum* (PGB project)	Effective management of sheath blight disease by *Trichoderma harzianum* enriched trichocompost + single spray with fungicide Nativo will enhance rice productivity as well as reduce environmental pollution.

Entomology Division

Research Achievement for 2015– 2016

Rice Farming Systems Division

Research Achievement 2015-2016

(Technology Developed)

Sl. No.	Technology Developed	How Country/ Farmer/User will be benefited
01	Maize+Potato-T. Aus-T. Aman	Rice and maize are widely cultivated in different cropping patterns in Kustia and Meherpur district. Most of these cropping patterns are three cropped cropping patterns, which in addition to the rice and maize also contain other non-rice crops. During fallow period of these cropping patterns there is still scope of inclusion of fourth crops. In Kushtia and Meherpur Sadar the highest REY was

		found from Maize+Potato-T. Aus-T. Aman cropping pattern among five tested pattern. This pattern can increase the farmers income with higher profitability and productivity.

Agricultural Economics Division

Research Achievements for 2015- 16

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 64% of area in Boro season, whereas in T. Aman season, BR11 and BRRI dhan49 were the dominant varieties that covered 19% area. In Aus season, the area coverage of BRRI dhan28 was the highest (15%) followed by BRRI dhan48 (11%) and BR26 (7%). • Among BRRI varieties, BRRI dhan29 was the top yielder in Boro (6.44t/ha) season followed by BR16 (5.90 t/ha). In T. Aman season, BRRI dhan49 ranked the top position in terms of per unit yield (5.02 t/ha) followed by BR11 (4.91 t/ha). In Aus season, BRRI dhan48 produced higher yield (4.52 t/ha) followed by BRRI dahn28 (4.51 t/ha). • Hybrids are being adopted as replacement of other MVs in Boro and Aus seasons due to higher yield performance. • Farmers faced constraints like higher wage rate and irrigation cost, lower market price of their product, non-availability of quality seeds, etc.	• Rate of adoption of modern rice varieties and its performance might assist extension agents in priority setting for varietal promotional programs. • Higher adoption of potential varieties indicated more area coverage and productivity of that variety, resulted in attaining food self-sufficiency.
1.2	**Impact of Seasonal Agricultural Credit on MV Boro Rice Cultivation in Mymensingh District** • The rice farmers had to pay about Tk. 10 for getting per 100 taka loan from Bangladesh Krishi Bank (BKB) of which official cost was only 9%. Farmers used 54% of borrowed money for Boro rice cultivation, 21% for family requirements and the rest 25% was used for other purposes.	The findings would help planners and policy makers to formulate proper guideline for disbursing agricultural credit on MVs rice production.

	• Cost of production as well as net return of Boro rice growers was higher for credit users than non-users. BCR on cash cost basis was higher for credit users (1.00) than non-users (0.94) indicating that credit borrowers were more benefited than non-borrowers. • Tips and bribes involved in loan transaction and insufficient amount of loan were the main constraint as reported by 79% and 59% farmers, respectively.	
1.3	**Estimation of Costs-Return, Factor and Income Shares of MV Rice Cultivation at Farm Level** • Rice farmers used more seed than the recommended dose irrespective of cropping season. Farmers applied mostly consistent amount of urea and TSP, but not splitting into three equal doses as per BRRI recommendation. They applied lower doses of MoP may be due to their ignorance. • MV Boro growers obtained higher yield due to better cropping environment, good management practices and use of better genotypes. However, net return was higher in Aman season due to higher market price and lower per unit costs of production compared to that of Aus and Boro. • 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 from T. Aman followed by Boro seasons among all other production participants. • There are lot of opportunities in rice production but not risk and threat free.	The findings would be more useful to planners and policy makers to decide procurement price and right amount of input subsidy provide on MVs rice production.
1.4	**A Comparative Economic Study on BRRI dhan29 and Hybrid Rice Production in Haor areas of Bangladesh** • Although, adoption rate (38 %) of BRRI dhan29 was higher than hybrid (22%), average yield of hybrid (6.45 t/ha) was higher than BRRI dhan29 (5.78 t/ha) in haor region. • The costs of production of hybrid rice (Tk 88154 t/ha) was 9% higher than BRRI dhan29 (Tk 80493 t/ha),	The result of this work might help farmers to select the right variety that would increase economic benefit.

	while the gross return of BRRI dhan29 (Tk 82,975 t/ha) was 9% higher than the hybrid varieties (Tk 76,063 t/ha). • The return to scale indicated that the farmers had opportunities to increase margin by efficient use of inputs.	
1.5	**Value Chain Analysis of Rice Bran and Bran Oil in Bangladesh: An Economic Investigation** • Rice bran oil, which is extremely light, versatile, delicious and beneficial for human health getting popularity to the consumers. Total cost of rice bran oil production (including byproducts also) was Tk. 176, 206/ton. After deducting the returns of byproducts from the total costs, cost of rice bran oil was Tk 87.02/kg. • The key problems of RBO were unavailability of adequate rice bran and lack of promotional activities. Considering the importance of rice bran oil, government should provide incentives to the millers to increase the supply of bran oil which could save huge amount of foreign exchanges.	The findings of the study will guide the policy makers, traders and other stakeholders to renovate the rice bran oil marketing system in Bangladesh.
1.6	**Impact of Farmers Training on Rice Production** • Participant farmers were significantly benefitted from adopting new technologies and production practices which ensured better yield than before training.	The study helped to find effectiveness of farmers' training on rice production.
1.7	**Social Dynamics Of Farm Household Women In The Plain And Hilly Areas Of Rural Bangladesh** • Access to assets and social perceptions are the main force that shapes the women's participation in rice farming system. • Women in the hilly region participated in the farming activities and enjoyed more flexibility about mobility than the women of non-hilly region, due to religious and social custom. However, despite the right, hilly women were not significantly empowered in decision making process than the women of the other regions of the country.	The generated information will be enormously useful in order to enhance the woman participation in the process of resource entitlement and access.

Agricultural Statistics Division

Research Achievement 2015-2016

(Technology Developed)

Technology Developed	How Country/Farmer/ User will be benefited
Name/Title of the technology: Description with photograph:	
● Stability Analysis of BRRI varieties Description: From the stability analysis of BRRI released rice varieties, it was found that in T. Aman season, BRRI dhan49 and BRRI dhan52 were found stable and in Boro season BRRI dhan29, BRRI dhan68, BRRI dhan69 and BRRI Hybrid dhan2 were the stable variety.	From the results of the analysis, researcher comes to know which variety is still stable and which variety is losing its stability that's why needs to replacement for any particular variety and set up their research strategy eventually which strength the future food security.
● Suitability mapping of newly released BRRI rice varieties Description: Suitability maps of BRRI dhan62 and BRRI Hybrid dhan4 has been prepared. Northern side of Bangladesh is suitable but south and eastern side not suitable for both BRRI dhan62 and BRRI Hybrid dhan4 cultivation	Farmers and researchers come to know the suitable area for BRRI dhan62 and BRRI Hybrid dhan4 and adobe particular variety in suitable area i.e. best use of land and maximizing production.
● Mobile Apps of "RKB" (Rice Knowledge Bank) Description: Mobile Applications (apps) are software developed for use on mobile devices and made available through app stores. This movement has also been felt in Bangladesh, over the past five years, where millions of people have begun to use smart phones and mobile apps for the first time. Hence, a mobile app has been developed by ICT Cell, Agricultural Statistics Division. This app named Rice Knowledge Bank (RKB) would be downloaded from Google play store and then can be used through Android base mobile. Through this app farmers could communicate directly to the crops specialist.	Farmers can easily come to know about newly BRRI released rice variety and its cultivation system and production, how to manage pest and can contact with the experts.

Farm Management Division

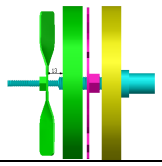
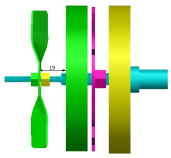
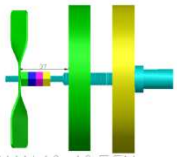
Research achievement 2015-2016

(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 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. Yield and yield components was higher in younger seedling used plot that produced more tillers and panicles.	This finding may be useful for the rice growers and researchers.
	3.3. 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 average 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 the cost of rice production and thus determine the retailer price of rice for the market.

Farm Machinery and Postharvest Technology Division

Research Achievement 2015-2016

<table>
<tr><th>Sl. No.</th><th>Technology developed</th><th>How country/farmers/user will be benefited</th></tr>
<tr><td>1.1</td><td>BRRI prilled urea applicator (PUA) for long duration variety
<table>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Impeller adjustment for long duration Boro</td><td>Impeller adjustment for medium duration Boro</td><td>Impeller adjustment for Aus/Aman</td></tr>
</table>
Fig.: Modified mechanism of BRRI Prilled urea
 
Fig.: BRRI Prilled urea</td><td>The existing prilled urea applicator was suitable for placing urea fertilizer in short to medium duration variety and maximum 180~190 kg urea can be placed by the machine. This amount of urea was not enough for long duration (more than 145 days) variety. In this regard, the existing BRRI prilled urea applicator was modified for deep placement of fertilizer for long duration Boro varieties. The gap between impeller center and release lever was found 13 mm for long duration varieties, whereas, previously it was 19 mm for medium duration Boro varieties, 37 mm for Aman or Aus varieties. It is suitable to place prilled urea in the field properly and can save about 30 -35% of prilled urea without sacrificing yield. Now farmer can apply prilled urea by this applicator for Aus, Aman and also for long duration Boro varieties as well.</td></tr>
</table>

Workshop Machinery and Maintenance

Adaptive Research Division

Research Achievement 2015-2016

(Technology Developed)

Sl. No.	Technology Developed	How Country / farmer / User will be benefited

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
1.	1. Advanced Lines Adaptive Research Trial (ALART): The Adaptive Research Division (ARD) evaluated the following fourteen sets of ALART in different agro-ecological regions of Bangladesh in different seasons during 2015-2016.	It is an important step before releasing a new variety
	1.1 T. Aus 2015. Two advanced lines along with BR26 and BRRI dhan48 as checks were tested at farmers' field in 11 locations. On an average, none of the two evaluated lines out yielded (4.00-4.35 t/ha) than the check variety BRRI dhan48 (4.58 t/ha) but both the lines gave higher yield than the check variety BR26 (3.54 t/ha). Considering grain yield, growth duration, lodging tolerance, disease infections, farmers' opinion and other necessary aspects, NERICA Mutant was recommended for Proposed Variety Trial (PVT).	Farmers will be benefitted by cultivating this variety along with BR26 and BRRI dhan48 in T. Aus season. More area will come under aus cultivation, which will contribute to sustain our food security.
	1.2 T. Aman 2015, MER (Micronutrient enriched rice). Three micronutrient enriched advanced lines along with BR25, BRRI dhan32 and BRRI dhan39 as checks were tested at farmers' field in 12 locations. Considering grain yield, grain size, grain quality, growth duration, disease reaction, phenotypic acceptance and farmers' opinion, none of the advance lines 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.
	1.3 T. Aman 2015, RLR (Rainfed lowland rice). Four advanced lines suitable for rainfed lowland along with BRRI dhan39, BRRI dhan57 and BRRI dhan62 as checks were tested at farmers' field in 11 locations. Considering grain yield, grain size, growth duration, disease reaction, phenotypic acceptance and farmers' opinion, WAS 161-B-4-B-1-TGR 51 (NERICA-L-32) was found suitable for PVT.	Farmers of rainfed lowland rice ecosystem, which covers a vast area of the country, will be benefited by using this variety. It is expected that the variety will contribute to sustain food security of the country.
	1.4 T. Aman 2015, BBR (Bacterial Blight Resistant). One advanced line resistant to bacterial blight along with BR11 and BRRI dhan31 as checks were tested at farmers'	Farmers will be economically benefited by using rice variety resistant or less susceptible to Bacterial blight, which causes huge yield loss.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	field in 11 locations. The advanced line BRC245-4-19-2-1 was found to be tolerant to Bacterial blight (BB) or very less susceptible to BB in all locations, compared to check varieties. Considering grain yield, growth duration, grain size, tolerance to BB and farmers' opinion, BRC245-4-19-2-1 was recommended for PVT.	Farmers' yield loss will be less because of submergence tolerant variety. It will be able to survive under submerged condition due to flash flood submergence.
	1.5 T. Aman 2015, FFS (Flash flood submergence). Two advanced lines tolerant to submerged condition along with BRRI dhan49 and BRRI dhan52 as checks were tested at farmers' field in 10 locations. Considering higher grain yield and shorter growth duration compared to check varieties, submergence tolerant level, grain size, the tested advance lines, BR9159-8-5-40-13-52 and BR9159-8-5-40-14-57 were recommended for PVT.	Information gained from this ALART will be used to design the next experiment of ALART for hybrid rice variety.
	1.6 T. Aman 2015, Hybrid. Two advanced lines for hybrid rice along with BRRI hybrid dhan4, BRRI dhan39 and BRRI dhan49 as checks were tested at farmers' field in 12 locations. On an average of 12 locations, none of the advanced lines gave higher yield than any of hybrid and inbred check varieties. Considering grain yield compared to check varieties, growth duration, grain size, disease infection and farmers' opinion, none of the tested advance 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 in favorable condition, will be economically benefited by getting the early harvest of short duration variety.
	1.7 Boro 2016, FB-SD (Favorable Boro-Short duration). Two shorter duration advanced lines along with BRRI dhan28 as check were evaluated in 12 locations. Considering grain yield, growth duration, grain size similar to BRRI dhan28, disease infection and farmers' opinion, both the tested advanced lines BRRI dhan29-SC3-28-16-10-8-HR1 (Com) and BR7358-5-3-2-1-HR2 (Com) were recommended for PVT.	After repeating the experiment, suitable rice genotype may be selected which will be high yielding and short duration.
	1.8 Boro 2016, HY-SD (High yielding-Short duration). Three advanced lines for high	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	yielding and shorter duration along with BRRI dhan28 as check were evaluated in 12 locations. In this experiment, the check variety (BRRI dhan28) was not properly selected. So, the experiment should be repeated by selecting the proper check variety (BRRI dhan58) in coming boro season for proper comparison and evaluation of the lines following instruction of suitable nutrient management (if any) for BRH11-9-11-4-5B to prevent irregular and abnormal maturity trend in the panicle (1/3rd of the panicle at basal portion remain milky while the terminal portion become overmatured).	Farmers will be benefited by getting micronutrients (Zn) enriched variety, especially children and pregnant women who are suffering from Zn deficiency.
	1.9 Boro 2016, ME-SD (Micronutrient Enriched-Short duration). Two micronutrient enriched short duration advanced lines along with BRRI dhan28 as check were evaluated in 12 locations. Considering grain yield, growth duration, fine grain type, plant height, lodging tolerance, disease infection, micronutrient enriched and farmers' opinion, both the lines BR7831-59-1-1-4-5-1-9-P1 and BR7831-59-1-1-4-9-1-2-P3 were recommended for PVT.	Farmers will be economically benefited by getting variety having green super rice characteristics like stable yield, more stress tolerant, low inputs requirement, less insects and disease attack etc.
	1.10 Boro 2016, GSR-LD (Green Super Rice-Long Duration). Three long duration green super rice were evaluated along with BRRI dhan58 and BRRI dhan29 as checks in 12 locations. Considering grain yield, growth duration, grain size, disease reaction, farmers' opinion and green super rice characteristics, HHZ15-DT4-DT1-Y1 was recommended for PVT.	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.
	1.11 Boro 2016, BIO-SD (Biotechnology Short duration). Two advanced breeding lines (developed by biotechnology division) were evaluated along with BRRI dhan28 as check in 12 locations. Considering grain yield, growth duration, grain size, disease infection very similar to that of check variety BRRI dhan28, more lodging tolerant	Information gained about the advanced line will be used to design the next experiment of ALART for long duration rice variety in boro season. Information gained from this ALART will be used to design the next experiment of ALART for hybrid rice variety in boro season.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	than BRRI dhan28 and farmers' opinion, both of the tested advance lines were recommended for PVT. **1.12** Boro 2016, BIO-LD (Biotechnology Long duration). One long duration advance line developed by biotechnology division along with BRRI dhan58 and BRRI dhan29 as checks were evaluated in 12 locations. Considering grain yield, growth duration, grain size, disease reaction, bushy plant type, phenotypic acceptance and farmers' opinion, BR(BE) 6158-RWBC2-1-2-1-1 was not recommended for PVT. **1.13** Boro 2016, Hybrid. Two advanced breeding lines of hybrid rice along with BRRI hybrid dhan3 and BRRI dhan28 as checks were tested at farmers' field in 12 locations. Based on grain yield, growth duration, grain size and farmers' opinion, none was found suitable for PVT. **1.14** Boro, 2016, SD-Comilla (Short duration-Comilla). Three advanced breeding lines suitable for Comilla region along with check varieties BRRI dhan28 and BRRI dhan60 were tested at farmers' field in seven locations of greater Comilla region. Based on grain yield, growth duration, grain size, phenotypic acceptance and farmers' opinion, the advance line HHZ23-DT16-DT1-DT1 was recommended for PVT for greater Comilla region.	Farmers in greater Comilla region will be benefited by using the variety suitable for Comilla region.
	Project_2 Dissemination of Technologies	
	Seed Production and Dissemination Program (SPDP) were conducted under different funding sources during 2015-16.	Wide dissemination of BRRI varieties may be expected throughout the country.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	2.1 BRRI Core Program 2.1.1 SPDP, T. Aus 2015. SPDPs were conducted in 24 upazilas of 15 districts (Sherpur, Gazipur, Netrokona, Rajbari, Bandarban, Rangamati, Khagrachari, Barisal, Patuakhali, Rangpur, Lalmonirhat, Kushtia, Meherpur, Chuadanga & Jhinaidah) in T. Aus 2015. BRRI dhan48 and BRRI dhan55 were used as varieties. Total production through demonstrations of BRRI dhan48 and BRRI dhan55 were about 38 tons and farmers retained 4 tons seeds from those varieties for next year cultivation. About 3,981 farmers gained awareness about the varieties through field visits, discussion and knowledge sharing. About 969 farmers were motivated to cultivate these varieties in next year.	Wide dissemination of these short duration T. Aus varieties may be expected in those areas.
	2.1.2 SPDP, B. Aus, 2015. SPDPs were conducted in six upazilas of three districts (Magura, Narail & Rajbari) using BR24 and BRRI dhan43. Total productions through demonstrations by those varieties were about 5 tons and farmers retained 675 kg seeds from those varieties for next year cultivation. About 850 farmers gained awareness and knowledge about the varieties through field visits, discussion and knowledge sharing. About 350 farmers were motivated to cultivate those varieties in next year.	Wide dissemination of these short duration B. Aus varieties may be expected in those areas.
	2.1.3 SPDP in Jhum, Aus 2015. SPDPs were conducted in three upazilas of three hill districts (Bandarban, Rangamati, Khagrachari) in Aus 2015. BRRI developed three Aus rice varieties: BR24, BRRI dhan27 and BRRI dhan55 were used in those demonstrations. Total production through demonstrations of BR24, BRRI dhan27 and BRRI dhan55 were about 2.75 tons and farmers retained 685 kg seeds from those varieties for next year cultivation. About 350 farmers gained awareness and	Wide dissemination of these Aus varieties may be expected in those hilly areas.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	knowledge about the varieties through field visits, discussion and knowledge sharing. About 200 farmers were motivated to cultivate these varieties 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.
	2.1.4 SPDP with USG, T. Aman 2015. SPDPs with USG were conducted in 48 upazilas of 27 districts (Satkhira, Chittagong, Cox's Bazar, Habigonj, Gaibandha, Khulna, Rajbari, Netrokona, Sherpur, Dinajpur, Barisal, Patuakhali, Jhalokathi, Barguna, Rangpur, Nilphamari, Lalmolnirhat, Kurigram, Kushtia, Meherpur, Chuadanga, Jhinaidah, Norsingdi Tangail Kishoergonj, Gazipur and Mymensingh) in T. Aman 2015. BR22, BR23, BRRI dhan37, BRRI dhan38, BRRI dhan41, BRRI dhan44, BRRI dhan49, BRRI dhan52, BRRI dhan54, BRRI dhan56, BRRI dhan57, BRRI dhan62 and BRRI dhan67 were used as varieties in demonstrations according to the suitability of the varieties in the respective locations. Total production by those varieties was about 81 tons, from which about 13 tons quality seeds were retained by the farmers for next year use. About 13,537 farmers gained awareness and knowledge about those varieties and the beneficial effect of USG and more than 4,556 farmers were motivated to cultivate those varieties and USG.	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.
	2.1.5 SPDP with USG, Boro 2016. SPDPs with USG were conducted in 65 upazilas of 32 districts (Gopalganj, Rajbari, Netrakona, Sherpur, Khulna, Jessore, Bagerhat, Dinajpur, Thakurgaon, Panchagor, Gaibandah, Naogaon, Bogra, Chittagong, Cox's Bazar, Moulobi Bazar, Sylhet, Sunamganj, Barisal, Patuakhali, Jhalokathi, Rangpur, Lalmolnirhat, Kushtia, Meherpur, Chuadanga, Jhinaidah, Norsingdi, Tangail, Kishoergonj, Gazipur and Mymensingh) in Boro 2016. Eight modern rice varieties (BRRI dhan47, BRRI dhan58, BRRI dhan59,	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	BRRI dhan60, BRRI dhan61, BRRI dhan63, BRRI dhan67 and BRRI dhan69) were used in those demonstrations in different locations. As a whole, total production by those demonstrations was 163 tons and farmers retained 20 tons seeds of those varieties for next year use. A total of 18,493 farmers gained awareness and knowledge through field visits, discussion and knowledge sharing and 8,692 farmers were motivated to adopt those varieties and USG.	
	2.2 Adaptive trials under Integrated Agricultural Productivity Project (IAPP) 2.2.1 T. Aus 2015. Four adaptive trials were conducted in four upazilas of two districts of Barisal (Barisal and Patuakhali) and two district of Rangpur region (Rangpur and Lalmonirhat). BRRI dhan27, BRRI dhan48, BRRI dhan55, BRRI dhan65 and local check (Munsur Irri) were used in southern districts while BRRI dhan43, BRRI dhan48, BRRI dhan55, BRRI dhan65 and BRRI dhan28 (as local check) were for northern districts. Considering overall performances and local situation, BRRI dhan27 and BRRI dhan48 were found suitable for Aus season in Barisal and Rangpur region, respectively. 2.2.2 T. Aman 2015. Eight adaptive trials were conducted in eight upazilas of 4 districts of Barisal (Barisal, Jhalokathi, Patuakhali and Borguna) and 4 districts of Rangpur region (Rangpur, Kurigram, Lalmonirhat and Nilphamari) in T. Aman 2015. BRRI dhan41, BRRI dhan44, BRRI dhan52, BRRI dhan54 and local check (BR11, Dudkalam and Sadamota) were selected in Barisal region while BRRI dhan49, BRRI dhan56, BRRI dhan57, BRRI dhan62 and local check (Binadhan-7, Swarna and Guti Swarna) were used in Rangpur region. Based on grain yield and growth duration, BRRI dhan52 and BRRI dhan41 were found suitable to cultivate in	BRRI dhan27 and BRRI dhan48 were found suitable for T. Aus season in Barisal and Rangpur region, respectively. Farmers will be benefitted by cultivating these varieties in those areas. BRRI dhan52 and BRRI dhan41 were found suitable for Barisal region and BRRI dhan49 for Rangpur region, respectively in T. Aman season. Farmers will be benefitted by cultivating these varieties in those areas.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	Barisal region and BRRI dhan49 was found suitable for Rangpur region. 2.2.3 Boro 2016. Six Adaptive trials were conducted in 3 districts of Barisal region (Barisal, Jhalokathi and Patuakhali) and 2 districts of Rangpur region (Rangpur and Lalmonirhat) under IAPP during Boro 2016. BRRI dhan47, 61, 64, 67, 69, Bhajan, Binadhan-10 and Kajla (local check) were used as cultivar in Barisal region while BRRI dhan50, 58, 59, 60, 63 and BRRI dhan28 (as local check) were used in Rangpur region. Based on grain yield, growth duration and farmers' opinion, BRRI dhan67 and BRRI dhan69 were found suitable for Barisal region and it was BRRI dhan58 and BRRI dhan63 for Rangpur region.	BRRI dhan67 and BRRI dhan69 were found suitable for Barisal region and it was BRRI dhan58 and BRRI dhan63 for Rangpur region in Boro season. Farmers will be benefitted by cultivating these varieties in those areas.
	2.3 Mujibnagar Integrated Agricultural Development Project (MIADP) 2.3.1 SPDP, T. Aus 2015. SPDPs were conducted in 12 upazilas of 4 districts. BRRI dhan48 was selected for conducting demonstration in each upazila. Total grain production of BRRI dhan48 was 15338 kg from which farmers retained 1210 kg seeds for next season cultivation. A total of 1111 farmers gained awareness and knowledge about BRRI dhan48 through demonstrations by discussion, field visit and knowledge sharing and 359 farmers were motivated to cultivate BRRI dhan48 in the next year. 2.3.2 SPDP, T. Aman 2015. SPDPs were conducted in 12 Upazilas of 4 districts under MIADP. BRRI dhan49, BRRI dhan57 and BRRI dhan62 were used as varieties in the selected upazilas. Total grain production of BRRI dhan49 was 8069 kg from which farmers retained 845 kg seeds for next season cultivation. A total of 1469 farmers gained awareness and knowledge about BRRI dhan49 through demonstrations by discussion, field visit and	Wide dissemination of BRRI dhan48 may be expected in those areas. Farmers will be benefited by cultivating BRRI dhan48 in T. Aus season in those areas. Wide dissemination of BRRI dhan49, BRRI dhan57 and BRRI dhan62 may be expected in those areas. Farmers will be benefited by cultivating those varieties in T. Aman season in those areas.

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	knowledge sharing and 262 farmers were motivated to cultivate BRRI dhan49 in the next year. Total grain production of BRRI dhan57 was 6887 kg from which farmers retained 750 kg seeds for next season cultivation. A total of 904 farmers gained awareness and knowledge about BRRI dhan57 through demonstrations by discussion, field visit and knowledge sharing and 296 farmers were motivated to cultivate BRRI dhan57 in the next. Total grain production of BRRI dhan62 was 7268 kg from which farmers retained 755 kg seeds for next season cultivation. A total of 955 farmers gained awareness and knowledge about BRRI dhan62 through demonstrations by discussion, field visit and knowledge sharing and 279 farmers were motivated to cultivate BRRI dhan62 in the next year if the seeds are available in the market or demonstration farmer. 2.3.3 SPDP, Boro 2016. SPDPs were conducted in 12 upazilas of 4 districts. BRRI dhan58, BRRI dhan60 and BRRI dhan63 were used in each upazila. Total seed production of BRRI dhan58, BRRI dhan60 and BRRI dhan63 were 11027, 10453 and 10252 kg. Farmers retained 1205, 969 and 770 kg seeds of BRRI dhan58, BRRI dhan60 and BRRI dhan63 respectively for next season. A total of 1182, 1135 and 1090 farmers gained awareness and knowledge from the demonstrations of BRRI dhan58, BRRI dhan60 and BRRI dhan63. 527, 458 and 407 farmers were motivated to cultivate BRRI dhan58, BRRI dhan60 and BRRI dhan63 in the next year.	Wide dissemination of these Boro varieties may be expected in those areas.
	2.4 Enhancing Quality Seed Supply Project (EQSS) 2.4.1 Quality Seed Production and Dissemination Program (QSPDP), T. Aman 2015. QSPDPs were taken in 10 upazilas of 5 districts of the country. The promising varieties, BRRI dhan49, BRRI dhan52 and	Wide dissemination of these T. Aman varieties may be expected in those areas. Farmers will be benefited by

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	BRRI dhan57 were selected for conducting demonstration in selcted upazilas. The total production by the above varieties was 16,781 kg in demonstrated areas from which farmers retained 3,407 kg as seeds for next year cultivation. Farmers opined that although BRRI dhan57 yielded low but timely Rabi crops cultivation is possible after the harvest of this variety. 2.4.2 QSPDP, Boro 2016. Ten trials were conducted in 5 districts of the country. The districts were Norsingdi,Kisorgonj, Gazipur, Tangail and Mymensingh. BRRI dhan58 and BRRI dhan69 were used as cultivar in the above program. Grand total of BRRI dhan58 & BRRI dhan69 regarding grain production was 16.77 tons from which 2.79 tons were retained by the motivated farmers for next year cultivation.	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 benefited by cultivating those varieties in Boro season in those areas.
	Project- 3	
	Farmers' training and promotional activities	
	3.1. Farmers training during 2015-16 During the reporting period, ARD conducted a total of 53 Farmers' training at different locations of the country in which a total of 1755 trainees (1490 farmers and 265 SAAOs of DAE) participated. 3.2. Field Day/ Farmer's Rally ARD conducted 66 Field days at different locations of the country under different projects (IAPP, MIADP, EQSS) and GOB during Aus 2015, Aman 2015 and Boro 2016. A total of 11,550 (app.) 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	
	Enrichment of own seed stock	

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
	4.1. Production of quality seeds of BRRI released recent varieties during 2015-16 Seeds of recent and promising rice varieties were produced in T. Aus, T. Aman and Boro seasons during the reporting period. A total of 5.62 tons quality seeds of different BRRI varieties were produced which were used and will be used for follow up adaptive research trials.	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: 2015-16

	Technology Developed	How country/Farmer/user will be benefited
1	Capacity Building and Technology Transfer Through Training	Knowledge and skill of the trained personnel on the subject mater were increased.
	Total training conducted: 62 No. of participants:1,581 Duration: 1-day,3- day, 1-week and two month Participants: Extension personnel of DAE, GO/NGO officers,scientists and farmers	1. Knowledge and skill of the participants on rice production technologies were enriched. 2. Rice yield and production of the country will be increased.

Regional Station

Regional Station, Barisal

Research Achievement 2015-16

(Technology Developed)

Sl	Research Progress	Expected output
Programme area/Project with duration: Regional Station, 2015-2016		
1	Development of Multi-trait Advance Breeding Lines for Tidal Areas • Hybridization of Female parent BRRI dhan52 with male parent Sadamota, BR7941-41-2-2-4, BR7941-41-2-2-4 and BRRI dhan56 was done which resulted in 15, 11, 9 and 16 F1 Seeds, respectively. • Parents viz. BRRI dhan28, BRRI dhan62, BRRI dhan63, BRRI dhan72 and BRRI dhan52 as recipients and Dud Kalam (Bold Grain, Tidal Sub Tol.), Balam (Long Slander, Tidal Tol. Intermediate Plant type), Borsha (Long Slander Grain, Tall, Tidal Tol.), SP-1, JS-1, JS-2 as donor parent for hybridization were grown during Boro, 2015-16	Better genotypes developed would lead to new variety.

Sl	Research Progress	Expected output
2	Development of Multi-trait Advance Breeding Lines for Boro in Barisal Region 175 plants were selected in T. Aman and grown in Boro, 2015-16 through Rapid generation advance process	Better genotypes developed would lead to new variety.
3	Development of Varieties for Tidal Submergence of T. Aman Rice Four progenies from $F_{2,}$ 90 progenies from F3, 67 progenies from F4 population, 66 fixed lines from Observational Trial and 8 entries from Secondary Yield Trial were selected	Better genotypes developed would lead to new variety.
4	Regional Yield Trial (RYT) RYT Aman 2015 RYT 1 (RLR):Six lines were evaluated against two standard checks. The highest yield was obtained by BR8227-6-2-1 and BRRI dhan49 (ck) (3.21 t/ha) which is higher than the other check BRRI dhan39. RYT 2(RLR): Eight lines were evaluated against two standard checks. The highest yield was obtained by BRRI dhan49 (ck) (3.03 t/ha) which is higher than the other lines & check varieties. RYT (PQR): Ten lines were evaluated against two standard checks. The highest yield was obtained by BR8522-21-4-8 (4.02 t/ha) which is higher than the other lines & check varieties. RYT (Biotech): Six lines were evaluated against three standard checks. The highest yield was obtained by BR9782-BC2-132-1-3 (3.40 t/ha) and the lowest yield was obtained by BRRI dhan33(ck) (1.67 t/ha). RYT Boro 2015-16 RYT_Cold: Two lines were evaluated against two standard checks. The highest yield was obtained by BR7812-19-1-6-1-P4 (4.07 t/ha) which is higher than the other line and check BRRI dhan28 (3.33 t/ha) and check BRRI dhan29 (3.32 t/ha). RYT 1_Bio (SD): Six lines were evaluated against a standard check. The highest yield was obtained by BR(BIO)9787-BC2-63-2-4 (4.40 t/ha) which was higher than the other lines and check BRRI dhan28 (3.10 t/ha). RYT 2_Bio (LD): Seven lines were evaluated against a standard check BRRI dhan29. The highest yield was obtained by BR(BIO)9787-BC2-122-1-3 (4.72 t/ha) which is higher than the other lines and check BRRI dhan29 (3.87 t/ha). RYT_Insect Res: Nine lines were evaluated against three standard checks. The highest yield was obtained by BR7903-16-10 (4.10 t/ha) which is higher than the other lines and checks. The lowest yield was obtained by BR8338-34-3-4 (3.30 t/ha) and BR8340-16-2-1 (3.30 t/ha). RYT 1_MER: Three lines were evaluated against a standard check BRRI dhan28. The highest yield was obtained by BR7831-59-1-1-4-5-1-9-P1 (4.67 t/ha) which is higher than the other lines and check BRRI dhan28 (3.96 t/ha). RYT 2_MER: Three lines were evaluated against two standard checks BRRI dhan63 and BRRI dhan29. The highest yield was obtained by BR7671-37-2-2-3-7-3-P10 (3.85 t/ha) which is higher than the other lines and checks.	Better genotypes developed would lead to new variety.

Sl	Research Progress	Expected output
	RYT#3_MER (LA): Three lines were evaluated against two standard checks. The highest yield was obtained by IR84839-RIL118-1-1-1-1-1 (3.80 t/ha) which is higher than the other lines and checks BRRI dhan58 (3.26 t/ha) and BRRI dhan29 (3.66 t/ha).	

Regional Station, Barisal
Research Achievement 2015-2016

BRRI R/S, Bhanga, Faridpur
Research Achievement 2015-2016

BRRI R/S, Comilla
Research Achievement 2015-2016

BRRI R/S, Habiganj
Research Achievement 2015-16
(Technology developed)

Sl No.	Technology developed	How Country/ Farmer/User will be benefited
1	Advanced breeding line BR9892-6-2-2B has developed for deep water areas.	Farmers of deep water areas will get more yield (4.5 t/ha) than local deep water rice.
2	Use of vermicompot or cowdung is a tool for reducing chemical fertilizer cost in Integrated nutrient management	Farmers able to save 50% chemical fertilizers cost by using vermicompot @1.0 t/ha or cowdung @ 2.0 t/ha.
3	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 one with same or more yield and could escape early flash-fiood in haor areas.
4	Rice–duck farming in haor areas can increase farm profitability.	Farmer's can earn around Tk.20,000/- or more in rice-duck farming than sole rice farming.

BRRI R/S, Station, Kushtia
Research Achievement 2015-2016

BRRI R/S, Rajshahi

Research Achievement: 2015-2016

(Technology Development)

Technology Developed	How country /Farmers/Users will be benefited
1. Relay cropping of direct seeded Aman rice with Jute	Cost of cultivation was reduced by 25% and famers' may save at least Tk. 20000/ha by cultivating relay cropping of direct seeded Aman rice with jute.

BRRI R/S, Satkhira

Research Achievement 2015-2016

(Technology Developed)

Sl. No.	**Technology Developed**	**How Country/Farmer/User will be benefited**
01.	BRRI dhan75	Farmers will be able to grow short duration high yielding slightly aromatic rice during T. Aman season using 20% less fertilizers.
02.	BRRI dhan78	Farmer will be able to grow rice in southern saline tidal areas during T. Aman season (this variety can be grown in land with salinity level 6-9 dS/m). It can be grown even in case of 12-14 days of submergence.
03	BRRI dhan80	Farmer will be able to grow high yielding photo insensitive premium quality rice with short growth duration.

BRRI R/S, Sonagazi

Research Achievement 2015-16

(Technology Developed)

Sl. No	**(Technology Developed)**	**How Country/Farmer/User will be benefited**
	The soil test based fertilizer dose along with 25% increased NPK was the most appropriate and profitable fertilizer dose for saline charland rice ecosystem during T. Aman season.	Rice production will increase in charland rice ecosystem during T. Aman season.

Regional Station, Rangpur

Research Achievement 2015-2016

(Technology Developed)