

## Research Achievement 2022-2023 (Technology Developed)

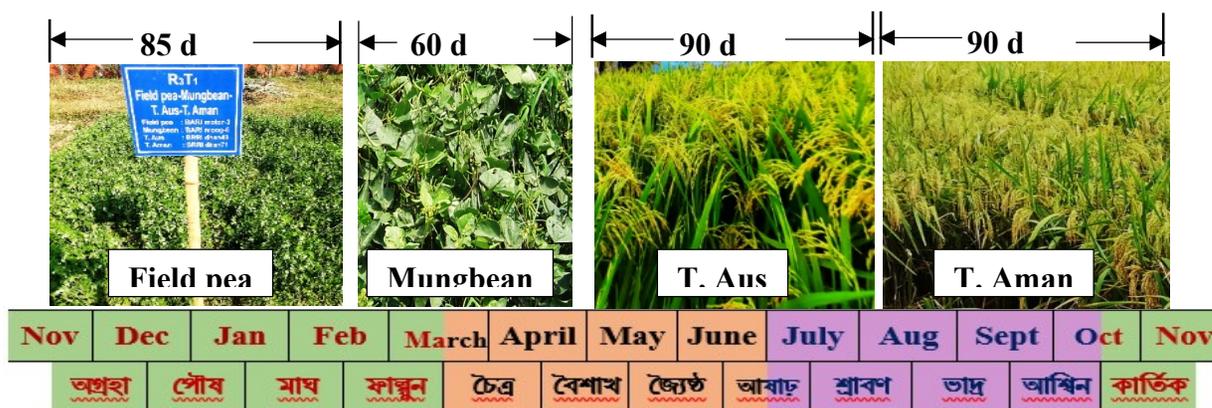
Sl. No.	Technology Developed during 2022-2023	How Country/Farmer/User will be benefited
	<b>Plant Breeding Division</b>	
1	<p><b>BRRRI dhan104:</b> Premium quality rice line BR8862-29-1-5-1-3 was approved and released as BRRRI dhan104 for Boro season by the National Seed Board (NSB). BRRRI dhan104 is the only aromatic Basmati type rice. It possesses all characteristics of high yielding rice varieties. Plant height of this variety is 92 cm. Its grain contains 29.2% amylose and 8.9% protein. Weight of 1000 mature grain of this variety is around 21.5 gram. The size shape of the grain is long slender (7.5 mm), white colored Basmati type and non-sticky.</p> <div style="text-align: center;">  </div>	<p>The growth duration of BRRRI dhan104 is 147 days. Although the average yield BRRRI dhan104 is 7.30 t/ha, however with proper care and management, it can give yield up to 8.71 t/ha. BRRRI scientists expect that being a high yielding premium quality aromatic rice variety, BRRRI dhan104 will gain popularity very quickly at farmers' level as the same time it is capable to earn foreign currency through export.</p>

<p>2</p>	<p><b>BRRRI dhan105:</b> BRC266-5-1-1-1, a low glycemic index (GI) rice i.e., diabetic rice was approved and released as BRRRI dhan105 for Boro season by the National Seed Board (NSB). The average plant height of BRRRI dhan105 is 101 cm. The results of PVT showed that BRRRI dhan105 yielded 8.39% higher than the check variety BRRRI dhan58 in top five locations. The grain quality of the rice is excellent. As the GI value of the rice is 55 so it can be called a low GI or diabetic rice. The amount of amylose and protein of the variety is 27.0% and 7.3%, respectively. The weight of 1000 grain of BRRRI dhan105 is 19.4 grams. The grain color of BRRRI dhan105 is as like as straw and the milled rice of the variety is medium slender and white.</p> 	<p>The growth duration of BRRRI dhan105 is 148 days. The average yield of BRRRI dhan105 is 7.6 t/ha. However, with proper care, under favorable environment it can be yielded 8.5 t/ha. BRRRI dhan105 will play an effective role in controlling diabetes as a low GI rice. Thus, it is expected that the people of Bangladesh will be interested for the cultivation of the variety and as a result BRRRI dhan105 will play a major role in the national rice production of Bangladesh.</p>
	<p><b>BRRRI dhan106:</b> BRRRI dhan106 is a high-yielding rice variety suitable for non-saline tidal submergence areas in Aus season. The breeding line of BRRRI dhan106 is BR8781-16-1-3-P2. It was developed through hybridization between the variety Moroberekan and IR50 followed by the pedigree selection method. The breeding trials were conducted in several locations in farmers' fields in the non-saline coastal region of the southern part of Bangladesh for evaluation of yield and adaptability and finally, it was released as T. Aus rice variety by the 109<sup>th</sup> National Seed Board meeting in 2023 for non-saline tidal submergence areas of Bangladesh. The main feature of this variety is that it has lodging tolerance ability. The flag leaf is erect, wide, and long, dark green in color. The purple color is present at the base of the plant and the tip of the spikelet. It has non-</p>	<p>Rice cultivation areas will be expanded under the non-saline coastal region of the southern part of Bangladesh during T. Aus season due to high yield and lodging tolerance ability of this variety.</p>

	<p>shattering behavior in the panicle. The plant height of the variety is 125 cm and growth duration is 117 days. Amylose content is 27.2% and protein content is 8.5%. The milled rice is medium and bold in size and shape, translucent, and cooked rice is fluffy. Thousand-grain weight of the variety is 24.5 gm. Its average yield is 4.80 tons per hectare which is 17.4 percent higher than the check variety BRRRI dhan27. Moreover, it can produce more than 5.5 t/ha in a favorable environment with proper management.</p>	
		
<p><b>Biotechnology Division</b></p>		
<p>1</p>	<p>A high yielding T Aman rice variety BRRRI dhan103 was approved by National Seed Board of Bangladesh in 2022.</p>	<p>This high yielding T Aman rice variety will be grown by the farmers that ultimately benefit the farmers as well as whole country.</p>
<p>2</p>	<p>Five doubled haploid homozygous advanced breeding lines were evaluated in Boro 2022-23 as RYT for the development of antioxidant enriched black rice variety.</p>	<p>These lines will be used to develop high yielding antioxidant enriched black rice variety that ultimately benefits the farmers</p>
<p><b>Hybrid Rice Division</b></p>		

01.	A total of 4589 kg of parental lines (A & R) and hybrid seeds of seven released hybrid varieties distributed to 23 seed companies along with 30 farmers	Popularization of BRRRI released hybrid varieties.
02.	One potential hybrid combination (BRRRI99A/BRRRI37R) has released as BRRRI hybrid dhan8 for Boro season having slender grain with yield potentiality 10.5-11.0 t/ha and growth duration within 145 days. It is released for Dhaka, Chittagang and Rangpur regions for farmers label cultivation. Two combinations have been selected having salinity tolerant 8 ds/m for whole life cycle.	Newly released BRRRI hybrid dhan8 has immense yield potentiality with desirable grain quality will fulfill farmers demand
03.	One promising combination (BRRRI99A/BRRRI54R) was selected for T Aman season having excellent grain quality and good seed production potentiality from Multi-location Yield Trials. This combination will be tested under National Hybrid Rice Yield Trials (NHRYT) in near future	New hybrid combination having desirable grain quality, high yield and duration will fulfill farmers demand in T Aman season
04.	Two promising restorer lines HRB260-5-11-2-5R (BRRRI55R) & HRB263-28-13-B-7R (BRRRI56R) 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 <sub>1</sub> 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 combination.
<b>Grain Quality &amp; Nutrition Division</b>		
1.	Formulation of anthocyanin-fortified rice-based bakery products with fermented rice bran.	Patient suffering from Non-communicable disease such as cancer, hypertention and diebetic will be benifited.
<b>Rice Farming System Division</b>		
	<p><b>Four crop cropping pattern for irrigated medium highland ecosystem:</b> Field pea (BARI Motor-3)-Mungbean (BARI Mung-6)-T. Aus (BRRRI dhan48)-T. Aman (BRRRI dhan71)</p> <p><b>Salient features</b></p> <ul style="list-style-type: none"> <li>• Double rice and pulse crop cultivation in this pattern increased the total productivity</li> <li>• Diversified crop cultivation like cereal and pulse crops minimize the risk of crop production</li> </ul>	<ul style="list-style-type: none"> <li>• Average yield of Field pea, Mungbean, T. Aus and T. Aman were 5.10 t/ha, 0.96 t/ha, 4.64 t/ha and 5.04 t/ha, respectivel</li> <li>• Rice equivalent yield was 24.66 t/ha in the improved cropping pattern</li> </ul>

- Two pulse crops in this cropping pattern can contribute to improve soil health
- Pulse crops were cultivated during rabi season that are less water consuming and rice was cultivated mainly in rainfed condition which demanded less water
- Field duration of the cropping pattern is about 325 days.



- which was about 179% higher than existing cropping pattern
- Gross margin from the improved cropping pattern was obtained Tk. 1,65,480/ha per annum
  - The marginal benefit cost ratio of the improved cropping pattern is 1.8

### Extrapolation domain

Partial-irrigated high land and medium highland (phase-I) ecosystem. North and North-Western part of Bangladesh, particularly in areas with sandy loam to silty loam soil where especially wheat or Rabi crops are grown after T. Aman rice

### Agronomy Division

#### 01 Maximizing yield of BRRi developed long duration T Aman varieties (like BRRi dhan52) through influencing some Agronomic Critical Factors at BRRi farm Gazipur.

This study of the individual factor together with their possible combinations under a given environmental site like BRRi, Gazipur has been examined with the objective of: to study the effect of Agronomic most critical factors for yield maximization (>7 tha) of long duration varieties and to find out and recommended the most appropriate Agronomic critical factors packages for yield maximization of BRRi developed varieties.

So for obtaining higher yield (>7 t/ha); Long duration T Aman variety like BRRi dhan52 will be needed to seeding with in 4<sup>th</sup> week of June and transplanting with in 3<sup>rd</sup> week of July with 20 -25 days old seedling and 1-2 seedling per hill. Following Spacing should be 25 x 15 cm and STB fertilizer management would be followed and additionally 1% MoP solution to be spray on 30 and 45 DAT. To maintain good growth, additional 1 t/ha varmi compost should be applied just before transplanting. Other recommended agronomic management would be followed when necessary.

Long duration T Aman variety cultivating farmers of Bangladesh will be benefited more than 1 - 1.5 t/ha grain yield than their existing practice. As a result, there cost of cultivation will be minimized and BCR will be higher. Additional rice will be added in national production.

#### 02 Maximizing yield of BRRi developed Boro varieties through influencing some Agronomic

All long duration boro varieties

	<p><b>Critical Factors.</b> In Boro season obtaining higher yield (&gt;8.00 t/ha) from long duration variety (&gt;150 day) variety, it may recommend</p> <ol style="list-style-type: none"> <li>i. Seeding would be done 1<sup>st</sup> to 2<sup>nd</sup> week of December.</li> <li>ii. TP should be done on 3<sup>rd</sup> to 4<sup>th</sup> week of December</li> <li>iii. Younger seedling (15 to 25-day) should be transplanted</li> <li>iv. Wider spacing (25 x 25 cm) should be followed</li> <li>v. Upper soil stirring should be done 25 &amp; 40 DAT.</li> <li>vi. STB fertilizer management should be followed</li> <li>vii. Additional 1% MoP solution to be sprayed at 30 and 45 DAT</li> <li>viii. 1 t/ha vermi-compost to be apply as basal</li> </ol> <p>Other recommended agronomic management would be followed when necessary.</p>	<p>cultivating farmers of bangladesh will be benifited. More than 1 to 2 t/ha additional grain yield may obtain same field from existing management practice.</p>
	<p><b>Irrigation &amp; Water Management Division</b></p>	
	<p><b>Title: Saline water irrigation strategies for Boro rice cultivation in the coastal saline area</b> <b>Description:</b> Salinity of irrigation water in dry season in coastal saline areas especially Khulna, Bagerhat and Satkhira is low initially (1-2 ds/m in December) which increases to 20-25 ds/m in April-May. As a result, due to the harmful effects of high salinity water, paddy and rabi crops cannot be cultivated properly and many lands remain fallow. In order to cultivate Boro rice in this region through proper management of saline water, salt tolerant varieties BRRI dhan 67 and BRRI dhan 97 were tested using different levels of saline water in 2022-23 season. Experimental results showed that irrigation water salinity up to 4 dS/m did not significantly reduce yield compared to 1 dS/m irrigation water. Average yields of 6.4 and 6.1 t/ha were obtained using irrigation water salinity of 1 ds/m and 4 ds/m, respectively. Using irrigation water salinities of 6, 8 and 10 dS/m resulted in yield reductions of 31%, 44% and 59% compared to 1 dS/m. Therefore, salt tolerant varieties BRRI dhan67, BRRI dhan97 and BRRI dhan99 can be grown in coastal saline areas with salinity level of 4 dS/m.</p>	<ul style="list-style-type: none"> <li>• Fallow land will be under cultivation</li> <li>• Cropping intensity will be increased</li> <li>• Farmers will be benefited economically.</li> <li>• Livelihood opportunities of the local farmers will be increased</li> </ul>
	<p><b>Plant Physiology Division</b></p>	
<p>1</p>	<p>Two germplasm (BRRI Genebank Acc. no. 3870 and 3881), one advanced breeding line (BR12274-4R-113) and four (4) parental line of hybrid rice (namely, BHR37, BHR80, BHR259</p>	<p>Could be used as donor for salt tolerant variety development.</p>

	and BHR260) were found tolerant to salinity stress and could be used for breeding program.	
2	Fourteen germplasms (namely, BRRRI Genebank Acc. no. 2098, 2102, 2105, 2116, 2118, 2121, 2124, 2133, 2135, 2139, 2149, 2155, 2156 and 2157) have ability anaerobic tillering should produce $\geq 10$ tillers/hill under water stagnant condition.	Could be used as donor for submergence and water stagnant tolerant variety development.
3	Four BRRRI Genebank Acc. no. 2312, 2320, 2451 and 2554 were consistently found drought tolerant in two consecutive evaluations under field and controlled drought condition which could be useful as donor parents in drought breeding program.	Could be used as donor for drought tolerant variety development.
4	Three BRRRI Genebank Acc. no. 2092, 2093 and 2135 were found tolerant to heat during anthesis should maintain spikelet fertility 66, 70 and 80% respectively.	Could be used as donor for high temperature tolerant variety development.
5	KASP genotyping is advantageous over the combination of InDel and CAPS considering introgression of <i>qHTSF4.1</i> into diverse genetic background.	Could be used in heat tolerant variety development.
6	The BRRRI Genebank Acc. no. 2836, and advanced breeding lines BR12552-3R-179, BR12552-3R-199 and BR11337-5R-29 were found tolerant to cold stress at seedling stage showing 80% survivability having SES score 1 and 3.	Could be used as donor for cold tolerant variety development.
7	Optimum harvesting time was found between 29 to 33 DAF (days after flowering) and 33 to 37 DAF for dry and wet season respectively. A significant yield (about 20-50%) was reduced due to early harvesting (about 21 to 25 DAF) in wet season. At dry season about 12-28% yield could be reduced if harvesting done after three weeks after flowering. About 12% reduction in yield occurred when harvesting one week late than optimum time in both seasons	Suitable harvesting time at adverse climatic condition.
8	Uri dhan contains more vascular bundles in the lemma and palea than rice. Rice has 5 and 3 vascular bundles in the lemma and palea, compared to 11-15 and 8-12 in the Uri dhan lemma and palea.	Basic research for development of C4 rice.
9	Two days of complete submergence and six days of recovery were found to be critical in differentiating submergence tolerant and sensitive cultivars using chlorophyll fluorescence imaging system.	Highthroughput phenotyping for submergence tolerance.
	<b>Pathology Division</b>	
1	<b>Development of pre-breeding materials:</b> Two short duration blast resistant rice lines BR(path)12452-BC3-42-22-11-4 and BR(path)12452-BC6-53-21-11 and two long duration blast resistant lines BR12454-BC2-69-97-39-5-44 and BR12454-BC2-71-91-6-23-26 could be used as	The lines have been recommended as pre-breeding materials to develop high yielding blast resistant variety.

	prebreeding materials.	
	<p><b>Farm Mechanization &amp; Post Harvest Technology Division &amp; Workshop Machinery &amp; Maintenance Division</b></p>	
1	<p><b>Design and development of a auto seed sower machine for raising mat type seedling</b></p> 	<p>Mechanical transplanting of rice is the process of transplanting rice seedlings which have been grown in a mat nursery or plastic tray. Uniformly spreading of seeds is essential in mat type seeding. If the seed is not spread evenly, the number of missing hills may increase during machine transplanting. Spreading the seeds by hand is a labor intensive, time consumed operation as it is not possible to maintain the same density of seedlings. In view of this, the FMPHT Division of BRRI developed a power operated auto seed sowing machine using locally available raw materials. The machine can be used to sow seeds in a rigid/flexible plastic tray on a thin layer of soil (20-25 mm) in equal thickness. To fill up the tray with soil in desired thickness, sowing seed on soil, covering the sowing seed and watering the tray can be accomplished simultaneously in a single operation. The soil height, seed sowing density can be adjusted as required using adjusting lever/dial gauge. The efficiency of seed sowing of the machine is about 30-35 times faster than that of hand</p>

		broadcasting. The device is suitable for raising mat-type seedling in tray commercially. It can be fabricated and repaired easily in local workshops.
	<b>Agricultural Economics Division</b>	
<b>1</b>	<p><b>Title: Farm level Adoption and Evaluation of Modern Rice Cultivation in Bangladesh</b></p> <ul style="list-style-type: none"> <li>• The adoption of modern varieties was 94.23, 90.50, and 99.67% in Aus, T. Aman, and Boro seasons</li> <li>• BRRI dhan48 ranked the top position (49.97%) in the Aus season in terms of area</li> <li>• BRRI dhan28 and BRRI dhan29 were still the most dominant HYV in the Boro season, covering 26.49% of areas.</li> <li>• BRRI dhan75 produced the highest yield (4.94 ton/ha) in the Aus season whereas, in T. Aman and Boro seasons, it was BR2 (5.82 ton/ha) and BRRI dhan92 (6.66 ton/ha), respectively. BRRI hybrid dhan1 yielded the highest which was 7.91 ton/ha whereas the average hybrids' yield was 7.39 ton/ha in the Boro season.</li> </ul>	<p>Breeders may use the information of the study for developing climate resilient region specific popular modern varieties.</p> <p>Researchers, extensionists' and policy makers may also use this information to formulate appropriate policy for enhancing food grain production.</p>
<b>2</b>	<p><b>Title: Estimation of Costs and Return of MV Rice Cultivation at Farm Level</b></p> <ul style="list-style-type: none"> <li>• Per hectare total variable cost of Boro rice and T. Aman rice cultivation were higher than in T. Aus season.</li> <li>• Per hectare gross margin of rice cultivation in Boro season (Tk. 71648) was higher followed by Aman (Tk. 71335) and Aus season (Tk. 48987).</li> <li>• BCR based on cash cost was the highest (1.29) in Aman season, followed by 1.18 and 1.13 in Boro and Aus, respectively.</li> </ul> <p>Gross profit ratios are 39, 46 and 36 for Aus, Aman and Boro, respectively. A high-profit ratio is an indication that the farmers are selling their produce at a high profit level.</p>	<p>The findings would help policy makers to fix the public procurement price, guarantee the support prices as well as provide the input subsidies to promote the rice production for farmers' wellbeing.</p>
<b>3</b>	<p><b>Title: Rapid Assessment Report: Prospects and Constraints of Cultivating BRRI dhan87 in Some Selected Areas of Bangladesh</b></p> <ul style="list-style-type: none"> <li>• The adoption of BRRI dhan87 in Bangladesh has shown promise but faces challenges, particularly in terms of decreased adoption rates over successive years.</li> <li>• However, the potential for this variety, characterized by a shorter field duration, higher yield potential, and improved grain and straw quality, remains significant. Farmers also appreciate its</li> </ul>	<ul style="list-style-type: none"> <li>• Rice breeders can use the information from this study to develop new variety.</li> <li>• Findings of the study will help the researcher and policymaker to develop an effective extension system.</li> </ul>

	<p>medium, slender grain quality with high amylose content, making it a favored choice for consumption.</p> <ul style="list-style-type: none"> <li>• Despite its advantages, several factors have contributed to the decline in adoption rates. Farmers have reported issues related to the alignment of BRR1 dhan87 with their preferred cropping patterns and its longer growth duration compared to other short duration varieties.</li> <li>• In Sylhet region, this variety got severely affected by Tungro disease which indicates the susceptibility of this variety to this disease. Lack of market acceptance because of its' low adoption as a new variety and comparatively coarse grain were also reported as constraints of higher adoption of BRR1 dhan87.</li> <li>• Additionally, concerns about false smut infestations have affected production. Availability of seeds has also been a challenge, with some farmers unable to obtain BRR1 dhan87 seeds from local sources.</li> </ul>	
4	<p><b>Title: Adoption Determinants and Profitability of Stress-Tolerant (Drought) Rice in Selected Areas of Bangladesh</b></p> <ul style="list-style-type: none"> <li>• The overall adoption rate of drought-tolerant rice cultivars is relatively low (23.69%), but it varies across different regions.</li> <li>• Swarna and BRR1 dhan51 is the most popular drought-tolerant rice varieties in the study area.</li> <li>• The adoption of drought-tolerant rice varieties is more pronounced in Chapainawabganj than in Rajshahi.</li> <li>• Drought tolerant rice cultivars is more profitable than other rice cultivars.</li> <li>• Education, land size, training, extension service, participation in field demonstration, membership in any agricultural organization, severity of drought, and total varieties cultivated had a statistically significant effect on the adoption of drought-tolerant rice cultivars.</li> <li>• The study suggests that the government should provide subsidies to farmers, conduct awareness campaigns, make drought-tolerant rice varieties more available, and support research and development of new drought-tolerant rice varieties.</li> </ul>	<p>Rice breeder's extension agent can use the information from this study to develop and disseminate suitable varieties for the concern areas.</p>
5	<p><b>Title: Effect of Subsidy on Mechanization in Rice Cultivation: An Evidence from Combine Harvester in Haor Areas</b></p> <ul style="list-style-type: none"> <li>• Farmers in haor areas have reduced total cost of paddy cultivation by Tk 15807.04/ha through using combine harvesters rather than conventional manual harvesting.</li> <li>• Net return and BCR of paddy cultivation reached to Tk 23610.53/ha and 1.20, respectively for</li> </ul>	<p>Researchers, extension personnel and policymakers may use this information to formulate appropriate policies for increasing subsidies in mechanization to ensure rice production in the Haor region</p>

	<p>using combine harvester whereas it was only Tk 11686.36/ha and 1.09, respectively in case of conventional harvesting process.</p> <ul style="list-style-type: none"> <li>• Investing in combine harvesters has been appeared as very successful ventures in the study area because of highly positive net present worth (Tk. 822663.50) and high internal rate of return (58.39%).</li> <li>• Owners of combine harvesters are enjoying higher net return as the BCR for them was estimated at 1.51 in the study areas.</li> <li>• High rental charge, insufficient investment in farm machineries and lack of suitable harvesters for low land were reported as major challenges in the study areas.</li> </ul>	of Bangladesh
6	<p><b>Title: Impact of Poverty Reduction on Nutrition Security in Bangladesh</b></p> <ul style="list-style-type: none"> <li>• Nutrition security was significantly increased due to the reduction of the poverty gap among households over the periods in different divisions.</li> <li>• Agricultural diversity score was also significantly influenced to increase nutrition security.</li> <li>• The poverty gap (increased consumption among poor people up to the poverty line) reduction highly contributed to increasing nutrition security through increasing income.</li> </ul>	The government, policy makers, researcher and extension workers may use this information to formulate appropriate policy to disseminate modern BRRI released rice technology which will help to increase farmers production, income and reduce rural poverty.
7	<p><b>Title: Livelihood Vulnerability to Flood Hazard in Bangladesh</b></p> <ul style="list-style-type: none"> <li>• Kurigram is more vulnerable than Jamalpur.</li> <li>• Considering the adaptive capacity, LVI-IPCC values show that Jamalpur is more vulnerable than Kurigram.</li> </ul>	The findings of this study would help to identify the causes of household vulnerability in the study areas and plan for drawing policy options for suitable adaptation to reduce vulnerability.
8	<p><b>Title: Assessment of Food Security of Garo Tribe in Selected Areas of Mymensingh Division</b></p> <p>The daily average consumption of rice, vegetables, and milk among the <i>Garo</i> tribe respondents exceeded the national average.</p> <p>Approximately 42% of the households were classified as non-poor, while the remaining 52% were categorized as ultra-poor, hardcore poor, or absolute poor.</p> <p>In food consumption scores, 53% of the respondents demonstrated acceptable high consumption, while others fell into categories such as poor consumption, borderline consumption, and acceptable</p>	The findings will help the policy makers to adopt time demanding policy to ensure better food for the tribal population.

	low consumption. Regarding financial aspects, out of a yearly total expenditure of 161,986 taka, a significant portion, equivalent to 56% (or 90,810 taka), was allocated to food expenditures.	
	<b>Agricultural Statistics Division</b>	
	Dynamics of Multi-trait stability index (MTSI) for identifying the most stable genotypes of three rice growing season in Bangladesh	Utilizing a multi-trait stability index, Scientists and researcher will assess the performance of rice varieties across different factors
	Comparative study for rice yield estimation by adjusting moisture content	Scientists and researcher will assess rice yield by adjusting moisture content
	Identification of influential weather parameters and seasonal drought prediction in Bangladesh using machine learning algorithm	Scientists and researcher will identify best Machine learning models (ranger, bagEarth, support vector machine, and random forest), for the prediction of multi-scale drought and the drought intensity shifting zones of Bangladesh.
	Suitability (Edaphic) Mapping of BRRRI dhan96 to BRRRI dhan99	Farners and policy makers will come to know suitable and not suitable areas for particular rice varieties and productivity can be increased.
	Develop a web application to calculate the Stability Index for BRRRI Stability Model	Under this web application, users can calculate the Stability Index for BRRRI stability model with less labour, cost and time
	Develop a Platform for BBRI Developed Management Information System (MIS)	Users can easily find out the respective software with less labour, cost and time

	Smart profiling of rice varieties for disaster-prone zones of Bangladesh	The app is delivering the detail information of suitable variety for selected areas using ‘Select suitable rice variety’ menu of ‘Rice Profile’ mobile app providing desired individual information of division, district and upazilla as input. Already we are including 07 rice type information out of 17 rice type into the mobile app. Also prepared location-specific map using remote sensing and GIS. It has a capacity to develop an easy comparison of the varieties for a specific environment and quickly picking up the preferred one(s). The information of 14 regions under DAE with districts and upazilla of Bangladesh has also included.
	<b>Farm Management Division</b>	
	<b>Project: Rice production management</b>	
1	<p><b>Efficacy of mechanical seedling transplanter and deep placement of mixed fertilizer on rice yield</b></p> <p>Mechanical transplanting with 80% fertilizer deep placement and mechanical transplanting with 100% fertilizer hand broadcasting practices are recommended for rice production. Urea saving is additional benefit with time saving and low transplanting cost (labour cost) when transplanted with rice transplanter cum fertilizer applicator. The BCR was higher in mechanical transplanting with fertilizer deep placement than hand transplanting. Therefore, mechanical transplanting with fertilizer deep placement is more profitable (Tk. 144515-125707) = 18,808 Tk/ha than hand transplanting.</p>	This finding may be useful for the rice farmers and researchers/ rice production farm.
2	<p><b>Effect of Foliar Application of Silicon on Yield of Aromatic Rice</b></p> <p>Foliar application of silicon has significant effect on yield of aromatic rice (BRRI dhan50). Silicon increases rice resistance to lodging and drought and dry matter accumulation. It can</p>	This finding may be useful for the rice farmers and researchers/ rice production farm.

	positively affect the activity of some enzymes involved in the photosynthesis in rice as well as reduce the senescence of rice leaves and protects the plant against pests and diseases.	
3	<b>Influence of different dates of transplanting on growth, yield performance and quality of fine rice varieties</b> In T. Aman season, 30 July to 30 August transplanting plants produced statistically identical yield of tested fine rice varieties. In Grain qualities parameters, Milling outturn (%), head rice (%) and protein content (%) were produced higher in 30 July to 15 August transplanting.	This finding may be useful for the rice farmers and researchers/ rice production farm.
4	<b>Effect of storage times in different storage technologies on quality of rice</b> If seed are kept in Plastic Container and Grain Pro Bag for up to 6 months after harvesting, seed quality, grain quality and vitamins (B- Complex) levels are good.	This finding may be useful for the rice farmers and researchers/ rice production farm.
5	<b>Effect of nitrogen levels on protein quality of rice at different regions</b> In different N levels: 150 Kg N ha <sup>-1</sup> fertilizer was used in Boro season at different regions to ensure maximum grain yield, grain protein content (%) and nitrogen (%)	This finding may be useful for the rice farmers and researchers/ rice production farm.
	<b>Project: Labor Management System</b>	
6	<b>Monitoring labor wage rate at different locations of Bangladesh</b> The average wage rate per day (8.0 hrs) was Tk. 573-648 at different locations around BRRI HQ and regional stations. The highest wage rate of labourers was in May (Tk. 700-800 per day) due to harvesting and post-harvest operations of Boro rice and transplanting of Aus rice. The highest wage rate (650-750 Tk per day) with food was observed in Cumilla.	This finding may be useful for the rice growers and researchers/policy makers.
	<b>Project: Rice Seed Production</b>	
7	<b>Performance of Boro varieties in seed production plots during 2022-23</b> In total 04, 11 and 12 varieties were cultivated in BRRI research field for the purpose of TLS production during Aus, T. Aman and Boro seasons, respectively in 2022-23. Yield of the varieties ranged from 3.50 t ha <sup>-1</sup> to 5.23 t ha <sup>-1</sup> , 2.54 t ha <sup>-1</sup> to 6.14 t ha <sup>-1</sup> and 4.87 t ha <sup>-1</sup> to 8.60 t ha <sup>-1</sup> in Aus, T. Aman and Boro varieties, respectively.	This finding may be useful for the rice farmers and researchers/ rice production farm.
8.	<b>TLS and Breeder seed production of different rice varieties during 2022-23</b> Farm Management division produced 16,868 kg TLS of which 3090 kg, 5700 kg and 8078 kg was produced in Aus, T. Aman and Boro seasons, respectively. In total 10,787 kg breeder seed was produced under the supervision of FMD.	This finding may be useful for the rice farmers and researchers/ rice production farm.
	<b>Project: Management and utilization of resources</b>	

9.	<p><b>Management and utilization of land, labour and other resources.</b></p> <p>In total 81.85 ha of land were utilized by different research divisions in different season at BIRRI HQ of which 6.18 ha in Aus, 37.65 ha in T. Aman and 38.02 ha in Boro season. Among the research divisions, Plant Breeding division utilized the highest amount of land (25.41 ha) followed by GRS division (13.25 ha) and Hybrid Rice division (7.84 ha). Including regional stations, BIRRI had 682 labors of which 464 regular and 218 irregulars at the start of the reporting time (1<sup>st</sup> July, 2022). In BIRRI HQ, total number of laborers was 436 of which 281 regular and 155 irregular labors.</p> <p>Total labour utilization by different divisions and sections of BIRRI HQ was 1,91,869-man days of which 57.38%, 39.79% and 2.83% were utilized for research, support service and holidays, respectively.</p> <p>In total Tk.10,96,32,031 was paid to the labourers as labour wage in which Tk.6,28,38,093, Tk. 4,36,04,938 and Tk. 3,189,000 were for research work, support service works, leaves and holidays, respectively.</p>	This finding may be useful for the rice growers and researchers.
	<b>Adaptive Research Division</b>	
	Adaptive research division (ARD) of BIRRI is not directly related to technology development. However, ARD is associated with technology development through conducting Advanced Lines Adaptive Research Trial (ALART) and recommended the advanced genotype(s) for proposed variety trial (PVT). Thus, ARD is playing vital role and putting significant contribution to develop rice variety. ARD also validates and disseminates the rice technologies developed by BIRRI through public private partnership.	
	<b>Training Division</b>	
I	1. Technology Transfer through training	Knowledge and skill of the trained personnel of the subject matter will be increased.
	Total training conducted : 40 No. of participants : 850	1. Knowledge and skill of the participants on rice production technologies will be enriched.

	Duration: 1 day to 2 month Participants: Extension personnel of DAE, GO/NGO officers and farmers.	2. Rice yield and production of the country will be increased.
	<b>Regional Station, Barishal</b>	
01	Rectangular sweeping net	Without using insecticide, farmers will be able to control insect infestation in seedbed using the rectangular sweeping net.
	<b>Regional Station, Satkhira</b>	
	Adjustment of seedling number/hill in saline area (3-4 seedlings/hill)	<b>Reduce seedling mortality rate</b>
	Seedling age	40 days old seedling relatively has high survival capacity in saline area
	Adjustment of suitable planting time of Rice	Reduce seedling mortality
	Zinc, Sulphur and K spray on seedling	Reduce seedling mortality
	Gher Farming Technology	Increase cropping intensity
	Four-Cropped Technology	Increase cropping intensity
	Salt-tolerant BRRI Varieties	Increase rice production area
	<b>Regional Station Rangpur</b>	
1.	Optimizing planting time on grain yield of rice	Farmers of norther region of Bangladesh will be benifitted by transplanting of BRRI dhan93 at 20 <sup>th</sup> of July in T. Aman. They will get highest grain yield (5.46 t/ha). In Boro, grain yield of rice was higher for BRRI dhan89 and produced higher grain yield (7.7 t/ha) on 01th

		February planting.
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