Research Achievements 2013-14

Plant Breeding

Research Achievement 2013-14
(Technology Development)

Technology Developed	How Country/Farmer/User will be benefited
Programme Area 01: Varietal Development Program (VDP)	
1.1. BRRI dhan63: BR7358-30-3-1 has been evaluated by National Seed Board for premium quality rice. This proposed variety showed 7.4 t/ha average yield with 149 days growth duration and 6 days earlier than BRRI dhan50 with yield advantage of 0.9 t/ha. It has export quality extra-long slender grain with 24.0% amylose content.	This variety will improve productivity of fine quality rice for domestic use and country also will be benefited by exporting this variety. .
1.2 BRRI dhan64: BR7840-54-1-2-5 has been evaluated by National Seed Board for Boro season. This proposed variety showed average yield of 6.0 t/ha with 155 days growth duration. It has 7.2 mg/kg higher zinc content than BRRI dhan28.	This variety will increase rice productivity in Boro season and will help reducing Zn deficiency among children and woman in Bangladesh.
1.3 BRRI dhan65: OM1490 has been evaluated by evaluation of NSB in Broadcast Aus for drought prone areas. This proposed variety showed average yield of 3.4 t/ha with 99 days growth duration It gave 0.5 t/ha yields advantage over the check variety BRRI dhan43 with almost similar growth duration. OM1490 has long slender grain with 24.8% amylose content	This variety will enhance productivity of Aus ecosystem for drought prone areas of Bangladesh.
1.4 BRRI dhan66: IR82635-B-B-75-2 has been evaluated by National Seed Board in T. Aman 2013-14 for drought tolerant at reproductive phase in rainfed low land rice. It showed 4.02 t/ha average yield with 113 days growth duration. It can give 0.5-1.0 t/ha more yield than BRRI dhan56 at drought prone environments of Bangladesh.	This variety will improve rice productivity of drought prone areas in Bangladesh.
1.5 BRRI dhan67: This line BR7100-R-6-6 has been evaluated by National Seed Board in Boro 2013-14 which is a salt tolerant rice variety. This proposed variety showed 5.98 t/ha average yield with 145 days growth duration. It has similar growth duration with BRRI dhan47 with yield advantage of 0.5 t/ha. It can tolerate 8 dS/m water salinity at its whole life cycle. BR7100-R-6-6 has long slender grain with 24.0% amylose content.	This variety will contribute in enhancement of yield of saline prone irrigated ecosystem in Bangladesh.

1.6 BRRI dhan68: BR7830-16-1-5-3 has been evaluated by National Seed Board in Boro 2013-14. This proposed variety showed 7.3 t/ha average yield with 149 days growth duration. It matured by 5 days late with BRRI dhan28 with yield advantage of 0.9 t/ha. BR7830-16-1-5-3 has long bold grain with 25.7% amylose content.	This variety will improve rice yield of irrigated ecosystem of Bangladesh.
1.7 BRRI dhan69: Weed Tolerant Rice has been evaluated by National Seed Board in Boro 2013-14. It showed 7.3 t/ha average yield with 153 days growth duration .The proposed variety matured by 5 days late with BRRI dhan28 with yield advantage of 0.9 t/ha. It has medium bold grain. It is also low input variety.	This variety will enhance rice productivity of irrigated ecosystem of Bangladesh.

Hybrid Rice Division

Research Achievement 2013-2014

(Technology Developed)

Program Area (01): Varietal Development Program (VDP)

Sl. No	Technology Developed	How country/farmer/user will be benefited
01.	A total of 665 kg of parental lines (A & R) and hybrid seeds of four released hybrid varieties distributed to 4 seed companies along with BADC	Popularization of BRRI released hybrid varieties.
02.	One promising combination (IR79156A/BRRI20R) and (IR79156A/BasmatiR) was selected for T. Aman season from preliminary yield trials.	New hybrid combination with desirable grain quality will fulfill farmers demand
03.	One promising combination (BRRI7A/BRRI31R) was selected for Boro season from multilocation trials. The combination (BRRI7A/BRRI31R) will be submitted to SCA trials for releasing as BRRI hybrid dhan5	New hybrid combination with desirable grain quality, high yield and duration will fulfill farmers demand
04.	Three new CMS lines BRRI29A, BRRI30A and BRRI31A (Gan46A/Chinese var5, AgroG2A/PR125B & AgroG2A/PR183) were developed in the background of China and exotic advance lines	Hopefully these newly developed CMS lines will perform better under rainfed conditions and give high heterotic effect with restorer lines
05.	Two promising restorer lines (BR1543-1-1-1-1R & 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.
06.	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

Biotechnology Division

Research Achievement 2013-2014

Sl. No.	Technology Developed	How country/ Farmer/ User will be benefited
1	Two (2), 26 and three (3) doubled haploid green plants were regenerated from the hybrid anther of BRRI dhan29×MR219, BRRI dhan2×/FL478 and MR219×IRBB60 crosses, respectively.	This line will be used to developed high yielding, salt tolerant and bacterial blight resistant that ultimately benefit the farmers.
2	During T. Aman/13, 52 anther culture derived doubled haploid advanced lines were evaluated in three OTs with standards checks. From them 16 materials were selected for further evaluation. On the other hand 122 anther culture derived doubled haploid advanced lines were evaluated in five OTs during Boro/13-14 with standard checks and among them 47 materials were selected for further evaluation.	From this study high yielding rice variety will be developed that ultimately benefit the farmers.
3	Sixteen (16) anther cultures derived doubled haploid advanced rice lines were evaluated as PYT with standard checks. Among them 10 entries were selected for further evaluations.	These lines will be used to developed short duration and high yield that ultimately benefit the farmers.
4	*GlyI* & *GlyII* genes were introduced into BRRI dhan29 to make it salt tolerant Four putative transformants were confirmed in T_2 generation by PCR analysis and T_3 seeds were harvested for further evaluation	These lines will be used to developed salt tolerant varieties that ultimately benefit the farmers in coastal areas
5	Genotyping of mapping population from BRRI dhan28/*Oryza rufipogon* (Ac.no.105890) cross has been completed for high yield QTL analysis. Some backcrossed lines were evaluated as observational trials and 56 promising lines were selected based on phenotypic appearance and yield performance.	Identified high yielding QTLs will be used for enhancing grain yield of elite Bangladeshi rice variety
6	Three BB pyramided BRRI dhan29 lines were evaluated as OT. Bacterial Blight screening was carried out with molecular marker and bacterial inoculation was also done with BXo9 in the	This lines will be used to developed bacterial blight resistant variety that ultimately benefit the farmers

	field. Two lines were selected from this study.	
7	Twenty six (26) homozygous lines having *SUB1* QTLs were evaluated as OT with standard checks. Among them 13 lines were selected for further evaluation.	These lines will be used to developed submergence tolerant variety that can be used in submerged areas.

Genetic Resources and Seed Division

Research Achievement 2013-2014
(Technology Development)

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:** Total 185 rice germplasm were collected from different districts of Bangladesh.	These germplasm would be utilized in breeding program for varietal improvement.
3.1.2	**Characterization:** Characterization of 150 germplasm including 51 new collections from hilly and coastal areas was performed against 53 morpho-agronomic characters. Molecular characterization of 96 germplasm was conducted using SSR marker. Rejuvenation of 2353 accessions including 174 new collections was performed. Apart this, 297 new collections were registered as accession.	Characterized germplasm would be utilized in trait specific breeding program
3.2	**Seed production and variety maintenance:** During reporting year, 151.39 tons of Breeder seed were produced and 115.71 tons of Breeder seed were distributed. Again, 1.20 tons of quality seed were distributed.	Faster dissemination of quality seed to the end users and increased production of rice accordingly.
3.3.1	**Exploratory and genetic studies:** Genetic divergence studies with forty six (46) rice genotypes of Boro season were performed and grouped into seven clusters.	The genetic variability and relationships i.e. genetic makeup of the studied germplasm could be well understood.

3.3.2	**Aromatic hybrid rice development:** • One hundred twenty (120) aromatic and fine rice germplasm were screened to identify diversified source materials of A, B and R lines. • Six cross combinations out of 90 cross showed 100% pollen sterility and backcrossed with corresponding pollen parent for conversion. • Forty germplasm were identified as maintainer lines and converted into new CMS lines through backcrossing. • Twelve restorer lines (SakkorkhoraR, ChiniguraR, KataribhogR, BU dhan 2R, BU dhan 1R, BRRI dhan 50R, SagordanaR, BaoizakiR, JirabhogR, JiradhanR, UknimodhuR, Jamai aduryR) were identified and being maintained.	Identified A, B and R lines could be used for development of aromatic hybrid rice variety (s) in Bangladesh which will be a new dimension of hybrid research.
3.4	**Documentation of technology:** During reporting year, 150 accessions were entered into the database with collected available information.	Characterized information of the germplasm could be utilized for selecting parent(s) in breeding program.

Grain Quality and Nutrition Division

Research Achievement 2013-2014

(Technology developed)

Sl. No	Technology Developed	How Country/Farmers/User will be benefited
1.	Pre-soaking of milled rice for 30 minutes in water that reduces cooking time and elongates the cooked rice more with a good texture.	The method would help to save energy and cooking time
2.	Physicochemical analysis identified Bhasha joria T. Aman, PL-3, Rahimi and Balam for high protein (7.9%) and Lalmota and Awned TPL-545, for high elongation ratio on cooking (>1.7)	The cultivars may be used to develop high protein and high elongation rice variety that would benefit the consumers/Farmer and export market.
3.	Prepared amino acid and mineral nutrient profile for BRRI developed rice varieties.	The outcome of the profile will help to improve nutritional value of rice based diet.

Agronomy Division

Research Achievement 2013-14

(Technology Developed)

Sl No.	Technology Developed	How Country/Farmer/User will be benefited
1	**For non-saline tidal submergence local Aman rice of Barisal region** Application of USG (size- 1.8 g) within four hills before seven days of PI (@ 30 kg N/ha) using 30 x 30 cm spacing.	Deep placement of USG gave yield advantages by 0.5 to 1.0 t ha^{-1} over existing farmer's practice.

Soil Science

Research Achievement 2013-14

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 enhances N_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% N and grain yield by about 15-20%.

Irrigation and Water management Division

Research Achievement 2013-14

(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/ User will be benefited
1	**Terminal drought mitigation adopting transplanting dates in T. Aman, 2013** The early establishment of T. Aman through supplemental irrigation effectively mitigated the terminal drought occurred at reproductive and ripening phases during T. Aman, 2013. Both short and long duration T. Aman varieties suffered less drought and showed good yield performance if they were transplanted before 24 July. So transplanting before 24 July would be medium risk period of drought and after that it would be high risk period.	Farmers can make a plan to transplant the Aman crop within the safe period. It will minimize the yield loss due to terminal drought.

Plant Physiology Division

Research Achievement 2013-14

Sl. No.	Technology Developed	How Country/ Farmer/User will be Benefited
1	BRRI dhan67 was developed from BR7100-6-6 line after salinity screening which is saline tolerant (8 dS/m) at reproductive stage.	Farmers' will benefitted directly by cultivating this variety in saline prone area.
2	IR59418-7B-21-3 was screened out which is saline tolerant (8 dS/m) at reproductive stage.	Breeder may use as a donor parents for salinity stress breeding.

Entomology Division

Research Achievement 2013-14
(Technology Development)

Sl. no.	Technology Developed	How Country/Farmer/ User will be benefited
1.	Out of 307 entries 27 were moderately resistant to resistant against brown planhhopper and 8 against white backed planthopper. The tested two F_2 materials, both of them showed moderately resistant reaction against brown planhhopper. A total of 54 IRBPHN materials tested, 13 were found to moderately resistant to resistant against brown planhhopper. Out of 153 entries/varieties, BR10 and BRRI dhan38 were shown moderately resistant against gall midge. Among 56 OT materials, four (OT-1, OT-3, OT-4 & OT-29) was recorded as resistant against gall midge. Only the line BR7642-62-1-2-3 out of 19 rice germplasms, was found resistant against gall midge.	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 159 commercial formulations of insecticides from 36 generic group were evaluated against brown planthopper (BPH) and 44 from 17 generic group against yellow stemborer (YSB) of which 151 were found effective against BPH and 13 against YSB were found effective. New or mixed formulations are doing well.	Farmers will be benefited by using these effective insecticides.
5.	For controlling BPH, sprayer having double nozzle is effective and less time consuming.	Farmers will be benefited by using this type of sprayer.

Plant Pathology Division

Research Achievement for 2013– 2014
(Technology Development)

Sl No.	Technology Developed	How Country/Farmer/User will be benefited
01	Identification and development of disease resistant advanced breeding	Disease resistant variety will increase the productivity of the country

	lines against bacterial blight and blast diseases	
02	A total of 379 pathotypes were detected from 470 isolates of blast pathogen based on the reactions against differential varieties (DVs)	These pathotypes will be used for future resistant breeding program.
03	Identification of pathogenic diversity and development of standard differential system by selecting differential blast isolates of *Pyricularia grisea* using monogenic lines	Differential set will help to develop durable blast resistant rice variety
04	Identification and validation of suitable mass screening technique for bakanae disease development	This screening method will used in future to develop bakane disease resistant rice variety.
05	Effective fungicides against sheath blight disease management	Five new fungicides recommended for sheath blight management. Effective management of sheath blight disease will enhance rice productivity.
06	Effective fungicides against blast disease management	Ten new fungicides recommended for blast disease management. Effective management of blast disease will enhance rice productivity.

Rice Farming Systems Division

Research Achievement 2013-14

(Technology development)

Serial no.	Technology developed	How country/farmer/user will be benefited
Programme Area: **Rice Farming Systems**		
01	Rice-Sunflower cropping pattern for rainfed coastal saline ecosystem	In the rainfed coastal saline area where salinity does not exceed 8 dS m^1 in Rabi season for sunflower growing period, T. Aman-Sunflower cropping pattern has found to be a promising and improved cropping pattern over the existing T. Aman-Fallow cropping pattern. In the improved cropping pattern either HYV T. Aman (var. BR23) or LV T. Aman (var. Jotaibalam) may be used sequenced with sunflower (var. Hysun33). Sunflower should be dibbled sown for better establishment. The improved cropping patterns, T. Aman (HYV)-Sunflower and T. Aman (LV)-Sunflower produces a rice equivalent yield of about 10 and 6.36 t ha^{-1} which are about 118 % and 237 % higher than HYV Rice-Fallow and LV Rice-Fallow cropping pattern, respectively. Inclusion of sunflower after T. Aman rice increases the cropping intensity and thus increases productivity.

02	High value fish culture in *Sorjan* ditch in tidal wetland nonsaline ecosystem	Introduction of high value fish species viz., *Magur*, *Shing* and *Koi* in *Sorjan* system appeared as potential and profitable technology. High value fish (*Shing*, *Magur*, *Koi*) are solely released in '*Sorjan*' ditches. Stocking density of *Shing*, *Magur* and *Koi* is about 250/decimal. Among the high value fish species *Magur* gives the highest production (1112 kg/ha) followed by *Koi* (1050 kg/ha) and *Shing* (803 kg/ha) with the gross margin of Tk. 3,25,469, 108696 and 2,10,598 per ha, respectively.

Agricultural Economics Division
Research Achievements for 2013- 14

Program Area: Socio-Economics and Policy

Principal program performing unit: Agricultural Economics Division

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, which covered about 64% in Boro season. In Aman season, BR11 and BRRI dhan49 were the most popular varieties covered 20%. But in Aus season, the area coverage was 19% and 7% for BRRI dhan28 and BRRI dhan48, respectively. • Among BRRI varieties, BRRI dhan29 was the top yielder (5.71 t/ha) followed by BRRI dhan58 (5.50 t/ha) in Boro season. In T. Aman Season BRRI dhan49 ranked top in terms of per unit yield (4.79 t/ha) followed by BRRI dhan46 (4.73 t/ha). In Aus season BRRI dhan29 also produced higher yield (5.02 t/ha) followed by both BR16 and BRRI dahn48 (4.40 t/ha). • In case of hybrid rice its area was 13% in Boro season and yield potential was higher compared to MV rice; • Farmers faced constraints like higher labour wage rate, irrigation cost, non-availability of quality seeds and lower market price of their product.	• Rate of adoption of MVs rice and its performance might assist extension agents in priority setting for varietal promotional programs. • Higher adoption of potential variety indicated more area coverage and productivity of that variety, resulted in attaining food self-sufficiency.
1.2	**Estimation of Costs and Return of MV Rice Cultivation at the Farm Level**	The findings would help planners and policy makers to formulate proper

	• Rice farmers using more seeds than the recommended rate, irrespective of cropping seasons. They used higher doses of Urea but comparatively low doses of MoP fertilizer. It may happen due to their ignorance about balance fertilizer use. • Boro rice growers obtained higher yield due to better cropping environment, agronomic practices and use of genotypes. Rice farmers received comparatively lower amount of gross return from MV Aus due to high post-harvest losses and prices and for MvBoro due to higher irrigation cost and low market price. MV T. Aman growers received higher net return due to low irrigation and better market price. • Human labour contributed the highest effort to the production process. On the other hand, farmers as a manager earned the highest share of income among all other production participants. There is a great opportunity of rice production in Bangladesh but it associated with natural condition and price uncertainty.	guideline for setting procurement price, price support and input subsidy on MVs rice production.
1.3	**Crop Land Shift into Mango Orchard: Causes, Impacts and Profitability under New Farming Systems in Barind Area of Bangladesh** Recently, an investigation was carried out to find the causes, challenges and opportunity of rice land shift to mango orchard bases cropping patterns are Wheat-Fallow-T. Aman (30%) and Mustard-Fallow-T. Aman (29%). About 75% farmers reported that they are shifting rice land to mango orchard because of water scarcity, land suitability, favourable environment, easy cultivation process and high profitability. Financial analysis shows that for rice cultivation farmers received Tk 1.17 for Tk. 1.0 investment. On the other hand, for mango cultivation with same investment farmer's received Tk 5.20. The estimated net present worth (NPW) of the project was Tk 99,588/ha and internal rate of return (IRR) was 28%, which indicate that mango cultivation was highly profitable in Barind region. However, there is a possibility to decrease food grain, pulses, oil seed and vegetables production in the long run, which may be a threat on food security in the region. Therefore, high and fallow land not suitable for rice cultivation should be demarcated for planned mango orchard along with ensured credit facilities for mango cultivation, processing,	The findings would help planners and policy makers to established cropping zone without hampering food production of the country.

	preservation and marketing.	
1.4	**Impact Assessment of Seed Production and Demonstration Program (SPDP) on Quality Seed and Rice Production** • Selected farmers were familiar with demonstrations like production and dissemination of seeds. But variety selection was not appropriate (long duration and coarse grain) in Khulna area. Farmers in the area prefer short duration and fine rice. • Farmers in Khulna area are not interested to preserve seed in own house because of availability of truthful level (TLS) and certified seeds at market.	• The findings would help researcher and policy makers to take necessary steps in variety dissemination program as per farmers need and local adoptability.
1.5	**Value Chain Analysis and Share of different Actors in Rice Marketing Channel in a Selected Area of Bangladesh** • In rice marketing, miller captured the highest net margin (45%) followed by the retailer (15%) and wholesaler (13%). On the other hand miller and wholesaler shared the highest marketing cost (52% and 15%) among the actors of the rice supply chain. • Overall net margin /profit of the supply chain of rice was more than half (58%) of the gross margin, which is not justifiable in the context of a developing economy like Bangladesh. The rice market structure should be guided to less intermediaries' actor-involvement. Each of the actor's roles should be valued as per their contribution in value addition.	The findings of the study will help the policy makers and researchers to formulate proper policy and guideline of rice marketing system in Bangladesh.
1.6	**Impact of Climate Change on Rice Production in Bangladesh** • The trend of Amanand Boro production is increasing over the years and thereby boosting up the aggregated production of rice. The total rice production would be increased upto 2030 and thereafter this trend would be downward. • The increasing trend in production eventually augmented the volume of stock of rice, in one hand; and on the other, declining the quantum of imports. • Negative income elasticity indicates strong substitution effects, confirming the changing food habit of the consumers'. However, total demand for rice would be increase as population	The results of this study would help the policy makers, researchers and government to take proper policy/plan to coping up with the various climatic conditions for sustainable rice production in Bangladesh.

	increasing over time.	
1.7	**Forecasting of Food Grains Area and Production in Bangladesh: A Univariate Time Series Approach** Analysis indicated that ARIMA (3, 1, 1), ARIMA (4, 1, 2), ARIMA (2, 2, ma(9)) and ARIMA (2, 1, 4) were the best fitted model for short run forecasting of Aus, Aman, Boro rice and wheat production, respectively. On the basis of the fitted models, production of Aus, Aman, Boro and wheat would be 2330, 14235, 18809 and 1698 thousand tons, respectively by the year 2022-23. The area of those crops would be 557, 5628, 5698 and 515 thousand ha, respectively by the year 2022-23 which indicates decreasing trend of crop area.	The results of the study would help planners to formulate guidelines for cereal production to ensure food security.
1.8	**Projection of Irrigation Cost over Next 10 Years by Using ARIMA Model** Irrigation cost is increasing continuously due to higher costs of fuel, electricity and labor. The projected irrigation cost would be 20% and 19% higher by the year 2024 for STW and DTW, respectively. Irrigation cost could be minimized by improving on-farm water management practices and introduction of water saving technology. Therefore for, policies should be taken to promote water management practice and research for water saving technologies	The findings of the study would help to formulate policy to increase the water use efficiency.

Agricultural Statistics Division

Research Achievement 2013-2014
(Technology Developed)

Sl. No.	Technology Developed	How Country/Farmer/ User will be benefited
1.	**Name/Title of the technology:** Development and validation of producer, consumer and producer cum consumer preference model for rice varieties **Summary:** This study is an attempt to evaluate the factors affecting producers′, consumers′ and producer-cum-consumers preference for rice varieties. On the basis of newly developed three models for producers′ preference, consumers′ preference and producer-cum-consumer preference for rice varieties were used to achieve the objectives. From the validation of models, producer, consumer and producer cum consumer preferred rice varieties for their higher yield at Panchagarh, Lalmonirhat, Kurigram and Thakurgaon. On the other hand, the pure consumers preferred varieties based on their tastes. BR11, BR22 and BRRI dhan32 in T. Aman, BR16, BRRI dhan28 and BRRI dhan29 in Boro, BR9, BR16 and BR20 in Aus season were found to be more preferable and cultivable varieties due to higher yield among the producers, consumers and producer-cum-consumers. Pure consumers were found to prefer rice varieties on the basis of tastiness, fine rice and availability of the varieties. BRRI variety contributes about 91% of total production but it does not reflect in field label because of BRRI variety sale in different brand name, namely BRRI dhan28 sale as Nizersail and BRRI dhan29 as Jhingasail and Minikit etc.	Three mathematical models have been developed for producer, consumer and producer-cum-consumer preference to rice varieties and these three models uses to determine factors affecting producer's decision on varieties for rice cultivation and can provide an indication of the factors affecting consumers' preference to rice varieties. Also, determine factors affecting producer-cum-consumer preference to rice varieties. Therefore, farmer and researcher will take decision that which crop and what condition they will grow the rice.

2.	**Name/Title of the technology:** An Application of Box-Jenkins Method for Forecasting of Aus, Aman and Boro Rice Production in Bangladesh **Summary:** The objective of this study was to forecast the Aus rice production in Bangladesh by using the Box-Jenkins method (ARIMA Model). In this work we are interested to construct ARIMA model for yearly time series data of aus, aman and boro rice production in Bangladesh for the periods 1971-1972 to 2013-2014, which are taken from the reliable publication "Year Book of Agricultural Statistics" is published by Bangladesh Bureau of Statistics (BBS), Bangladesh. In this study, the methodology first refers to use of ARIMA model as propounded by Box and Jenkins for forecasting of requirement and production of aus, aman and boro rice. Forecast of aus rice production showed a decreasing trend but aman and boro rice production showed an increasing trend.	The projections/forecast will help the government to make policies with regard to relative price structure, production and consumption of rice and also to establish relations with other countries of the world.
3.	**Name/Title of the technology:** The effect of Minimum Temperature on Boro Rice Production of Bangladesh for Last Decade **Summary:** The study was conducted to understand the impact of climate on Boro rice production and identify the vulnerable rice growing area in Bangladesh for changing climatic condition and adaptation process and to Policy recommendation of different area for rice production under diverse climatic condition. Rice production data are plotted in a figure using ArcGIS-10.1 software for different region of last decade. Then collect and calculate the data of minimum and maximum temperature for the Boro season from Bangladesh Meteorological Department (BMD) and plotted in graph for December-January and March-May differently in figures and graphs. Also it is plotted temperature data against the Boro rice production. Minimum temperature keeps prominent effect on Boro rice production during germination, subsequent growth and finally rice production. In last decade (2002-2012) Minimum	To overcome from low temperature stress on Boro rice and get more production cold tolerant variety like BBRI dhan36, BRRI dhan55 can be adapted. Hence, in Sylhet, Jessore, Kushtia, Mymensing and Rajshahi area, where minimum temperature is low, such type of varieties can be introduce to get higher yield.

	temperature trend of December-January months more or less followed the trend of Boro rice production which indicates the effect of minimum temperature is prominent. Among 23 rice regions, the production of Patuakhali, Barisal, and Noakhali regions were low may be salinity effect is prominent there (as coastal area) where in Comilla, Sylhet, Kishoreganj, Bogra Dinajpur, Rajshahi, and Rangpur were high.	
4.	**Name/Title of the technology:** Information and Communication Technology (ICT) **Summary:** • Established and maintained Local Area Network (LAN) and provided 300 internet connections to all scientist & officer and increased bandwidth from 8 mbps to 12 mbps. • Developed Web Portal with both Bengali & English. BRRI is incorporated with it as a first organization among NARS institute. • Provided Digital Signature by Controller of Certified Authority (CCA) under Ministry of ICT among 52 scientist and officer including DG, Director (Admin) and Director (Research). • Created own Web Mail ID and group mail ID for all scientist and officer of BRRI and web hosting completed into Bangladesh Computer Council (BCC). • Made a facebook "BRRI Networks" for all employee of BRRI and it is linked with facebook group "Krishi Bhabna" under Ministry of Agri. (MoA), "Public Service Innovation" under PMO and "National Portal Framework" under A2i. • Provided Skype account to all divisional, regional and section head for video conferencing to conduct research activities. • Made and stored all Personal Data Sheet (PDS) into BARC data centre. It is showing now at BRRI web portal. • Established Management Information System (MIS) into BRRI server and provided training for 09 (Nine) module to all related scientists, officers and stuff's by assisting of NATP: Phase 1 project.	BRRI users as well as all users of Bangladesh are benefitted by the development of ICT.

Farm Management Division

Research achievement 2013-2014
(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. Different sources of N and weed control methods on rice Application of super clean instead of refit gave Tk. 4010 ha^{-1} more profit but Application of super clean instead of hand weeding gave Tk. 10210 ha^{-1} more profit. However, application of refit instead of hand weeding the more profit was Tk. 6200 ha^{-1} and application of USG instead of PU the more profit was Tk. 3875 ha^{-1}.	This finding may be useful for the rice growers and researcher .
	3.2. Cost of Production of rice: The cost of production (variable cost basis) of per kg of rice was Tk. 23.4 in aus, Tk. 16.9 in aman and Tk 16.5 in boro season. The BCR was 1.29, 1.71 and 1.72 in aus, aman and boro seasons, respectively.	This finding may be useful for the policy makers, planners, rice growers and rice research/ production farm.
	3.3. Laborers' wage rate in rice production farm: Agricultural Laborers' wage rate at rice production farm was monitored throughout the year at different locations of Gazipur sadar. The wage rate varies from Tk. 335 to 350 day^{-1}. The wage rate in peak periods of the year was Tk. 470 to 480 in the month of May, Tk. 285 to 340 in July-August and Tk. 330 to 420 in December -January. In Habiganj, Rangpur, Rajshahi, Barisal, Sonagazi, Comilla Satkhira and Khulna the wage of agril. labour was Tk. 200-300, 200-300, 200-300, 250-300, 250-300, 300-400, 300-400 and 350-400, respectively.	The agril. 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 2013-2014

Sl. No.	Technology developed	How country/farmers/user will be benefited
1.1	Improvement of air-blow type engelberg huller   Modified air blowing type rice mill	Modified air blowing type (one-pass) rice mill saves time and produce quality of milled rice than traditional engelburg huller mills. Modified air blowing types mill capacity was found 250 to 300 kg/h which is 2 to 3 times more than small air blowing rice mill. Farmers and millers both will be benefited by getting extra 1.0% rice than traditional engelberg huller.

Workshop Machinery and Maintenance

Research Achievement 2013-14

(Technology Developed)

Sl. No.	Technology developed	How Country/Farmer/User will be benefited
1	**BRRI Self-propelled reaper** A self-propelled reaper for rice and wheat with a simple, light weight and low cost power transmission gearbox was designed and developed in the research workshop of BRRI. The gearbox was mounted to the chassis of the reaper and tested for 1.0 and 1.2-meter reapers head. The effective field capacities of 1.0 and 1.2 meter reapers were 0.251 and 0.31 ha/hr, respectively for harvesting rice. The equivalent values for wheat were 0.246 and 0.32 ha/hr, respectively. Similarly, field efficiency of 1.0 and 1.2-meter reapers was 71.7 and 73.8%, respectively for rice. The equivalent values for wheat were 7.03 and 76.2%, respectively. In 1.2 m reaper head, the effective field capacity is higher and on the other hand fuel	1. A good number of benefits can be achieved such as risk free crop production i.e., reduce wastage of time, avoid natural calamities etc. 2. It has increased cropping intensity, decreased working hours, minimized human drudgery and post–harvest losses as well as harvesting cost. 3. It has increased on-farm income and also generated off-farm employment in manufacturing, supply and servicing of reaper as well as agriculture machinery. 4. It has decreased total costs of harvesting. 5. It has decreased time requirement for harvesting including binding and collecting.

	consumption, harvesting time and cost are lower than those of 1.0 m reaper head and manual harvesting. So harvesting with 1.2 m self-propelled reaper will be beneficial /profitable to the farmers.	

Adaptive Research Division

Research Achievement 2013-2014

(Technology Developed)

Sl. No.	Technology Developed	How Country / farmer / User will be benefited
Program Area: Technology Transfer		
01.	**Adaptive Research Division**	
	Project_1 **Validation of Technologies**	
	1. Advanced Lines Adaptive Research Trial (ALART): The Adaptive Research Division (ARD) evaluated the following eight sets of ALART in different agro-ecological regions of Bangladesh in different seasons during 2013-2014. **1.1 ALART (Partially Irrigated),** **T. Aus, 2013.** Two advanced lines along with BR26 and BRRI dhan48 as checks were tested in eight locations of Bangladesh. Based on the growth duration, grain yield, disease infections and farmers' opinion, none of the advanced lines was found to be more suitable than the check variety BRRI dhan48. So, none was being proposed for Proposed Variety Trial (PVT). **1.2 ALART, Upland Aus 2013.** Five advanced lines along with BRRI dhan43 as check were tested in six locations of	It is an important step before releasing a new variety Information gained from this ALART will be used to design the next experiment of ALART for T. Aus. Information gained from this ALART will be used to design the next experiment of ALART for upland Aus.

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	Bangladesh. Although there were some advantages in respect to grain yield and growth duration, none of the advanced lines was found to be more suitable than the check variety BRRI dhan43 due to tall plant height, severe lodging tendency and disease reactions. So, none was being recommended for PVT.	
	1.3 ALART (Salinity), T. Aman, 2013. Three advanced lines along with BRRI dhan53 and BR54 as checks were evaluated in eight locations of Bangladesh. Considering the growth duration, grain yield, grain size and farmers' opinion, IR78761-B-SATBI-28-3-24 and IR78761-B-SATBI-28-3-26 were found suitable for PVT.	Farmers in salt affected areas of coastal region will be benefitted by using salt tolerant varieties having higher yield and shorter growth duration.
	1.4 ALART (Drought), T. Aman 2013. Four advanced lines along with BRRI dhan56 as check were tested in eight drought prone areas of Bangladesh. Based on drought tolerance, growth duration, grain yield, grain quality, phenotypic acceptability and farmers' opinion, IR83383-B-B-129-4 and IR82589-B-B-84-3 were recommended for PVT.	Farmers in drought prone areas will be benefitted by using drought tolerant varieties having higher yield and reasonable growth duration.
	1.5 ALART (PQR and MN), T. Aman 2013. Four advanced lines along with BRRI dhan37 and BRRI dhan39 as checks were tested in eight locations of Bangladesh. Based on growth duration, grain yield, grain quality, phenotypic acceptability and farmers' opinion, BR7357-11-2-4-1-1, BR7369-16-5-2-3-1 and BR7528-2R-19-HR10 were recommended for PVT.	Premium quality rice variety will fulfill the growing demand of consumers and exporters. On the other hand, farmers will be economically benefited by getting the high market value of PQR. Children and pregnant woman, especially in rural areas, will be benefitted by micronutrient enriched rice genotype which is very much needed for their sound health.
	1.6 ALART (RLR), T. Aman 2013. Three advanced lines along with BRRI dhan39 and BRRI dhan49 were evaluated in eight	Suitable variety for rainfed lowland rice ecosystem, which covers a vast area of the country, will be helpful to keep

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Program Area: Technology Transfer		
	locations of Bangladesh. Based on growth duration, grain yield, acceptable grain quality and farmers' opinion, BR7472-16-2-1-2-3 and BR7622-5-1-1-1 were recommended for PVT.	Bangladesh in a sustainable condition for self-sufficiency in food.
	1.7 ALART (Micronutrient), Boro 2014. Two micronutrient dense advanced lines along with BRRI dhan28 and BRRI dhan60 were evaluated in 11 locations of Bangladesh. Based on micronutrient (zinc) enriched, higher yield, grain type, non shattering habit, growth duration and farmers' opinion, BR7671-37-2-2-3-7 may be considered for PVT.	Rice varieties with high content of Zn and higher yield will improve the nutritional status of our children and pregnant women, especially who are suffering from Zn deficiency. At the same time, farmers will be benefitted due to higher yield.
	1.8 ALART (Aerobic/Low water), Boro 2014. Three advanced lines along with BRRI dhan28 as check were evaluated in seven locations of Bangladesh where water holding capacity is low. Based on higher yield, medium growth duration and farmers' opinion the tested entries IR83140-B-36-B-B and IR83142-B-71-B-B may be considered for PVT.	Rice varieties which need low water will reduce the irrigation cost for rice cultivation. Ultimately, farmers will be benefitted by saving some money for irrigation.
	Project_2 **Dissemination of Technologies**	
	Seed Production and Dissemination Program (SPDP) were conducted under different funding sources during 2013-14.	Wide dissemination of BRRI varieties may be expected throughout the country.
	2.1 BRRI Core Program **2.1.1 SPDP with USG, T. Aman, 2013.** SPDPs with USG were conducted in 17 upazilas of 10 districts (Gazipur, Jhenadha, Mymensingh, Rajshahi, Pabna, Dinajpur, Gaibandha, Jessor, Cox's Bazar and Chittagong) by using BRRI dhan49 and BRRI dhan57. Total production of BRRI dhan49 and BRRI dhan57 were 11049 kg and 8805 kg respectively, from which 700 kg and 1885 kg quality seeds were retained by the farmers for	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.

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	next year use and distribution to other interested farmers. **2.1.2 SPDP with USG, Boro, 2014.** SPDPs with USG were conducted at seven upzilas of seven districts (Mymensingh**,** Norsingdhi**,** Panchogor**,** Gaibandha**,** Bogra**,** Sathkhira and Moulovibazar) by using BR16, BRRI dhan50 and BRRI dhan55. About 5393, 5449 and 5569 kg grains of the respective varieties were produced from which farmers retained 1073, 1120 and 1295 kg of BR16, BRRI dhan50 and BRRI dhan55 for next year use and distribution to other interested farmers.	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.
	2.2 Integrated Agricultural Productivity Project (IAPP) **2.2.1 Seed Production and Dissemination Prorgam (SPDP) under IAPP** **2.2.1.1 SPDP, T. Aus 2013.** SPDPs were conducted in eight upazilas of four districts in Barisal region. BRRI dhan27 and BRRI dhan48 were used in the trials. Total production of BRRI dhan27 and BRRI dhan48 were 6346 and 7960 kg and retained seeds by the farmers were 1265 and 1445 kg, respectively for further use and distribution to other interested farmers. **2.2.1.2 SPDP with USG, T. Aman 2013.** SPDPs with USG were conducted in eight upazilas of four districts of Barisal and four districts of Rangpur region under IAPP during Aman 2013. BRRI dhan41 and BRRI dhan44 were selected for Barisal region while BRRI dhan49 and BRRI dhan57 were selected for Rangpur region. Total production of BRRI dhan41 and BRRI dhan44 were 1666 kg and 1825 kg respectively in three upazilas of Barisal region from which 174 kg and 221 kg were retained as seeds by the farmers for next	Wide dissemination of these short duration aus varieties may be expected in those areas. 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.

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	season cultivation. In Rangpur region, BRRI dhan49 performed well but it was severely affected by False Smut disease in some locations. Total produced grains of this variety were about 3070 kg and farmers retained 491 kg seeds for next season. The performance of BRRI dhan57 was also satisfactory and it produced 1968 kg grains from which 322 kg were retained as seeds by the farmers for next season cultivation. **2.2.1.3 SPDP with USG, Boro 2014.** SPDPs with USG were conducted in 14 upazilas of three districts of Barisal and four districts of Rangpur under IAPP. BRRI dhan47 and BRRI dhan58 were selected for Barisal region whereas BR16, BRRI dhan50 and BRRI dhan55 were selected for Rangpur region. A total of 11.68 tons grains of BRRI dhan47 were produced in seven upazilas from which 1.04 tons were retained as seeds by the farmers for next season cultivation. BRRI dhan58 was found as a good variety and produced 4.40 tons grains from which 1.10 tons were retained as seeds in the Barisal region. In Rangpur region, total produced grains of the respective varieties were 39.25 t and farmers retained 7.74 t as seeds for next season cultivation. **2.2.2 Adaptive trials under IAPP** **2.2.2.1 Adaptive trials, T. Aman 2013 in Barisal and Rangpur regions under IAPP** Eight Adaptive trials were conducted in eight upazilas of four districts of Barisal and four districts of Rangpur region. BRRI dhan41, BRRI dhan44, BRRI dhan49, BRRI dhan53, BRRI dhan54 and Sadamota as local check were selected in Barisal region with two replications where as BRRI dhan37, BRRI dhan38, BRRI dhan49, BRRI dhan52, BRRI	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. Suitable T. aman variety for cultivation may be identified for Barisal and Rangpur regions. Farmers will be benefitted by cultivating suitable variety.

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	dhan57 and Swarna as local check were selected in Rangpur region with two replications. **In Barisal region:** Among the varieties under adaptive trials of Barisal region, BRRI dhan44 gave the highest yield in most locations having the highest mean yield (4.10 t/ha) followed by BRRI dhan41 (3.89 t/ha) which was almost similar with BRRI dhan49 (3.83 t/ha). Among the varieties, mean growth duration was the highest (158 days) in the local check variety Sadamota followed by BRRI dhan41 (145 days). The lowest mean growth duration (128 days) found in BRRI dhan53 that was followed by BRRI dhan54 (135 days). **In Rangpur region:** Across the varieties and locations, the highest mean grain yield (4.93 t/ha) was found in the local check Swarna followed by BRRI dhan49 (4.82 t/ha) and BRRI dhan52 (4.51 t/ha). The lowest was in BRRI dhan37 (3.29 t/ha) that was almost similar with BRRI dhan38 (3.38 t/ha). The highest average growth duration (147 days) was required for BRRI dhan52 that was followed by Swarna (144 days), BRRI dhan37 (142 days), BRRI dhan49 (133 days) whereas the lowest growth duration (106 days) was in BRRI dhan57. **2.2.2.2 Adaptive trials, Boro 2014 under IAPP** Seven Adaptive trials were conducted in three districts of Barisal and four districts of Rangpur region. BR16, BRRI dhan47, BRRI dhan55, BRRI dhan58 and Bhajan (local check) were used in Barisal region while BR16, BRRI dhan50, BRRI dhan55, BRRI dhan58 and BRRI dhan28 (Farmer's seed as local check) were used in Rangpur region. **In Barisal region:** Across the locations and	BRRI dhan44 and BRRI dhan41 were found suitable to cultivate in the Barisal region of Bangladesh. Local popular variety Swarna was found to be more popular variety followed by BRRI dhan52 and BRRI dhan57. If we take proper measure against Faulse smut for BRRI dhan49 then it would be one of the most popular varieties in the Rangpur region. Suitable boro variety for cultivation may be identified for Barisal and Rangpur regions. Farmers will be benefitted by cultivating suitable variety.

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	varieties, BRRI dhan58 performed the best and gave the highest mean grain yield (6.70 t/ha) and the lowest yield (5.44 t/ha) was in the local check variety Bhajan. The mean highest growth duration (166 days) was found in Bhajan followed by BR16 (164 days), BRRI dhan58 (155 days) and the lowest was in BRRI dhan55 (148 days). **In Rangpur region:** Irrespective of locations, BRRI dhan58 gave the highest mean grain yield (6.42 t/ha) that was significantly higher than the other varieties tested. This was followed by BRRI dhan55 (5.80 t/ha) which was almost similar with BRRI dhan50 (5.69 t/ha) and the lowest (5.20 t/ha) was in the check variety BRRI dhan28 (used farmer's seed). Irrespective of locations, the highest mean growth duration (166 days) was recorded in BR16 that was followed by BRRI dhan50 and BRRI dhan58 (156 days) while the lowest growth duration (148 days) required for BRRI dhan28 as local check.	BRRI dhan58 and BRRI dhan47 were found suitable to cultivate for Barisal region of Bangladesh. BRRI dhan58 and BRRI dhan50 were found suitable to cultivate for Rangpur region of Bangladesh.
	2.3 Mujibnagar Integrated Agricultural Development Project (MIADP) **2.3.1 SPDP, T. Aus 2013.** SPDPs were conducted in 16 upazilas of four districts (Kushtia, Meherpur, Chuadanga and Jinaidah) by using BRRI dhan48. Total production was 17,751 kg and farmers retained 1881 kg seeds for next season cultivation. **2.3.2 SPDP, T. Aman 2013.** SPDPs were conducted in 12 Upazilas of the above four districts by using BRRI dhan49 and BRRI dhan57. Total production of BRRI dhan49 was 7840 kg and BRRI dhan57 was 5996 kg. A total of 1625 kg of BRRI dhan49 and 1820 kg of BRRI dhan57 were retained by the farmers for next season cultivation. **2.3.3 SPDP with USG, Boro 2014.** SPDPs with USG were conducted in eight upazilas of	Wide dissemination of BRRI dhan48 may be expected in those areas. Wide dissemination of BRRI dhan49 and BRRI dhan57 may be expected in those areas. Wide dissemination of these boro

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	above four districts by using BRRI dhan50 and BRRI dhan58. Total production of BRRI dhan50 and BRRI dhan58 were 12412 and 7708 kg, respectively. Farmers retained 1687 kg and 1433 kg seeds of BRRI dhan50 and BRRI dhan58 for next season use.	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 2013.** QSPDPs were conducted in 10 upazilas of 10 districts (Jhalokathi, Rajshahi, Satkhira, Jessore, Khulna, Chittagong, Comilla, Sherpur and Norshingdi). BRRI dhan46 and BRRI dhan57 were selected for each upazila except Narayangonj. BRRI dhan49 was selected for Narayangonj. Total production of BRRI dhan46, BRRI dhan49 and BRRI dhan57 were 11147, 1733 and 11466 kg and retained seeds by the farmers were 1900, 300 and 1975 kg respectively for further use. **QSPDP, Boro, 2014.** QSPDPs were conducted in 10 upazilas of five districts (Pabna, Sherpur, Tangail, Cox's bazar and Kishorgonj). BR16, BRRI dhan50, BRRI dhan55 and BRRI dhan58 were selected for each upazila. Total production of BR16, BRRI dhan50, BRRI dhan55 and BRRI dhan58 were 7524, 7202, 8018 and 8312 kg and retained seeds by the farmers were 876, 1085, 1040 and 785 kg respectively for further use and distribution to other interested farmers.	Wide dissemination of these T. aman varieties may be expected in those areas. Wide dissemination of these boro varieties may be expected in those areas.
	2.5 AFACI Food Security Project **2.5.1 Rice production by using USG applicator in T. Aman, 2013.** Rice production using USG applicator was conducted in Chandina, Comilla. The farmers were provided with seeds of BRRI dhan49, BRRI dhan52 and BRRI hybrid dhan4. Majority farmers at	Wide dissemination of BRRI dhan49 may be expected in that area. However, USG applicator needs further improvement for uniform dropping of USG in the farm level. If it is possible,

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	Comilla were interested to grow BRRI dhan49 for better yield along with fine grain and medium growth duration and high market price. Farmers did not prefer BRRI dhan52 for its longer duration and large size grain. About 30% of produced grains of BRRI dhan49 in demonstrated plots were retained as seeds by the farmers themselves for next season cultivation.	it will help to reduce labor cost of USG application manually.
	2.6. Minimizing Rice Yield Gap Project (MoA) **2.6.1 Identification of location specific rice cultivation problem and maximizing rice yield through BRRI technologies, T. Aman 2013.** Research activities were carried out in seventy five upazilas throughout the country. Yield gap of 15.59% was observed in T. Aman, 2012 which was reduced to 10.53% in T. Aman, 2013 i.e. 5% yield gap was minimized within this period which resulted to an additional production of around 14 lac tons and added to our national production. **2.6.2 Identification of location specific rice cultivation problem and maximizing rice yield through BRRI technologies, Boro 2014.** The experiments were conducted in 75 upazilas in farmers' participatory approach. It was further observed that yield gap was 13.18% in Boro, 2013 which was reduced to 9.98% in Boro, 2014 i.e. 3.20% yield gap was minimized within this period.	Our national production will be increased and food security will be ensured. Our national production will be increased and food security will be ensured.

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	2.7 Yield Gap Minimization in Rice using Integrated Crop and Resource Management (ICRM) Practices under KGF. On-farm farmers' participatory adaptive research trials were conducted on Integrated Crop and Resource Management (ICRM) practices in 9 upazilas of 5 districts during Aman, 2013 and Boro, 2014. BRRI implemented the project activities in 5 upazilas: Kapasia (Gazipur), Pakundia, Kotiadi (Kishoreganj), Monohordi and Polash (Norshingdi) where as Social Progress Services (SPS), an NGO implemented in 4 upazilas: Madargonj (Jamalpur), Sadar, Nokhla and Nalitabari (Sherpur). In ICRM practices, 0.8-1.3 t/ha increased grain yields over farmers practice were found during Aman season and 0.7-1.1 t/ha increased grain yields during Boro season.	Rice yield gap will be minimized to some extent and farmers will be benefitted.
	Project- 3	
	Farmers' training and promotional activities	
	3.1. Farmers training during 2013-14 A total of 61 farmers' training were conducted under different programs in which 2135 trainees (1830 farmers and 305 DAE personnel) participated. **3.2. Field Day/ Farmer's Rally** ARD conducted 83 Field days at different locations of the country under different projects and GOB during the reporting period. A total of about 13,000 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	

Training Division

Research Achievement 2013 – 2014

	Technology Developed	How country /Farmer/User will be benefited
	Program Area : Technology Transfer Program Performing Unit : Training Division	
I	1. Technology Transfer Through Training	Knowledge and skill of the trained personnel of the subject matter will be increased.
	Total training conducted : 77 No. of participants : 1,621 Duration: 1 day, 3 days, 1 week and 2 month Participants: Scientists, Extension personnel of DAE, GO/NGO officers and farmers.	1. Knowledge and skill of the participants on rice production technologies will be enriched. 2. Rice yield and production of the country will be increased.