## Name of Institute: Bangladesh Rice Research Institute Report of Research Activities During 2020-2021

## Varietal Development program Plant Breeding Division

Sl. no.	Research Progress	Expected output	
Plant b	reeding division		
<mark>Varieta</mark>	Varietal Development program area		
		1	
1.	Rice Breeding		
	<b>1.1 Title: Development of Upland Rice (B. Aus and Jhum rice)</b> <b>Progress:</b> Twenty crosses were made using 11 parents. Fifteen thousand seven hundred fifty (15,750) individuals from 14 crosses of F <sub>3</sub> generation and four thousand one hundred and two (4,102) individuals obtained from 20 crosses of F <sub>5</sub> generation were advanced through field RGA. Out of 2,584 lines, 176 lines comprising 11 crosses were selected from LST based on individual flowering, grain type trait and phenotypic acceptability under field condition. In total, 13 entries were selected from 78 genotypes from different yield trials. Out of 44 entries, 5 entries were selected in observational yield trial (OYT) based on growth duration, yield, homogeneity and other morpho-agronomic traits. Five genotypes out of 24 tested entries were selected on the basis of yield and growth duration (earliness) in PYT. Three entries were selected out of 10 genotypes in SYT. Improvement of Jhum rice under upland rice program was executed to develop high yielding rice variety with low (10-19%) to high (>25%) grain amylose content and drought tolerance along with good eating quality for Jhum cultivation acceptable to tribes of Chottogram hill districts. Fifteen crosses were made using 10 parents. Seventeen F <sub>1</sub> s were confirmed out of 40 crosses. Thirteen and 14 local jhum cultivars were evaluated in Observational yield trial-3 (OYT-1) and 9 and 7 were selected, respectively considering growth duration, yield and uniformity of morpho-agronomic traits. Ten Binni accession were evaluated in Observational yield trial-3 (OYT-3) and six were selected. Duration: 2020-2021	Promising lines/ varieties will be developed with short duration: 90-95 days, yield potential: 4.0- 4.5 t/ha, with early vigor.	

Sl. no.	Research Progress	Expected output
	1.2 Title: Development of Partially irrigated (T. Aus) Rice	Promising lines/
	Progress: In total, 29 crosses were made using 40 parents and	varieties will be
	3938 F1 seeds were obtained; 14 crosses were confirmed as true	developed with better
	hybrid; 26800 progenies of 57 crosses in T Aus season were	yield potential (5.0-
	advanced through modified FRGA. Out of 7009 lines of 37	5.5 t/ha) and shorter
	crosses, 1556 uniform lines were identified from LST based on	growth duration (105-
	uniformity in heading, plant height and acceptable grain type in	110 days) in
	the field condition. Finally, 713 fixed lines were selected from	comparison to
	1556 lines on the basis of trait genotyping with 12-SNP indica	existing varieties.
	panel. Thirty-seven genotypes were selected from 110 entries	
	in observational yield trial (OYT), one advanced line out of	
	three from RYT#1 for favorable ecosystem and two advanced	
	lines out of four from RYT#2 were selected for non-saline tidal	
	ecosystem in Barishal region on the basis of homogeneity with	
	respect to plant height, phenotypic acceptability at vegetative	
	and maturity stages and physicochemical properties. Among	
	two genotypes, one genotype BR8781-16-1-3-P2 was	
	recommended for PVT. The proposed line BR9006-40-2-3-1	
	was evaluated in PV1. The 104 <sup>th</sup> meeting of National seed	
	Board (NSB) approved the B. Aus variety BKKI dhanks for	
	cultivation in 1. Aus growing areas of Bangladesn. The	
	DDDI dhan08 by National good Doord (NSD)	
	Duration: 2020 2021	
	Duration. 2020-2021	
	1.3 Title: Development of rice for shallow flooded and deen-	High vielding (4.0-5.0
	water environment	t/ha) rice varieties for
	<b>Progress:</b> In total, 37 crosses were made and 19 F <sub>1</sub> s crosses	shallow flooded area
	were confirmed through QC SNP panel analysis. A total of	(up to 1.0 m depth),
	6.365 progenies of 20 $F_2$ crosses, 5.035 progenies of 18 $F_3$	shallow deep area (30
	crosses were advanced through RGA. Twelve fixed lines were	cm water) and
	selected from $F_6$ population for OYT. In Yield trials, 18	medium deep area
	genotypes were selected out of 35 genotypes. In OYT the	(50-60 cm water)
	genotype BR8791-5R-1 gave highest yield (3.2 t/ha) which is	along with
	significantly higher than the check variety BRRI dhan91 (2.5	submergence,
	t/ha) whereas in PYT the genotype BR11186-5R-377 (4.1 t/h)	facultative elongation
	gave highest yield which was significantly higher than the check	and hypoxia tolerance
	variety BRRI dhan91 (1.8 t/ha). In SYT, four advanced	will be developed.
	materials were selected for semi deep water conditions. ALART	
	tor shallow deep flood areas was conducted in three locations	
	where two materials (BR10-230-7-19-B and BR10247- 14-18-	
	/-3 -1B) were selected having moderate elongation and better	
	yield than checks. ALARI for very deep flooded areas were	
	conducted in nine locations, however two advanced genotypes	
	BKBK9390-6-2-2B and BK10260-5-11-21-6B and two local	
	pure lines Dudiaki and Knoiya motor having faster elongation	
	were selected based on data of two locations (other damaged due to flood). The heritability obtained for arein yield under	
	BRBR9390-6-2-2B and BR10260-5-11-21-6B and two local pure lines Dudlaki and Khoiya motor having faster elongation were selected based on data of two locations (other damaged due to flood). The heritability obtained for grain yield under	

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	stress of all trials conducted was ranging from 71 % to 94%	
	indicating acceptable level of precision in these experiments.	
	Duration: 2020-2021	
	<b>1.4 Title: Development of Rainfed Lowland Rice (RLR)</b> <b>Progress:</b> In T. Aman 2020-21 reporting year, totally 2,087 F <sub>1</sub> seeds were obtained from 23 single crosses. Four F <sub>1</sub> crosses were confirmed as true hybrid. Panicles of 21,267 progenies from F <sub>2</sub> to F <sub>6</sub> generation of 88 crosses were harvested at the time of maturity and preserved and processed with proper labels through RGA/FRGA method. From Line Stage Testing trials (LST), 705 genotypes were visually selected out of 8995 lines. From The International Rice Observational Nursery (IRLON), six genotypes out of 69 genotypes were selected for further trial in Preliminary Yield Trial (PYT). From three PYTs, 5 genotypes were selected out of 13 tested genotypes. Two genotypes were selected out of 13 tested genotypes of two Secondary Yield Trials (SYT). Two RYTs' were conducted at seven regional stations of BRRI. From two RYTs three genotypes out of 14 genotypes were selected for re-trial. From six materials of Advanced Yield Trial (AYT), two were found promising to forward for Proposed Variety Trial (PVT) by Adaptive Research Division. <b>Duration: 2020-2021</b>	Short duration varieties (105-115 days) with 4.5-5.0 t/ha yield potential and medium duration (116-130 days) varieties with 6.0-7.0 t/ha yield potential will be developed.
	<b>1.5 Title: Development of Salt Tolerant Rice (STR)</b> <b>Progress:</b> In T. Aman season, 14 crosses were made using 19 well characterized elite parents. A total of 43 F <sub>1</sub> s was confirmed as true hybrid through F <sub>1</sub> verification by quality check (QC) genotyping with purity SNP panel during T. Aman season. The Field Rapid Generation Advance was done at BRRI Farm, Gazipur. In the T. Aman season, 71,335 segregating progenies derived from 103 crosses were advanced in F <sub>2</sub> -F <sub>6</sub> generations using FRGA technique. Yield trials were carried out in Gazipur, Koyra, Khulna and Ashasuni, Debhata, Kaliganj and BRRI Farm, Satkhira in T. Aman season. In LST, out of 7179 breeding lines, 972 lines were selected on the basis of strong culm with good plant ideotype, acceptable grain type and uniformity at heading in field condition. A total of 450 LST lines were genotyped using trait-specific SNP panel to identify promising breeding lines with trait of interest (ToI). Out of 1436 breeding lines, 100 lines harbored the 7-10 QTLs/genes that regulate ToI that are designated as Genetically Important Lines (GILs). Each line was assayed against QTLs and genes of interest to assess the presence or absence of useful traits. Out of 816 genotypes, 226 genotypes were selected from OYT. Three PYTs (PYT#1, PYT#2 and PYT#3) were conducted using 63 breeding lines. Forty-two genotypes were selected from these trials depending on grain yield, salinity tolerance and phenotypic acceptability.	Salt tolerant varieties meeting the preferences of farmers and consumers will be developed with seedling stage (EC 14 dS/m) & reproductive stage tolerance (EC 8- 10 dS/m) and better yield potential (5.5- 6.5 t/ha for T. Aman and 7.5-8.0 for Boro season)

Sl. no.	Research Progress	Expected output
	Thirty-four genotypes, out of 46 genotypes were selected from	
	SYT/AYT and three genotypes such as IR108158-B-2-AJY1-1	
	(IR1611032), IR1511464, TP30649(IR1511456) were	
	selected from RY 1 for conducting ALAR1.	
	in Boro Season, 20 crosses were made using 21 ente parents. A	
	verification by quality check (OC) genetyping with purity SNP	
	panel. Totally 80,128 segregating progenies from 113 crosses	
	$(F_2-F_5 \text{ generation})$ were harvested from FRGA nursery and	
	grown in the subsequent generation. In LST trial, 450 lines out	
	of 3823 lines were selected on the basis of desirable plant type,	
	grain quality and uniformity at flowering under field condition.	
	A total of 128 genotypes were selected out of 410 from two	
	OYT's based on growth duration, grain yield, and homogeneity	
	in different morpho-agronomic traits. Out of 371 genotypes, 96	
	genotypes were selected from four PYTs. Fifteen genotypes	
	were selected from two AYT's. Five genotypes from RYT-1	
	and five genotypes from RYT-2 were selected. In RYT-3, 18	
	genotypes were evaluated in five locations and six genotypes	
	such as BK11/10-4K-102, BK11/15-4K-180, BK11/23-4K-2/, DD11716 4D 105 DD11722 4D 12 and DD11712 4D 227	
	DK11/10-4K-105, DK11/25-4K-12 all DK11/12-4K-22/	
	grain quality traits like amylose and protein content. The mean	
	grain yield of selected lines ranged from 8.02 t/ha (BR11716-	
	4R-102) to 8.53 t/ha (BR11712-4R-227) which were higher	
	than the check varieties. The lower SES score (score 3-4)	
	indicates salt-tolerance and the higher score (score 7-9) shows	
	the sensitivity of the genotypes. The selected lines showed salt-	
	tolerance that varied from high (BR11716-4R-105, BR11723-	
	4R-12 and BR11712-4R-227) to moderate levels (BR11716-	
	4R-102, BR11723-4R-27, BR11716-4R-105). All yield trials	
	were conducted in Gazipur, Khulna and Satkhira region during	
	Boro season where salinity level (EC) varied from 3.09 dS/m to $28.5 dS/m$ in the field. All the selected lines have high employed	
	28.5 dS/m in the field. All the selected lines have high amylose content ( $>25.0\%$ ) and the protein content of the selected lines	
	content ( $23.0\%$ ) and the protein content of the selected lines ranged from 7.2% (BR11712-4R-227) to 11.3% (BR11723-4R-	
	27) However the highest protein content (11.3%) was obtained	
	in BR11723-4R-27 among 18 breeding lines, and the lowest	
	amount of protein (7.1%) was found in BR11716-4R-108.	
	Duration: 2020-2021	
	1.6 Title: Development of Premium Quality Rice (PQR) for	National and
	T. Aman and Boro Seasons	international grade
	<b>Progress:</b> In T. Aman 2020-21, a total of 43 crosses (27 crosses	(Kalızıra, Chinigura,
	IOF PQK, SIX for anti-oxidant enriched rice and 10 for	Kataribhog, Basmati,
	photosensitive rice) were made and 24 crosses (24 for PQR, six	and RDDI albor 24
	were confirmed as true hybrid using quality control SND panel	anu DKKI unan34 type) high vialding
	analysis. A total of 8.816 progenies (4.000 progenies of 12 F <sub>2</sub> )	aromatic varieties
	crosses and 4,816 progenies of 14 F <sub>3</sub> crosses) were advanced	with earliness and

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	through RGA under PQR, $2,500$ progenies of five $F_2$ crosses	good plant type will
	1,595 progenies from 10 F <sub>3</sub> crosses, 3,583 progenies from 18 F <sub>4</sub>	be developed
	crosses and 2,922 progenies from 14 F5 crosses were advanced	
	through RGA under Antioxidant program, whereas from	
	pedigree nurseries, 23 PS were selected from five F <sub>2</sub> population,	
	55 PS were selected from five F <sub>3</sub> population, 16 PS were selected	
	from three F <sub>5</sub> population under photosensitive program. In total	
	51 genotypes were selected out of 144 from different yield trials.	
	From Observational Trial (OT) 13 genotypes were selected from	
	71 genotypes based on growth duration, yield, homogeneity and	
	morpho-agronomic traits. From PYT#1 & 2, total genotypes were	
	selected out of 22 genotypes. In total 22 genotypes were selected	
	out of 41 genotypes from SYT#1, SYT#2 & SYT#3. In OYT, the	
	genotype BR11802-11-3-1 produced highest yield (4.5 t/ha). In	
	PYT#1 the aromatic Chinigura type genotype BR10824-5-6-4-1	
	produced highest yield (2.9 t/ha) which is significantly higher than	
	the check variety Chinigura, Kalijira, BINA dhan13 and BRRI	
	dhan34. In PYT#2, the Kataribhog type genotype BR11213-12-	
	2-3 produced highest yield (2.6 t/ha) which was significantly	
	higher than the check varieties Kataribhog, Dinajpur Karatibhog	
	and BRRI dhan37. In SYT#1 the Bashmati type aromatic	
	genotype BR8493-12-7-4-P1 produced highest yield (3.2 t/ha). In	
	RYT#1 the non-aromatic Kalijira type genotype BR9590-45-1-3-	
	2-P2 showed highest yield (3.7 t/ha) followed by aromatic	
	genotype BR8493-3-5-1-P1 which produced 3.5 t/ha yield. In	
	RYT#2, the non-aromatic Kataribhog type genotype BR9844-7-	
	4-4-2-4-2 produced highest yield with 111 days growth duration	
	and the yield was significantly higher than the check varieties	
	Dinajpur Kataribhog and BRRI dhan37. In ALART, a non-	
	aromatic Kataribhog type genotype BR8528-2-2-3-HR2	
	produced highest yield followed by the aromatic genotype	
	BR9178-7-2-4-4 producing 3.1 t/ha yield. Under photosensitive	
	rice program, 39 genotypes out of 121 were selected from	
	different yield trials. In PYT, the photosensitive genotype TL	
	Aus-Gaz8-45-6-P2-1 produced significantly higher yield (5.2	
	t/ha) than the check varieties BR22 (4.3 t/ha) and BR23 (4.2 t/ha).	
	In SY1#1, the genotype BR8845-21-1-5-10-3-P2 produced	
	significantly higher yield (4.0 t/ha) while in SY 1#2, a strongly	
	photosensitive genotype IL Aus Kushtia-3 (PR-2) produced	
	higher they the check variation DD22 (2.8 t/kg) and DD22 (4.0	
	nigher than the check varieties $BR22$ (3.8 t/ha) and $BR23$ (4.0 t/ha). The height life state of functional features of all	
	trials conducted was remained for grain yield under stress of all trials conducted was remained from $66.9\%$ to $0.6\%$ indicating	
	utais conducted was ranging from 00 % to 90% indicating	
	In Boro 2020 21 geogen totally 15 152 E. goods were abtained	
	from 25 grosses Eighteen E, grosses were optimized as true	
	hom 25 closses. Eighteen F1 closses were confirmed as true hybrid A total of 12 821 progenies of 24 progens were horizented	
	from E <sub>2</sub> to E <sub>4</sub> generations and preserved and processed with	
	noner labels through RGA/ERGA method from IST 100	
	genotypes were visually selected based on uniformity. nlant	

Sl. no.	Research Progress	Expected output
	height, growth duration, grain type and lodging tolerance out of 3186 lines. From two PYTs, a total of 28 genotypes were selected out of 52 tested genotypes. From SYT, four genotypes were selected out of twelve tested genotypes. One RYT was conducted at nine regional stations of BRRI. The RYT was conducted in eight locations of Bangladesh. Two genotypes were selected for ALART out of five genotypes from RYT. ALART was conducted at 10 different locations of Bangladesh. Considering all necessary attributes ARD did not recommend any of the two genotypes for PVT. <b>Duration: 2020-2021</b>	
	<b>1.7 Title: Development of Favorable Boro Rice (FBR)</b> <b>Progress:</b> Forty-nine crosses were made using 40 varieties/lines as parents targeting to develop high yielding breeding lines enriched with favorable alleles of key target traits, viz. disease resistance (blast and BLB), insect resistance (BPH) and acceptable grain quality (amylose, chalkiness, palatability, zinc content, etc.). Eleven crosses out of 13 were confirmed as true F <sub>1</sub> through a hybridity test using QC SNP genotyping. From segregating RGA nurseries, in total 33,232 individual plants were advanced from 99 cross combinations of F <sub>2</sub> -F <sub>6</sub> generations. Out of 3,456 lines tested in LST 228 lines were selected based on the presence of the favorable alleles of key target genes for BLB resistance ( <i>xa5, xa13</i> and <i>Xa21</i> ), blast resistance ( <i>Pi-ta, Pi-9</i> and <i>Pb1</i> ), BPH resistance ( <i>Bph17, BPH32</i> ), grain quality ( <i>Wx-a, Wx-b, Wx-10, Chalk5</i> and <i>BADH2</i> ) and uniformity in plant height, days to flowering, grain size and shape. Forty-one genotypes out of 794 tested in four locations following sparse testing model of genomic selection in OYT were selected based on genomic BLUP for yield. Out of 120 breeding lines tested in AYT at three locations, 10 genotypes having 150-154 days growth duration and 5-29% yield advantage over the check varieties (BRRI dhan84 and BRRI dhan81) and 9 breeding lines with 155-160 days growth duration and 6.5-13.7% yield advantage over BRRI dhan89 were selected for further advancement. From RYT, three lead breeding lines showing almost similar yield to that of BRRI dhan89 with at least seven days shorter duration were selected for further advancement. <b>Duration: 2020-2021</b>	Rice varieties for favorable irrigated ecosystem will be developed with high yield potential (7.0- 8.5 t/ha), earliness and acceptable grain quality.
	<b>1.8 Title: Development of Cold Tolerance Rice (CTR)</b> <b>Progress:</b> Twenty crosses were made using 21 breeding lines for the development of a high yielding breeding population enriched with favorable alleles of key target traits, viz. cold tolerance at seedling and reproductive stage, disease resistance (BLB and Blast), insect resistance (BPH) and acceptable grain quality (Amylose, palatability, chalkiness, zinc content, etc.). Eleven crosses out of 13 were confirmed as true F <sub>1</sub> through a	Cold tolerance rice varieties will be developed for cold affected northern, western and Haor region with high yield potential (6.5-7.5 t/ha).

Sl. no.	Research Progress	Expected output
	hybridity test using QC SNP genotyping. In total 29,603 individual plants were advanced from 95 crosses of $F_2$ - $F_6$ and BC <sub>1</sub> F <sub>4</sub> -BC <sub>1</sub> F <sub>6</sub> generations of segregating RGA populations. Out of 6,317 lines tested in LST, 384 uniform lines in terms of plant height, days to flowering, grain size and shape were selected based on the presence of the favorable alleles of key target genes for cold tolerance ( <i>SCT1</i> , <i>COLD1</i> , <i>CTb</i> ), BLB resistance ( <i>xa5</i> , <i>xa13</i> and <i>Xa21</i> ), blast resistance ( <i>Pi-ta</i> , <i>Pi-9</i> and <i>Pb1</i> ), BPH resistance ( <i>Bph17</i> and <i>BPH32</i> ) grain quality ( <i>Wx-a</i> , <i>Wx-b</i> , <i>Wx- 10</i> , <i>Chalk5</i> and <i>BADH2</i> ). Twenty-five genotypes out of 218 breeding lines and 25 genotypes out of 778 breeding lines tested under natural cold stress (at booting stage) and non-stress conditions at two locations in OYT-1 and OYT-2, respectively were selected based on significantly higher yield than the check varieties of similar growth duration under non-stress condition and minimum yield reduction under cold stress condition further yield trial. From AYT with 82 breeding lines tested at five locations, six breeding lines showing yield of 7.19-7.90 t/ha (8.91% to 19.67% higher than BRRI dhan28) with 151-153 days growth duration and eight breeding lines having growth duration 154-157 days and 15.14% to 20.13% higher yield than BRRI dhan28 and 10.36-16.09% higher yield than BRRI dhan67 were selected for further evaluation. Two genotypes out of 21 breeding lines/varieties tested in RYT at eight locations showed a growth duration similar to BRRI dhan28 and 0.25- 0.42 t/ha higher yield. From another set of RYT with seven breeding lines/varieties conducted under natural cold stress (at booting stage) and non-stress conditions at 10 haor sites under Kishoreganj, Sunamganj, and Habiganj districts, two lead lines were selected based on 0.6 t/ha and 1.0 t/ha higher yield, respectively over BRRI dhan67 and BRRI dhan28 under non- stress condition and 1.9-2.0 t/ha yield advantage over BRRI dhan28 under cold stress for further advancement.	
	<b>1.9 Title: Development of Zinc Enriched Rice (ZER)</b> <b>Progress:</b> The experiments were conducted in both T. Aman and Boro seasons. In T. Aman season, 49 single crosses were made which produces a total 7,098 seeds. A total of 18 crosses were selected and confirmed as true $F_1$ comparing with their parents and registered. From $F_2$ population 515 plants from 28 crosses were selected. From pedigree nursery, a total of 1,317 progenies and 167 fixed lines from 82 crosses were harvested from $F_3$ - $F_6$ generations at the time of maturity. From two Observational Trials (OT), 48 genotypes out of 175 were selected based on yield and growth duration considering significant difference in growth duration from the check variety. Totally, 23 genotypes from three PYTs were selected out of 100 genotypes. From two SYTs, 02 genotypes from 13 genotypes were selected. Only One genotype from RYT conducted at	Rice varieties with high iron and zinc content with resistance to major insect pests and diseases and acceptable grain quality will be developed.

Sl. no.	Research Progress	Expected output
Sl. no.	<b>Research Progress</b> seven regional stations of BRRI was found promising out of eight genotypes. ALART was conducted at 10 different locations of Bangladesh. Considering all necessary attributes ARD did not recommend the genotype for PVT. From PVT, the zinc enriched line was not recommended to release as a variety by SCA. In Boro season, 100 single crosses were made which produced 19,556 seeds. A total of 50 crosses were confirmed as true $F_1$ comparing with their parents. From $F_2$ population 2,066 plants of 40 crosses were selected. In pedigree nursery, 2,744 progenies with 182 fixed lines were harvested from 61 crosses of $F_3$ and $F_5$ generations at the time of maturity. From OT, 53 genotypes out of 131 were selected based on yield and growth duration considering significant difference in growth duration from the check variety. Seven genotypes from PYT were selected out of 26 genotypes to advance in SYT. From SYTs, only one genotype out of 06 genotypes was selected. None of	Expected output
	the genotypes were selected from RYT. ALART was conducted at 10 different locations of Bangladesh. Considering all necessary attributes ARD did not recommend the genotype for PVT. From PVT, the zinc enriched line IR99285-1-1-1-P2 was recommended to release as a variety by SCA conducted in ten locations of Bangladesh. <b>Duration: 2020-2021</b>	
	<b>1.10 Title: Development of Insect Resistant Rice (IRR)</b> <b>Progress:</b> The experiments were conducted in both T. Aman and Boro seasons. In the T. Aman season, 28 crosses were made using 26 parents and 25 crosses were confirmed as true hybrids using quality check (QC) genotyping with purity SNP panel. In total 39,484 segregating progenies from 57 crosses of F <sub>2</sub> -F <sub>5</sub> generations were advanced using Field Rapid Generation Advanced (FRGA) technique. Out of 4192 F <sub>5:6</sub> LST lines derived from 20 different crosses, 564 genotypes were selected based on strong plant architecture, grain type and uniformity in heading under field condition as well as 16 trait SNP markers. The yield trials (OYT, PYT and AYT) were conducted at three locations of BRRI Gazipur, Cumilla and Rajshahi. Seventy-nine genotypes were selected from 460 breeding lines in OYT. Twelve selected OYT genotypes had both <i>bph17</i> and <i>bph32</i> SNP favorable alleles. Seven lines were selected from 50 lines in PYT. Two genotypes were evaluated in two RYT's and none of the entry was selected due to poor performance compared to the check varieties. Four promising lines such as BR9880-40-1- 3-34, BR9881-24-2-2-25, BR9880-27-4-1-18 and BR9880-2-2- 2-1 were evaluated in ALART that showed moderate resistance to BPH (SES Score 5.0). Two (BR9880-40-1-3-34 and BR9880-27-4-1-18) from ALART were recommended for conducting ra ALART in T. Aman 2021 22 season	Brown Plant Hopper (BPH) and Gall midge (GM) resistant varieties will be developed with better yield potential (5.5- 6.5 t/ha for T. Aman and 7.0-8.0 t/ha for irrigated Boro season).

Sl. no.	Research Progress	Expected output
	In Boro season, 23 crosses were made using 27 parents and 21	
	crosses were confirmed as true hybrids through $F_1$ verification	
	using quality check (QC) genotyping with purity SNP panel. A	
	total of $63,89/$ individual plants were harvested from $6/$ crosses	
	in F <sub>2</sub> -F <sub>5</sub> generations by FRGA technique. In LS1, 962 lines	
	having strong plant architecture, grain quality and uniformity in	
	heading lines that are the descendants of 16 crosses. Finally	
	468 I ST lines were selected using 16 trait SNP markers. Sixty	
	out of 316 genotypes were selected from OVT. Out of 78	
	genotypes 10 were selected from AYT for further evaluation	
	Total 65 parental lines were maintained in insect resistant	
	maintenance breeding program.	
	Duration: 2020-2021	
	1.11 Title: Development of Disease Resistant Rice (DRR)	Bacterial Blight (BB),
	Progress: Nine crosses for BB and ten for blast in T. Aman and	Blast and Rice
	17 crosses for BB and 10 for blast were made in Boro season.	Tungro Virus (RTV)
	Twelve crosses for BB and thirteen for blast in T. Aman and	resistant varieties will
	nine crosses for BB and four for blast in Boro season were	be developed with
	confirmed as true F <sub>1</sub> . A total of 36300 progenies for BB and	better yield potential
	27350 progenies for blast were advanced from $F_{2-6}$ generation	(5.5 - 6.0  t/ha for T.
	through Green-house RGA and FRGA. Out of 3495 lines, 198	Aman season and 7.5-
	uniform lines from 1. Aman season and 1940 uniform lines out	8.0 t/ha for Boro
	of 10491 were identified from LS1 in Boro season based on uniformity in booding, plant boight and grain type. Forty and	season).
	genetynes for BR were selected from observational yield trial	
	(OVT) in T Aman season whereas 45 entries out of 540 for BB	
	during Boro season showed better yield notential and	
	agronomic performance over the check varieties and tolerance	
	to BB. From PYT, nine advanced lines were promoted based on	
	growth duration, grain yield and BB score compared to the	
	check varieties in T. Aman season and 23 genotypes out of 80	
	for BB were selected in Boro season. From RYT trial, three	
	genotypes for T. Aman season were selected compared to yield,	
	growth duration, BB resistance and better grain quality	
	characters and three BB resistance genotypes performed better	
	but yield was not $>10\%$ higher than the check variety.	
	Therefore, the high yielding background of BB resistant	
	promising lines will be used as genetic resource to develop high	
	yielding disease resistance varieties. The promising BB	
	resistant line BR8938-19-4-3-1-1-P2-HR3 was evaluated in	
	Proposed Variety Trial (PVT) and has been proposed to release $DD$ resistant sequences $DD$ $U$ = 101	
	as BB resistant variety BKKI dhan101.	
	Duration: 2020-2021	

Sl. no.	Research Progress	Expected output
	1.12 Title: Development of Submergence and Water	High yielding rice
	Stagnation Tolerant Rice varieties	varieties with different
	<b>Progress:</b> Totally 2,305 F <sub>1</sub> seeds were obtained from 35 single	growth duration and
	crosses. Fifteen single F <sub>1</sub> s crosses were selected and confirmed	three weeks
	through QC SNP panel analysis. Panicles of 3,230 from nine F <sub>2</sub>	submergence,
	crosses, 4,890 from 10 F <sub>3</sub> , 4,145 from nine F <sub>4</sub> progenies, 6,565	stagnant flood and
	from 22 F <sub>5</sub> progenies, and 3,590 from 13 F <sub>6</sub> progenies were	anaerobic germination
	harvested at the time of maturity, processed with proper labels	tolerances with yield
	and preserved. The ranges of mortality percentage of different	target 6.0-6.5 t/ha in
	RGA generations were 18-20%. From LST population, 1,419	normal condition and
	lines were genotyped with trait markers using custom SNP	5.5 t/ha in stress
	panel among which 145 lines were selected based on uniformity	condition.
	and traits markers like Sub1, Wx-A group, Wx-A NB, xa13,	
	Xa21 etc. In yield trial, 1,054 genotypes were tested out of	
	which 129 genotypes were selected based on phenotypic	
	acceptance, growth duration, survivability and higher yield	
	performance. From OYT#1, eleven genotypes out of 56	
	genotypes, from OYT#2, twenty genotypes out of 60 genotypes.	
	from OYT#3, twenty genotypes out of 46 genotypes, from	
	OYT#4, 8 genotypes out of 24 genotypes, from PYT#2, four	
	genotypes out of eight genotypes, from PYT#3, six genotypes	
	out of 12 genotypes, from PYT#4, three genotypes out of eight	
	genotypes, from AYT#1, three genotypes out of eight	
	genotypes, from AYT#2, five genotype out of fourteen	
	genotypes, from PVS#1, two genotypes out of four genotypes.	
	from PVS#2, one genotype out of three genotypes, were	
	selected. In OYT#1, the genotype BR11692-5R-345 with 89%	
	survivability produced highest yield of 6.1 t/ha under stress	
	condition. In OYT#2 the genotype BR11690-5R-301 showed	
	higher yield (5.3 t/ha) under stress with 71% survivability. In	
	OYT#3, the genotype BR11694-5R-236 produced highest vield	
	(7.2  t/ha) followed by the genotype BR11694-5R-317 (6.4 t/ha)	
	having a survivability of 94% and 100% survivability.	
	respectively. In OYT#4, the highest yield was 6.0 t/ha given by	
	the genotype IR100842-B-B RGA-B RGA-B RGA-9 with	
	survivability of 93%. In PYT#2 the genotype BR11185-5R-	
	738-5 produced highest yield (4.1 t/ha) with survivability of	
	79% and growth duration of 119 days. In PYT#3, the genotype	
	BR11196-5R-83 produced highest yield (4.3 t/ha) with 80%	
	survivability and 119 days growth duration. In PYT#4 the	
	genotype IR 127152-3-22-18-1-B produced highest yield of 4.8	
	t/ha which possessed all four <i>SUB1</i> genes along with four BB	
	resistance genes. In AYT#2, the genotyne IR16F1148 gave	
	highest yield of 4.5 t/ha with 94% survivability and 120 days	
	growth duration under stress. This genotype was also evaluated	
	in PVS#1, where it produced 4.2 t/ha vield under stress which	
	was 1.2 t/ha higher than the check variety RINA dhan 11 (3.0)	
	t/ha) with similar growth duration. This genotype was promoted	
	to ALART From PVS#2 two genotypes viz RR9158-19-9-6-	
	50-2-HR1 and IR13F441 produced higher yield under stress	
	50 2 miti and mitist in produced mgner yield ander stress	

Sl. no.	Research Progress	Expected output
	(4.5 t/ha and 4.3 t/ha respectively) with survivability of 87% and 86% respectively. Yield and survivability were significantly higher than the check varieties BRRI dhan52 (3.4 t/ha) and BRRI dhan79 (3.5 t/ha). These two genotypes were also promoted to ALART. The genotype BR9158-19-9-6-50-2-HR1 also got the highest preference score in PVS function. From AGGRi-network trial, out of 83 genotypes, 34 genotypes were selected of which survivability ranging from 93 to 99%. The heritability obtained for grain yield under stress of all trials conducted was ranging from 51% to 98%, whereas that for non-stress trials was ranging from 54% to 89%, indicating acceptable level of precision in these experiments. <b>Duration: 2020-2021</b>	
	<ul> <li>1.13 Title: Development of Water Saving and Aerobic Rice varieties</li> <li>Progress: A total of 14 crosses were made using 11 parents and 2,560 F<sub>2</sub> populations from four crosses were advanced through FRGA. From yield trial conducted under AWD condition, 12 genotypes were selected from 28 genotypes grown. Ten genotypes from PYT, two genotypes from AYT were selected. In PYT, none of the genotypes produced higher yield than the check variety BRRI dhan89 (7.0 t/ha), however the genotype BR11207-5B-288 produced 5.7 t/ha yield followed by the genotype BR11206-5B-75 (5.6 t/ha) with 5-6 days lower growth duration. The yield of these genotypes was significantly higher than the check variety BRRI dhan28 with similar growth duration. In AYT, the genotype IR16L1081 produced highest yield (5.7 t/ha) however it was not significantly higher than the check varieties BRRI dhan28 (5.3 t/ha) and BRRI dhan58 (5.5 t/ha). These genotypes would be used as parent. The heritability obtained for grain yield under stress of the trials conducted was ranging from 59 % to 96% indicating acceptable level of precision in these experiments.</li> </ul>	Short duration water- use-efficient rice genotypes with 10% more yield than the standard check varieties will be developed for Boro season under transplanted alternate wetting and drying (AWD) and aerobic condition.
	<b>1.14 Title: Development of Drought Tolerant Rice (DTR)</b> <b>Progress:</b> In T. Aman 2020-21 reporting year, totally 3678 $F_1$ seeds were obtained from 18 crosses. In total, 13,721 plants were harvested from 74 crosses of $F_2$ , $F_4$ - $F_6$ generations at the time of maturity and preserved and processed with proper labels through RGA/FRGA method. From LST, 729 genotypes were visually selected out of 9,100 lines. PYT was evaluated in four locations of BRRI and 04 genotypes out of 16 were selected for RYT. In Boro 2020-21, 2,561 progenies were harvested from 10 crosses of $F_3$ generation at the time of maturity and preserved and processed with proper labels through RGA/FRGA method. 176 elite drought tolerant genotypes from IRRI were evaluated	Drought Tolerant Varieties for T. Aman season will be developed with potential yield target (5.0-6.0 t/ha).

Sl. no.	Research Progress	Expected output
	in OT at BRRI farm and all of them were selected to evaluate in	
	T. Aman 2021-22 season.	
	Duration: 2020-2021	
	1 15 Titles Development of Crosser Sumer Diss (CSD)	Development of loss
	<b>1.15 Title: Development of Green Super Rice (GSR)</b> <b>Progress:</b> Form AYT, four entries out of six in T. Aman season and forty entries were selected from Boro season based on PAcp, growth duration, yield and grain quality. Among these forty GSR Boro genotypes, nine genotypes were evaluated in T. Aus ecosystem for developing high yielding and short duration T. Aus rice varieties and 28 genotypes having low amylose (9.0- 22.6%) were provided to upland rice (Aus) program to develop high yielding jhum rice for hilly people of Bangladesh. From RYT, one entry 7FBR336 (8.02 t/ha) out of five was performed better than the check variety BRRI dhan58 (7.88 t/ha) with 2-3 days longer growth duration in Boro season. The proposed genotypes HHZ5-DT20-DT2-DT1 (GSR IR1-5-D20-D2-D1) and HHZ12-SAL2-Y3-Y2 (GSR IR1-12-S2-Y3-Y2) was evaluated under PVT by NSB team in coastal area of Bangladesh in Boro season and among these two genotypes HHZ5-DT20-DT2-DT1 (GSR IR1-5-D20-D2-D1) has been released as BRRI dhan99. The variety BRRI dhan99 produced 1.2 t/ha higher yield than the salinity tolerant check BRRI dhan67 with five days longer growth duration.	Development of less input but high yield potential (7.0-8.0 t/ha) genotypes with tolerance to different stresses (abiotic and biotic).
	<ul> <li>Initial of with five days longer growth duration.</li> <li>Duration: 2020-2021</li> <li>1.16 Title: Deployment and Validation of High Betacarotene Rice and High-Iron &amp; Zinc Rice Varieties (Healthier Rice Project)</li> <li>Progress: In T. Aman 2020-21 season, 4,135 seeds of six back crosses of BC<sub>2</sub>F<sub>1</sub> generation were made for introgression of provitamin A in BRRI dhna48, BRRI dhan67, BRRI dhan71, BRRI dhan84, BRRI dhan87 and BRRI dhan89. A total of 2 homozygous and 272 heterozygous lines were selected from the introgression program of GR2-E trait in three varieties (BRRI dhan28, BRRI dhan49 and BRRI dhan62) in the BC<sub>3</sub>F<sub>5</sub> generation trough Marker Assisted Selection (MAS) breeding method.</li> <li>In Boro 2020-21, in total 4,440 F<sub>1</sub> seeds of six backcrosses of BC<sub>3</sub>F<sub>1</sub> generation through MAS breeding method. In the Contained Trial (CT) of GR2E Golden rice, from 61 provitamin-A enriched GR2E BRRI dhan28 golden rice introgression lines and 9 pure lines of GR2E BRRI dhan29 golden rice (IR112060 GR2-E: 2-7-63-2-96), 14 promising genotypes were selected for further evaluation based on their grain yield and carotenoid content. From the Confined Field Trial (CFT) of high iron and zinc rice (Event IRS1030-039, IRS1030-031, IRS1027-059), 05 lines were selected for further evaluation.</li> </ul>	Development of high yielding rice varieties with enhanced Provitamin A, high Iron and Zinc content in polished rice grain.

Sl. no. Res	earch Progress	Expected output
1.17	Title: International Network for Genetic Evaluation of	Exchange of elite rice
Rice	e (INGER)	germplasm among the
Pro	gress: Totally six entries out of 51 entries of one INGER	rice growing
nurs	ery set of Aus, 50 entries out of 321 entries from five INGER	countries of the world
nurs	ery sets of T. Aman 2020-21 and 45 entries from three	and their evaluation,
ING	ER nursery sets of Boro 2020-21 seasons were selected to be	characterization and
used	in different breeding programs for direct use in the	utilization under
bree	ding pipeline.	wider range of
Dur	ation: 2020-2021	environments for
		ultimate use by
		farmers.
<b>Biotechnolog</b>	y Division	
Varietal Deve	elopment program area	
1. Pro	ect I: Tissue Culture	
1.1	Fitle: Development of low glycemic index (GI) rice variety	Low glycemic index
thro	igh anther culture.	(GI) rice variety will
Pro	gress: During Boro 2020-21, three doubled haploid lines	be developed
deriv	ved from a cross between BRRI dhan29 and Kanaklata were	
eval	uated as a secondary yield trial (SYT). Among them two	
lines	were selected for Regional yield trial (RYT).	
Dur	ation: 2020-2021	
1.2	<b>Fitle: :</b> Development of salt tolerant rice variety through	High yielding rice
anth	er culture	variety will be
Prog	gress: 796 F <sub>1</sub> seeds were harvested during Boro 2020-21 for	developed
futu	e year anther culture program. Two doubled haploid lines	
from	the cross BRRI dhan28/BRRI dhan61 were selected for	
furth	er evaluation as SYT for favorable Boro Duration: 2020-	
202		
1.3	<b>Fitle:</b> Development of premium quality rice variety through	Premium quality rice
anth	er culture	variety will be
Pro	<b>Press:</b> A total of 6789 and 7596 hybrid anthers from 13	developed
cros	ses were plated on N6 and M10 media. In total of 91 calli	rr
were	e obtained and 47 green plants were regenerated from 4	
cros	ses only: BRRI dhan90/BRRI dhan34. BRRI	
dhar	90/Kataribhog. BRRI dhan90/Kalizira and BRRI	
dhar	90/Tulshimala. Seven (7) crosses and eleven (11)	
back	crosses were done. A total of 673 seeds were harvested for	
futu	e anther culture program. A total of 17 doubled hanloid	
lines	were evaluated in T Aman 2020 Among them four (4)	
and	seven (7) doubled hanloid plants were selected from BRRI	
dhar	38/ Bashful (acc. no. 3954) and RRRI dhan50/ Bashful	
	no. 3954) crosses, respectively	
(uee	. 110. 550 () 0100000, 100p0011 019.	

Sl. no.	Research Progress	Expected output
	<b>1.4 Title:</b> Development of Aus variety through anther culture <b>Progress:</b> Eight crosses were made and total of 259 $F_1$ seeds were harvested for future anther culture program. <b>Duration:</b> 2020-2021	High yielding Aus rice variety will be developed
	<ul> <li>1.5 Title: Development of antioxidant enriched black rice variety through anther culture</li> <li>Progress: During Boro 2020-21, a total of 16 double haploid lines derived from a cross between BRRI dhan28 and Padi Kool were grown as observational trial (OT) with standard checks. Among them six lines were selected further.</li> <li>Duration: 2020-2021</li> </ul>	Antioxidant enriched black rice variety will be developed
	<ul> <li>1.6 Title: Development of somaclone using EMS treaded rice seed</li> <li>Progress: During Aus, 2020 a total 85 EMS treated somaclonal variants of BRRI dhan48 (M<sub>1</sub>SC<sub>5</sub>) were evaluated. A total of 25 fixed lines and 77 plants were selected from EMS treated somaclonal variants of BRRI dhan48 (M<sub>1</sub>SC<sub>5</sub>). During T. Aman 2020 a total of 30 EMS treated somaclonal variants of BR11 were grown as OT with standard check but none was selected. A total of 224 EMS treated somaclonal variants of BR11 were grown in the field. Among them 19 fixed lines and 97 plants were selected</li> <li>Duration: 2020-2021</li> </ul>	Short duration high yielding Aus rice variety will be developed
	<ul> <li>1.7 Title: Development of Aus variety through somaclonal variation</li> <li>Progress: Nine fixed somaclonal lines were evaluated during Aus 2020 season as PYT with standard checks. Among them five lines were selected for SYT</li> <li>Duration: 2020-2021</li> </ul>	High yielding Aus rice variety will be developed
	<ul> <li>1.8 Title: Improvement of BRRI dhan47 through somelonal variation</li> <li>Progress: During Boro 2020-21 six somaclonal lines developed from BRRI dhan47 were evaluated as PYT. Among them four lines were selected for further evaluation</li> <li>Duration: 2020-2021</li> </ul>	Seed shattering reduced BRRI dhan47 will be developed
	<b>1.9 Title:</b> Development of antioxidant enriched black rice variety through somaclonal variation <b>Progress:</b> A total of 81 (SC <sub>3</sub> ) and 111 (SC <sub>4</sub> ) somaclonal variants of Lansan, Padi Chelum and Padi Kool were grown in T. Aman/2020. Among them 41 and78 antioxidant enriched black rice plants were selected, respectively. A total 146 and 56 somaclonal variants were grown in Boro 2020-21. Among them	Antioxidant enriched black rice variety will be developed

Sl. no.	Research Progress	Expected output
	440 (SC <sub>3</sub> ) and 41 (SC <sub>4</sub> ) antioxidant enriched plants were	
	selected.	
	<b>Duration:</b> 2020-2021	
		D:00 /
	<b>1.10 Little:</b> Development of rice variety through wide	Different stress
	<b>Progress:</b> A total of 72 lines developed from wide hybridization	will be developed
	were evaluated in T. Aman/2021. Among them 38 plants were	will be developed
	selected for generation advancement. Five (5) backcrosses were	
	done with previously embryo rescued plants to reduce sterility.	
	A total of 102 BC2F1 seeds were harvested.	
	<b>Duration:</b> 2020-2021	
	1.11 Title: Development of high yielding photosensitive rice	High yielding
	variety through anther culture	photosensitive rice
	<b>Progress:</b> During T. Aman 2020, six crosses were done. A total	variety will be
	o 106 $F_1$ was harvested for future anther culture program	developed
	<b>Duration:</b> 2020-2021	
	<b>1.12 Title:</b> Development of premium quality rice (kalijira type)	Premium quality rice
	through somaclonal variation	(kalijira type) rice
	Progress: Matured seeds of kalijira were culture on MS media	variety will be
	to get the calli. Calli were then transferred to regeneration	developed
	medium for regeneration of green plantlets. Seeds were	
	harvested from 14 somacional variants (SCV <sub>0</sub> ) of Kalijira rice.	
	<b>Duration:</b> 2020-2021	
2.	Project II: Marker assisted selection	
	<b>2.1 Title:</b> Identification of QTLs for taller seedling height	QTLs for taller
	<b>Progress:</b> Genotyping of 184 F <sub>2</sub> individuals developed from a	seedling height for
	cross between BR11 x Sadamota (acc. no. 1576) were done.	developing tidal
	Genotyping was done using sixty (60) polymorphic primers	submergence tolerant
	with 184 $F_2$ individuals. From the mapping population, a total	will be identified
	of 11 pedigree lines were grown in 1. Aman 2020. A total of 4	
	Duration: 2017 2021	
	<b>Duration:</b> 2017-2021	
	<b>2.2 Title:</b> Marker assisted selection for fragrance in $F_3$	Validated functional
	Population of BRRI dhan87 and Kalijira.	marker for fragnance
	<b>Progress:</b> I wenty-nine pedigree lines developed from a cross	will be used to
	them \$1 plants were selected on the basis of around around the	Bosmoti nor
	duration and plant height All tested aromatic lines were	Basmati aromatic
	confirmed by using functional marker ( $FSP + IFAP + INSP +$	and non aromatic rice
	EAP) of fragrance gene $BADH2$ . The primers combination of	varieties
	ESP and IFAP amplified the fragrance allele-specific at 257 bp.	
	On the other hand, the primers combination of INSP and EAP	
	amplified the expected non-fragrance-specific allele (355 bp).	

Sl. no.	Research Progress	Expected output
	Thirty eight (38) pedigree lines developed from a cross between BRRI dhan28 and Kalijira were evaluated. Among them 148 plants were selected on the basis of aroma, growth duration and plant height during T Aman 2020. The selected aromatic lines were confirmed by using functional marker (ESP + IFAP + INSP + EAP) of fragrance gene <i>BADH2</i> in early generation. <b>Duration:</b> 2018-2021	
Hybrid	Rice Division	
Varieta	Development program area	
1.	<ul> <li>Project I: Material Development</li> <li>1.1 Title: Identification of prospective B and R from diverse genetic origin &amp; NPT background in source nursery</li> <li>Progress: T. Aman: Two hundred and fifty-six (256) test crosses and 299 (A x R) crosses were made using 13 CMS lines during T. Aman season 2020. Boro: One hundred thirty-four (134) test crosses and 427 (A × R) crosses were made using 14 CMS lines during Boro season 2020-21.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Maximum number of crosses with diverse genetic origin will be made.
	<ul> <li>1.2 Title: Prospective maintainer and restorer lines identification in testcross nursery</li> <li>Progress: T. Aman: During T. Aman season 2020, out of 169 testcrosses (F1s) twelve entries have been found heterotic over check varieties expressing 10-40% yield advantage over check BRRI hybrid dhan6 with similar growth duration, 11-42 % over Dhanny Gold and 13-44% over AZ7006 and fourteen entries were found completely sterile. Pollen parents of those heterotic combinations were regarded as suspected restorers and pollen parents of completely sterile combinations were regarded as suspected maintainer lines.</li> <li>Boro: During Boro 2020-21, eight (8) entries were found completely sterile and eleven (11) entries have been found heterotic over check varieties. Pollen parents of completely sterile and eleven (as suspected maintainer lines and pollen parents of heterotic combinations were regarded as suspected restorers.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	<ol> <li>B and R lines from the crossed entries will be Confirmed,</li> <li>Heterotic rice hybrids will be selected</li> <li>Prospective parent materials will be added into new CMS lines</li> </ol>
	<ul> <li>1.3 Title: Developing CMS lines from identified maintainer through back crossing</li> <li>Progress: T. Aman: Six BC<sub>6</sub> generations were stable in terms of pollen sterility and other desired agronomic traits and hence shifted to CMS maintenance and evaluation nursery as new CMS lines. Other generations were advanced for next generation except for three BC<sub>1</sub> generations. It was discarded due to fluctuation in pollen fertility.</li> </ul>	New promising and adaptable CMS lines having high outcrossing & high amylose will be developed

Sl. no.	Research Progress	<b>Expected output</b>
	Boro: Four $BC_6$ generations were advanced as new CMS lines and shifted to CMS maintenance and evaluation nursery. Other entries were advanced for next generations except three $BC_1$ generations due to pollen fertility fluctuation. <b>Duration:</b> T.Aman: July-Nov/2020 Boro: NovApril/2020-21	
	<ul> <li>1.4 Title: Evaluation of locally developed and exotic CMS lines and their maintainer lines</li> <li>Progress: T. Aman: All the CMS lines were maintained by hand crossing for seed increasing and genetic purity. Overall performance of the experiment was good and expected number of seeds was obtained except one locally collected CMS line. It was discarded due to severe fluctuation in pollen sterility. Boro: All the CMS lines were maintained by hand crossing for seed increasing and genetic purity. Overall performance of the experiment was good and expected number of seeds was obtained except one locally collected CMS line. It was discarded due to severe fluctuation in pollen sterility. Boro: All the CMS lines were maintained by hand crossing for seed increasing and genetic purity. Overall performance of the experiment was good and expected number of seeds was obtained from each entries.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Performance evaluation of newly developed and exotic CMS lines and all CMS lines maintainance will be done by hand crossing for genetic purity.
	<ul> <li>1.5 Title: Development of maintainer lines through (B×B) crosses</li> <li>Progress: T. Aman: Seventeen crosses were made using 15 parents. Selection of parents made based on: - i) phenotypic value that improves breeding value ii) Cyto-source iii) genetic distance. Boro: Fourteen (B×B) crosses were made.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Broadening the genetic base of maintainer lines and develop new recombinant lines for emphasizing yield and cyto-sources
	<ul> <li>1.6 Title: Development of restorer lines through (R×R) crosses</li> <li>Progress: T. Aman: Ten crosses were made using 16 parents.</li> <li>Parents selection was made on the basis of such criteria :- i)</li> <li>phenotypic value that improves breeding value, ii) genetic distance, iii) High amylose (&gt; 25%).</li> <li>Boro: Eleven R×R crosses were made for new recombinant restorer lines development.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Broadening the genetic base of restorer lines and developing new recombinant lines emphasizing on high amylose content and yield.
	<b>1.7 Title:</b> $F_1$ confirmation of $R \times R$ and $B \times B$ crosses <b>Progress:</b> T. Aman: True $F_1$ plants were selected comparing with respective parents. 20-40g disease free seeds from each cross were harvested in R x R improvement experiment whereas, 200g seeds per cross was collected from $B \times B$ improvement experiment. Boro: Fifteen ( $B \times B$ ) and six ( $R \times R$ ) crosses were confirmed as true hybrid. True $F_1$ plants were selected comparing with respective parents. 20-40g disease free seeds from confirmed R	Confirmation of F <sub>1</sub> s and exclusion of crosses due to undesired pollen load

Sl. no.	Research Progress	Expected output
	$\times$ R crosses were collected. Whereas, 200g seeds per cross was collected from confirmed B×B crosses	
	Duration: T.Aman: July-Nov/2020	
	Boro: NovApril/2020-21	
	<b>1.8 Title:</b> Field Rapid Generation Advance (FRGA) for B and R line improvement. <b>Progress: Boro:</b> 8832 progenies from 18 crosses (10 R × R, 3 A × R and 5 B × B) were advanced to $F_3$ generation using field rapid eneration advance (FRGA) technique. <b>Duration:</b> Boro: NovApril/2020-21	Rapid advancement of segregating population for shortening breeding cycle.
	<b>1.9 Title:</b> Generation Advancement of Parental Lines having multi stress genes (HRDC materials) at Restorer (R) and Maintainer (M) background. <b>Progress:</b> T. Aman: In total, 36 progenies were selected from pedigree generations based on the better performance with phenotypic acceptability, insect and disease reaction, grain type and growth duration Boro: Out of 34 screened progenies, 30 progenies having one or more QTL's whereas four progenies having no QTL's. A total of 43 progenies were selected from F <sub>7</sub> generation, among them 15 progenies were harvested as a single plant basis and 28 progenies bulked through pedigree method <b>Duration:</b> T.Aman: July-Nov/2020 Boro: NovApril/2020-21	Progenies were selected for the development of restorers and maintainers with high yield potential and multi stress resistance.
	<ul> <li>1.10 Title: Generation advancement of Fatema dhan</li> <li>Progress: T. Aman: Out of ten segregating lines, selected nineteen plants as new lines based on red stigma, white stigma, awn less and with awn presented</li> <li>Boro: In this season, 21 lines was selected out of nineteen (19) based on red stigma, white stigma, awn less, awn present, plant type panicle size and also other agronomic performance. Entry no 12 Fatema-1 (red tip) panicle exertions were low and susceptible to sheath rot diseases.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Fixed line selection from Fatema dhan
	<ul> <li>1.11 Title: Improvement of restorer lines using Fatema dhan</li> <li>Progress: T. Aman: A total 46 plants were selected from 9 crosses. Boro: A total 40 plants were selected from 9 crosses.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	New recombinant restorer lines development.
	<ul> <li>1.12 Title: Evaluation of Multi-stress tolerant lines of HRDC (Hybrid Rice Development Consortium)</li> <li>Progress: T. Aman: The tested lines were evaluated based on plant height, days to 50% flowering, anther color, pollen grain, panicle length, spikelet fertility (%), phenotypic acceptability</li> </ul>	Identification of prospective maintainers and restorers from MST materials.

Sl. no.	Research Progress	<b>Expected output</b>
	and pollen load during T Aman 2020. Among these lines MST3 and MST15 were shown segregation and based on uniformity and superiority eleven (11) from MST3 and two (2) plants from MST15 were selected for next generation. Boro: The tested lines were evaluated based on plant height, days to 50% flowering, anther color, pollen grain, panicle length, spikelet fertility (%), phenotypic acceptability and pollen load during Boro 2020-21. Among these lines MST3 and MST15 had shown segregating phenomenon and individual plants were selected based on performance. Eleven best plants from MST3 and two from MST15 were selected. <b>Duration:</b> T.Aman: July-Nov/2020 Boro: NovApril/2020-21	
2	<b>Project-II: Evaluation of parental materials &amp; hybrids</b>	Dromising hybridg
	<ul> <li>2.1 The Observational Trial (OT) of experimental hybrids</li> <li>Progress: T. Aman: Out of 336 hybrids twenty-four hybrid combinations performed well but finally selected five upon yield range at least 7.5 t/ha. The selected hybrid combinations expressed 16-22% yield advantage over BRRI hybrid dhan6, 20-26% over AZ 7006 and 14-20% over Dhanny Gold. Upon commercial seed production feasibility of these selected hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combination will be submitted to SCA trials. The heritability obtained from yield was 82% indicating high level of precision in this experiment.</li> <li>Boro: Out of 173 hybrids eighteen (18) hybrid combinations were selected based on yield, duration and grain type. The selected hybrid dhan5, 11-35% over Tej Gold, 9-32% over Teea and 26-53% over SL8H. Upon commercial seed production feasibility of these selected hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combinations, PYT and MLT trials will be conducted and based on satisfactory yield advantage over check, hybrid combination will be submitted to SCA trials. The heritability obtained from growth duration, thousand grain weight, spikelet fertility and grain yield were 84%, 80%, 57% and 59% indicating high level of precision in this experiment.</li> <li>Duration: T.Aman: July-Nov/2020 Boro: NovApril/2020-21</li> </ul>	Promising hybrids will be selected
	<b>Progress:</b> T. Aman: Under preliminary yield trials one hybrid was selected out of 10. It showed yield advantage 12% over BRRI hybrid dhan6, 26% over AZ 7006 and 28% over Dhanny	yield potential hybrids will be identified
	Boro: During Boro 2020-21 we selected three hybrids out of 14, based on yield, grain quality and amylose content. All the selected hybrids showed yield advantage ranging from 6-12 %	

Sl. no.	Research Progress	Expected output
	over BRRI hybrid dhan5, 10-16 % over Tej Gold, 15-22 % over Teea and 11-17 % over SL8H. Heritability of yield was 75% indicating high level of precision of this experiment. Location: BSCRI, Gazipur. Duration: T.Aman: July-Nov/2020 Boro: NovApril/2020-21	
	2.3 Title: Multi-location Yield trials of Promising hybrids Progress: T. Aman: Out of twelve hybrids, three combinations exhibited yield advantage ranged from 7-13% over BRRI hybrid dhan6, 11-16% over AZ 7006 and 15-21% over Dhanny Gold with similar growth duration of BRRI hybrid dhan6 but around two week earlier than check variety AZ7006 and Dhanny Gold. Yield level was not satisfactory in Barishal site due to bird damage. Boro: Three hybrids were selected based on stable yield performance and advantage over check across location. All the selected hybrids showed yield advantage ranging from 3-4 % over BRRI hybrid dhan5, 10 –12 % over Tej Gold, 14-16 % over Teea and 9-10 % over SL8H. Yield fluctuation in Barishal happened due to disease and bird attack during flowering and maturity stage. Heritability of mean yield was 76 % indicating high level of precision of this experiment <b>Duration:</b> T.Aman: July-Nov/2020 Boro: NovApril/2020-21	Potential hybrids with wide adaptability will be selected
	<ul> <li>2.4 Title: Performance evaluation of new HRDC hybrids with local check</li> <li>Progress: A total of nine hybrids were evaluated including two checks. Among these hybrids IR136947H &amp; IR136890H performed well compared to check with short growth duration. HRDC hybrid IR136947H showed yield advantage 4.7% and 6.1% over check variety BRRI hybrid dhan5 and Teea, respectively. Another hybrid IR136890H also showed yield advantage 0.6% and 1.9% over check variety BRRI hybrid dhan5 and Teea, respectively. Late arrival, one location evaluation and one year replicated yield trial do not reflect the actual yield potential of a variety. So, need more seeds in time from HRDC to conduct yield trials in multi-location for true yield potentiality assessment.</li> <li>Duration: Boro: NovApril/2020-21</li> </ul>	Promising hybrids will be selected
	<b>2.5 Title:</b> Performance evaluation of BRRI developed new	Promising hybrids
	promising hybrids <b>Progress:</b> A total of 53 hybrids were evaluated including four checks. Among these hybrids five hybrids were selected based on yield and at per or lower growth duration compared to check varieties.	will be selected

Sl. no.	Research Progress	Expected output
	Duration: Boro: NovApril/2020-21	
	<b>2.6 Title:</b> Blast tolerant parental line development of hybrid rice. <b>Progress:</b> Seed multiplication was done and at the same time six test crosses were performed to confirm the presence and absence of fertility restorer ( <i>Rf</i> ) gene in the blast tolerant lines. <b>Duration:</b> Boro: NovApril/2020-21	Five test crosses will be performed to confirm the presence and absence of fertility restorer ( <i>Rf</i> ) gene in the blast tolerant lines.
	<ul> <li>2.7 Title: Assessment of specific and general adaptability for selection of suitable rice hybrids under saline prone areas for Boro season</li> <li>Progress: Adaptability under saline condition of BRRI developed and popular company hybrids along with popular saline tolerant inbred checks BRRI dhan67, Bina dhan-10 and locally cultivated rice IT was done at two coastal locations of Satkhira and one location at Koyra, Khulna. None of the tested entries survived at Kaliganj, Satkhira and Koyra, Khulna due to very high-water salinity (30.23 ds/m and 25.8 ds/m, respectively). We found that the top three highest yielding genotypes were BRRI hybrid dhan5 (8.23 t ha-<sup>1</sup>), BRRI hybrid dhan4 (8.20 t ha-<sup>1</sup>) and BRRI hybrid dhan3 (7.90 t ha-<sup>1</sup>) followed by BRRI hybrid dhan5, BRRI hybrid dhan4, BRRI hybrid dhan3 and BRRI hybrid dhan6 can be cultivated profitably in areas where water salinity level of the paddy field remains 3 ds/m to 7 ds/m</li> </ul>	To find out suitable hybrid rice genotypes suitable for saline prone areas for Boro season.
	<ul> <li>2.8 Title: Screening of parental lines of hybrid rice against salinity during Boro 2020-21</li> <li>Progress: The yield performance of the tested entries is presented in Table 47. Among the tested 55 parental lines along with checks were identified tolerant at 4.53 to 8.30 ds/m in Kaligonj and 5.56 to 9.41ds/m in Assasuni of Satkhira district respectively (Fig. 1). The yield range was 2.85-5.55t/ha in Kaligonj where the highest yield was found in standard check variety BRRI dhan67 followed by LPH 47R (5.47 t/ha), IR58443-6B-10-3 (5.44 t/ha), EL 254R (5.43 t/ha) and BRRI 15R (5.32 t/ha) respectively whereas the lowest yield was found in the standard check BRRI dhan97 (5.21t/ha) followed by IR58443-6B-10-3 (5.08 t/ha), IRRI New R 2019 (5.08 t/ha), and EL260 (4.93 t/ha) respectively. The lowest yield was obtained from BRRI35B (2.53 t/ha). Comparing two locations' average yield of parent lines with check varieties found that none of the tested entries showed yield advantage over Ck-1 and</li> </ul>	finding out salinity tolerant line (s) having better phenotypic acceptance, higher yield potential, and higher survivability than the standard checks under the saline prone field.

Sl. no.	Research Progress	Expected output
	Ck-5. Similar to seventeen percent yield advantage over Ck-2 found in 20 entries whereas up to five percent more yield over each of Ck-3 and Ck-4 was observed in seven entries. The yield performance of 31 entries was found similar to twenty-six percent more over the susceptible check variety (Ck-6). The performance of tested entries regarding seedling stage salinity tolerance is presented in Table 48. Among the tested entries, 12 entries were identified as tolerant to moderately tolerant at 12dS/m. The Survivability ranged from 60.0 -100% with SES scores of 3.0-5.0 respectively. The rest of the genotypes was found susceptible to highly susceptible. One or more QTLs of salinity tolerance were identified only in 15 parent lines. Out of these lines, only three such as F2277R, BRRI7B, and BRRI10B were found as tolerant to moderately tolerant in the screening of parent lines against salinity tolerance at the seedling stage. <b>Duration:</b> Boro: NovApril/2020-21	
	<ul> <li>2.9 Title: Comparative performance of Super hybrid US-88 with BRRI hybrid dhan6 during T Aman 2020 and Boro 2020-21</li> <li>Progress: T. Aman: Performance of super hybrid US-88 compare to BRRI hybrid dhan6 was not satisfactory due to late sowing and transplanting and at milking stage of panicle, there was heavy rainfall and gusty wind that made both the entries lodging. Average replicated yield of US-88 was 4.30 t/ha ranging from 2.53 to 5.58 t/ha while BRRI hybrid dhan6 was 4.15 t/ha ranging from 3.72-4.71 t/ha. Boro: Super hybrid US-88 did not perform well due to severe BLB infestation at flowering stage and yielded the lowest 6.97 t/ha. Whereas popular hybrids Tej Gold and SL8H gave yield 8.73 t/ha and 8.77 t/ha respectively and less infested by BLB. BRRI developed promising hybrid-1 &amp; 2 did not give expected yield due to BLB infestation and it was 8.66 t/ha and 7.47 t/ha respectively. But BRRI released popular hybrid BRRI hybrid dhan3 and BRRI hybrid dhan5 performed well and showed yield 9.56 and 9.22 t/ha, respectively.</li> </ul>	Performance of super hybrid US-88 with BRRI hybrid dhan6 will be evaluated.
3	<b>Project-III: Seed production</b> <b>3.1 Title:</b> CMS seed multiplication of BRBI7A_BRBI10A	BRRI hybrid dhan
	BRRI35A and BRRI97A during T. Aman, 2020 <b>Progress:</b> T. Aman: Seed yield of 48.5 kg/plot (0.09 t/ha), 101 kg/plot (1.01 t/ha), 41 kg/plot (0.41 t/ha) and 145 kg/plot (0.97 t/ha) were obtained from BRRI7A, BRRI10A, BRRI35A and BRRI97A respectively in T. Aman season 2020. Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period. Boro:	seed production and cultivation technologies will be optimized for Bangladesh conditions

Sl. no.	Research Progress	Expected output
	Duration: T.Aman: July-Nov/2020 Boro: NovApril/2020-21	
	<ul> <li>3.2 Title: Foundation CMS seed production of BRRI hybrid dhan5</li> <li>Progress: T. Aman: Seed yield of 24.1 kg/plot (0.28 t/ha) was obtained from BRRI7A in T. Aman season 2020. Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Pure and good quality seed of CMS line will be developed for subsequent use.
	<ul> <li><b>3.3 Title:</b> CMS line multiplication of BRRI hybrid dhan6</li> <li><b>Progress:</b> T. Aman: Seed yield of 710 kg/plot (1.29 t/ha) was obtained from IR79156A in T. Aman season 2020 (Table 21).</li> <li>Seed yield was satisfactory due flowering time was less interrupted by rain.</li> <li>Boro:</li> <li><b>Duration:</b> T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Pure and good quality breeder seed of CMS lines will be produced for subsequent use.
	<ul> <li>3.4 Title: Small scale breeder seed production of promising CMS lines duing T. Aman, 2020</li> <li>Progress: T. Aman: Seed yield of 1.0 kg/plot (0.2 t/ha), 1.3 kg/plot (0.26 t/ha) and 3.0 kg/plot (0.4 t/ha) were obtained from IR58025A, IR102758A and IR78369A respectively in T. Aman season 2020. Seed yield was very poor due to pollen was washed out for continuous heavy rain during supplementary pollination period.</li> <li>Boro: Seed amount got from selected promising CMS lines ranging from 0.81 to 2.08 t/ha during Boro 2020-21. Seed amount varied CMS line to CMS line due to rain at supplementary time and it was happened in particular entries due to sowing time difference for making time isolation in flowering.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Pure and good quality breeder seed of CMS lines will be produced for subsequent use.
	<b>3.5 Title:</b> CMS seed multiplication of BRRI hybrid dhan2, BRRI hybrid dhan3, BRRI hybrid dhan4, BRRI hybrid dhan5 and BRRI hybrid dhan6 during Boro season 2020-21 <b>Progress:</b> CMS seed yield of 350 kg (1.40 t/ha), 624 kg (1.84 t/ha), 251kg (2.04 t/ha), 289 (1.4 t/ha) and 1938 kg (2.85 t/ha) were obtained from BRRI10A, BRRI11A, IR58025A, BRRI7A and IR79156A, respectively. <b>Duration:</b> Boro: NovApril/2020-21	Pure and good quality seed of CMS lines for subsequent use will be produced.
	<b>3.6 Title:</b> Multiplication of Released Hybrid Restorer lines during Boro, 2020-21	Good quality seeds of R lines will be produced.

Sl. no.	Research Progress	Expected output
	<b>Progress:</b> Seed yield of 6.0 t/ha, 7.0 t/ha, 7.5 t/ha 6.33 t/ha and 5.33 t/ha were obtained from BRRI10R, BRRI15R, BRRI20R, BRRI31R and EL254R, respectively. Fresh seeds of restorer lines are prerequisite for good quality hybrid seed production.	
	Duration: Boro: NovApril/2020-21	
	<b>3.7 Title:</b> F <sub>1</sub> seed production through contract grower during Boro, 2020-21 <b>Progress:</b> During Boro 2020-21, we got 5000 kg (2.5 t/ha) of BRRI hybrid dhan3, 4420 kg (2.46 t/ha) of BRRI hybrid dhan4, 6790 kg (2.61 t/ha) of BRRI hybrid dhan5, 4550 kg (2.47 t/ha) of BRRI hybrid dhan6 and 4000 kg (2.08 t/ha) seeds of BRRI hybrid dhan7 from Ishwardi, Pabna.	Large amount of seed of BRRI hybrid dhan will be produced.
	Duration: Boro: NovApril/2020-21	
	<ul> <li>3.8 Title: Experimental F1 seed production of promising hybrids during T Aman, 2020</li> <li>Progress:</li> <li>T. Aman: Experimental F1 seed production ranging 0.19 to 14.5 kg/plot from selected promising hybrid combinations during T. Aman 2020 which was equivalent to 0.06 to 2.90 t/ha. Some combinations did not produce sufficient seeds due to lack of flowering synchronization and frequent raining during flowering time.</li> <li>Boro: Experimental F1 seed production ranging 1.1 to 58.2 kg/plot from selected promising hybrid combinations during Boro 2020-21 which was equivalent to 0.07 to 3.90 t/ha. Some combinations did not produce desired seed due to lack of flowering synchronization and frequent raining during Boro 2020-21 which was equivalent to 0.07 to 3.90 t/ha. Some combinations did not produce desired seed due to lack of flowering time.</li> <li>Duration: T.Aman: July-Nov/2020</li> <li>Boro: NovApril/2020-21</li> </ul>	Sufficient quantity of F1 hybrid seeds will be produced for PYT & MLT
	<b>3.9 Title:</b> F <sub>1</sub> seed production of BRRI hybrid dhan4, BRRI hybrid dhan5 and BRRI hybrid dhan6 during Boro, 2020-21 <b>Progress:</b> A total of 860 kg (2.15 t/ha) from BRRI hybrid dhan5 and 1330 kg (2.2 t/ha) from BRRI hybrid dhan6 were obtained. Seed yield of 63 kg/plot (1.6 t/ha) and 111 kg/plot (0.74 t/ha) was obtained from IR58025A and BRRI7A, respectively. Seed yield was very poor in case of BRRI7A due to continuous heavy rain during supplementary pollination time that washed out pollen grains. <b>Duration:</b> Boro: NovApril/2020-21	Sufficient quantity of F <sub>1</sub> seeds for subsequent use will be produced.
4	Project-IV: Dissemination of Hybrid rice technology	
	<b>4.1 Title:</b> Parental lines & F1 seed distribution	BRRI developed
	T. Aman:	nybrid rice varieties

Sl. no.	<b>Research Progre</b>	SS					Expected output	
	Sl. Recipient	Nos.	$F_1$	A line	B line	R line	will be expanded and	
	01 Seed Companies	13	400	70	- (Kg)	25	popularized.	
	02 Farmers 03 BRRI Scientists + sta	85 ffs 20	688 800	-	-	-		
	04 BRRI, R/S (5)+SPIR	A 6	500	-	-			
	Total Grand Total	124	2388	70	0.00 2483 Kg	25.00		
	Boro							
	Sl. Recipient	Nos.	F <sub>1</sub>	A line	B line	R line		
	No.           01         Seed Companies	24	(kg) 856.0	(kg) 1771.00	<u>(kg)</u>	(kg) 593.00		
	02 Farmers BRRI Scientists +	120	1000.0	350.00	-	150.00		
	staffs +DAE BRRI, R/S (5)	19	5020.0	-	-			
		6 169	8876.00	- 2121.00	- 0.00	743.00		
	Grand Total		•	1	1740.00			
	Duration: T.Ama	n: July-	Nov/20	20				
Const	Boro:	NovA	$\frac{1}{202}$	20-21				
Variate	Resources and Se	ea Divis gramm	sion e area					
<u>v al icia</u>	Project I: Rice G	ermnla	<del>e area</del> sm Cor	iservat	ion and	Management		
1.	1.1 Title:Two	o local	rice var	rieties	of Bangl	adesh namely		
	Dinajpur Kat	aribhog	(Acc.	no. 4	791) and	d Bangladesh	Helps to promote	
	Kalijira (Acc.	. no 24'	7) from	BRRI	Rice Ge	enebank were	branding of Kalijira	
	ranked as GI	product	s of Ba	nglades	h.Publisł	ned in Journal	and Kataribhog at	
	no. 5 and 6 of	f 'The C	Jeograp	hical Iı	ndication	(GI) Journal'	National and	
	of Bangladesl	n on No	vember	; 2020	by the I	Department of	International level.	
	Patents, Desig	gns and	Trade	Marks,	Ministr	y of Industry,		
	Bangladesh.							
	1.2Title: Collection	on of ric	e (Oryz	a sativ	a L.) geri	nplasm.		
	Progress: 156 ric	e germp	lasm of	which	8 in Aus	, one <i>Jhum</i>	The collected new	
	rice, 88 in T. Ama	ın, 46 in	B. Am	an and	13 in Bo	ro seasons	germplasm enriched	
	were collected fro	m diffei	ent dist	ricts of	Banglad	lesh including	the rice Genebank	
	hilly areas						for different users	
	Duration: July 20	20 to Ju	ne 2021				for different users.	
	-							
	1.3 Title: Rejuver	nation a	nd conse	ervatio	n of rice g	germplasm.		
	Progress: A total	of 2,679	) germp	olasm o	f which 6	532		
	accessions (betwee	en Acc.	2501 to	o 5000)	in T. Au	s 2020, 1,465	Rejuvenation of the	
	accessions (betwee	en Acc.	2001 to	o 4000)	in T. An	nan 2020 and	Genebank accessions	
	582 accessions (be	etween A	Acc. 01	to 460	0) in Bor	o 2020-21	with fresh slock and	
	were rejuvenated	in field	for getti	ng fres	h seed an	nd on average	medium and long-	
	500 g of seeds per	accessi	on were	e produ	ced.		term storage	
	Duration: July 20	)20 to Ju	ine 202	1			~	
	<b>1.4 Title:</b> Morpho	logical	characte	erizatio	n of rice	germplasm.		
	Progress: Four ex	perime	nts were	e condu	cted to cl	haracterize	Significant variability	
	156 rice germplas	m (acce	ssions a	s well	as new co	ollections) of	was observed among	
	which 48 in Boro	2019-20	) under	PBRG	_NATP-2	2 project, 28	the studied	
	in T. Aus 2020 an	d 50 in '	T. Ama	n 2020	through	52 agro-	germplasm	
	morphological tra	its (both	21 qua	ntitativ	e and 31	qualitative	considering specific	

Sl. no.	Research Progress	Expected output
	characters) using the 'Rice Germplasm Descriptors and	trait i.e. extreme low
	Evaluation Form' (2018), GRSD, BRRI at GRSD, BRRI,	to extreme high and
	Gazipur. But in Boro 2020-21, 30 germplasm were	this variability could
	characterized on the basis of 10 quantitative characters.	be used in rice
	Duration: July 2020 to June 2021	breeding.
		The varieties having expected higher yield and other desirable characters would be utilized in crossing program, if satisfy the breeder's targeted objective
	<ul> <li>1.5 Title: Molecular characterization of rice germplasm</li> <li>Progress: Forty-eight Aus and 72 T. Aman rice germplasm</li> <li>were studied in the Molecular Laboratory of GRSD, BRRI for</li> <li>developing DNA profiles under PBRG-NATP-2 project. Total</li> <li>genomic DNA was extracted from young leaves of three-</li> <li>week-old plants following the quick DNA extraction protocol</li> <li>of Ferdous <i>et al.</i> (2012).</li> <li>Duration:July 2020 to June 2021</li> </ul>	The DNA profile of 48 Aus and 72 T. Aman rice germplasm were generated and the unrooted neighbour-joining tree grouped the germplasm into three (3) and four (4) major clusters, which would be utilized in crossing program, if satisfy the breeder's objective
	<ul> <li>1.6 Title: Germplasm processing, registration and storage</li> <li>Progress: In total 2,915 germplasm were processed and conserved with respective accession number in different storages of Genebank during reporting year. The germplasm were cleaned and dried with a seed moisture content of less than 9% for short-term storage.</li> <li>Duration: July 2020 to June 2021</li> </ul>	Twenty-sixnewgermplasmwereregisteredasnewaccessionsaccessionnumber8,605to8,605to8,630inBRRIGenebankforsafeconservation.
	<ul> <li>1.7 Title: Rice germplasm supply and exchange</li> <li>Progress: A total of 1,545 samples were supplied to 33</li> <li>different users in the reporting year. Among the samples,</li> <li>1,123 germplasm accessions were supplied for research</li> <li>purpose and 422 samples of BRRI developed rice varieties</li> <li>were supplied to the researchers, Department of Agricultural</li> <li>Extension (DAE) personnel and university students for</li> <li>research, demonstration as well as other purposes.</li> <li>Duration: July 2020 to June 2021</li> </ul>	Supplied germplasm were utilized for crossing to develop new better rice variety and the screening program identify the tolerant germplasm against different biotic and abiotic stresses.
2.		

Sl. no.	Research Progress	Expected output
	<b>Project II: Seed Production and Variety Maintenance</b>	
	<b>2.1 Title:</b> Variety maintenance and nucleus seed production <b>Progress:</b> One hundred and eleven BRRI developed and recommended rice varieties including 14 local improved varieties (LIVs) were maintained using panicle to row method, implementing time isolation and performing thorough roguing.	After harvest, both intact panicles and nucleus seed of each variety were stored (20°C with 40% RH) for maintaining varieties
	<ul> <li>Progress: Fifty-one BRRI developed rice varieties of which 33 in T. Aman and 18 in Boro were grown following panicle to row method to produce nucleus seed stocks for breeder seed production.</li> <li>Duration: July 2020 to June 2021</li> </ul>	At maturity, panicles from 'true to type' plants of all the varieties were harvested and both intact panicles for BRRI HQ, Gazipur and nucleus seed stocks for BRRI regional stations were stored in controlled temperature (20°C with 40% RH) for breeder seed production
	<ul> <li>2.2 Title: Breeder seed production and distribution</li> <li>Progress: GRS Division, Farm Management Division and nine regional stations of BRRI were engaged in breeder seed (BS) production as per national demand. The BS plots were visited to monitor the varietal purity and performances. Off-type plants were identified and rogued out in every growth stage.</li> <li>After harvesting of a variety, the seeds were separately threshed, dried, cleaned and stored in controlled temperature (20°C with about 40% RH) at BRRI HQ, Gazipur. The harvested seeds then offered as seed lot for getting 'tag' from Seed Certification Agency (SCA) which is required for distribution.</li> <li>Duration: July 2020 to June 2021</li> </ul>	A total of 193.03 tons of breeder seed of which 139.39 tons of 17 Boro varieties, 9.64 tons of eight Aus varieties and 44.00 tons of 28 T. Aman varieties were produced during 2020-21. At the same time, 186.212 tons of breeder seed of which 134.391 tons of 17 Boro varieties, 8.851 tons of eight Aus varieties and 42.970 tons of 28 T. Aman varieties were distributed with tags
		distributed with tags among 996 partners (GO, NGO and PS)

Sl. no.	Research Progress	Expected output
		for foundation seed
		production.
	<b>2.3 Title:</b> Sending SMS to SeedNet partners for breeder seed	Eight partners before
	distribution	Aus 2021 and 1/5
	<b>Progress:</b> Text message (SMS) with variety name and allotted	Aman 2021 seasons
	quantity of breeder seed were sent through mobile apps	were messaged for
	Duration: July 2020 to June 2021	distributing breeder
		seed through BRRI
		'Rice Seed Network'.
	<b>2.4 Title:</b> Monitoring seed production plots and farms	No major insect-pest
	Progress: Breeder seed production plots of BRRI regional	damage, varietal
	stations (RSs) at Rangpur and Cumilla along with	impurity (<1%) and
	foundation seed production farm of BADC at Kashimpur,	no obnoxious weeds
	Mymensingh were visited.	Isolation distances
	Duration: July 2020 to June 2021	and crop conditions
		were satisfactory.
		The seed producers
		were advised for
		thorough roguing by
		themselves for one
		more time before
		harvesting for
		production seed
3.	Project III: Exploratory and Genetic Studies	
	<b>3.1 Title:</b> Secondary Yield Trial (SYT) of of Balam rice	The highest grain
	germplasm	yield per plot (6 sq.
	Progress: Balam (Acc. 516) and Jesso-Balam TAPL (Acc.	m) as yield per
	2473, 2472) along with BR7 and BRRI dhan80 as standard	hectare was observed
	checks were grown in T. Aman 2020.	in Acc. no. $2472 (4.93)$
	Duration: July 2020 to December 2020	kg as $4.5 / t ha^{-1}$ ),
		10110wed by 4.29 kg as $3.98$ t ha <sup>-1</sup> in Acc
		516 and $335$ kg as
		$3.10 \text{ t ha}^{-1}$ in Acc.
		2473, which were
		significantly different
		from the checks and
		selected for T. Aman
		2021 as Regional
	2.2 Titles Cocondomy Viold Trick (OVT) of Code Materia J1	Yield Trial (RYT).
	Mota rice germplasm	The grain yield per
	Progress: Sada Mota (Acc. 7888) and Lal Mota (Acc. 7889)	plot (6 sq. m) as vield
	along with BRRI dhan 76 and BRRI dhan 77 as standard checks	per hectare was
	were grown in T Aman 2020	observed in Acc.
	Duration · July 2020 to December 2020	7889 (4 kg as 3.68 t
		$ha^{-1}$ ) and 3.8 kg as

Sl. no.	Research Progress	Expected output
		3.47 t ha <sup>-1</sup> in Acc. 7888, which were significantly different from the checks and
		selected for T. Aman 2021 as RYT.
	<ul> <li>3.3 Title: Performance study of nine aromatic rice germplasm</li> <li>Progress:Nine aromatic rice germplasm accessions <i>viz</i>.</li> <li>Chinigura, Jirakatari, Chinisail, Chiniatop, Dhonia,</li> <li>Khatobabu, SubalLata, Katari-1 (Sada), Katari-2 (Lal) and</li> <li>BRRI dhan34 as standard checks were evaluated as PYT</li> <li>during T. Aman 2020.</li> <li>Duration:July 2020 to December 2020</li> </ul>	The highest grain yield $(5.04 \text{ t ha}^{-1})$ was observed in Chiniatop, followed by 4.53 t ha <sup>-1</sup> in Chinigura, 4.51 t ha <sup>-1</sup> in Katari-1 (Sada) and 4.49 t ha <sup>-1</sup> in Chinishailalong with 3.51t ha <sup>-1</sup> for BRRI dhan34 and selected for SYT in the next season.
	<b>3.4 Title:</b> DNA finger printing of Kalijira rice germplasm <b>Progress:</b> Forty-two Kalijira accessions in T. Aman season were studied using 50 SSR markers during T. Aman 2020. DNA extracted, PCR products, temperature profiles, gel documentation and data analysis were performed.	DNA profile of 42 Kalijira accessions with SSR markers were generated and documented
	<b>Duration:</b> July 2020 to June 2021	
	<ul> <li>3.5 Title: Evaluation of photosensitive rice germplasm collected from Northern districts of Bangladesh Progress: A total of 10 photosensitive germplasm along with three checks were grown late (transplanting 15 September) in T Aman season to identify germplasm suitable for late transplanting after flood in northern region of Bangladesh (Bogura, Kurigram, Lalmonirhat, Gaibandha, Rangpur and Jamalpur).</li> <li>Duration: July 2020 to June 2021</li> <li>3.6 Title: Performance evaluation of local aromatic rice germplasm from BRRI Genebank Progress: A total of 65 T. Aman aromatic rice germplasm were evaluated for different traits to select the suitable/ desired/ superior germplasm comparing with BRRI dhan34 for releasing as a new variety.</li> </ul>	One germplasm from Mal Shira group (Acc. no. 299), one from Ganjia group (Acc. no. 520) and one BindiPakri (Acc. no. 4810) were selected on the basis of their morpho- agronomic traits for further evaluation Thirteen germplasm <i>viz.</i> Sai bail, Khaskani, Tulsimala, Chini Atop, Jira Dhan, DeshiKatari, KatariBhog, Chini Sail, Chini Kanai, Pachet
	Duration: July 2020 to June 2021	Parbat Jira, ModhuMadab, MeeDhan and Khasa Mukhpura were selected on the basis

Sl. no.	Research Progress	Expected output
		of their morpho-
		agronomic traits for
		further evaluation
	<b>3.7 Title:</b> Performance study of Jirasail genotype	
	<b>Progress:</b> Different Jirasail accessions collected from Bogura,	Rajshahi, Jirasail
	Jashore, Rajshahi. Naogaon and Tangail along with BRRI	produced the highest
	dhan81 as standard check was evaluated as Secondary Yield	grain yield $(5.10 \text{ t ha})$
	Trial (SYT) during Boro 2020-21 at BRRI Gazipur	Jionowed by Bogura Jirosoil $(5.01 \text{ t } \text{ he}^{-1})$
	Duration: November 2020 to April 2021	which was about $0.6$ t
		ha <sup>-1</sup> higher than check
		variety BRRI dhan81
		and selected for SYT
		in the next season.
	<b>3.8 Title:</b> Characterization of similar named Tepi Boro group	
	of rice germplasm	Diverse ranges of
	<b>Progress:</b> Twenty-five similar named TepiBoro group of rice	variations were
	germplasm were characterized through 33 qualitative agro-	observed among the
	morphological traits and three SSR markers at GRSD, BRRI,	germplasm. The
	Gazipur. The sensory test with 1.7% KOH solution (Sood and	molecular study
	Siddiq 1978) was also conducted. All germplasm along with	value ranged from
	Kalizira (Acc. 1589), Bangladesh Kalijira (Acc. 247) and	0.29 (RM282) to 0.47
	BRRI dhan34 as checks were molecularly characterized using	(RM223) and the
	aroma link RM282, RM273 and RM223 markers	unrooted neighbour-
	Duration: November 2020 to April 2021	joining tree grouped
		the germplasm into
		three major clusters
		and generated
		information were
		documented for
	3.0 Title: Identification and selection of sticky rise from <i>Hum</i>	The highest grain
	rice germplasm	vield/bill (20.08 g)
	<b>Progress:</b> Fifty-six <i>Jhum</i> rice germplasm were characterized to	was observed in
	study the selection criteria during Aus 2020	Rengkhoea dhan
	Duration: July 2020 to June 2021	followed by 19.42 g
		in Chhuri dhan, 18.96
		g in Sray, 18.92 g in
		company, 18.54 g in
		Kamra and the lowest
		(2.91  g) in Horina
		Binni Iollowed by
	3 10 Title: Dormancy and storage ability of newly released	
	BRRI rice varieties	
	Progress: Freshly harvested 13 new BRRI released rice	
	varieties (Fig 7) of Boro season were tested for germination to	
	check the dormancy and storage ability. After sun-drying and	No dormancy period was observed in any

Sl. no.	Research Progress	Expected output
	grading, the seeds (<12% moisture) of all the varieties were	of the studied
	stored at 20°C in 50% RH. One hundred healthy seeds were set	varieties and
	in each Petri dish in three replications. Germination data were	continued for another
	collected starting from 6 <sup>th</sup> June 2021 and continued with	six months with
	maintaining a seven days interval from the initial date of	maintaining a 15 days
	storage	interval for getting
	storage.	consistent result for
	Duration:November 2020 to April 2021	luture use
GQN D	ivision	
<b>Varieta</b>	Development programme area	
	<b>Programme area/Project (Duration)</b>	
1	<b>Project I: GRAIN QUALITY CHARECTERISTICS FOR VARIETY DEVELOPMENT</b>	
	1.1 Title: Determination of physicochemical and cooking	Among them 75 had
	properties of advanced breeding lines (Continue)	more than 70%
	Progress: A total of 663 breeding lines were analyzed	milling outturn, 92
		had more than 60%
		head rice recovery, 22
		have shown
		translucent (1r) grain,
		257 had long grain,
		I/2 had more than 5.0 I/R ratio 371 had
		L/D ratio, $3/1$ had more than $25.0%$
		amylose content 55
		had more than 9.0%
		protein content, 27
		had more than 1.5
		elongation ratio and
		190 had between the
		range of (4.0-5.0)
		volume expansion
		ratio. Some of the
		promising lines were
		identified for higher
		milling and head rice
		recovery, size and
		snape, amylose
		content, protein
		ratio and accentable
		other
		physicochemical
		properties.
		r-r-r-

Sl. no.	Research Progress	Expected output
	<b>1.2</b> Title: Determination of physicochemical and cooking	A total number of two
	properties of transforming rice breeding lines	thousand nine
	(Continue)	hundred fifty seven
	Progress: A total of 2957 samples were analyzed.	(2957) lines were
		evaluated for grain
		quality properties for
		superior quality.
		Based on the
		performance on grain
		quality, we
		recommend eight
		lines for FBR
		(PYT#1), 4 for FBR
		(BZT) (PYT#2), CTR
		(PYT#4), 7 for FBR
		(AYT # 1,2) , 2 for
		CTR, Haor
		(AYT#3,4) and 8
		lines for boro (SYT #
		1,2,3) for further
		advancement.
	<b>1.3</b> Title: Evaluation of physicochemical properties of	BRRI Website were
	newly released BRRI varieties (Continue)	updated
	Progress: All physicochemical and cooking data up to BRRI	
	dhan89 and BRRI hybrid dhan1 to BRRI hybrid dhan7 were	
	analyzed.	
2.	Project I I : GRAIN QUALITY PARAMETERS FOR	
	CONSUMER PREFERENCE	
	2.1 The: To Screening, Selection, and Training of Sensory Developments (Continue)	
	Panensis (Continue)	
	Progress: Methodology & Questioners were developed Study	
	will start commence soon	
3	Project I I I: Nutritional Quality Assessment of Rice	
3	2 1 Title: Effect of 7n and phytote activities on 7n enviced	The range of milling
	rice variation at different locations in T. Aman season	outturn is $69$ to $72\%$
	The varieties at unicient locations in 1. Aman season	bead rice recovery is
	Progress: Physicochemical properties and micronutrient	57 to 67% milled rice
	contents of BRRI dhan72 have shown variation at different	length is 65 to 69
	locations due to climatic factor such as drought, flood salinity	mm. L/B ratio is 3.1
	high temperature and soil conditions.	to $3.7$ , 1000 grain wt.
		is 23.3 to 25.59.
		amylose content is
		20.0 to 23.1%, protein
		content is 8.6 to 9.8.
		cooking time is 16:30
		to 18:30 min
		imbibition ratio is 3.9
		to 4.3, iron content is

Sl. no.	Research Progress	Expected output
		6.5 to13.2 ppm and
		zinc content is 15.9 to 20.1 ppm of BRRI
		dhan62. Similarly, the
		range of milling
		outturn is 69 to 72%,
		53 to 61%, milled rice
		length is 6.5 to 6.7
		mm, L/B ratio is $2.6$
		to 2.8, 1000 grain wt. is $27.8$ to $28.9g$
		amylose content is
		22.3 to 26%, protein
		content is 6.9 to 9.2%, imbibition ratio is 3.7
		to 4.5, iron content is
		4.5 to15.0 ppm and
		zinc content is 10.7 to
		dhan72.
4	Project IV: COMMERCIAL RICE BASED	
	PRODUCTS	
	4.1 Title: Determination of physicochemical properties and	BRRI dhan92 and
	quality of puffed, popped and flattened rice from newly	BRRI hybrid dhan6
	released BKKI varieties Progress: Puffed popped and flattened rice were produced	found suitable for
	from BRRI varieties to evaluate the quality products.	producing puffed rice.
	Comparing few parameters (fully puffed rice, length and	BRRI dhan87 and
	breadth increased percentage) with BR16 (Std), it is ascertained	BRRI dhan89 show
	from the results that BRRI dhan92 and BRRI hybrid dhan6 are	excellent
	better in producing whole puffed rice followed by BRRI dhan90	performance for
	and BRRI dhan95. Considering physical parameters, BRRI	popped rice. BRRI
	dhan87 and BRRI dhan89 show excellent performance for	dhan93 showed the
	whole, partial broken, broken and unpopped rice. Among the	best performance for
	tested varieties, in terms of weight of whole, partial broken and	producing flattened
	broken flattened rice as well as percentage of length increased,	rice.
	BRRI dhan93 showed the best performance comparing with	
	BR16.	
	<b>Duration:</b> 2020-2021	

Sl. no.	Research Progress	Expected output			
Rice Farming Systems Division					
Program Area: Rice Farming Systems					
1	Project I. Survey				
	<b>1.1 Title:</b> Survey on Tobacco-based cropping system <b>Progress:</b> Questionnaire was developed and survey was conducted in five different locations (Manikganj, Rangpur, Kushtia, Meherpur and Bandarban) where tobacco is grown. Data analysis and report writing are under processing. <b>Duration:</b> 1 year	Information on socioeconomic profile of farmers, crops, cropping patterns, benefit-cost and problems of			
		tobacco of tobacco- based cropping pattern will be available. This information will be used to replace this health hazardous crop by other profitable crops.			
	<ul> <li>1.2 Title: Characterization of farming system of Charlands in Gangatic Floodplain region</li> <li>Progress: Questionnaire has been developed and survey will be conducted within short time to characterize the farming system of Charlands.</li> <li>Duration: 1 year</li> </ul>	Information on crops, cropping patterns, other enterprises of farming systems and socioeconomic profile of farmers will be available for charland. This information will be used to improve system productivity in charland.			
2	Project II: Development of Resource Conservation Technologies and Component technology for Stress prone area				
	<b>2.1 Title:</b> Integration of mustard and pulses in the rice-based cropping system under different rice growing environments <b>Progress:</b> The study is going on in farmers' field at different rice growing environments viz., Tangail, Mymensingh, Gazipur, Kishoreganj, Sirajganj, Rajshahi, Khulna and Satkhira under zero and normal tillage and relay and sequential planting.	Improvement of location specific pulses and oil seed crop based cropping patterns.			
	Duration: 3 years				
	<ul> <li>2.2. Title: Synchronization of transplanting of Boro rice in different elevation of haor by single and double transplanting methods</li> <li>Progress: The study is going on in Kishoreganj haor area. One-year cycle has been completed and data analysis is under processing for report writing. The experiment will be repeated in the next year for valid conclusion.</li> <li>Duration: 3 years</li> </ul>	A new Boro crop establishment method will be developed in descending elevated lands using double transplanting technique.			

Sl. no.	Research Progress	Expected output
	<ul> <li>2.3. Title: Impact evaluation of temperature and precipitation changes on promising rice cultivars yield in Bangladesh using crop simulation model, ORYZA.</li> <li>Progress: A on-farm trial was conducted in Gazipur and Jhinaidah and 1<sup>st</sup> year data has been collected to run the model.</li> <li>Duration: 3 years</li> </ul>	Sowing / transplanting window of Aus/T. Aman rice will be determined for achieving potential yield.
3	Project III: Development of Cropping Systems and Component Technology for Hilly Area	
	<ul> <li>3.1. Title: Fertilizer management in HYV Aus rice in Jhum cultivation</li> <li>Progress: An on-farm fertilizer management trial is being conducted in 12 locations of 3 hill for last 2 years with four different methods of fertilizer application in jhum production system.</li> <li>Duration: 4 years</li> </ul>	Location specific fertilizer management package will be determined for jhum production system.
	<ul> <li>3.2. Title: Performance of HYV Aus rice along with local varieties under Jhum cultivation sytsem</li> <li>Progress: An on-farm trial with newly released Aus varieties is being conducted in 19 locations of 3 hill districts in jhum production system for last two years to observe the performance of HYV rice in jhum production system.</li> <li>Duration: 3 years</li> </ul>	Performance of BRRI developed Aus rice in jhum production system will be identified in comparison to the jhum rices.
4	Project IV: Development of Cropping Systems and Component Technology for Favorable Environment (Irrigated condition)	Agro-economically profitable cropping patterns and component technologies for favorable environment (irrigated condition) will be developed
	<ul> <li>4.1. Title: Long term cropping patterns trial</li> <li>Progress: In the first year nine cropping patterns were evaluated at BRRI, Gazipur. The experiment will be repeated for next 6 to 7 years to generate valid information.</li> <li>Duration: 8 years</li> </ul>	Long-term implication of different cropping patterns will be determined on productivity, weed and pest infestation and soil health.
	<ul> <li>4.2. Title: Determination of the effects of rice sowing date, seedling age, and rice growth duration on yield of popular premium quality rice varieties</li> <li>Progress: The experiment was conducted in farmers' field at BRRI, Gazipur and Dinajpur district to find out the optimum sowing date, seedling age of popular premium quality rice varieties.</li> <li>Duration: 2 years</li> </ul>	Optimum sowing date and seedling age for different rice varieties in different locations will be found.

Sl. no.	Research Progress	Expected output
	<b>4.3. Title:</b> Development of four-crop cropping patterns for favorable irrigated ecosystems in medium highland	Four-crop cropping patterns with higher
	<b>Progress:</b> The experiment was conducted at BRRI, Gazipur to evaluate the performance of different four crop cropping patterns along with three crop-cropping patterns.	and return will be developed.
	Duration: 3 years	
5	<b>Project V: Validation and Delivery of Farming Systems</b> <b>Technologies</b>	Farmerswillbebenefitedthroughadoptionoffarmingsystemstechnologies
	<b>5.1. Title:</b> Intensification of Boro–Fallow–T. Aman cropping pattern through the inclusion of mustard in irrigated ecosystem of Madhupur Tract <b>Progress:</b> The study is being conducted in the farmers' field at	System productivity and farmers income will be increased.
	Dhanbari, Tangail to intensify the double cropped area to triple- cropped area through inclusion of mustard. First year cycle is completed and 2 <sup>nd</sup> cycle on-going in farmers' field. <b>Duration:</b> 3 years	
	<b>5.2. Title:</b> Improvement of Jhum cultivation through the replacement of local rice with the modern Aus rice in hilly areas <b>Progress:</b> An on-farm experimental trial was conducted in different locations of 3 hill tract districts in jhum production system to observe the performance of HYV Aus rice in jhum production system. <b>Duration:</b> 2 years	Performance of BRRI developed Aus rice in jhum production system will be identified.
	<ul> <li>5.3. Title: Intensification of single T. Aman area through the inclusion of modern Aus rice in plain land in hilly areas</li> <li>Progress: The study was conducted in different locations of 3 hill districts to observe the feasibility of Aus rice cultivation in the piedmont plain land where the existing cropping pattern is Fallow-Fallow-T. Aman by using surface water irrigation of chhara.</li> <li>Duration: 2 years</li> </ul>	System productivity and farmers income will increase.
	<ul> <li>5.4. Title: Inclusion of Mustard after T. Aman in Boro-Fallow</li> <li>-T. Aman cropping pattern in piedmont plain</li> <li>Progress: The study is going on in the farmers' field at the piedmont plain lands of 3 hill districts to intensify the double cropped area to triple-cropped area through inclusion of mustard for last two years.</li> <li>Duration: 2 years</li> </ul>	System productivity and farmers income will increase.
	<ul> <li>5.5. Title: Piloting of cropping pattern technologies to increase the productivity</li> <li>Progress: The activity is going-on in Kotiadi and Pakundia, Kishoreganj. Major cropping patterns of this area are Boro-Fallow-T. Aman and Boro-Fallow-Fallow. The study was undetaken to increase the farm productivity through intervention of improved cropping pattern technologies.</li> <li>Duration: 3 years</li> </ul>	Total productivity will be increased through intervention of improved cropping pattern by inclusion of an extra crop.
Sl. no.	Research Progress	Expected output
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	<b>5.6. Title:</b> On-farm evaluation of newly released Boro varieties	Performance of Boro
	as late Boro in Potato-Boro-T. Aman cropping pattern	varieties as late
	Progress: An on-farm experimental trial is going-on in	planted condition will
	Rangpur district to assess the performance of newly released	be identified.
	Boro varieties after potato to increase system productivity. Five	
	Boro rice varieties along with three Aman varieties are	
	evaluated in farmers' field under Potato-Boro-T. Aman	
	cropping pattern	
	Duration: 3 years	
6	Project VI: Development of Semi-aquatic Farming System	
•	6.1 Title: Development of vegetables fish and fruit system in	Mixed farming
	mini pond	system technology in
	<b>Drograss:</b> The experiment is going on in <b>DDDI</b> Coginum to	system technology m
	develop mixed forming system technology in mini nond for	developed
	develop mixed familing system technology in mini pond for	developed
	diversitying and maximizing yield. In mixed farming system	
	arouds, fish, vegetables and fruits are cultivated in and around	
	the pond under different production niche.	
	Duration: 3 years	
7	Project VII: Development of homestead agro-forestry	
,	system with evotic date nalm ( <i>Phoenix dactylifera</i> ) in the	
	drought-prone ecosystem	
	7.1 Title: Derformance of evotic date palm ( <i>Phaguir</i>	Eco friendly
	<i>daetylifara</i> ) in homestand and agroforestry systems	profitable agro
	<b>Drograss</b> . The study is being conducted in Mujibneger	forestry systems with
	according to develop across forestry system with avoid	avotio data nalm will
	data nolm to increase the system productivity and income of the	be developed
	date pain to increase the system productivity and income of the	be developed.
	farmers.	
0	Duration: 10 years	
8	Project VIII: Integrated Farming Research and	
	Development for Livelinood Improvement in the Plain land	
	Eco-system	
	8.1. Title: Year round vegetables and spices production in	After adoption of this
	homestead	technology,
	<b>Progress:</b> The study was conducted at the FSRD site Tengra,	homestead vegetable
	Sreepur, Gazipur. BARI developed Goyeshpur Model was used	production and
	in vegetables production systems for 12 cooperative farmers.	income of farm
	After intervention vegetables and fruits production,	family will be
	consumption and selling were increased significantly.	increase.
	Duration: 2 years	
	<b>8.2. Title:</b> Improvement of the existing Boro-Fallow-T. Aman	System productivity
	cropping pattern through inclusion of oil seed and pulse crops	and farmers income
	Progress: The experiment was conducted at the FSRD site	will increase.
	Tengra, Sreepur, Gazipur. Two improved cropping patterns	
	viz., Mustard-Boro-T. Aman, and Mustard-Mungbean-T. Aus-	
	T. Aman were tested against existing Boro-Fallow-T. Aman	
	cropping pattern. Improved cropping pattern produced the	
	higher rice equivalent yield and gross margin over the existing	
	cropping pattern	
	Duration: 2 years	

Sl. no.	Research Progress	Expected output
	8.3. Title: On-farm evaluation of Aus and T. Aman rice	Production and farm
	varieties in T. Aus-T. Aman-Rabi cropping system in partially	income will be
	irrigated ecosystem	increased.
	Progress: The activity was conducted at FSRD site Tengra,	
	Sreepur, Gazipur. Different modern rice varieties during Aus,	
	Aman and Boro season were evaluated in the farmers' field.	
	BRRI dhan48, BRRI dhan71 and BRRI dhan50 performed	
	better among the tested varieties in Aus, Aman and Boro season,	
	respectively.	
	Duration: 2 years	
	<b>8.4. Title:</b> Evaluation of turmeric and ginger production under	Production and
	fruit tree based agro forestry system	income from fruit
	<b>Progress:</b> The study was conducted at the FSRD site Tengra,	garden will be
	Sreepur, Gazipur. Three farmers were selected at the FSRD site	increased.
	for the production of ginger and turmeric in fallow land under	
	mango and litchi orchard. Production and income of ginger was	
	higher than the turmeric under fruit tree based agro-forestry	
	system.	
	Duration: 2 years	TT 1
	<b>8.5.</b> Title: Performance of chewing type sugarcane cultivation	Homestead
	in homestead	production and
	<b>Progress:</b> The activity was conducted at the FSRD site Tengra,	income will be
	Sreepur, Gazipur. Saplings of three varieties (Amrita, Turag,	increased. SCRI
	to each of 12 selected formers. Former's responses were user	verieties will be
	encouraging Based on the result and formers' oninion Turag	disseminated
	and Ronghilash can be cultivated in homestead which will	uissemmateu.
	increase farmer's income as well as improve the putritional	
	status of the farm families	
	Duration: 2 years	
	<b>8.6. Title:</b> An improved cropping pattern for highland in	System productivity
	Madhupur Tract soil: Mustard-Mungbean-T. Aus-Blackgram	and farmers income
	<b>Progress:</b> The experiment was conducted at the FSRD site	will be increased.
	Tengra, Sreepur, Gazipur with six disperse replications.	
	Improved cropping patterns: Mustard-Mungbean-T. Aus-Black	
	gram was tested in the highland near the homestead against	
	farmers existing Fallow-Fallow-T. Aman cropping pattern.	
	Farmer's opined that cultivation of four crops in a year	
	increased crop productivity and income.	
	Duration: 2 years	
	8.7. Title: Vegetable production nearby homestead at FSRD	Production and
	site, Tengra, Sreepur, Gazipur	income of farm
	<b>Progress:</b> The activity was conducted at the FSRD site Tengra,	tamily will be
	Sreepur, Gazipur. In the rabi season vegetables like bottle	increased.
	gourd, cabbage, cauliflower and tomato were cultivated	
	tollowed by brinjal, chili, amaranth and sponge gourd during	
	kharit season. Bottle gourd and brinjal cultivation was more	
	profitable than other crops. Farmer's prefered early production	
	or vegetables for getting nigner profit.	
1	Duration: 2 years	

Sl. no.	Research Progress	<b>Expected output</b>
	8.8. Title: Vaccination program for livestocks at FSRD site,	Mortality rate of
	Tengra, Sreepur, Gazipur	livestock was
	Progress: The vaccination activity was conducted at the FSRD	minimized and
	site Tengra, Sreepur, Gazipur. Vaccination against Khuravax	increased farm
	for cattle, PPR for goat and Ranikhet vaccine for chicken, duck	income.
	and pigeon were provided. Two hundred and fifty-eight cattle,	
	about eighty goats, three hundred and fifty chickens, ninety	
	ducks and fifty-five pigeons were vaccinated at FSRD site.	
	Duration: 2 years	
	<b>8.9. Title:</b> Turkey rearing under scavenging system	Overall farm income
		will be increased.
	Progress: The programme was carried out at the FSRD site	
	Tengra, Sreepur, Gazipur. Forty turkey chickens were given to	
	the selected farmer maintaining a ratio of 3:7 male and female.	
	Farmers were highly interested to include this new intervention	
	in their existing farming practice because turkey rearing under	
	scavenging system is easy, farmers friendly and profitable.	
	Duration: 2 years	
	8.10. Title: Small scale pigeon rearing in farmer's household	Farm income will be
	Progress: The activity was undertaken at the FSRD site Tengra,	increased.
	Sreepur, Gazipur. Twelve pairs of adult pigeon were distributed	
	to six farmers (Two pairs to each farmer). Local breeds of	
	pigeons were collected from the local market. Pigeon rearing	
	was profitable and it provides additional income to the farmer.	
	Duration: 2 years	
	8.11. Title: Maximization of farmer's income through carp poly	Production and
	culture technique at low cost management in perennial pond	income from
	Progress: The program was initiated at the FSRD site, Tengra,	perennial pond will be
	Sreepur, Gazipur to increase productivity of the existing ponds	increased through
	and also to increase farm income. Five farmer's ponds were	carp poly-culture.
	selected for the mixed fish cultivation. It was observed that, fish	
	production and utilization significantly increased after	
	intervention.	
	Duration: 2 years	
	<b>8.12. Title:</b> Semi-aquatic production system of vegetables, fish	System productivity
	and fruit in mini pond	and farm income will
	<b>Progress:</b> Semi-aquatic production system of vegetables, fish	be increased.
	and fruit system in mini pond was conducted at the FSRD site	
	Tengra, Sreepur, Gazipur. Three derelict ponds were selected in	
	the project site and semi-aquatic production system was	
	evaluated.	
	Duration: 2 years	
	<b>8.13. Title:</b> Development of mini orchard in homestead	Diversified fruit
	<b>Progress:</b> Saplings of different fruit trees were distributed	production system at
	among the farmers of Tengra village, Sreepur, Gazipur. Mango,	homestead will be
	guava, olive, papaya, almond, wood apple, custard apple and	developed.
	Dragon saplings were supplied to the farmers. Total 1117	
	saplings of different exotic and indigenous fruit species were	
	distributed at the FSRD site during 2020.	
	<b>Duration:</b> 2 years	

Sl. no.	Research Progress	<b>Expected output</b>
	8.14. Title: Empowerment of rural woman through off-farm	Off-farm activities
	activities at FSRD Site, Sreepur, Gazipur	will improve the
	<b>Progress:</b> The activity was conducted at the FSRD site Tengra,	economic condition
	Sreepur, Gazipur. Base line information of the cooperative	of rural women.
	women farmers were recorded regarding their income and	
	livelihood status. It was observed that after intervention net	
	return and sale value was increased over before intervention.	
	Duration: 2 years	
	<b>8.15.</b> Title: Farmers' participatory mushroom production at	Mushroom
		production at
	<b>Progress:</b> The study was conducted at FSRD site tengra,	homestead Will
	sreepur, Gazipur. Mushroom production at nome condition	increase lamity
	and also increase income which facilitate to bring solvency of	
	rural poor women	
	Duration: 2 years	
	Agronomy Division	
1	<b>Title:</b> Enhancing rice yield by optimizing planting time of newly	
	released T Aman varieties	
		Optimum time of
	Progress: 10 July to 10 August transplanting BRRI dhan93 and	planting will be find out
	BRRIdhan94 gave similar grain yield and growth duration. After 10	
	August grain yield decreasing but growth duration increases	
	gradually. Whereas, in case of BRRI dhan95 growth duration as well	
	as grain yield decreasing from 10 July to 10 September transplanting.	
	Duration: T Aman 2020	
2	<b>Title</b> : Nitrogen application to maximize grain yield of Swarna type	
	varieties in T. Aman season	
		Optimum nitrogen rate
	Progress: BRRI dhan93 and BRRI dhan95 gave highest grain yield	for swarna type
	on STB treatment which is similar with STB + 10% and BRRI	varieties will be find out
	recommended dose treatment.	
	Duration: T Aman 2020	
3	<b>Title:</b> Effect of nitrogen and potassium fertilizer management on	
	growth and vield of mechanically transplanted Boro rice	
	8	Modified N and K
	<b>Progress:</b> Mechanically transplanted Boro rice is needed more N and	management will
	K for higher grain yield.	increase the grain yield
	Duration Dans 2021	office
4	<b>Title:</b> Improvement of soil health in four crops pattern through	
	agronomic management.	Soil health will be
		maintained if
	Progress:	recommen-ded doses of
		each crop is applied
	1) Yield of Aus 2021 was 4.75 t/ha when variety was BRRI dhan48	with proper agronomic practices
	ii) Yield of T. Aman 2021 was 4.25 t/ha when variety was BRRI	Practices
	dhan62	

Sl. no.	Research Progress	Expected output
	Duration: T. Aus 2023; T. Aman 2023	
5	Title: Maximizing yield of BRRI developed new varieties through	
	influencing	Specific management
	Some Agronomic Critical Factors in different seasons at BRRI farm	speeme management
	Gazipur.	package will be develop
	1	for BRRI dhan88, 89, BR
	<b>Objective:</b> 1. To study the effect of Agronomic most critical factors	dhan20
	for yield maximization of newly BRRI developed varieties.	ullall29
	2. To find out and recommended the most appropriate Agronomic	
	critical factors packages for yield maximization of newly BRRI	
	developed varieties.	
	<b>Progress:</b> The highest grain yield was observed by BRRI dhan89 in	
	management $M_3$ (Seeding on November 4th week. Transplanting	
	with 20 days seed bed Seedling maintaining line to line 30 cm.	
	and plant to plant distance 25 cm with only two seedling. Two	
	times upper soil stirring at 20 DAT & 35 DAT. Soil test based	
	10 t/ha targeted yield based inorganic fertilizer will be applied	
	followed by 1% MoP solution spray schedule on 35 & 45 DAT)	
	treatment followed by BRRI dhan29 in management $M_5$ (Seeding	
	4th week of November, transplanting with 20 days tray bed	
	seedling maintaining line to line 30 cm. and plant to plant	
	distance 25 cm with two seedling. Two times upper soil stirring	
	at 20 DAT & 35 DAT. Soil test based 10 t/ha targeted yield	
	based inorganic fertilizer will be applied followed by 1% MoP	
	solution spray schedule on 35 & 45 DAT) than BRRI dhan29 in	
	management M <sub>1</sub> (BRRI recommended management). It was	
	observed that long duration varieties more responsive to the	
	different management than short duration variety. Long	
	duration both two varieties produced identical higher yield	
	irrespective of short duration variety in all management	
	treatments. Short duration variety also produced highest grain	
	vield in management M <sub>3</sub> .	
(	Duration: Boro, 2020-21	
0	Hue: Effect of time of planting on growth and yield of BRRI developed variaties for hear region in Para season	
	<b>Progress:</b> The highest yield was observed from BRRI dhan89	Suitable time of
	at 10-January and 01-December transplanting followed by	planting and
	BRRI dhan58 and BRRI dhan74 on 10 January transplanting	recommend
	The lowest grain yield was obtained by DDDI dhan 74 on 1	appropriate high
	Decomber transplanting and it may be accurred due to carly	yielding BRRI variety
	transplanting and cold succentibility of this variety. In successful	developed
	uansplanting and cold susceptionity of this variety. In case of	actoroped
	growin duration, longer growth duration was observed in early	

Sl. no.	Research Progress	Expected output
	transplanting which was decreased in late transplanting in all	
	varieties; it was due to increase temperature.	
	D (1 D 2020.21	
7	Duration: Boro, 2020-21	
/	the information of the second	Vield and quality of
	through influencing some Agronomic management in Aman	some popular local
	seasons	fine aromatic popular
	Objectives:	varieties will be
		maximized at more
	1. To study the effect of some Agronomic management for	than 3.5 - 4.0 t/ha
	yield maximization of some local fine aromatic popular	
	varieties	
	2. To find out and recommended the most environments	
	2. To find out and recommended the most appropriate	
	Agronomic management packages for yield maximization	
	and quanty improvement of some local line aromatic	
	populai varieties.	
	Progress:	
	Among the tested 8 variety, BRRI dhan34 and Tulshi Mala have	
	higher sensitivities to Agronomic management and produced	
	higher grain yield in respective to other tested varieties. Kalo	
	Malshira and Gobidha Voaug have les management sensitivity	
	on grain vield production, as a result has produced similar vield	
	at all Agronomic managements.	
	5 5	
0	Duration: Aman, 2020	
8	<b>Ittle:</b> Application of Nano-zinc oxide to improve salt tolerance	
	in rice	BRRI dhan67 gave
	Objective:	51% higher yield with
		100 ppm Nano-ZnO
	To investigate the effect of Nano-zinc oxide on growth and	spray than without
	yield of rice under salinity stress	spray in saline
	Progress	saline condition
	11051055.	BRRI dhan67 gave
	100 ppm Nano-ZnO spray at active tillering and heading stages	21% higher yield with
	improved the growth of BRRI dhan67 and BRRI dhan88. Nano-	100 ppm Nano-ZnO
	ZnO spray increased the grains panicle <sup>-1</sup> and yield of BRRI	spray than without
	dhan67 for both saline (5.25 ds $m^{-1}$ ) and non-saline condition.	spray.
	In saline condition BRRI dhan67 gave 51% higher yield with	
	100 ppm Nano-ZnO spray than without spray. In non-saline	
	condition BRRI dhan67 gave 21% higher yield with 100 ppm	

Sl. no.	Research Progress	Expected output
	Nano-ZnO spray than without spray. In BRRI dhan88, it was	
	found that Nano-Zn spray could not improve the yield.	
	Durations Amon 2020	
9	<b>Duration:</b> Aman, 2020 <b>Title of the experiment:</b> Herbicide Application: Shifts in soil	Effective herbicides
	microbial community structure,	will be introduced for weed management in
	<b>Objective:</b> 1. To furnish the information regarding the effects of herbicides on soil microorganisms in transplanted rice.	rice field without chancing soil microorganisms.
	Progress:	C
	Fungus could be recovered their numbers 7 days after the application of Pendamethalin 33EC whereas NFB & PSB could be recovered 20 days after its application and total bacteria could be recovered 30-60 days after its application (Figure 1). In case of Phenoxlum 20EC, NFB & total bacteria could be recovered their numbers 10 days after its application whereas PBS & fungus could be recovered their numbers 20 days after its application (Figure 1). On the other hand, NFB, total bacteria & fungus could be recovered their numbers 20 days after the application of Ethoxysulfuron whereas PBS could be recovered their numbers 10 days after its application.	
10	Duration: Aman, 2020	
10	<b>Little :</b> Herbicide Application: Shifts in soil microbial	
	<b>Objective:</b> To furnish the information regarding the effects of herbicides on soil microorganisms in transplanted rice.	Effective herbicides will be introduced for weed management in rice field without
	<b>Progress:</b> Fungus and total bacteria could be recovered their numbers 20 days after the application of Pendamethalin 33EC, whereas NFB (Nitrogen Fixing Bacteria) & PSB (Phosphate Solubilizing Bacteria) could be recovered 10 days after its application. In case of Phenoxlum 20EC, NFB and PBS could be recovered their numbers 60 days after its application whereas fungus could be recovered their numbers 7 days after its application. Total bacteria could be recovered their numbers 30 days after its application. In case of Ethoxysulfuron, NFB, total bacteria, PBS & fungus could be recovered their numbers 20 days after its application. After the application of all herbicides, total bacteria could be recovered with hundred percent from 20 to 30 days and NFB, could be recovered by hundred percent within 60 days. Phosphate Solubilizing Bacteria (PSB), could be recovered with hundred percent from 30 to 60 days after the	chancing soil microorganisms.

Sl. no.	Research Progress	Expected output
	application of all herbicides. Fungus could be recovered with	
	hundred percent from 7 to 60 days after the application of all	
	herbicides.	
	D (1 D 2020.21	
11	Duration: Boro, 2020-21 Title: Ontimizing planting time of Advanced Ling Adaptive	Tradity lithestor of works
11	Passage Trial (ALAPT) Promium Quality Pias (POP) in Para	dimetricited than 20 Brands
	Season at PPDI Form Gazinur	Advanced POR
	Season at BKKI Fann, Gazipur	Breeding lines for
	Progress: Both of the tested entries (BR8526-38-2-1-HR1 and	Gazipur region might
	Lata Balam) mature 5-10 days delayed then the check entries	give higher grain
	(BRRI dhan50, BRRI dhan63 and BRRI dhan81).	yield than check
	Transplanting in 15 January found the most suitable planting	variety.
	time of all entries in Boro season. BRRI dhan63 (6.96 t/ha)	
	produced significantly the highest grain yield followed by	
	BR8526-38-2-1-HR1 (6.70 t/ha) and BRRI dhan81 (6.53 t/ha).	
12	<b>Duration:</b> Boro, 2020-21	
12	<b>Descente</b> Trial (ALAPT) Zing Enrich Bigs (ZEP) in Dere	
	Research That (ALART), Zinc Enrich Rice (ZER) in Boro	Advanced ZER
	Season at BKRI Farm, Gazipur	Breeding lines for
	Progress:	Gazipur region might
		give higher grain
	Transplanting in 15 January found the most suitable planting	yield than check
	time of all four entries in Boro season. The growth duration of	variety.
	IR105837-8-95-2-1 and BRRI dhan/4 (ck) was almost similar	
	and found 5-6 days earlier then BRRI dhan89 (ck) and BR8912-	
	12-6-1-1-1. BRRI dhan89 produced significantly the highest	
	grain yield (7.30 t/ha) followed by BRRI dhan/4 (7.14 t/ha) and $BP0012 12 (1.1.1.1) (6.74 t/h)$	
	BR8912-12-6-1-1-1-1 (6.74 t/ha).	
	<b>Duration:</b> Boro, 2020-21	
13	Title: Optimizing planting time of Advanced Line Adaptive	
	Research Trial (ALART), Disease Resistance Rice (DRR) in	Advanced DRR
	Boro Season at BRRI Farm, Gazipur	Breeding lines for
	Duoguossi	Gazipur region might
	riogross.	give higher grain
	The maturity of advanced DRR line BR8938-19-4-3-1-1-P2-	yield than check
	HR3 were 5-10 days delayed than check BRRI dhan28.	variety.
	BR8938-19-4-3-1-1-P2-HR3 produced statistically higher grain	
	yield then BRRI dhan28. BR8938-19-4-3-1-1-P2-HR3 gave the	
	highest grain yield (6.95 t/ha) in 20 January transplanting.	
	<b>D</b> (' <b>D</b> 2020.21	
	Duration: Boro, 2020-21	

Sl. no.	Research Progress	Expected output
14	Title: Effect of seedling age on tillering dynamics of BRRI	
	varieties and its impact on yield in Boro season	Ontinuum tillon
	Progress:	number of a variety
		will be determined for
	• Thirty five days old seedling produced the highest fillers	higher grain yield in
	followed by 30, 40, 45 and 50 days old seedling.	Boro season.
	• Higher grain yield (7.19 t ha <sup>-1</sup> ) was observed in 35 days old	
	seedling followed by 40 days old seedling.	
	• Among the varieties, BRRI dhan92 and BRRI hybrid dhan3	
	gave the highest yield 7.70 and 7.25 t ha <sup><math>-1</math></sup> , respectively.	
	• Statistically similar yield (5.50 and 5.48 t ha <sup>-1</sup> ) was observed	
	in BRRI dhan84 and BRRI dhan88, respectively. BRRI	
	hybrid dhan3 and BRRI dhan96 also gave statistically	
	identical yield (7.18 and 6.85 t $ha^{-1}$ ).	
	Duration: Boro, 2020-2021	
15	Title: Effect of seedling age on tillering dynamics of BRRI	
	varieties and its impact on yield in T. Aman season	0
	Progress:	Optimum tiller
		will be determined for
	• In T. Aman 2020, Fifteen days old days old seedling	higher grain vield in
	produced the highest tillers in all varieties.	T. Aman season.
	• 23-30 days old seeding produced statistically similar ther number $m^{-2}$ for all varieties	
	• BRRI dhan93 had the highest tiller number irrespective of	
	seedling age and was statistically similar with BRRI dhan87	
	• <b>DBDI</b> dhan04 produced the higher arein yield (6.72 t he <sup>-1</sup> )	
	• BKKI diali94 produced the higher grain yield (0.72 t ha) followed by PPPI dhen02 (6.04 t he <sup>-1</sup> ) PPPI hybrid dhen6	
	$(5.81 \pm ho^{-1})$ DDDL dhen $(5.51 \pm ho^{-1})$ and DDDL dhen $(0.04 \pm ho^{-1})$	
	(3.51  tha), BKKI dilailo/ $(3.51  tha)$ and BKKI dilailo/ $(2.51  tha)$	
	(5.51  t ha), respectively.	
	• Among the seeding age, 25-30 days old seeding produced	
	higher grain yield (6.52 t ha <sup>-1</sup> ) followed by 15 days (6.08 t	
	ha <sup>-</sup> ) and 35 days old seedling (4.45 t ha <sup>-</sup> ), respectively.	
16	<b>Duration:</b> 2019-2020	
10	The Growin and yield improvement of 1. Aman rice in	
	charland ecosystem through integrated nutrient management	Economically viable
	Progress:	fertilizer management
	• Higher grain yield of 6.60 and 6.27 t ha <sup>-1</sup> was observed in	will be determined for
	BRRI dhan87 with BRRI recom Dose of fertilizer (RDF) (N-P-K-	growth and yield of
	S @ 69-10.4-41-10.8 kg ha <sup>-1</sup> ) followed by treatment T <sub>4</sub> (cow dung @ 5	rice in Charland area.
	$tha^{-1}$ ) + 50% of RDF 75%)	
	• Significantly higher grain yield was found in To and T.	
	treatment compared to other treatment due to higher number	
	a cannent compared to other treatment due to mgner number	

Sl. no.	Research Progress	<b>Expected output</b>
	of panicles and more grains panicle <sup>-1</sup> . Lower grain yield (4.26	
	t ha <sup>-1</sup> ) was found in control.	
	Duration: Aman,2020	
17	Title: Yield maximization of T. Aus rice through integrated	
	crop management	0 1 1 1 1 1 1 1 1
	_	Suitable integrated
	Progress:	crop management
	• Higher grain yield 5.22 t ha <sup>-1</sup> was given by BBBI dhan82	package will be
	with ICM (N-P-K: 80-10 4-49 kg ha <sup>-1</sup> and 4 seedlings hill <sup>-1</sup> )	developed for T. Aus
	The vield of BRRI dhan48 ( $4.55 \text{ t ha}^{-1}$ ) was lower than BRRI	rice.
	dhan82 due to bacterial leaf blight infestation before	
	maturity.	
	• Higher grain yield of ICM over BRRI recommended	
	fertilizer and farmers practice was mainly attributed to higher	
	grains panicle <sup>1</sup> , which was caused by the difference in	
	panicles per $m^2$ and sterility (%) among the three treatments.	
18	<b>Duration:</b> Aus, 2020	
10	advanced lines / popular varieties	
	Progress:	Advanced lines for
		Gazipur region might
	The entries BR9005-53-1-1 and BR9006-40-2-3-1 yielded less	give higher grain
	than the check varieties (BRRI dhan48 and BRRI dhan82) at all	yield than check
	the time of planting. The tested entry BR8784-4-1-2-P2 gave	variety.
	higher grain yield than check variety BRRI dhan27 (Table 2).	
	BR8784-4-1-2-P2 yielded highest with 114 days growth	
	duration transplanted on 25 <sup>th</sup> of May.	
	Duration: Aus 2020	
19	Title: Determination of optimum planting time of BRRI	
	developed Aus varieties	Ontinuum alantina
	1	time of BRRI
	Progress:	developed Aus
	Newly released BRRI dhan82 and popular rice varieties BR26	varieties might give
	and BRRI dhan48 planted from 30 April to 1 June with 10 days	higher grain yield
	interval to find optimum planting time at BRRI farm, Gazipur.	
	DDDI dhan 48 produced the highest answering wind (4.2.5.0.4 here)	
	within 111 112 days in all planting time. Higher results of	
	within 111-115 days in all planting time. Higher number of	
	panicies m, grains panicle and neavier grain contributed to higher grain yield of DDDL dhen 48 (Table 2). Ten May planting	
	in all variaties produced higher grain yield compared to other	
	n an varieties produced ingher grain yield compared to other	
	planung dates.	
	Duration: Aus, 2020	

Sl. no.	Research Progress	Expected output
20	Title: Enhancing rice yield by optimizing planting time of newly	Optimum planting
	released T. Aman varieties	time of BRRI
		developed Aman
	Progress:	varieties might give
	From 10 July to 10 August transmonting DDDI dhan 02 and	higher grain yield
	FIGHTO JULY to TO August transplanting, BKKI unanys and	
	BRRIdhan94 gave similar grain yield and growth duration	
	(Table 4). After 10 August grain yield decreasing but growth	
	duration increases gradually. Whereas, in case of BRRI dhan95	
	growth duration as well as grain yield decreasing from 10 July	
	to 10 September transplanting. BRRI dhan95 gave flowering in	
	October at all transplanting date.	
	Duration: Aman, 2020	
	Soil Science division	
	Crop-Soil-Water Management programme area	
	Expt.1.1. Increase N use efficiency through nanotechnology	Evaluation of N use
	and zeolite amendment	efficiency of typically
	A pot trial was conducted using terrace naddy soil of BRRI	synthesized urea-HA
	Gazipur greenhouse in Boro 2020 to 2021 with the objective to	(nydroxyapatite)
	investigate the N use efficiency of typically synthesized urea-	nanonybrid over
	HA (hydroxyapatite) nanohybrid and urea plus purified natural	ontimum rice vield
	zeolite (71% SiO <sub>2</sub> ) over prilled urea. Five treatments viz. $T_1$ :	optimum nee yield.
	PKSZn, T <sub>2</sub> : Urea-N <sub>120</sub> PKSZn, T <sub>3</sub> : Nano fertN <sub>120</sub> PKSZn, T <sub>4</sub> :	
	Nano fertN <sub>60</sub> PKSZn and T <sub>5</sub> : Urea-N <sub>120</sub> PKSZn + purified	
	natural zeolite (71% SiO <sub>2</sub> ) @ 2.5 t ha <sup>-1</sup> were tested in a complete	
	random design with 3 replications. Urea-HA nanohybrids was	
	synthesized according to method by Kottegoda et al. (2017).	
	Transplanted rice (BRRI dhan89) was grown under continuous	
	flooding for 128 days.	
	Among the studied parameters, the number of effective tiller	
	and panicle, filled grain weight, grain and straw yields were	
	significantly (p<0.01) greater in all N fertilizer treated pots ( $T_2$ ,	
	$I_3$ , $I_4$ and $I_5$ ) than N untreated pot ( $I_1$ ). All these parameters	
	were also statistically identical between the N fertilizer	
	treatments with N applied at 120 kg na <sup>-1</sup> from trea (12), hand fortilizer (T), and treat $(T)$ . In more fortilizer N	
	refutilizer (13), and urea $\pm$ zeonte (15). In hand refutilizer N applied at 60 kg N ha <sup>-1</sup> i.e. in T <sub>i</sub> , the no. of tiller and papiele	
	were statistically identical with that in N applied at 120 kg N ha <sup>-</sup>	
	<sup>1</sup> from urea $(T_2)$ nano fertilizer $(T_2)$ and urea + zeolite $(T_5)$	
	However the filled grain weight and grain yield in $T_4$ only	
	statistically identical with that in T <sub>3</sub> (Nano fert, N <sub>120</sub> -PKSZn)	
	but differed from $T_2$ and $T_5$ . The agronomic N use efficiencies	
	$(AE_N)$ (kg grain kg <sup>-1</sup> applied N) were alike in T <sub>2</sub> (28) and T <sub>4</sub> (28)	
	but greater in $T_5(31)$ and lower in $T_3(21)$ . Therefore, Urea-HA	
	nanohybrid may save up to 50% urea use providing comparable	
	N use efficiency with widely applied prilled urea. Also	
	application of urea-plus zeolite may increase N use efficiency	
	over prilled urea and urea-HA nanohybrids.	

Sl. no.	Research Progress	Expected output
	Duration: 2 Yrs	
	<b>1.2.</b> Nutrient management for growing four crops in a year Experiment has been initiated in T. Aus 2016 to grow four crops in a year to sustain soil fertility and increase productivity. Three fertilizer treatments viz. Soil test based (STB) fertilizer (T <sub>1</sub> ), crop residues (CR) + STB fertilizer (T <sub>2</sub> ) and fertilizer control i.e. native soil nutrients (T <sub>3</sub> ) were tested with Mustard-Boro-T. Aus- T. Aman (CP-1) and Mustard-Mungbean-T. Aus-T. Aman (CP- 2) patterns. Experimental design was randomized complete block with 3 replicates. First crop Mungbean was incorporated in T <sub>2</sub> treatment. After two crop cycles, T <sub>1</sub> and T <sub>2</sub> treatments gave statistically identical grain yield in each crop. In the 3rd year and 3rd crop cycle, both cropping patterns were also giving their potential yield with AEZ based chemical fertilizer application (T <sub>1</sub> ) as well as with crop residue incorporation (T <sub>2</sub> ). After 4 <sup>th</sup> and 5 <sup>th</sup> crop cycles, it is revealed that AEZ based or soil test based (STB) chemical fertilizers seemed sufficient to obtain potential yield of each crop under both patterns. In all cases, incorporation of crop residue had some positive impact on yield and hopefully on soil fertility than chemical fertilizer only. Considering rice equivalent yield (REY), CP-1 (15.4 t ha <sup>-1</sup> ) performed better than CP-2 (10.1 t ha <sup>-1</sup> ), but requires long- term evaluation to observe the sustainable yield trends and soil fertility status.	Appropriate integrated nutrient management packages will be developed for triple and four crops based cropping patterns.
	<b>1.3.</b> Determination of N fertilizer doses for ALART materials Before releasing a variety, N requirements of ALART materials need to be adjusted as N is the most limiting nutrients for rice production. Separate field trials were conducted at BRRI, Gazipur for six ALART materials viz. two RLR (BR9571-13-1-9-1-1 and BR9574-9-5-3-1-1) with standard checks as BRRI dhan49 and BRRI dhan87, PQR (BR 8526-38-2-1-HR1) with check Lata Balam, and three ZER genotypes BR10001-94-2-B with check BRRI dhan72, BR 8912-12-6-1-1-1-1 and IR 105837-8-95-2-1 with check BRRI dhan89 during T. Aman 2020 and Boro 2020-2021. The trials were set up following split-plot design with three replications, where fertilizer doses were assigned in the main-plot and rice genotypes in the sub-plot. The respective N fertilizer doses (kg ha <sup>-1</sup> ) for T. Aman season was N <sub>0</sub> , N <sub>30</sub> , N <sub>60</sub> , N <sub>90</sub> and N <sub>120</sub> , and for Boro was N <sub>0</sub> , N <sub>40</sub> , N <sub>80</sub> , N <sub>120</sub> , N <sub>160</sub> and N <sub>200</sub> . Standard doses of P, K, S nutrients were applied along with N doses. In the T. Aman, RLR line BR9574-9-5-3-1-1 yielded the highest 4.84 t ha <sup>-1</sup> at 60 kg N ha <sup>-1</sup> which was significantly higher than the assigned check varieties at same N rate. The average yields of the BR9574-9-5-3-1-1 and BR10001-94-2-B were not	Determination of appropriate N rates for ALART materials for optimum rice yield.

Sl. no.	Research Progress	Expected output
	statistically higher than their respective checks at different N levels. Among all the genotypes, BRRI dhan72 yielded the highest grain (4.94 t ha <sup>-1</sup> ) at 60 kg N ha <sup>-1</sup> . The optimum N requirement of the BR9571-13-1-9-1-1, BR9574-9-5-3-1-1, BRRI dhan49 (ck.) BRRI dhan87 (ck.), BRRI dhan87 (ck.), BR10001-94-2-B and BRRI dhan72 (ck.) were 34, 71, 27, 52, 50, and 40 kg ha <sup>-1</sup> respectively. At Boro the highest grain yield (7.84 t ha <sup>-1</sup> ) was obtained at 160 kg N ha <sup>-1</sup> in BR 8526-38-2-1-HR1 (PQR) which was insignificant with 200 kg N ha <sup>-1</sup> . Moreover, insignificant grain yield was obtained at 140, 160 and 200 kg N ha <sup>-1</sup> in Lata Balam (6.34, 6.63 and 7.20 t ha <sup>-1</sup> ). Grain yield was increased with the incremental dose of N (up to 200 kg N ha <sup>-1</sup> in IR 105837-8-95-2-1 (ZER) and check variety BRRI dhan89. The highest grain yield (9.09 t ha <sup>-1</sup> ) was obtained at 200 kg N ha <sup>-1</sup> in IR 105837-8-95-2-1 (ZER) which was similar (8.46 t ha <sup>-1</sup> ) with 160 kg N ha <sup>-1</sup> . Check variety BRRI dhan89 was produced the highest grain yield (9.80 t ha <sup>-1</sup> ) among all the tested ZER genotypes.	
	Duration: 1 Yrs	
	Expt.1.4. Determining N requirement of disease and pest resistant ALART materials	
	Four BPH resistant lines: BR 9880-40-1-3-34, BR 9881-24-2- 2-25, BR 9880-27-4-1-18 and BR 9880-2-2-2-1 were compared with check variety BRRI dhan93 and resistant check T27A, and DRR (BB) line BR 8938-19-4-3-1-1-P2-HR3 was compared with BRRI dhan28. The trials were set up following split-plot design with three replications, where fertilizer doses (N doses: N <sub>0</sub> , N <sub>20</sub> , N <sub>40</sub> , N <sub>60</sub> , N <sub>80</sub> and N <sub>100</sub> kg ha <sup>-1</sup> ) were assigned in the main-plot and rice genotypes in the sub-plot. Standard doses of P, K, S were applied along with N doses.	
	Grain yield increased with increasing N dose of up to 60 kg ha <sup>-1</sup> in most genotypes than it declined. The lines BR 9880-40-1-3-34 (4.19 tha <sup>-1</sup> ) and BR 9881-24-2-2-25 (4.30 tha <sup>-1</sup> ) gave maximum grain yield with the N rate of 60 kg ha <sup>-1</sup> and the yields were higher than other four rice genotypes. The other two lines i.e. BR 9880-27-4-1-18 and BR 9880-2-2-2-1 gave significantly lower grain yield than the check BRRI dhan93. The calculated optimum N doses for BPH resistant advanced lines BR 9880-40-1-3-34, BR 9881-24-2-2-25, BR 9880-27-4-1-18, BR 9880-2-2-2-1, and check BRRI dhan93, and T27A were 56, 63, 47, 55, 57 and 45 kg N ha <sup>-1</sup> respectively. Significant grain yield was obtained at 160 kg N ha <sup>-1</sup> in DRR (BB) line BR 8938-19-4-3-1-1-P2-HR3 (6.87 t ha <sup>-1</sup> ) with check variety BRRI dhan28 (7.23 t ha <sup>-1</sup> ). The economic optimum N dose for DRR (BB) line BR 8938-19-4-3-1-1-P2-HR3 and the check variety BRRI dhan28 was 153 and 162 kg N ha <sup>-1</sup> , respectively.	

Sl. no.	Research Progress	<b>Expected output</b>
	Duration: 1 Yrs	
	Expt.1.5. Screening of N use efficient rice genotypes ( Bengal Assam Aus Panel rice population)	Find out the N use efficient traits of 150
	A study was conducted at BRRI farm Gazipur to find out the N use efficient traits of 150 BAAP populations. BRRI dhan28 was	Panel rice population
	used as check variety. Two N- fertilizer doses; $N_{50}$ and $N_{100}$ kg ha <sup>-1</sup> were tested among the BAAP populations following split plot design where, N doses were assigned in the main-plot and BAAP populations in the sub-plot. Flat doses (kg ha <sup>-1</sup> ) of P-K-S @ 20-50-10 were applied along with N doses.	(BAAP)
	The highest grain yield 27.33 g plant <sup>-1</sup> obtained in IRGC ID 29295 at N <sub>100</sub> treatment. However, at a glance, the N use efficient BAAP populations were IRGC ID: 29368, 34737, 29361 and 29007 that yielded 23, 18, 17.06 and 17.13 g grain plant <sup>-1</sup> , respectively at 50 kg ha <sup>-1</sup> N application. BRRI dhan28 produced 16.96 g grain plant <sup>-1</sup> in N <sub>100</sub> and 7. 34 g grain plant <sup>-1</sup> in N <sub>50</sub> treatment. The PFP <sub>N</sub> (grain kg kg <sup>-1</sup> applied N) due to application of 50 kg N ha <sup>-1</sup> were 115, 90.2, 85.3, 85.65, and 36.7 in IRGC ID: 29368, 34737, 29361, 29007 and BRRI dhan28, respectively. On the other hand, PFP <sub>N</sub> (grain kg kg <sup>-1</sup> applied N) was 68.33 for IRGC ID 29295 and 42.25 for BRRI dhan28 in N <sub>100</sub> treatment.	
	Duration: 1 Yrs Expt.1.6. Determination of N fertilizer doses for new BRRI varieties	Determination of appropriate N rates
	The experiment was conducted at the experimental field of BRRI, Gazipur during T. Aman 2020 and Boro, 2020-21 seasons to determine the optimum N requirement of BRRI dhan87 and BRRI dhan92, respectively. The experiment was laid out in a RCB design with three replications. The applied N doses (kg ha <sup>-1</sup> ) were 0, 30, 60, 90, 120, 150 in T. Aman and 0, 40, 80, 120, 160, 200, in Boro season, respectively along with flat doses of P, K, S fertilizer. Study results showed grain yields of BRRI dhan87 and BRRI dhan92 were significantly influenced by N rates. The economically optimum N dose for BRRI dhan87 was 85 kg ha <sup>-1</sup> and 209 kg ha <sup>-1</sup> for BRRI dhan92. <b>Duration: 1 Yrs</b>	for newly released BRRI varieties for optimum yield.
	Expt.1.7. Effect of nitrogen and potassium rates on modern	Suitable ratio of N
	<b>rice cultivation</b> The study was conducted to observe the effect of nitrogen (N) and potassium (K) on the yield and nutrition of modern rice at BRRI farm, Gazipur during T. Aman 2020 and Boro 2020-21 season. The experiment was laid out in split-plot design with three replications assigning the rates of K in the main plots and that of N in the subplots. Soil test based flat rates of P and S were applied to all the plots. The application rate of K was 0,	and K for MV rice cultivation will be developed with N and K dynamics in soil and plant.

Sl. no.	Research Progress	<b>Expected output</b>
	50, 100, 150 and 200 kg ha <sup>-1</sup> both in T. Aman and Boro seasons. Nitrogen was applied @ 0, 50, 75 and 100 kg ha <sup>-1</sup> , in T. Aman season, while in Boro season, the rate of N was 0, 100, 150 and 200 kg ha <sup>-1</sup> . The test varieties were BRRI dhan87 and BRRI dhan89 in T. Aman and Boro seasons, respectively.	
	In T. Aman, the highest mean grain yield (4.28 t ha <sup>-1</sup> ) of BRRI dhan87 was achieved with 100 kg K ha <sup>-1</sup> averaged over all N doses. The straw yield of BRRI dhan87 was also significantly affected by N and K application with the highest yield being recorded with 75 kg N and 150 kg K ha <sup>-1</sup> . In Boro 2020 to 2021, grain and straw yield of BRRI dhan89 was significantly affected by the interaction of N and K addition. The effect of N on grain yield was distinctly dominant over K during Boro season. Sharp increases were observed in grain yield (~2.5 t) due to the addition of N over the N control (i.e., no added N) in all K doses. The highest grain (6.62 t ha <sup>-1</sup> ) and straw yields were achieved with 200 kg N and 150 kg K ha <sup>-1</sup> . The response of BRRI dhan87 and BRRI dhan89 to N and K addition was generally quadratic in nature with the yield being increased with the addition of the nutrients up to a maximum and then declined with further increase. Accordingly, the optimum N and K rates were 63 and 116 kg ha <sup>-1</sup> , respectively, for BRRI dhan87 during T. Aman, while for BRRI dhan89 in Boro season, the rates were 163 kg N and 158 kg K ha <sup>-1</sup> .	
	Expt.1.8. Performance of BRRI rice varieties under P deficient soil	
	Acute P deficiency reduces rice yield depending on internal and/or external mechanisms that allow greater soil P extraction. The experiments were conducted at BRRI farm, Gazipur during T. Aman 2020 and Boro 2020-2021 season having deficit soil available P condition. Six treatments of P doses calculating from soil test value (STB) viz. $T_1$ = P control, $T_2$ = 50% of STB P (11 kg ha <sup>-1</sup> ), $T_3$ = 75% of STB P (16.5 kg ha <sup>-1</sup> ), $T_4$ = 100% of STB P (22 kg ha <sup>-1</sup> ), $T_5$ = 125% of STB P (kg ha <sup>-1</sup> ) and T <sub>6</sub> = 150% of STB P (27.5 kg ha <sup>-1</sup> ) were applied in both the seasons. The experiments were conducted in RCBD with three replications. BRRI dhan87 and BRRI dhan89 were used as tested rice varieties for T. Aman and Boro season respectively. Each plot received a flat dose of N-K-S-Zn (kg ha <sup>-1</sup> ) @ 90-42-10-1 in T. Aman and 60-20-10-2 in Boro season.	
	In the P deficient soil, P fertilizer had significant effect on grain yield. The grain yield in the P fertilized plot progressively increased with the increasing level of P fertilizer in both seasons. In T. Aman season, yield increasing trend was observed up to $T_6$ treatment. The highest grain yield was obtained in $T_6$ treatment (5.57 t ha <sup>-1</sup> ), and it was statistically	

Sl. no.	Research Progress	Expected output
	similar with T <sub>4</sub> (5.47 t ha <sup>-1</sup> ) and T <sub>5</sub> (5.55 t ha <sup>-1</sup> ) treatment. The P control plot yielded only 2.91 t ha <sup>-1</sup> . In the Boro, under control P condition, grain yield was only 2.22 t ha <sup>-1</sup> and with 50% or 75% application of fertilizer P, grain yield increased significantly. The highest grain yield in BRRI dhan89 (7.22 t ha <sup>-1</sup> ) was recorded in the T <sub>4</sub> treatment where 100% STB dose of P was applied followed by T <sub>5</sub> (7.17 t ha <sup>-1</sup> ) and T <sub>6</sub> (7.15 t ha <sup>-1</sup> ) treatment. Response of added phosphorus is much lower in wet season than in dry season.	
	Expt.1.9. Effect of different micronutrients on growth and	
	yield of rice	
	A pot experiment was conducted in the glasshouse of Soil Science Division, BRRI Gazipur in sandy soil to determine the effect of micronutrients and beneficial nutrients on growth and yield of rice. The study was laid out in a completely randomized block design with three replications and five treatments: $T_1$ = NPKSZn, $T_2$ = $T_1$ + CuNiSeSi, $T_3$ = $T_1$ + CuNiSi, $T_4$ = $T_1$ + CuSi and $T_5$ = $T_1$ + Si. All treatments received a blanket doses of chemical fertilizer i.e. N-P-K-S-Zn @ 120-15-60-10-1.5 kg ha <sup>-1</sup> . The Cu, Ni, Se and Si were applied as foliar spray @ 1%, 0.2%, 10 ppm and 0.2%, respectively. In the T. Aman season, the growth and yield of BRRI dhan87 significantly differed with the applied treatments. The highest plant height (114.56 cm), number of panicles per hill (13) panicle length (21.44 cm) number of filled grains per panicle (122), grain (78.18 g pot <sup>-1</sup> ) and straw yield (77.05 g pot <sup>-1</sup> ) were obtained in the T <sub>2</sub> treatment. In the T. Aman season, it appeared that the increased growth and yield was either the effect of Se alone or the combined effect of Cu, Ni, Se and Si. In the Boro season, the highest number of filled grains per panicle (151) and grain yield (94.55 g pot <sup>-1</sup> ) were found with T <sub>5</sub> treatment where, Si was sprayed in combination with recommended chemical fertilizer.	
	Expt.2.0. Regional yield maximization trial (RYMT) under	
	different management practices	
	The experiment was initiated at BRRI, Gazipur in Boro season in 2020-2021 to validate the effect of integrated improved management practices (IIMP) and BRRI recommended practices on grain yield and proper grain filling in a panicle. Two selected genotypes (BRH11-9-11-4-5B-HR3 and BRH13- 2-4-6-4B) and a check (BRRI dhan63) were evaluated under both practices following factorial randomized design with three replications. IIMP were: healthy seedling raising using 60 g seeds per square meter seed bed, urea fertilizer application using 4 splits as basal, 25-30 DAT, 55-60 DAT (before PI) and 75-80 DAT (beginning of heading), and harvesting at 90% maturity.	

Sl. no.	Research Progress	<b>Expected output</b>
	BRRI recommended practices were: traditional seedling raising	
	using 100g seeds per square meter seed bed, urea fertilizer	
	application using 3 splits as 10 DAT, 30-35 DAT, 55-60 DAT,	
	and harvesting at 80% maturity. Result of Boro 2020-21 showed	
	that, considering grain yield and sterility percentage, interaction	
	effect between IIMP and BRRI recommended practices were	
	insignificant. IIMP produced significantly the highest grain	
	yield but sterility percentage were insignificant. Tested	
	genotype, BRH11-9-11-4-5B-HR3 and BRH13-2-4-6-4B	
	produced significantly the highest grain yield 8.7 and 8.6 t ha <sup>-1</sup>	
	respectively, compared to check BRRI dhan63 (7.6 t ha <sup>-1</sup> ).	
	Similar trend was also observed in case of sterility percentage.	
	Duration: 1 Vrs	
	Duration: 1 118 Project II: Identification and Management of Nutritional	
	Disorders in Rice	
	Event 2.1.1 ong-term use of organic and inorganic nutrients	
	in Boro-Fallow-T Aman rice	
	in Doro-ranow-r. Aman rec	
	A long-term experiment was initiated on a permanent layout at	
	BRRI HQ farm Gazipur in 1985 Boro season having 12	
	treatments assigned in RCB design with four replications. The	
	objective of the study was to find the impact of long-term	
	nutrient management on grain yield and soil health. The	
	treatments were revised according to needs (see BRRI, 2016	
	and BRRI, 2019). The recent STB doses of NPKSZn were 150-	
	12-80-5-2 kg ha <sup>-1</sup> and 100-10-80-5-2 kg ha <sup>-1</sup> for Boro and T.	
	Aman rice, respectively.	
	In the T. Amer, and Dara account amission of N. D. V. and S.	
	In the I. Aman and Boro seasons, omission of N, P, K and S	
	fortilizer treatment in T. Amen 2020 smarred to complete	
	recurrice relation in 1. Aman 2020, among the applied argonic motorials $\mathbf{DM} + \mathbf{IDNS} (4.22 \pm ho^{-1})$ CD + IDNS (4.12 $\pm ho^{-1}$ )	
	organic materials, $FM^+HFNS$ (4.25 that ), $CD^+HFNS$ (4.15 that <sup>1</sup> ) and $VC^+$ IDNS (4.08 t ha <sup>-1</sup> ) tracted plate were produced	
	similar grain yield compared to complete chemical fartilizer	
	similar grain yield compared to complete chemical fertilizer $(4.27 \text{ t hs}^{-1})$ In Boro 2020 2021, the highest grain yield 7.01 t	
	(4.27  tha). In Doio 2020-2021, the inglest grain yield 7.01 t ha <sup>-1</sup> was obtained from PM + IPNS which was statistical	
	identical with all other tested organic + IPNS treatments i.e. CD	
	+IPNS (6 70 t $ha^{-1}$ ) and VC + IPNS (6 60 t $ha^{-1}$ ). In both seasons	
	sulfur omitted plot gave significantly lower grain yield	
	compared to full dose of chemical fertilizer plot but there was	
	no significant yield difference obtained in Zn omitted plot.	
	Moreover, significant vield difference was found between	
	reduced K dose (40 kg ha <sup>-1</sup> ) and complete K fertilizer treatment	
	$(K 80 \text{ kg ha}^{-1})$ but in case of moderate K dose (K 60 kg ha <sup>-1</sup> ) and	
	complete K dose (K 80 kg $ha^{-1}$ ) the vield difference was	
	insignificant. In case of annual vield, organic with IPNS based	
	chemical fertilizer treatment shows an increasing trend	
	compared to complete chemical fertilizer treatment	
	Duration: 36 Yrs	

Sl. no.	Research Progress	Expected output
	Expt.2.2. Effect of intensive rice cropping on rice yield	
	under continuous wetland condition	
	<b>under continuous wetland condition</b> This experiment was initiated in 1971 in a permanent layout with NPK fertilizer application. Since Boro 2000, the experiment was modified to accommodate six treatments viz. control (native nutrient), reverse control (NPKSZnCu), NPK, NPKS, NPKSZn and NPKSZnCu after several revisions in the year of 1982, 1984 and 1991. In Boro 2020-2021, the experiment was revised again the N and K fertilizer from 140 to 160 and 80 to100 kg ha <sup>-1</sup> , respectively. The varieties tested in T. Aus, T. Aman and Boro seasons were BRRI dhan48, BRRI dhan87 and BRRI dhan84, respectively. The NPK doses used were 160-25-100, 60-15-80 and 60-10-60 kg ha <sup>-1</sup> for Boro, T. Aman and T. Aus, respectively. Sulfur, Zn and Cu were applied at 10, 4 and 1 kg ha <sup>-1</sup> in the Boro season only. The annual rice production trend from 1981 to 2020 was decreasing in the control treatment, however, from 2001 the reverse control treatment produced grain yield almost similar to complete fertilized treatment .In 2020, annual rice production in control plot was 4.41 t ha <sup>1</sup> while its reversed management (addition of NPKSZnCu fertilizer) resulted in 13.59 t ha <sup>-1</sup> yr <sup>-1</sup> grain production, which was close to complete fertilizer treatment (14.14 t ha <sup>-1</sup> yr <sup>-1</sup> ). It indicates that complete fertilizet cultivation. Results indicated that additional use of Zn and Cu once in a year with NPKS increased annual grain yield by more than 1.0 t ha <sup>-1</sup> than the application of NPKS alone. A similar increasing grain yield trend was observed in complete fertilizer (NPKSZnCu) treatment in Boro season 2020-21.	
	Duration: 50 Yrs	
	Expt.2.3. Response of rice to K fertilizer rates in rice-based cropping pattern in the Old Himalayan Piedmont soil	
	An experiment was conducted at Hazi Mohammed Danesh Science and Technology University (HSTU) farm soil, Dinajpur (AEZ-1) in Boro 2020-2021 season to identify the optimum K rate for Boro rice and to maintain soil fertility especially for K nutrient. The soil of the experimental field was sandy loam in texture having pH 5.8, organic carbon 1.2%, total N 0.09%, available phosphorus 12 ppm and exchangeable K 0.10 meq/100g soil. Six K rates including control were assigned in RCBD design with three replications. The treatments were; K control, 50% STB K (40 kg ha <sup>-1</sup> ), 75% STB K (69 kg ha <sup>-1</sup> ), 100% STB K (92 kg ha <sup>-1</sup> ), 125% STB K (115 kg ha <sup>-1</sup> ) and 150% STB K (138 kg ha <sup>-1</sup> ). Flat doses of N-P-S and Zn were used @ 140-20-10 and 2 kg ha <sup>-1</sup> , respectively. The tested variety was BRRI dhan88. Study result showed the grain and straw yield ware influenced circificantly with increasing the K document.	

Sl. no.	Research Progress	Expected output
	100% STB dose and further increasing the k doses, grain yield did not increase significantly. From the quadratic equation, the economic optimum dose of K was found 106 kg ha <sup>-1</sup> . So, soil test-based fertilizer especially K fertilizer should apply in the Old Himalayan Piedmont soil for obtaining higher rice yield with maintain soil fertility.	
	Duration: 1 Yrs	
	Expt.2.4. Determining critical limit (CL) of rice for soil nutrients	
	The study was conducted with the objective to determine the CL of soil P, K, S and Zn for rice cultivation. Based on land type, cropping pattern and soil texture, 180 soil samples were collected from 3 AEZs (viz, 18, 19 and 20). Soil samples were analyzed for different macro and micro-nutrients and selected for low, medium and highly fertile soils.	
	<b>Pot trial at net house.</b> Pot experiments for P, K, S and Zn were conducted for each nutrient (with and without respective nutrients) following RCB design with three replications. The test crop was BRRI dhan89. Critical Limits of P, K, S and Zn were derived by plotting the relative crop yield (%) on the Y axis for each crop per nutrient following Cate and Nelson method (1965). The study result revealed that the estimated value of critical limit of P, K, S and Zn for rice was 8.7 mg kg <sup>-1</sup> , 0.09 meq /100 g soil, 16.1 mg kg <sup>-1</sup> and 0.70 mg kg <sup>-1</sup> , respectively.	
	<b>Farmers' field trials.</b> In the Boro 2020-21, the estimated CL values of P, K, S and Zn for rice soil were evaluated in farmer's field (deficient soil for each nutrient status). Six treatment combinations were assigned in RCBD with 3 replications on soil test base dose (STB). The treatments were; nutrient control, 50% STB, 75% STB, 100% STB, 125% STB and 150% STB for each nutrient. Here, the 100% STB dose was calculated from the respective critical value of nutrients. The tested rice variety was BRRI dhan28. The P and S experiments were conducted in Companiganj of Sylhet district (AEZ-20) and the K and Zn experiments were conducted in Katchua of Chandpur district (AEZ-19). From the response curve the economic optimum dose of P, K, S and Zn were 42, 115, 24 and 2.72 kgha <sup>-1</sup> , respectively. The calculated optimum dose of each nutrient was found almost similar in compared to STB dose.	
	Duration: 2 Yrs	
3	Project III. Integrated nutrient management	
	Expt.3.1. Integrated nutrient management for double and triple rice cropping	
	The experiment was initiated in Boro 2008-09 at BRRI farm Gazipur in a clay loam soil to find the suitable fertilizer	

Sl. no.	Research Progress	<b>Expected output</b>
	management for double and triple rice cropping system and to find out the impact of triple rice cropping on soil health. In Boro-Fallow-T. Aman pattern, BRRI dhan58 and BRRI dhan49	
	were tested. In Boro -T. Aus-T. Aman pattern, BRRI dhan74, BRRI dhan48 and BRRI dhan46 were included as test variety.	
	Fertilizer treatments used were: $T_1$ : control, $T_2$ : STB dose NPKS @ 160-25-60-20 kg ha <sup>-1</sup> for Boro, 70-12-48-10 kg ha <sup>-1</sup> for T. Aus and 84-21-32-06 kg ha <sup>-1</sup> for T. Aman, $T_3$ : STB (50%) + Mixed manure (MM) as CD @ 2 t ha <sup>-1</sup> + ash @ 1 t ha <sup>-1</sup> oven dried, T <sub>4</sub> : farmers' practice (FP) as NPKS @ 80-10-20-10 kg ha <sup>-1</sup> for Boro, 70-10-15-0 kg ha <sup>-1</sup> for T. Aus and 70-10-15-0 kg ha <sup>-1</sup> for T. Aman, respectively. The experiment was laid out in RCB design with three replications.	
	The study result of Boro 2019-20 and T. Aman 2020 under double cropping pattern showed that 100% STB and 50% STB + MM fertilizer produced statistically similar grain yield. In the same year under triple rice cropping pattern, treatments 100% STB and 50% STB + MM fertilizer also produced statistically identical grain yield in all three seasons. However, both in double and triple rice cropping pattern, 100% STB and 50% STB + MM fertilizer produced significantly higher grain yield than farmers' practice and native nutrient. Cumulative yield of triple rice cropping was always higher than double rice cropping pattern irrespective of treatment	
	Duration: 8 Yrs	
	Expt.3.2. Rice yield improvement in the coastal land through vermicompost (VC) amendments	
	Six experiments were conducted at three farmer's field of Dumuria, Khulna and Amtali, Borguna, in both T. Aman in 2020 and Boro 2020-2021 season to find out the effect of different doses of VC on grain yield. Treatments were as; VC (@ 0, 1, 2 t ha <sup>-1</sup> (oven dry basis) with full dose of chemical fertilizer (FRG, 2018). Grain yield increased significantly due to different doses of added VC at Dumuria, Khulna in both T. Aman 2020 and Boro 2020-2021season, however statistically similar grain yield obtained due to application of either 1 or 2 t ha <sup>-1</sup> of VC. In the Dumuria, Khulna about 6% grain yield increased in T. Aman and 22 % in Boro season at 2 t ha <sup>-1</sup> VC application over control. In the Boro season, at Amtali Borguna, application of 2 t ha <sup>-1</sup> VC produced significantly the highest grain yield (7.06 t ha <sup>-1</sup> ) followed by VC 1 t ha <sup>-1</sup> (6.52 t ha <sup>-1</sup> ). The lowest grain yield 5.72 t ha <sup>-1</sup> recorded in the control treatment.	
	Duration: 2 Yrs Expt.3.3 Nutrient management under conservation	
	agriculture (CA) in double rice cropping system	

Sl. no.	Research Progress	Expected output
	This experiment was initiated at Paba, Rajshahi, in Boro 2018-	
	19 seasons with the objectives to determine the nutrient	
	requirement of rice in Boro-Fallow-T. Aman cropping pattern,	
	and to improve soil health under conservation agriculture	
	practices. Two crop establishment methods (unpuddled and	
	puddle) in main plot, two residue management practices (straw	
	retained and straw removed) in sub plot and four fertilizer doses	
	as recommended fertilizer (RD) 100%, 125% of RD. 75% of	
	RD, and 50% of RD were assigned in split-split plot design with	
	three replications.	
	In Boro 2020-21 grain yields were significantly higher under	
	puddled cultivation than un-puddled condition (Table 6). Rice	
	straw (RS) incorporation significantly increased the rice yield	
	in Boro season. 25% extra fertilizer application significantly	
	increased the grain yield irrespective of residue management	
	and crop establishment methods. In T. Aman 2020, grain yields	
	were insignificant under unpuddled and puddled cultivation.	
	However, RS incorporation significantly increased the rice	
	yield in T. Aman season. Moreover, 125%, 100% and 75% of	
	RD of fertilizer produced statistically identical grain yield	
	mespective of residue management and crop establishment	
	Duration: 2 Vrs	
	Expt 3.4 Rice yield and soil health improvement through	
	organic and inorganic amendment.	
	The experiment was initiated at the experimental farm of BRRI,	
	Gazipur in 1. Aman season in 2019 to investigate the effect of $(100)$	
	vermicompost (VC) and silicon (Si) on rice grain yield and soil	
	nearmine soli was sitty clay foam in texture naving pH /.1, organic carbon 13 g kg <sup>-1</sup> total N 1.2 g kg <sup>-1</sup> Olsen available P	
	organic carbon 15 g kg , total N 1.2 g kg , Orsen available F 10.1 mg kg <sup>-1</sup> exchangeable K $M$ mg kg <sup>-1</sup> and available S 31	
	$kg^{-1}$ The experiment was laid out in a split- plot design with	
	three replications, where main plots comprised of four levels of	
	VC (0, 2.5, 5, 10 t $ha^{-1}$ ) and sub-plots had four Si rates (0, 100,	
	200, 400 kg ha <sup>-1</sup> ). The variety was BRRI dhan87 in T. Aman	
	and BRRI dhan89 in the Boro season. Results of Boro 2020-21	
	showed that, grain yield of BRRI dhan89 with different VC	
	rates increased significantly from control. The highest grain	
	yield (7.44 t $ha^{-1}$ ) of BRRI dhan89 was obtained at 2.5 t $ha^{-1}$	
	VC application which was statistically similar with 5 and 10 t	
	ha <sup>-1</sup> VC rates. Among Si rates, 100 kg ha <sup>-1</sup> performed better	
	which was statistically similar with 200 and 400 kg ha <sup>-1</sup> . In T.	
	Aman 2020, the highest grain yield (4.57 t $ha^{-1}$ ) of BRRI	
	dhan8 / was obtained with 2.5 t $ha^{-1}$ VC application which was	
	statistically similar with 5 and 10 t ha <sup>-1</sup> VC. But among S1 rates,	
	insignificant grain yield was found.	
	Duration: 3 Yrs	
4	Project IV. Soil and Environmental Problems	

Sl. no.	Research Progress	Expected output
	Expt.4.1. Management interventions to improve NUE and	
	reduce N losses	
	A field experiment was conducted during Boro 2020-2021 at	
	BRRI Gazipur to quantify the fate of N fertilizer (crop, soil and	
	losses) and N fertilizer use efficiency (NUE) under various N	
	management options. The tested seven treatments were: T1: no	
	N fertilizer (N <sub>0</sub> ), T <sub>2</sub> : 140 kg N ha <sup>-1</sup> from prilled urea (N <sub>140</sub> PU),	
	T <sub>3</sub> : T <sub>2</sub> +25% N (N <sub>175</sub> PU), T <sub>4</sub> : T <sub>2</sub> -25% N (N <sub>105</sub> PU), T <sub>5</sub> : Cow dung	
	$(2 t ha^{-1})$ + IPNS with T <sub>2</sub> (N <sub>140</sub> PU+CD), T <sub>6</sub> : Bioorganic	
	fertilizer (2 t $ha^{-1}$ ) + IPNS with T <sub>4</sub> (N <sub>105</sub> PU+ Bioorganic fert.)	
	and T7: Deep placed Urea Super Granule (USG) alike T4 (N105	
	USG) were tested following RCBD with 4 replications. A	
	blanket rates of P-K-S-Zn (@ 25-80-10-1 kg ha <sup>-1</sup> , respectively	
	were applied. Seedlings of BRRI dhan89 has tested. Gas	
	samples were collected to analysis CH <sub>4</sub> and N <sub>2</sub> O emission.	
	Measurement of NH <sub>3</sub> emission (volatilization) was performed	
	by using close chamber technique and Boric Acid Trap method.	
	N fertilizer application significantly increased grain yield over	
	control. Among the N fertilizer applied treatments the higher	
	grain yield (6.3 t ha <sup>-1</sup> ) and $AE_N$ (35 kg grain kg <sup>-1</sup> N) was attained	
	from the N fertilizer applied at the rate of 105 kg N ha <sup>-1</sup> from	
	PU+ Bioorganic fertilizer $(T_6)$ followed by USG $(T_7)$ treatment	
	where about 31 kg grain kg <sup>-1</sup> N (AEN) and 6.0 t ha <sup>-1</sup> grain yield	
	was obtained.	
	Time course of NH <sub>3</sub> emission fluxes after urea application	
	The NH <sub>3</sub> emission peaks were usually observed on day 1-3, day	
	3 and day 1 after the $1^{\text{st}}$ , $2^{\text{nd}}$ and $3^{\text{rd}}$ split application of urea.	
	respectively. In case of all three splits the neak $NH_2$ emissions	
	were greater in the treatment with higher rate of N annlication	
	i.e. in the N175PU (T <sub>2</sub> ) resulting 86, 54 and 51 mg NH <sub>2</sub> -N m <sup>-2</sup>	
	$d^{-1}$ after 1 <sup>st</sup> 2 <sup>nd</sup> and 3 <sup>rd</sup> splits of urea application respectively	
	The lowering of NH <sub>2</sub> -N emission neaks was found with	
	reducing rate of N fertilizer application ensuing 55, 34 and 39	
	mg NH <sub>2</sub> N m <sup>-2</sup> d <sup>-1</sup> in N <sub>14</sub> PU and 52, 27 and 23 in N <sub>167</sub> PU after	
	$1^{\text{st}}$ 2 <sup>nd</sup> and 3 <sup>rd</sup> splits of urea application respectively. Except the	
	1, 2 and $5$ spins of the application, respectively. Except the higher value after 1 <sup>st</sup> tondressing of 40% uses in T <sub>c</sub> treatment	
	$(N_{105} \text{ PU} + \text{Bioorganic fart})$ the overall near NH2 emissions	
	Were lower (13 and 23 mg NH <sub>2</sub> N m <sup>-2</sup> $d^{-1}$ ) then in the CD	
	applied plots (N <sub>140</sub> DI $\pm$ CD) (22 and 62 mg NII- N m <sup>-2</sup> d <sup>-1</sup> )	
	apprice prois $(1N_{140} + 0^+CD)$ (22 and 02 mig $1Nm_3-1N m^2 = 0^+$ ).	
	Among the N tertinzer treatments, the NH3-N emission was the	
	NUL N $m^2$ $d^{-1}$ often 1st and $2m^4$ employed (38 and 9, mg	
	$N\Pi_3 - N \Pi^- \alpha^-$ , after $\Gamma^-$ and $Z^-$ applications, resp.) In N <sub>0</sub>	
	treatment, some NH <sub>3</sub> -N emission was recorded initially which	
	possibly ensued from native soil organic matter mineralization	
	with lesser plant N uptake after two weeks of crop	
	establishment, later on the emission was below the detection.	
1	Across the N fertilizer application treatments, the $NH_3-N$	

Sl. no.	Research Progress	Expected output
	emission was declined to below detection limit on day 10 after $1^{st}$ split, day 6 after $2^{nd}$ split and day 7 after $3^{rd}$ split. Similar to NH <sub>3</sub> emission fluxes, the cumulative NH <sub>3</sub> -N emission was significantly (p<0.01) greater in the treatment with higher urea-N application rate T <sub>3</sub> : N175PU (6.7 kg ha <sup>-1</sup> season <sup>-1</sup> ) and lower in the treatment with lower urea-N application rate T <sub>4</sub> : N105PU (3.2 kg ha <sup>-1</sup> season <sup>-1</sup> ). The total NH <sub>3</sub> -N emission (in kg ha <sup>-1</sup> season <sup>-1</sup> ) was significantly (p<0.01) lowest in the N0 (0.6) and N105USG (1.1) treatments. Among N <sub>140</sub> PU, N <sub>140</sub> (PU+CD) and N <sub>105</sub> (PU+ Bioorganic fert.) treatments, the total NH <sub>3</sub> -N emission was statistically identical but significantly lower (p<0.01) than that in T <sub>3</sub> : N175PU.	
	<b>Expt.4.2.</b> Effect of different organic sources for amelioration of industrial polluted area of Sripur, Gazipur	
	The rice soils of Sripur, Mirzapur and Pirojali were irrigated with contaminated industrial water. The soils of the area contained organic matter (>2.5%), high level of Fe (87 to 580 ppm), Mn (7 to150 ppm), Cu (1 to 7 ppm), and Zn (3 to 65 ppm). A number of 3 farmers field experiments were conducted in Boro 2020-21 at each location of Mirzapur and Pirujali and Sripur with the objective to ameliorate such soil with different amendments for improve rice productivity. Treatments were as T <sub>1</sub> : Inoculum + full chemical fertilizer (kg ha <sup>-1</sup> ) N-P-K-S @ 100-20-80-10, T <sub>2</sub> : Biochar + full chemical fertilizer (kg ha <sup>-1</sup> ) N-P-K-S@ 100-20-80-10, T <sub>3</sub> : Vermicompost (VC) + IPNS based chemical fertilizer (N-P-K-S @40-0-48-10), T <sub>4</sub> : Full chemical fertilizer, T <sub>5</sub> : Control. Treatments were laid out in RCB design with three replications.	
	In the Sripur, insignificant effect was found due to application of soil amendments over chemical fertilizer treatment for the number of tiller, panicle, grain and straw yield of BRRI dhan89. However, a little higher grain yield (4.67 t ha <sup>-1</sup> ) was recorded when Plant Growth Promoting Bacteria (PGPB) inoculum was applied with chemical fertilizer compared to other treatment. At Mirzapur, BRRI dhan74 was cultivated. The significant highest amount of grain yield (5.45 t ha <sup>-1</sup> ), tillier number m <sup>2</sup> (305) panicle number m <sup>2</sup> (291) was obtained in the inoculum + full dose of chemical fertilizer treatment, though it was statistical similar to the biochar + full dose of chemical fertilizer (5.41 t ha <sup>-1</sup> ) and only full dose of chemical fertilizer (5.27 t ha <sup>-1</sup> ) application. The negative impact of VC + chemical fertilizer application was found on grain yield (4.81 t ha <sup>-1</sup> ) at Mirzapur. At Pirujali, application of full dose of chemical fertilizer yielded 7.21 t ha <sup>-1</sup> grain though it was statistical similar with PGPB inoculum, biochar and VC applied treatment. At all sites, the lowest grain yield was recorded in the control treatment. In the Sripur, among the heavy metals the lowest Pb uptake (27 c ha <sup>-1</sup> )	

Sl. no.	Research Progress	Expected output
	<sup>1</sup> ) was found in the biochar (T <sub>2</sub> ) and Inoculum applied treatment (T <sub>1</sub> ). Conversely, the highest Cd uptake (2.5 g ha <sup>-1</sup> ) was found in the Biochar (T <sub>2</sub> ) and lowest (1.0 g ha <sup>-1</sup> ) in the chemical fertilizer applied treatment (T <sub>4</sub> ). At Mirzapur, uptake of Fe (4.54 kg ha <sup>-1</sup> ), Pd (138 g ha <sup>-1</sup> ) and Cd (10.2 g ha <sup>-1</sup> ) increased due to chemical fertilizer application. However, the lowest Fe (2.18 kg ha <sup>-1</sup> ), Pb (115 g ha <sup>-1</sup> ), Cd (6.7 g ha <sup>-1</sup> ) and Ni (2.6 g ha <sup>-1</sup> ) uptake found in the control treatment. At Mirzapur, application of treatment significantly increased Fe uptake over control. At Pirujali, chemical fertilizer increased Pb uptake (157 g ha <sup>-1</sup> ), however application of biochar (125 g ha <sup>-1</sup> ) and inoculum (119 g ha <sup>-1</sup> ) significantly reduced Pb uptake. The lowest Cr (18.4 g ha <sup>-1</sup> ) and Ni (2.0 g ha <sup>-1</sup> ) uptake was found in the control treatment.	
	Duration: 3 Yrs	
	<b>Expt.4.3. Effect of biochar on rice yield in the charland</b> The study was conducted at BRRI Regional Station, Sirajganj with the objective to determine the effect of biochar on rice growth, yield and soil health in charland. The experiment was initiated in Boro 2019-20 and consisted of four treatments: $T_1$ = control, $T_2$ = recommended fertilizer (RF), $T_3$ = RF + biochar @ 2 t ha <sup>-1</sup> and $T_4$ = RF + biochar @ 4 t ha <sup>-1</sup> . The treatments were arranged in RCB design with 3 replications. The biochar was produced from chita dhan (unfilled grain). Flat doses of NPKS were applied @ 100-15-40-10 in T. Aman and 138-21-75-18 in Boro season. Biochar was applied only in Boro season and incorporated with the soil before 7 days of transplanting. In T. Aman season, 30 % fertilizer was reduced from recommended dose in the biochar treated plots. In the Boro season, application of biochar @ 4 t ha <sup>-1</sup> with recommended fertilizer resulted the highest grain yield (8.96 t ha <sup>-1</sup> ) of BRRI dhan89 compare to the other three treatments. In the T. Aman season, reduction of 30% chemical fertilizer in treatments that received biochar either @ 2 t ha <sup>-1</sup> or 4 t ha <sup>-1</sup> in the previous Boro season produced grain yield statistically similar to the full dose of chemical fertilizer (5.03 t ha <sup>-1</sup> ) treatment.	
5	Project v. Soil Microbiological studies	

## Expt.5.1.Field evaluation of BRRI bio-organic fertilizer

BRRI bio-organic fertilizer was developed with the objectives to reduce synthetic N and P fertilizer use in rice cultivation and improve soil health. To evaluate its field performance, one field experiments were conducted at BRRI HQ in both the season of T. Aman 2020, and Boro 2020-21. Bio-organic fertilizer (BoF) was used at 2 t ha<sup>-1</sup>. The treatment combinations were NPKS (100%), BoF + 70% (N) +100% (KS), BoF +100% NPKS and fertilizer control. Recommendation rates of chemical fertilizers for T. Aman and Boro were (kg ha<sup>-1</sup>) N-P-K-S @ 67-10-41-10 and 140-20-80-10, respectively. BRRI dhan87 at T. Aman and BRRI dhan89 was grown in the Boro season. Study result proved bio-organic fertilizer (BoF1@ 2t ha-1) has potential to supplement 30% N and 100% P requirement for HYV rice without sacrificing yield. In the T. Aman, application of BoF with 70% (N) +100% (KS) gave the highest grain yield of 5.82 t ha<sup>-1</sup>. Statistically similar grain yield was obtained in 100% NPKS (5.24 t ha<sup>-1</sup>) and BoF +100% NPKS (4.91) treatment. However, in the Boro season, the highest grain yield was recorded (7.32 t ha<sup>-1</sup>) in the BoF with 100% NPKS treatment and statistical similar grain yield was obtained in both 30% reduced N and 100% NPKS applied treatments. The significantly lowest grain yield was found at the control treatment.

## Expt.5.1.a. Effect of bio-organic fertilizer on grain yield in the farmers' field

Six field demonstration trials were conducted to evaluate the performance of Bio-organic fertilizer at the farmers' field. In the field trials, BoF + 70% (N) +100% (KS) treatment was compared with standard NPKS (100%) doses. In the Gaziprur site, application of bio-organic fertilizer 2 t ha<sup>-1</sup> (dry weight basis) along with 30% reduced urea and 100% removal of TSP fertilizer gave 5.7 to 10.52 % yield improvement. Similarly, the same treatment gave 9.52 to 18.2% yield increment at Dhanbari, Tangil. Whereas, in Madhupur, Tangail site, bio-organic fertilizer increased yield 67% compared to standard chemical fertilizer application.

## **Duration: 3 Yrs**

**Expt.5.1.b. Effect of balanced fertilizer on grain yield in the farmers' field** Four field demonstration trials were conducted to evaluate the performance of balanced fertilizer at the farmers' field. In the field trials, balanced fertilizer dose was compared with farmers' fertilizer doses. Field demonstration trials have been conducted at Kamarkhada, Sirajganj, Sonagazi, Feni, Bashial, Tangail and Asasoni, Satkhira, respectively. In all the demonstration trials balanced fertilizer dose treatment gave the highest grain yield compared to farmers' dose alone.

	Duration: 1 Yrs	

Sl. no.	Research Progress	Expected output
	Expt.5.2. Microbial characterization of different AEZs soil	Characterization of
	Soil biology dictate soil health. The study was initiated in the year of 2019 with the objective to determine the microbial properties of different AEZ soils of Bangladesh. A total 120 sample (composite of 1100 soil sample points) were collected (0-15 cm) from 7 AEZ's using GPS and analyzed for total and beneficial bacteria, fungus and actinomycetes. Microbial populations were determined using spread plate count technique with specific growth media. Soil samples were collected from AEZ-8 (Kishoreganj), AEZ-21(Kishoreganj), AEZ-10 (Faridpur Sadar), AEZ-16 (Munshiganj), AEZ-19 (Cumilla), AEZ-22 (Habiganj and Moulovibazar), and AEZ-27 (Rangpur) district. Study report showed that among the tested AEZ's, the highest total bacteria found in Kishoreganj (AEZ-21), followed by Habiganj (AEZ-22) and Faridpur Sadar (AEZ-10) (Fig.5a). Total fungus population was low and almost similar in all tested AEZ's soil. The population of free-living N <sub>2</sub> fixing, Rhizobium and phosphate solubilizing bacteria were lower in number compared to any healthy agricultural soil.	plant growth promoting bacteria to develop bio-fertilizer
	solubilization (3582 mg kg <sup>-1</sup> P) was recorded in the strain B64, which was isolated from AEZ-11. Strain B59 (AEZ-15) solubilized the second highest P (2961 mg kg <sup>-1</sup> ). Indoleacetic acid (IAA) was determined by using spectrophotometer and it was ranged from 2 to 144 mg kg <sup>-1</sup> . The highest IAA was produced by strain B59 (AEZ-15). Strain identification is in progress.	
	Duration: 1 Yrs	
	Plant Physiology Division Programme area/Project (Duration)	
1	Project I: Salinity tolerance	
	<ul> <li>1.1 Title: Exploring new sources of salinity tolerance from BRRI Gene Bank germplasm at seedling stage</li> <li>Progress: Four hundred (400) germplasm along with standard tolerant check IR58443-6B-10-3 and sensitive check IRRI154 were screened for seedling stage salinity tolerance at 12 dS m<sup>-1</sup> by the method described by Gregorio <i>et al.</i> (1997).</li> <li>Duration: On-going</li> </ul>	Amongthem46germplasm(Acc. no.:2712,2729,2755,2768,2775,2779,2780,2796,2821,2834,2840,2860,2890,2905,2926,2951,2963,2971,2972,2974,2975,2974,2975,2977,3004,3006,3037,3051,

Sl. no.	Research Progress	Expected output
Sl. no.	<b>Research Progress 1.2 Title:</b> Characterization for salinity tolerance at the seedling stage during T. Aman and Boro season <b>Progress:</b> Six hundred and eighty-seven (687) advanced breeding line along with standard tolerant check IR58443-6B-10-3 and sensitive check IRRI154 were screened for seedling stage salinity tolerance at 12 dS m <sup>-1</sup> by the method described by Gregorio <i>et al.</i> (1997). <b>Duration:</b> On-going <b>1.3 Title:</b> Characterization for salt tolerance of a backcross	Expected output $3052, 3072, 3076, 3078, 3083, 3085, 3126, 3127, 3128 and3130) were foundtolerant to moderatelytolerant to moderatelytolerant (SES scoreranged from 3.0-5.0).Among them, ninegenotypes (BR9626-1-2-12, BR9625-B-1-4-6, BR(BIO)8961-AC26-16-4, IR103783-B-B-6-2, IR15T1319,SVIN468, SVIN164,and SVIN160) weretolerant (SES 3) andanother101genotypesweremoderatelytolerant(SES score rangedfrom 3.5 -5.0)Progenieswere$
	<b>Progress:</b> Six hundred and eighty-seven (687) advanced	1-2-12, BR9625-B-1-
	breeding line along with standard tolerant check IR58443-6B-	4-6, BR(BIO)8961-
	10-3 and sensitive check IRRI154 were screened for seedling	AC26-16-3,
	Gregorio <i>et al.</i> (1997).	16-4. IR103783-B-B-
	Duration: On-going	6-2, IR15T1319,
		SVIN468, SVIN164,
		and SVIN160) were
		tolerant (SES 3) and
		another 101
		genotypes were
		(SES score ranged
		from 3.5 -5.0)
	1.3 Title: Characterization for salt tolerance of a backcross	Progenies were
	population of rice at seedling stage	distributed non-
	<b>Progress:</b> 1. One thousand five hundred sixty-nine (1569)	normally from
	BC <sub>2</sub> F <sub>2</sub> progenies derived from BRRI dhan29/BRRI	tolerant to sensitive
	and IRB1154) were screened in hydrononics culture @ 12 dS/m	classes with negative
	salinity stress at seedling stage.	sensitivity
	2. Twenty (20) tolerant and moderately tolerant progenies along	Sensitivity
	with parents were genotyped by 4 polymorphic SSR and STS	Significant marker-
	molecular marker (RM10694, RM8094, AP3206f, RM493)	trait linkages for the 4
	Duration: On-going	markers revealed due
		to the presence of all
		Saltal OTI region
		The following
		markers could be
		useful to track
		seedling stage salt
		tolerance in the
		breeding of salinity
		dhan47 or derived
		lines are used.
	1.4 Title: Validation of Ashfal balam salinity tolerant QTLs at	A total of 39
	the reproductive phase	significant QTLs
	<b>Progress:</b> One-hundred twenty-nine (129) F <sub>7</sub> -RIL populations	were identified for
	derived from BR11/Ashfal balam along with parents and checks	different traits. One

Sl. no.	Research Progress	Expected output
	(IR58443 and IRRI154) were grown in the salinity tank @ 6	cluster of QTL in
	dS/m salinity stress from transplanting till maturity.	chromosome 6 was
	Remapping was done by using currently generated phenotype	found consistent (also
	data and previously genotyped 105 polymorphic SNP data	found in the previous
	through ICI-mapping software	mapping) for filled
	Duration: On-going	grain number and
		filled grain weight
		within the marker
		interval id6007312-
		K id6011324 could
		be potential for future
		target.
		6
	1.3 Title: CRISPR-Cas9 mutagenesis of the OsRR22 gene for	
	improving salinity tolerance of rice	Vector construction
	Progress: To design a CRISPR/Cas9 targeting the OsRR22	completed to do rice
	gene in rice, a 19bp guide sequence (5'-	transformation.
	AGAGGGATCAATTCCCCGT-3') was a protospacer adjacent	
	motif lying within the OsRR22 coding sequence	
	(LOC Os06g08440). The guide sequence was properly cloned	
	into the binary vector pC1300-Cas9. The binary vector pC1300-	
	Cas9 harboring Cas9/OsRR22 sgRNA was mobilized into	
	Agrobacterium tumefaciens LBA4404 by freeze-thaw method	
	and confirmed through PCR-gel electrophoresis	
	Duration: On-going	
2.	Project II: Submergence tolerance	
	2.1 Title: Screening of rice germplasm for two weeks flash flood	Out of 100
	submergence tolerance	germplasm only one
	Progress: Twenty days old seedlings were transplanted in a	germplasm found
	submergence tank. Two weeks after transplanting plants were	non-elongating types
	completely submerged for 14 days. The water level was up to	(Acc. No. 1465)
	1m. After 14 days of drain out of water recovery and	having survivability
	survivability score was taken.	percentage was 50%
	Duration: On-going	(SES score 7) and rest
		of the germplsms
		were elongating type.
		Survivability of the
		tolerant check
		varieties FR13A and
		BRRI dhan79 was
		100% while
		susceptible check
		BR5 showed only
		15% survivability.
		÷

Sl. no.	Research Progress	Expected output
	<b>2.2 Title:</b> Identification of rice Advance Breeding line for two	Out of 26 advance
	weeks' flash flood submergence tolerance	line Seven advance
	Progress: Twenty five (25) days old seedlings were	line found moderately
	transplanted in a concrete submergence tank. Two weeks after	tolerant.
	transplanting plant were complete submerged at 1-meter height	
	and keep submerged condition for 14 days. After 21 days of	
	drain out of water recovery or survivability score was taken.	
	Duration:	
	<b>2.3 Title:</b> Screening for stagnant flooding tolerance of advance	Out of 50 genotypes
	breeding lines and germplasm at whole growth period during T.	on the basis of
	Aman season	survivability (%) and
	<b>Progress:</b> Twenty-one days old seedling will be transplanted.	tillering ability 2
	One seedling per hill with 20 x 20cm spacing. The stagnant	germplasm and 12
	flooding treatment was started from 7 DAT with 5 cm water	advance lines
	depth and was increased weekly by 5 cm up to 40 cm at 56 DAT	(Table2) were
	and then increased to 50 cm at 63 DAT and to 60 cm at 70 DAT	selected as
	and maintained till maturity	moderately tolerant to
	Duration: On-going	stagnant flood condition.
	2.4 Title: Screening of BRRI dhan78 under saline submergence	BRRI dhan78 had
	condition	80% survivability for
	Three different submergence conditions (6, 8 and 12 dS/m) with	both 6 and 8 ds/m
	three different inundation period (10,12 and 14 days) were	salinity at 10 and 12
	impose. BRRI dhan47 and BRRI dhan79 were used as saline	days of inundation
	and submergence tolerant check respectively.	period.
	Duration: On-going	
	2.5 Title: Evaluation of elongation ability of BRRI dhan91	The results showed
	under deep flooding condition	that under
	<b>Progress:</b> Twenty days old seedling was transplanted following	submergence
	two environments. One was medium deep water condition.	condition the percent
	Under this condition two week after transplanting water level	elongation of the
	was increased (a) 10 cm per week and stopped when the water	tested varieties ranges
	level was up to 1.5 m. Another one was complete submergence	from 13.91% in BRRI
	condition. Under this condition two week after transplanting	dhan79 to 100.27% in
	plants were completely submerged for 14 days. The water level	Higol Digha and
	was up to 1m. After 14 days of drain out of water percent	survivability ranges
	elongation and survivability score was taken.	from 10./1% in Lal
	Duration: On-going	Digha to 100% in
		BRRI dhan52. The
		percent elongation
		and survivability of $41 - DDDL^{11} = 01$
		found 20.47 0/ - 1
		1000 $39.4$ / % and 57.140/
		07.14%, respectively.
		under medium deer
		water condition the
		water condition the
		tested varieties ranges
		from 02.82 cm in
		110111 72.02 CIII III

Sl. no.	Research Progress	Expected output
		Higol Digha to 257.88 cm in BRRI
		dhan51. The plant
		height of the attempt
		was found 232.65 cm
3	Project III: Drought tolerance	was iound 252.05 cm.
	<b>3.1 Title:</b> Screening of rice germplasm for drought tolerance at reproductive phase, T. Aman2020 <b>Progress</b> Three hundred rice germplasm collected from BRRI gene bank along with check variety BRRI dhan71 and IR64 were tested during T. Aman season 2020 at BRRI farm Gazipur following Field-managed screening protocol (IRRI, 2008). <b>Duration: On-going</b>	Outof300germplasms,43genotypesshowedbetter performance inrelation to yield underrainfedcondition atreproductivephasewhichwereselected
		for further confirmation under control condition in rainout shelter.
	<b>3.2 Title:</b> Confirmation of performance for advanced breeding lines under control drought condition at reproductive phase <b>Progress</b> Twelve advanced breeding lines along with check variety BRRI dhan56, BRRI dhan71 and IR64 were evaluated in Plant Physiology net house shaded by polythene sheet at BRRI HQ, Gazipur during T. Aman season, 2020. <b>Duration: Completed</b>	Out of 12 advanced breeding lines IR118194-B-17-3 performed better followed by IR1181194-B-51-1 and IR118194-B-6-4- HR2.
	<ul> <li>3.3 Title: Evaluation of previously selected germplasm under drought stress at reproductive phase in the rain-out shelter</li> <li>Progress This experiment was conducted in the rain-out shelter, Plant Physiology Division at BRRI HQ, Gazipur during T. Aman season, 2020 to evaluate previously selected 41 germplasm with check variety BRRI dhan71 and IR64.</li> <li>Duration: Completed</li> </ul>	Under control drought condition in the rainout shelter, out of 41 germplasm BRRI Gene Bank Acc. no. 2276 yielded highest followed by Acc. no. 1800, 1905 and 1907. The sterility percentage of these genotypes was less than 50%
4	Project IV: Heat tolerance	
	<b>4.1 Title:</b> Screening for high temperature tolerance of spikelet fertility QTL introgression lines <b>Progress</b> Fifty-five high temperature spikelet fertility QTL introgression lines were tested along with parents (BRRI dhan28, BRRI dhan29 and N22) under control glass house condition with high temperature $(25\pm 2^{0}C)$ and high hyperidity	The tested lines scored 3-7 having spikelet fertility ranged from 32-68%. However, the parents, BPPL dhen 28 scored
	(75+5%) condition during flowering	7 with cnikelet
	Duration: Ongoing	fertility 21% and

Sl. no.	Research Progress	Expected output
		donor N22 scored 5
		with fertility 53%.
	<b>4.2 Title:</b> Preliminary yield trial of high temperature spikelet	The heat tolerant line
	fertility QTL introgression line	yielded highest 6.57
	<b>Progress</b> One high temperature spikelet fertility QIL	tha <sup>-1</sup> with earliness
	introgression lines in the background of BRRI dhan28 were	about 1-5 days
	dhan <sup>88</sup> ) in the field condition during Boro 2020 21	porent BPPI dhon 28
	Duration: Ongoing	and checks. The line
	Duration. Ongoing	also showed
		improved or similar
		grain quality traits.
	<b>4.3 Title</b> : Screening of Aus rice germplasm for heat tolerance.	Out of 50 germplasm,
	<b>Progress</b> At heading stage plant immediately transferred into a	three germplasm (Acc
	green house where temperature and humidity control at 35°C	no. 1782, 1783, 1797
	and 75 RH from 8:30 to 14:30 and rest of the time at $30^{\circ}$ C and	and 2085) were found
	70% RH. The plant were kept here for seven days then	medium heat tolerant
	transferred to normal environmental condition and continue to	with a SES score 3
	maturity.	and there fertility
	Duration: Ongoing	percentage were $6/$ ,
		03, /1 and 02%
5	Project V: Cold tolerance	Tespectively.
	5.1 Title: Screening of rice genotypes for seedling stage cold	Among the tested rice
	tolerance	genotypes, 32 BRRI
	Progress Some 250 BRRI GeneBank Germplasm and three	GeneBank
	BRRI varieties along with four check varieties namely BRRI	germplasm (Acc. no.
	dhan28, BRRI dhan36, Mineasahi and HbjB-VI were tested for	2256, 2257, 2264,
	seedling stage cold tolerance in cold water tanks at artificial	2268, 2277, 2282,
	condition. Seeds were sown in plastic trays (60 cm length x 30	2288, 2289, 2290,
	cm breadth x 2.5 cm height) filled with gravels and crop residue	2291, 2292, 2293, 2293, 2296
	tree granular soil and allowed to grow until 3 leaf stage. The	2296, 2300, 2308, 2212, 2220, 2222
	plastic trays were then placed into cold water tanks adjusted to constant temperature at $12^{\circ}C$	2312, 2320, 2333, 2324, 2327, 2345
	Duration: Ongoing	2334, 2337, 2343, 2343, 2346, 2347, 2340
	Duration. Ongoing	2340, 2347, 2349, 2352, 2358, 2363
		2392, 2500, 2500, 2500, 2300, 2398, 2405, 2429.
		2432, 2433) and
		BRRI dhan84 showed
		moderately cold
		tolerant at seedling
		stage.
	<b>5.2 Title:</b> Evaluation of advanced breeding lines for	Considering growth
	Progress Some 17 advance breeding lines along with aback	sterility percentages
	varieties viz BRRI dhan 28 BRRI dhan 67 BRRI dhan 60 and	six short duration
	BRRI dhan89 were evaluated for reproductive stage cold	lines (BR10717-5R-
	tolerance at natural field condition. There were two seeding	82. BR11001-5R-37
	times 18 October and 22 November (control). Thirty-five-day-	BR11001-5R-2.
	old seedlings were transplanted in main field. Early planting	BR11000-5R-27,

Sl. no.	Research Progress	Expected output
	was done with a view to falling rice reproductive phase at cold	BR11662-11-5-3 and
	stress. In early planting (18 October sowing) growth duration	BR11000-5R-4) and
	was increased by 16 to 26 days in different rice genotypes.	three medium to long
	Duration: Ongoing	duration lines
	0 0	(TP30753, BR10715-
		5R-1 and BR10715-
		5R-9) were selected
		for further evaluation
	<b>5.3 Title</b> : Characterization and evaluation of some selected rice	Advanced rice
	genotypes for cold tolerance:	genotypes BR11894-
	<b>Progress</b> Some 21 advanced breeding lines 18 exotic variety	R-R-R-345
	three BRRI varieties (BRRI dhan45 BRRI dhan92 and BRRI	R R R 3 15, R R 11338-5R-39 and
	dhan96) along with five check varieties namely BRRI dhan28	BR11338-5R-12
	BRRI dhan 36 BRRI dhan 67 BRRI dhan 69 and HbiB-VI were	were selected as
	characterized and evaluated in natural field condition. Three	moderately cold
	different seed sowing times viz 15 October 31 October and 15	susceptible lines at
	November (control) were considered three sets of sowing and	reproductive phase of
	designated as $1^{st}$ set, $2^{nd}$ set and $3^{rd}$ set, respectively.	BRRI dhan67.
	Duration: Ongoing	Out of 18 exotic rice
		varieties GB34 and
		other three black rice
		genotypes and BRRI
		dhan45 selected as
		moderately cold
		susceptible varieties
		which had higher
		tolerant than BRRI
		dhan28 and BRRI
		dhan36.
		BRRI dhan96 was
		moderately cold
		tolerant at vegetative
		phase as like BRRI
		dhan67 and BRRI
		dhan69 but
		susceptible at
		reproductive phase.
		However. BRRI
		dhan92 escape cold
		stress at reproductive
		phase due to its longer
		growth duration.
	5.4 Title: Effect of polythene covering on seedling raising in	The longest seedling
	Boro season	was recorded from
	Progress An experiment was conducted to identify the most	covering for all time
	suitable technique for protecting Boro rice seedling from cold	followed by covering
	injury. Sprouted seeds of BRRI dhan81 were shown in puddle	from 11.0 am to sun
	seedbeds on 13 December 2020. It was covered by transparent	set and covering for
	polythene sheet.	all time with opening
	1 7	at both end of the

Sl. no.	Research Progress	Expected output
	Five different types of polythene covering treatment at seedbed	seedbed cover. Fresh
	viz. covering for all time, covering for 24 hrs during cold wave,	weight of seedling
	covering from 11.0 am to sun set, covering for whole night and	was significantly
	covering for all time with opening at both end of the seedbed	higher in covering for
	cover along with control were used.	all time with opening
	Duration: Ongoing	at both end than all
		other treatments.
		However, highest
		seedling strength was
		recorded from
		seedbed having
		polythene covering
		for 24 hrs during cold
		wave only from 19 to
		23 December 2020
		followed by covering
		for whole night and
		covering for all time
		with opening at both
		ends. Lest seedling
		mortality after
		transplanting in the
		main field was
		recorded from
		covering for 24 hrs
		during cold wave and
		covering for whole
		night which was
		statistically similar to
		control. Seedling
		mortality after
		transplanting was
		comparable between
		covering from 11.0
		am to sun set and
		covering for all time
		with opening at both
		end although it was
		slightly higher than
		control treatment.
		Polythene covering
		for all time at seedbed
		had lower seedling
		strength but higher
	Durait and Mile Concerned and a disce	seeding mortality.
0	rroject v1: Growth studies	Deced - 14
	<b>0.1 Hue:</b> Kesponse to photoperiod of some promising advance	Based on relative
	breeding lines under control condition	photoperiod
	riggress inity-one advance breeding lines were tested along	sensitivity, 2
1	with $BK22$ , Nizersan (strong photoperiod sensitive) and BRTT	genotypes (BK11919-

Sl. no.	Research Progress	Expected output
	(moderate photoperiod sensitive) as standard check. Ten-hour	4R-26 and BR11921-
	photoperiodic treatment (7.00 AM to 5.00 PM) was started from	4R-124) out of 31
	seed sowing by using black cover. One set were grown at	breeding lines
	natural day length.	showed RPS about
	Duration: Ongoing	55-66% classified as
		moderately
		photoperiod sensitive.
		However, 10 and 19
		lines showed
		insensitive and
		weakly sensitive to
		photoperiod,
		respectively.
	6.2 Title: Photosensitivity test of advance breeding lines	Out of 40 advances
	<b>Progress</b> Plant were grown in net house condition. One set of	breeding
	plant expose to sunlight not more than 10 hrs. by black covering	lines Fourteen (14)
	until flowering another set kept normal condition.	advance breeding
	Duration: Ongoing	lines found strongly
		photosensitive
	<b>6.3 Title</b> : Reduction of growth duration through accumulation	Results showed that
	of degree days at seedling stage	GDD differed
		significantly in
	Progress An experiment was conducted to measure growth	different treatments,
	duration reduction of Boro rice variety (BRRI dhan81) through	but days required for
	accumulation of degree days at seedling stage. Seeds of BRRI	panicle initiation (P)I
	dhan81 were sown in seed beds on 13 December 2020. For	and flowering as well
	accumulation of degree days at seedling stage seedbeds were	as growth duration
	covered by transparent polythene sheet. Five different types of	remain statistically
	polythene covering treatment at seedbed (covering for all time,	similar. It is
	covering for 24 hrs during cold wave, covering from 11.0 am to	indicating that growth
	sun set, covering for whole night and covering for all time with	duration of Boro rice
	opening at both end of the seedbed cover) along with control	variety could not be
	were used.	reduced through
	Forty-three days old seedlings were transplanted in the main	accumulation of
	field. Days required to panicle initiation, flowering, and	degree days at
	maturity of BRRI dhan81 were recorded.	seedling stage.
		Accumulation of
		degree days at
		seedling stage
		become useless for
		reducing growth
		duration of rice as it
		did not translate into
		new tillers. After
		transplanting in main
		field rice seedlings
		started tillering and
		new tillers received
		same amount of light
		energy in all

Sl. no.	Research Progress	Expected output
		treatments which
		ultimately provide
		rice development at
		same time.
	<b>6.4 Title</b> : Determination of growth stages of some rice varieties	Too early planting of
	as affected by sowing time	BRRI hybrid dhan4
	<b>Progress</b> An experiment was conducted during Aman season.	and BRRI hybrid
	Five different seed sowing times, including 15 June 30, 16 July,	dhan6 may be
	30 July and 16 August, were considered five sets of sowing and	detrimental because
	designated as 1st set, 2nd set, and 5, 4 and 5 set,	they may face
	five leaf stage	high temperature
	Plant materials: BRRI dhan 87 BRRI dhan 90 BRRI dhan 91	stress and late
	BRRI dhan93 BRRI dhan94 BRRI dhan95 BRRI hybrid	planting It may be
	dhan4 and BRRI hybrid dhan6	hazardous due to cold
	Duration: Ongoing	stress sterility. BRRI
		dhan95 and BRRI
		dhan94 were
		relatively safe both
		early and late planting
		because it matures
		closely in both cases.
	6.5 Title: Rooting dynamics of BRRI rice varieties against	Among 84 varieties,
	different nitrogen concentrations	36 in cluster Ia, 26 in
	<b>Progress</b> Eighty-four (84) BRRI rice varieties were grown in	Ib, and 22 in II.
	Yoshida Nutrient solution (1976) modified.	Varieties under
	Duration: Ongoing	Cluster II had higher
		(MRI) Total root
		length (TRL) and
		Root number (RN)
		than other varieties of
		Ia and Ib.
7	Project VII : Yield potential	
	7.1 Title: Generation of male sterile rice line for two-line hybrid	Vector construction
	system by editing TMS5 gene using CRISPR/Cas9 system	completed to do rice
	<b>Progress</b> To design a CRISPR/Cas9 targeting the <i>TMS5</i> gene	transformation.
	in rice, a 19bp guide sequences (5'-	
	ACCGTCGAGGGCTACCCCG-3') was a protospacer adjacent	
	motif lying within the TMS5 coding sequence	
	$(LOC_Os02g12290.1)$ . The guide sequences were properly	
	cloned into the binary vector pC1300-Cas9. The binary vector $C_{1200} = C_{1200} = C_{$	
	pC1300-Cas9 harboring Cas9/1MS5 sgRNA was mobilized	
	mito Agrobacierium iumejaciens LBA4404 by freeze-inaw	
	Duration: Ongoing	
8	Project VIII: C4 Rice research and development	
	8.1 Title: Investigation of anatomical and photosynthetic	Stomatal density is
	differences in rice leaves and related C4 species	higher in C4
	_	compared to C3
Sl. no.	Research Progress	Expected output
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	<b>Progress</b> The stomata in the leaves of C3 and C4 species were	species. Kaoun and
	counted of representative samples of leaves in both surfaces	Shayma showed an
	Duration: Ongoing	equal distribution in
		the number of stomata
		in both surfaces of
		leaves
9	Project IX: Crop weather information	
	9.1 Title: Automatic weather station data collection and	Collected and
	maintenance	reported 4 Vantage
	Progress Collection of all weather data recorded by 6 Vantage	Pro2 automatic
	Pro2 automatic weather stations established in BRRI HQ and 5	weather station data.
	different regional stations (Rangpur, Rajshahi, Satkhira,	
	Bhanga and Habiganj).	
	Duration: Ongoing	
	Entomology Division	
	Programme area/Project (Duration)	
1.	<b>Project I: Survey and Monitoring of Rice Arthropods</b>	
	1.1 Pest and natural enemy monitoring at BRRI farm	
	Green leafhopper (GLH), white leafhopper (WLH) and	
	grasshoppers (GH) were the most abundant pests and found in	Incidence patterns of
	all habitats. Highest number of GH was found in grass fallow	insect pests and their
	followed by rice bund, seedbed and transplanted rice (T. rice).	natural enemies will
	Higher numbers of natural enemies were found in the seedbed.	be known.
	Spider (SPD), damsel fly (Dam. fly), ladybird beetle (LBB) and	
	carabid beetle (CDB) were the dominant predators in all the	
	habitats of the reporting year.	
	Duration:Long term	
	1.2 Incidence of insect pests and natural enemies in light	
	trap	T . 1 C
	Highest number of insect pests was observed in Gazipur	Long term record of
	followed by Rajshahi, Barishal, Rangpur, Cumilla and	light trap data on
	Sonagazi. Liger beetle was only found in Barishal and Rajshahi.	insect pests incidence
	Earwig was found in Rajshahi, Barishal and Gazipur. Highest	will help to create a
	incidence of BPH was observed in all studied locations. In case	database which help
	of natural enemies, spiders showed the dominant species in all	to study the effect of
	locations.	climate change on
	Durational on a tame	rice insects and
	Duration: Long term	natural enemies.

Sl. no.	Research Progress	Expected output
	1.3. Title: Survey of rice insect pests in selected AEZ's of	
	Bangladesh	
	Insect pests were below the economic threshold level (ETL)	Long term survey
	during the reported period. Highest yellow stem borer (YSB)	data on insect pests
	was found in Patuakhali followed by Barguna, Chattogram and	incidence will help to
	Satkhira. BPH population found highest at Chattogram	study the effect of
	followed by Barguna and Patuakhali. However, BPH was not	climate change on
	found in Satkhira. LBB and species were the most abundant	rice insects and
	natural enemies observed in all locations but Patuakhali	natural enemies.
	harbored highest number of them. During the reporting year we	
	also recorded one novel unknown insect pest observed in BRRI	
	R/S research farm. Outbreak of this insect pest was occurred in $\frac{1}{2}$	
	September 2020 at BRRI R/S research farm, Binerpota,	
	Satkhira. This insect pest was not identified yet. It reduces the	
	number of tiller and plant becomes dry. We did not find any	
	Brobably, they food rise roots and secretes showing which	
	damage plants. Their outbreak was also observed in 2021 at	
	same location. More investigation requires to identify as species	
	level and its management. In addition this year we also	
	observed serious outbreak of BPH in Tarash. Siraigani	
	Chandpur, Tanore, Raishahi, Rangpur, Satkhira, and Khulna.	
	Duration:Long term	
Ì	1.4 Survey and monitoring of rice arthropods and yield loss	
	estimation.	
	A total of 78% farmers applied granular insecticide during 1 <sup>st</sup>	Present status of
	urea top dressing and 100% farmers used insecticide with foliar	insecticide
	application at least 2-3 times in a season. Among them 30%	application and
	farmer were used synthetic pyrethroids group of insecticide	yield loss due to
	which not recommended for rice insect control. Majority of the	insect infestation
	farmers (80%) used knowledge source from pesticide dealer for	will be known from
	pest control followed by DAE personnel (15%) and ancestors or	a selected village.
	neighbors 5% only. Insect pests were below the economic	
	threshold level (ETL). No significant yield loss was observed in	Insecticide
	insecticide treated and untreated field. Only 0.13% yield loss	application will be
	occurred due to infestation of different insects in BKRI dnan89	reduced in the
	Durotion. Mid town	selected village on
	Duration: Whatterm	rice production.
		1

Sl. no.	Research Progress	Expected output
	<b>1.5 Fall Armyworm (FAW) monitoring in rice field</b>	
	The highest population of FAW (388 moths) was trapped in	
	farmers field at Chuadanga followed by farmers field at	Incidence pattern of
	Mithapukur, Rangpur (381). Among the three BRRI stations,	FAW in rice will be
	FAW moth was found highest at Barishal (117 moths) followed	known.
	by BRRI Gazipur (55 moths) and BRRI R/S Rangpur. Daily	
	highest average FAW moth count per trap was at Latifpur, Rangpur. Latifpur and Chuadanga have maize fields within 500 m of pheromone trap installed rice field. Based on this result, it can be hypothesized that maize plant close to Latifpur and Chuadanga induced a higher number of FAW moths in a pheromone trap in the rice field. The maize surface was a source of FAW for rice both in Latifpur and Chuadanga. Continuous FAW movement between maize and rice has been shown in the area and facilitated by regular maize cultivation in the areas, explains the positive relationship between the proportion of maize in the landscape and the abundance of FAW in	
	pheromone trap in the rice plot	
	Duration: Short term	
	1.6 Use of solar light trap to insect pest management in rice	
	Pilot scale research and field trials were conducted in rice field	
	in BRRI research field, Gazipur. Significant number of insect pests that can cause damage to rice were caught in each month. Highest numbers of insect pests were trapped in October followed by June and November and lowest number of insect pest were caught in January. Highest number of GLH and YSB were recorded in October 2020. Among the natural enemies, staphylinid beetle commonly trapped in all months and highest abundance was observed in June followed by October. The predator green mirid bug was found in May, June, October and November. This result indicated that solar light trap would be a promising tool for monitoring and integrated pest management (IPM) in rice field. <b>Duration:</b> Short term	Incidence patterns of insect pests and their natural enemies will be known.
2.	Project II: Bio-Ecology of Rice Insect Pest and Natural Enemy	

Sl. no.	Research Progress	Expected output
	2.1 Behavioral adaptation of rice leafroller (RLR) in	
	different temperature	Behavioural
	Egg hatched and larvae of RLR were found higher in 35°C than	responses of rice
	30°C. However, the number of folded leaves by the RLR larvae	leafroller to heat
	were higher in 30°C. It might be due to higher temperature.	stress and potentiality
	Adult emergence was found higher 35 days after larvae hatched	to adapt to high
	in 35°C. It indicated that temperature is one of the important	temperatures will be
	factors for RLR growth and development. Any deviation from	known. Therefore, the
	the optimum temperature during their lifetime can cause	possibility of RLR
	changes in their life stages from larva to adult. More research of	population outbreak
	RLR in different temperature is further needed to understand the	will remain high
	mechanism of their behavioral adaptations.	despite global
	Duration: Short term	warming.
	2.2 Seasonal abundance and spacing composition of vice	
	2.2 Seasonal abundance and species composition of fice	
	Stell Dorer species	It will hale to
	(VCD) dark headed hear (DUD) and rink herer (DD) ware	It will help to
	(YSB), dark neaded borer (DHB) and pink borer (PB) were	abundance and
	found in all seasons from DH and WH dissection. Incidence of the CD is available of $DHD > VCD > DD$	abundance and
	the SB population was found in the order of DHB > YSB > PB	diapausing of
	both by dead heart and whitehead dissection at BRRI farm,	different stem borer
	Gazipur. DHB was the predominant species (50.44%) followed	species throughout
	by YSB (43./9%) and PB (5.//%) from a count of 51 SB larval	the year in the
	populations. On an average 2.9% DH and 1.2% wH tiller were	specific areas which
	observed during the season.	will neip to take
	T Amon 2002. VSP was the prodominant spacing (70.250/)	horer monogeneration
	<b>1.</b> Aman 2002. ISD was the predominant species $(/9.25\%)$ followed by DHP (18.87.0%) and DD was the lowest (1.900/) in	rice production
	dead heart tillers. However, in the dispection of W/H tillers, the	nee production.
	DHR large was found highest (40.27%) followed by VSD	
	(15 57%) On an average (combinedly in dood beaut and	
	(+3.3770). On an average (combinedity in dead near and whitehead) VSP was the bighest (62.410/) in SD normal-time	
	followed by DUD (24,120/) DD gamplation was the located	
	10110 we uv DDB (54.12%). PB population was the lowest $(2.480\%)$ in characteristic of 122 SD larges and 2.10/ tiller were	
	(3.4070) In observation of 152 SB farvae and 2.1% uller were	
	Boro 2002. VSD was the production there are size (40.40.0)	
	<b>BUFU 2003:</b> Y SB was the predominant borer species (49.49%)	
	IOHOWED BY DHB (44.11%) and PB population was found to be	

Sl. no.	Research Progress	Expected output
	lowest (6.40%) in observation of 87SB larvae and on an	
	average 1.7% tiller were infested during the season.	
	Monitoring of diapausing stem borer population: A total of	
	31 SB larvae were found in 400 T. Aman rice stubbles. YSB	
	was the predominant borer in the stubbles (77.42 %) followed	
	by DHB (1935 %) and PB (3.23%) only.	
	Duration: Short term	
	2.3 Behaviour and biological parameters of Fall Armyworm	
	when feeding rice.	T 111 1 ( C 1 )
	Different rice varieties have no significant impact on the	It will help to find out
	development period of FAW from egg to adult (F = 1.349, df = $60 \text{ P} = 0.208$ ). Mean developmental time (from large to adult)	the impact of Fall
	69, P = 0.208). Wean developmental time (from larva to adult)	Armyworm on non-
	was significantly differed between fice $(51.75 \pm 1.05 \text{ days})$ and maize bost $(26.04 \pm 0.72 \text{ days}) = -11.007 \text{ df} = 6 \text{ P} < 0.01)$ This	demographic
	maize nost (20.94 $\pm$ 0.72 days, t = 11.997, u1 = 0, 1 < 0.01). This result indicated that rice delays 4.81 days for their development	narameters
	from larva to adult when compared to maize. Development time	parameters.
	from egg to adult did not differ significantly between male and	It will also help to
	female within the same host. Host plant has no significant	understand the
	impact on survival rate of FAW between rice and maize hosts (t	management strategy
	= 0.172, df = 6, P = 0.869).	of Fall Armyworm in
	Duration: Mid term	rice field.
3	Project III: Project: Biological Control of Rice Insect Pests	
	3.1 Leveraging diversity for ecologically based pest	
	management	
	During T. Aman season, highest number of grasshopper (GH)	It will help to avoid
	was found in $T_1$ (14.00/20 sweep) followed by RLF, green	insecticide spraying
	leathopper (GLH) and white leathopper (WLH), (4.00, 3.00 and	in the early crop
	2.25 respectively) at BRRI Gazipur. Comparatively lower	the buildup of
	incidence of insect pests observed in $I_2$ . In case of natural	different natural
	hird hastla (LDD), agrabid hastla (CDD) and dragon fly (Dara	enemies in rice eco-
	bit dbeeter (LDB), calabid beeter (CDB) and dragon hy (Drag. fly) were found in $T_{c}$ (6.75, 6.0, 3.5, 1.75 and 0.75 respectively	system
	(0.75, 0.0, 5.5, 1.75) and $(0.75, 1.75)$	System.
	and 0.5 respectively) at BRRI farm Gazinur VSB egg	Farmers could stop
	narasitism and RLF larval narasitism observed highest in T <sub>1</sub>	using insecticides by
	$(25.39 \text{ and } 19.22 \% \text{ respectively})$ compared to $T_2(0 \text{ and } 1.25 \% \text{ compared to } T_2(0 \text{ and } 1.25 \% \text{ compared to }$	harvesting similar
	respectively) at BRRI, Gazipur. Though grain vield observed	increases in matita
	similar both in $T_1$ & $T_2$ (4.80 and 4.59 t/ha respectively). But	from the reduced
	additional sesame produced in $T_1$ which increase the rice	insecticide use and
	equivalent yield (REY). BRRI dhan87 yielded lower in both the	able to maintains the
	treatments due to lodging at soft dough stage of the crop. In T <sub>2</sub>	ecological diversity
	insecticide were used 3 times during T. Aman season but yield	of the farms.
	was similar to $T_1$ . But extra profit comes from $T_1$ with additional	
	sesame production and no use of insecticide.	It also save
	During Boro 2020-21 season, GLH, WLH, SHG, LHG, YSB	environment from
	and RB were found both in $T_1$ and $T_2$ at BRRI farm, Gazipur.	insecticidal pollution.
	Highest number of SHG was found in $T_2$ (1.6/20 sweep) and	*
	other insect pests were observed less than $1.0/20$ sweeps. In case	
	of natural enemies, highest number of spider (SPD), damsel fly	

Sl. no.	Research Progress	Expected output
	(Dam. fly) and lady bird beetle (LBB) (3.47, 1.67 and 0.87	
	respectively per 20 complete sweep) were found in T <sub>1</sub> compared	
	to T <sub>2</sub> . Moreover, carabid beetle (CBB) and staphylinid beetle	
	(STB) were not found in $T_2$ where insecticide used four times.	
	But similar yield (6.43 and 6.50 t/ha) was obtained in $T_1$ and $T_2$	
	respectively.	
	1	
	Duration: Mid term	
	3.2 Study on entomogenous fungi to control brown	
	planthopper	It will help to isolate
	Fungus inoculated plants showed 63-68% death of BPH in	the fungi from
	subsequent trial. This result indicates that spraving of fungus	naturally infected
	can be an effective biological tool for BPH management if it can	insects.
	combine with other management techniques like botanicals	
	(neem oil/ mahogany seed) or nanoparticles which may increase	It will also help to
	the efficacy of entomonathogenic fungus. Hence, identification	explore suitable
	and mass multiplication of the fungues is further required to test	media for mass
	in the field condition	production of the
		entomogenous fungi
	Duration: Mid term	and its use in BPH
		management.
4.	Project IV: Crop Loss Assessment	
	4.1 Effect of deadheart and whitehead on grain yield of	
	BRRI rice varieties	It will help to know
	On an average 1.39% dead heart and 0.83% white head	the compensation
	observed when rice plant was infested at 35 DAT. There was no	abilities of different
	significant difference was found in tiller per hill between	BRRI varieties along
	infested and un-infested hill when average 1.39% dead heart	with damage, vield
	found at 50 DAT in BRRI dhan87. At maturity stage, significant	loss and it's relation
	difference was not found also in panicle per hill, plant height,	to infestation severity
	and panicle length between infested and un-infested hill. But	of YSB in rice
	significantly higher filled grains (924.44/hill) was found in	production.
	infested hill compared to un-infested hill (851,52/hill). As a	1
	result, grain weight was found highest (21.85 g/hill) in infested	
	hill compared to un-infested hill, 20.16 g/hill. Again, unfilled	
	grain number reduced in infested hill (475 69/hill) compared to	
	un-infested hill (569.25/hill). As a result, percent filled grain per	
	panicle found highest (70,14%) in infested hills compared to un-	
	infested hills. This indicated that when YSB larvae damaged	
	any tiller of a particular hill the plant supply more nutrient to	
	other tiller of the same hill. As a result, more filled grain number	
	found in the panicle of infested hill which compensate the loss	
	of damaged tiller. So, no yield loss found by the damage of YSB	
	at early crop stage when dead heart and white head remain	
	below 2 and 1% respectively	
	Duration: Mid term	
	4.2 Assessment of natural nest control services in rice field	
	BPH populations increased rapidly after seven days in both	
	regions and were significantly higher in caged versus uncaged	It will help to quantify
	nlots $(n < 0.01 \text{ df} = 1.9)$ BPH population development was not	the natural nest
	prove $(p > 0.01, \alpha_1 = 1, \gamma)$ . Bit it population development was not	ine naturar pest

Sl. no.	Research Progress	<b>Expected output</b>
	noticeable outside of caged areas in the experimental fields,	control service in rice
	suggesting that the natural enemy communities were effectively	field and to estimate
	suppressing their population growth. We also observed the NE	the yield loss due to
	in uncaged plots but not in caged plots. In addition, we observed	BPH infestation
	the NE on the mesh net suggesting that the cages effectively	
	prevent entry of NE in caged plots. Significant lower grain yield	
	was recorded in caged versus uncaged plots (Fig. 24) averaging	
	15-36.98% loss per hill in both geographic locations. Grain	
	yield also depended on year with 15 - 34.68% grain loss in	
	2018-19, and 21.53 - 36.98% in 2019-20. The number of	
	panicles per hill is the most important characteristic for rice	
	grain yield (Huang et al. 2020). Lower panicle numbers per hill	
	were observed in caged versus uncaged plots, averaging 6.08-	
	15.42% less panicles per hill in caged plots. These results	
	indicate that cage outside BPH population was controlled	
	naturally by biocontrol agents in field.	
	Duration: Mid term	
5.	Project V: Evaluation of chemicals and Botanicals	
	5.1 Test of different insecticides against major insect pests	
	Evaluation of the effectiveness of commercial formulations of	
	different insecticides against major insect pests of rice were	
	performed in field and in storage condition. A total of 10/	Effective insecticides
	commercial formulations of insecticides were evaluated against	and bio-pesticides are
	brown planthopper (BPH). Among them 100 insecticides were	identified against
	of 28 commercial formulations 10 were found effective. For	and recommended
	Dice his no (PH) all 7 commercial formulations found effective	for registration to
	All six insecticides were were found effective against rice	Sub PTAC and
	weevil (RW) Among all the tested insecticides 10 were bio-	
	nesticides and they were found effective against BPH and VSB	TAIC.
	<b>Duration</b> : Long term	
	Duration. Long term	
	5.2 Effect of insecticides on natural enemies of rice insect	
	Available insecticides of different chemical group i.e.,	_
	acetamiprid, spinosad, abamectin, chlorantraniliprole, Fipronil	Comparatively safe
	and chlorpy were evaluated at BRRI, Gazipur to know their	insecticide to the
	effect on natural enemy populations of rice field. Sweeping data	natural enemies of
	of natural enemy populations was counted after 48 hours of the	rice field with
	insecticides application. Abameetin followed by	effective insect
	chlorantraniliprole and tipronil showed comparatively safe for	control will be
	natural enemies of rice field.	aetermined.
(	Duration: Mild term	
0.	6.1 Desidue analysis of ablavantuanilinuals and	
	u.i Residue analysis of chiorantraniliprole and thiamethoyam in rice grain	
1	UIIAIIIUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU	

Sl. no.	Research Progress	Expected output
	In this study, we detected pesticide residues from rice sample	It will help to detect
	using LC-MS. Detection was carried out by a LCMS-2020 fitted	insecticide residues in
	with electrospray ionization (ESI) probe operated in the positive	rice hull, bran and
	ion mode. Matrix standard solutions (0.025–25 lg L-1) were	polished rice.
	chosen to calibrate for samples. The linear equations were $y =$	
	12107x + 7150 (standard solutions). The correlation	It will also help to
	coefficients ( $r^2$ ) were 0.999 (standard solutions). Quantification	establish monitoring
	of the chlorantraniliprole in real samples was based on the	and guidance on safe
	matrix-matched calibration for standard solutions calibration	use of insecticide in
	rice samples. The concentrations of chlorantraniliprole and	rice field which
	thiamethoxam in the tested samples were presented in Table 1.	enhance safe food
	The concentrations were 0.0046 to 0.0243 and 0.0026 to 0.04	production.
	mg/kg in chlorantraniliprole and thiamethoxam respectively in	1
	the polished rice grain of different treatments. However, the	
	detected amount of both chlorantraniliprole and thiamethoxam	
	in the samples were below the Maximum Residue Limit (MRL:	
	0.4 mg kg-1 for chlorantraniliprole) and 0.6 mg kg-1 for	
	thiamethoxam, EU).	
	Duration: Mid term	
	6.2 Microbial degradation of pesticide residue in	
	agroecosystem Chlorentrenilingele degradation by bacterial strains was	Pole of microbial
	exhibited as a decrease in chlorantraniliprole concentration that	organism in nesticide
	was proportional to increase in bacterial growth and a time	degradation will be
	dependent removal of chlorantraniliprole was observed in	known
	bacterial cultures. Based on literature and our initial results, it is	KIIO WII.
	clear that the degradation varied to bacterial strains and time.	
	Bacillus subtilis shows highest degradation rate of	
	chlorantraniliprole than <i>Bacillus thuringiensis</i> and	
	Pseudomonas fluorescens. More details studies including field	
	studies are required and plan to be done in current year.	
	Duration: Mid term	
7	Project VII: Host plant Resistance	
	7.1 Screening of rice germplasm, advance line against major	
	insect pests	<b>T</b> . <b>111 1</b> . <b>1</b> 1
	The screening procedures standardized at IRRI and described	It will help to develop
	by Heinrichs <i>et al.</i> (1985) were adopted in this study.	insect resistant
	A total of 552 rice breeding lines were screened including	varieties.
	UTI(Insect), PTI (Insect) and ATI (Insect). In above trials	
	most of the entries showed susceptible reaction against BPH. In	
	reaction against DDL However the breading line DD107(	
	4P 5 and SVIN220 from DVT (Insect) showed moderately	
	susceptible reaction against RDH In AVT (Insect) lines all	
	entries showed suscentible reaction against RDH	
	entries snowed susceptible reaction against DI II.	
	A total of 127 rice breeding lines were screened including	
	RYT(FBR), RYT(CTR), AYT(FBR), and AYT(Cold). In above	
	trials most of the entries showed susceptible to BPH. However.	

Sl. no.	Research Progress	Expected output
	the breeding line TP26717 from RYT(FBR), IR15A3466 from	
	AYT(FBR), IR100723-B-B-B-10 and TP26717 from	
	AYT(Cold) showed moderately susceptible to BPH.	
	Duration: Mid term	
	7.2 Development of BPH resistance breeding lines through	
	marker assisted selection	
	Development of segregating population	
	E. was confirmed using 10 SNP papel Among E2 population	
	we performed molecular analysis using SSR marker RM8072	T, 111 1 , 1 1
	was used for confirmation of the presence of BPH32 gene	It will help to develop
	was used for communication of the presence of D1 1132 gene.	new breeding lines
	Evaluation and inheritance pattern analysis of BPH	for BPH resistant.
	resistance gene in BRRI dhan87	
	To understand the inheritance of DDU registeres in connecting	
	nonvlation of DDDI dhan 87 a total of 20 Exclines were infacted	
	with <b>BPH</b> at the seedling stage. The average damage score of	
	was 5.0 showing resistant to BPH while that of parent (BRRI	
	dhan 87) was 9.0 showing highly suscentible to BPH BPH	
	damage score ranged from 3.0 to 9.0 in the $F_{2,2}$ nonulations. The	
	results showed that the damage score of $F_{2,3}$ lines was single	
	peak and partial distribution, suggesting that the BPH resistance	
	was controlled by multiple major and/or minor genes/OTLs.	
	Duration: Mid term	
	7.3 Title: Identification of BPH resistance sources from local	
	germplasm	It will help to select
	The screening procedures standardized at IRRI and described	and characterized
	by Heinrichs et al. (1985) were adopted. A local germplasm	BPH resistant
	Acc 489 (Digha-3) showed stable resistance against BPH,	materials as a source
	which was used for developing elite donor and introgress	for further use in
	resistance gene into modern cultivar. Digha-3 was crossed with	developing pre-
	BRRI dhan89, susceptible cultivar. $F_1$ was developed from	breeding materials
	cross of BRRI dhan $89 \times Acc$ 489 was confirmed	using BPH resistant
	Marker. Later, we will advance $F_2$ population in RGA nursery.	linked marker.
	Duration: Mid term	
	7.4 Suppression of serotonin synthesis in rice using CRISPR	
	The aligonucleotide sequence of target insertion part of	It will beln to develop
	CVP71A1 gene was purchased from Macrogen company	insect resistant rice
	(Humanizing Genomics Seoul Korea) via Biotech Concern	varieties which will
	(Dhaka Bangladesh) The Cas9/gRNA (Catalog No VK005-	also reduce the
	01. VIEWSOLID BIOTEC, Beijing, China) was purchased and	insecticide
	used in this experiment. The recombinant Cas9 vector was	dependency on rice
	selected, and cultured. DNA was extracted from cultured	production.
	recombinant vector and target part of the genome was amplified	•
	using PCR. Analysis of gel electrophoresis confirmed the target	
	gene successfully cloned (Fig. 9). The target amplified DNA	
	band was purified from agarose gel using FavorPrep Gel/PCR	
	purification Mini Kit (Cat No. FAGCK001, FAVORGEN,	
	Biotech CORP, Taiwan) and sent for sequencing in National	

Sl. no.	Research Progress	Expected output
	Institute of Biotechnology (NIB), Ashulia, Savar, Dhaka. The	
	sequencing results confirmed that Cas9 vector contains target	
	sequence of CYP71A1 gene. Sequencing result shows 100%	
	similarity with original target sequence and recombinant SK-	
	gRNA-CYP71A1. The successful recombinant vector VK005-	
	01 harboring Cas9/CYP71A1 sgRNA was transformed into	
	Agrobacterium tumefaciens LBA4404 by freeze-thaw method.	
	<b>Duration:</b> Mid term	
8.	Project VIII: Insect Molecular Biology	
	8.1 Molecular characterization of BPH ( <i>Nilanarvatalugens</i> )	
	nonulation in Rangladesh based on COI gene analysis	
	The exact collection point of each geographic location was	
	demonstrated in Bangladesh man (Fig. 14) PCR products were	
	visualized on 1% TAE agarose gel electronhoresis. Single hand	
	was purified from all samples using EducrDrap Cal/DCP	
	was purification Mini Kit (Cat No. EACCK001 EAVODCEN	
	Piotoch COPD Taiwan) Dhylogonatic tree clearly shows that	
	Divident COKF, Taiwail). Flyiogenetic free clearly shows that	
	(Fig. 16). Variation was also absorved within countries both in	
	(Fig. 10). Variation was also observed within countries bour in	
	Bangladesh and India.	
	Duration: Mid term	
	8.2 Gene drive to control BPH ( <i>Nilaparvatalugens</i> )using	
	CRISPR Cas9 genome	
	editing tool	
	Nanoject III Programmable Nanoliter Injector which is used	It will help to assess a
	inject DNA into insect body/egg was purchased from	gene diversity of BPH
	Drummond Scientific Company (USA).	in Bangladesh and
	We injected more than 50 insects first time. However, all insects	to know the impact of
	died after injection. It indicates that insect did not revive due to	geographic location
	cold shock as well as Cas9 protein injection. Later, we injected	in BPH genomic
	more than 300 insects using water without Cas9 protein.	structure.
	However, more investigations are required to recover insects	
	after injection.	
	Duration: Mid term	
9	Project IX: Integrated Pest Management (IPM)	
	9.1 Use of nanoparticle to control rice insect pests	
	Three nanoparticles including Ag, Cu and ZnO were tested	
	against BPH, GLH and FAW. The size of Ag, Cu and ZnO	It will help to
	nanoparticles is 20, 40 and 20 -30 nm respectively. Ag nano-	develop nano-
	particles showed below 30% mortality of BPH nymph and more	particle based pest
	than 45% mortality of FAW. It indicated that tested	management in rice.
	nanoparticles are not effective against BPH and FAW.	It will also help to
	However, Ag nanoparticle showed comparatively higher	reduce chemical
	mortality against FAW than BPH and GLH. More experiments	pesticide load in
	with new synthesis nanoparticles are planned to be tested again	environment.
	using more insect pests.	
	9.2 Use of sex pheromone to control rice leafroller and	
	yellow stem borer	The efficacy of sex
	Significant number of YSB and leaffolder were caught in each	pheromone against
	trap both in Gazipur and Barishal. However, higher number of	leafroller and YSB

Sl. no.	Research Progress	Expected output
	YSB catches observed in Gazipur than Barishal. This result	in rice field will be
	indicated that pheromone trap could be effective to monitor as	known.
	well as control both YSB and leafroller in rice field.	
10	Project X: Vertebrate Pest Management	
	10.1 Study on the efficiency of different traps against rice field rats.	Effective trap for rat
	paint bucket trap were evaluated to capture rat in rice field and found that live traps (single capture) were more effective than other traps to catch rice field rats.	control in rice field will be determined.
	Plant Pathology Division Programme area/Project (Duration)	
1.	<b>Development of Early Warning System of rice blast disease:</b> Data have been collected and provided to the CIMMYT Team for development and validation of EWS	Early Warning System ( <i>EWS</i> ) for disease appearance will be developed
2.	<b>Studies on host ranges of the blast pathogen:</b> Three blast isolates from grass weed were inoculated which did not show any symptom on leaves of rice, foxtail millet and wheat. However, rice blast isolate developed blast symptoms on rice leaves excluding foxtail millet and wheat leaves.	Host ranges of the blast pathogen will be identified
3.	Identification of the source of infection of major rice diseases: disease incidence tended to reduce on plants generated from healthy seeds compared to those generated from diseased seeds	Source of infection of major rice diseases will be identified
4.	<b>Improvement of differential system for rice blast disease in</b> <b>Bangladesh:</b> Five isolates were selected for the details study (pathogenicity and molecular)	Standard differential blast isolates (SDBIs) will be identified
5.	<b>Identification and validation of physiological races of bacterial blight and its distribution patterns in Bangladesh (NATP-2):</b> Thirteen races were identified according to the reaction pattern of the BB isolates against BB resistant NILs. <i>Xa27, Xa21, xa13</i> and <i>xa5</i> were identified as effective gene	Population structure of different disease- causing pathogens will be known
6.	<b>Etiology, Epidemiology and Management of Bacterial</b> <b>Panicle Blight:</b> 14 isolates were isolated as single colony culture. Among these isolates, only three were found as <i>Burkholderia glumae</i> as causal organism of BPB.	Management protocol of Bacterial Panicle Blight will be developed
7.	<b>Development of blast and bacterial blight resistant variety:</b> Advanced lines having blast ( <i>Pi9, Pb1</i> ) and bacterial blight ( <i>Xa4, Xa21</i> ) resistant genes BR(Path)13784-BC3-63-6-4-HR6 produced the highest average yield (6.7 t/ha) with yield range 5.2-8.5 t/ha over the locations.	blast/bacterial blight resistant pre-breeding materials/variety will be developed

Sl. no.	Research Progress	Expected output
8.	<b>Development of multiple disease resistant (blast and bacteria blight) rice varieties in the background of BRRI dhan29 using gene pyramiding approach:</b> Seven advanced lines having blast ( <i>Pi9, Pb1</i> ) and bacterial blight ( <i>Xa21</i> ) resistant genes have been selected.	Line(s) with blast and bacterial blight resistance will be developed
9.	<b>Development of multiple disease resistant (blast and bacteria blight) rice varieties in the background of BRRI dhan58 using gene pyramiding approach:</b> Six advanced lines having blast ( <i>Pb1</i> ) and bacterial blight ( <i>Xa21</i> ) resistant genes have been selected.	Line(s) with blast and bacterial blight resistance will be developed
10.	<b>Development of multiple disease resistant (blast and bacteria blight) short duration rice varieties in the background of BRRI dhan63 and BRRI dhan81:</b> Six advanced lines having blast ( <i>Pi9, Pb1</i> ) and bacterial blight ( <i>Xa21</i> ) resistant genes have been selected.	Line(s) with blast and bacterial blight resistance will be developed
11.	Gene pyramiding for bacterial blight (BB) resistance: A good number of progenies of $BC_4F_2$ , $BC_3F_2$ and $BC_3F_4$ developed from the crosses were resistant to the most virulent BB isolate <i>BXo93</i>	Bacterial blight resistant pre-breeding materials/variety will be developed
12.	<b>Development of blast resistant variety (short duration):</b> Three lines (having blast resistant Pi9 gene) produced 6.1-6.5 t/ha yield which was more than the check (BRRI dhan28) 5.7 t/ha. Grain quality was similar to BRRI dhan28.	Short duration blast resistant variety will be developed
13.	<b>Development blast resistant variety (long duration):</b> Ten lines (having blast resistant Pi9 gene) produced 8.7-10.1 t/ha yield and the check (BRRI dhan29) produced 9.0 t/ha.	Long duration blast resistant variety will be developed
14.	<b>Introgression of</b> <i>Pita2</i> <b>gene in BRRI dhan63:</b> Five lines have been developed. The yield ranged from 4.5-5.3 t/ha with the growth duration 144-146 days. The growth durations were 8-10 days earlier than BRRI dhan63.	Resistant source against blast disease will be developed
15.	<b>Pyramiding blast resistant</b> <i>Pita2</i> and <i>Pi9</i> genes: Seeds at different generations were harvested for further advancement from two parental crosses	Blast resistant pre- breeding materials/variety will be developed
16.	<b>Development of blast resistant varieties using differential</b> system and molecular Markers: A total of 61 lines were selected as blast resistance with different agronomic characteristics	Blast resistant pre- breeding materials/variety will be developed
17.	<b>Development of Blast Resistance Rice by CRISPR/Cas9-</b> <b>Targeted Mutagenesis of the</b> <i>OsERF922</i> gene: The sequence of <i>OsERF922</i> gene was cloned into the binary vector pC1300- Cas9. The binary vector was mobilized into <i>Agrobacterium</i> <i>tumefaciens</i> and confirmed through PCR-gel electrophoresis.	Blast resistant pre- breeding materials/variety will be developed

Sl. no.	Research Progress	Expected output
18.	<b>Development of pre-breeding materials of tungro resistance:</b> BC2F1, BC3F1, BC4F1 and BC5F1 seeds from different crosses were produced. Three hundred plants were selected from 600 plants in Aman, 2020 and these lines were advanced during Boro,2020-21.	Resistant source against Tungro disease will be developed
19.	Linkage and QTL mapping of blast resistant variety BR16: BC2F1 seeds were produced in Boro, 2020-21 and to be continued	Resistance sources against rice diseases will be identified
20.	Studies on the genetic mechanism of rice blast and gall midge resistance in BRRI dhan33: The mapping population of BC1F2 family lines (US2/BRRI dhan33//US2) were developed. Among 625 markers, 184 markers showed polymorphic between BRRI dhan33 and US2.	Gene(s) responsible for rice blast and gall midge resistance will be identified
21.	<b>Linkage and QTL mapping of tungro resistance in rice:</b> Five significant ( $p < 0.05$ ; 0.01) QTLs that is <i>qRTVR3.1</i> , <i>qRTVR4.2</i> , <i>qRTVR9.3</i> , <i>qRTVR10.4</i> and <i>qRTVR11.5</i> , were identified and found in chromosomes 3, 4, 9, 10 and 11, respectively.	Sources of resistance against Tungro disease will be developed
22.	<b>Validation of tungro resistant QTL identified in Landrace</b> <b>Kumragoir:</b> Developed mapping population BC <sub>2</sub> F <sub>4</sub> and BC <sub>2</sub> F <sub>5</sub> generation were developed in Aman 2020 and Boro 2020-21, respectively	Resistance source against Tungro disease will be developed
23.	<b>Phenotyping and genotyping of rice varieties for blast</b> <b>resistance:</b> only marker assisted selection/ identification even with gene-based markers do not indicates the resistance to blast rather the pathotypic reaction with variable differential isolates	Resistance source against blast disease will be identified
24.	<ul> <li>Phenotypic and molecular screening of local germplasm against rice blast disease: 41 germplasm found susceptible and 3 germplasm found resistant.</li> <li>Among the germplasm, 26 germplasm have <i>Pit</i> gene, 21 germplasm have <i>Pi40</i> gene and few other germplasm contains <i>Pib, Pita-2, Pita/Pita2, Pi9, Piz</i> or <i>Pi5</i>.</li> </ul>	Resistance source against blast disease will be identified
25.	<b>Detection of blast and bacterial blight resistant genes in</b> <b>BRRI released Boro varieties through Phenotyping and</b> <b>genotyping:</b> Marker assisted detection for blast resistant, no varieties were detected having <i>Pi9</i> gene, while <i>Pb1</i> gene was present in eight (8) varieties and <i>Pita2</i> was in twelve (12) varieties.	Resistance source against blast and BB diseases will be identified
26.	<b>Confirmation of resistant genes of Bacterial Blight through</b> <b>gene base SSR markers and pathogenicity test:</b> Out of 74 germplasm 41 germplasm carried <i>Xa4</i> gene, 15 carried <i>xa5</i>	Resistance source against BB disease will be identified

Sl. no.	Research Progress	Expected output
	gene, 62 carried Xa7 gene, 33 carried xa13 gene, and 19 carried Xa23 gene. Only a single germplasm consisted of Xa21 gene. Acc. No. 4216 having Xa4, Xa7, xa13, Xa21 genes was highly resistant and Acc. No. 1523 having Xa4, xa5, xa13 and Xa23 gene combination was resistant to all the Xoo strains.	
27.	Field evaluation of blast resistant lines in blast hot spot area in Debidwar, Cumilla during Boro 2020-21: Thirty-eight highly leaf and neck blast resistant lines were selected out of 3988 during Boro 2019-20.	Blast resistant lines will be developed
28.	<b>Detection of novel loci underlying rice blast and BB</b> resistance by integrating a genome-wide association study and evaluation of resistant genes: Bacterial blight (BB) resistant 21 entries have selected out of 186 local germplasm in Bangladesh.	Blast and bacterial blight resistant pre- breeding materials/lines will be developed
29.	Screening of advanced breeding lines against bacterial blight and blast (TRB): Out of 5190 advanced breeding lines, 2138 materials were found resistant against BB. These materials are needed to evaluate further	Advanced lines against bacterial blight and blast will be identified
30.	Screening of INGER materials obtained from IRRI against blast disease of rice, Boro 20-21: 12 entries such as SVIN682, SVIN683, SVIN684, SVIN690, SVIN271, SVIN272, SVIN509, SVIN332, SVIN446, SVIN352, SVIN457 and SVIN458 showed resistance.	Blast resistant lines will be identified
31.	Screening of advanced breeding lines against bacterial blight (BB) disease during Boro 20-21: Among 135 genotypes ten advanced breeding lines are found as resistant materials	Bacterialblightresistantadvancelines will be identified
32.	<b>Screening of advanced breeding lines against sheath blight</b> <b>of rice:</b> Two lines BR9888-19-4-7 and BR9143-25-7-2-2 showed resistant reaction out of 86 genotypes.	Sheath blight resistant lines will be identified
33.	Screening of rice germplasms against bakanae disease: Among the tested 100 germplasm, five were found resistant.	Bakanae disease resistant source will be detected
34.	<b>SSR marker-based diversity analysis of upland rice</b> ( <i>Oryza sativa L.</i> ) germplasm: A total of 86 alleles were detected by the 28 polymorphic SSR markers. The germplasms were classified based on the polymorphism data into nine cluster groups, cluster I- cluster IX	Source for Uupland rice will be identified
35.	<b>Crop Loss Assessment of rice due to major diseases in</b> <b>Bangladesh:</b> Data on major disease of rice were collected. Collected Data are under process.	Yield loss due to major diseases will be determined.
36.	Formulation of nano particles and control of bakanae disease: Nano particle was synthesized using neem leaf. Seed	Disease management by using nano particles

Sl. no.	Research Progress	Expected output
	treatment @ 15 ml/L water was found effective against bakanae disease through seed treatment.	
37.	<b>Green synthesis of nano-particles:</b> Silver, Zinc-oxide and silica nano was produced from Neem leaf extracts while Copper oxide nano particle was produced from Tulsi leaf extracts. All nano particles were confirmed using UV-vis spectrophotometer.	Nano-particles will be synthesized for disease management
38.	Determination of residual effect of trifloxystrobin, tebuconazole and tricyclazole in rice grain under field conditions: Detection of residual effect of Trifloxystrobin and tebuconazole group of fungicides are under progress.	Residual effect of pesticides will be detected
39.	<b>Biological control of sheath blight disease:</b> Identified two bacteria which have shown strong antagonistic activity against <i>R. solani.</i>	Rice diseases could be managed Biologically
40.	<b>Identification of potential bio-control agents and</b> <b>formulation of biopesticides against bakanae disease of rice:</b> <i>Biocontrol agents eg., Bacillus</i> spp, <i>Pseudomonas</i> spp., <i>Trichoderma</i> spp. Were identified. <i>Trichoderma</i> harziaum was confirmed through ITS sequencing. <i>Trichoderma</i> based formulation has prepared.	Biological management of rice disease will be developed
41.	Microbial effect on AQU, DHN and DREB genes expression in rice under drought stress: A considerable rise in the transcript level of aquaporin gene in rice genotype was observed when treated with T. harzianum formulation. T. harzianum up regulated the expression of AQP gene expression of rice genotype IR64 and BRRI dhan56 under drought, which was alleviated by application of T. harzianum.	Gene regulation by microbs under adverse condition (drought stress) will be identified
42.	<b>Evaluation of new chemicals against Blast disease of rice:</b> 7 fungicides (mostly Tricyclazole group fungicide) controlled more than 80% blast disease	New chemicals for disease management will be identified
43.	<b>Development of nano particle mediated fungicide for rice blast disease management:</b> Ag, ZnO and CuO nano particles were prepared from AgNO3, ZnSO4.7H2O and CuSO4.5H2O respectively using starch as stabilizing technique and glucose as reducing agent. The nano particles were confirmed using UV-vis spectrophotometer.	Nano-particle based fungicide will be synthesized for disease management
44.	<b>Evaluation of effective chemical against rice Sheath Blight</b> <b>disease:</b> Six fungicides were found effective against sheath blight disease (80% or above).	New chemicals for disease management will be identified
45.	<b>Chemical control of sheath rot and false smut disease of rice under different planting time:</b> The response of fungicides in	Interaction between chemicals and planting time will be

Sl. no.	Research Progress	Expected output
	controlling both sheath rot and false smut was not evident in this	known for disease
	experiment	management
	Farm Machinery and Postharvest Technology Division	
	<b>Programme area/Project (Duration)</b>	
1.	Project I: Development of Agricultural Machines	
	<ul> <li>1.1 Title: Development and fabrication of whole feed combine harvester</li> <li>Progress: The preliminary performance test was done in three different locations (Tarotpara, Jogitola and BARI farm) during Boro 2021 season. Firstly the machine worked satisfyingly but after working few hours the machine stopovers due to the clogging that occurred at the inclined augur/screw. The auger was clogged due to the dust particle such as cutting leaves and residual straw of the plants, which was generated from threshing drum due to additional moisture content of the paddy. Besides the side clearance of the inclined screw may causes this clogging problem. The inner clearance of the inclined screw was found over then the designed clearance due to poor workmanship. Some modifications were done by changing the chain-sprocket instead of the belt pulley. For this modification, the speed of the horizontal auger/screw has increased more than the previous belt-pulley. After removing the clogged grain from the auger/screw, the machine again worked very nicely. Operation of cutting, conveying, threshing, cleaning was good enough but only clogging problem was found in conveying paddy through the horizontal and inclined screw conveyor. However, it was observed few amounts exhaust gases with lower engine performance, so that engine power needs to increase for obtaining better capacity. The fuel consumption of the machine was 3.78~3.97 l/h and field capacity was 0.318~0.332 ha/h.</li> </ul>	A suitable whole feed combine harvester will be available in Bangladesh condition.
	<ul> <li>1.2 Title: Design and development of a head feed power thresher</li> <li>Progress: A head feed thresher was fabricated by using locally available materials in Nayem Engineering workshop, Modan, Netrakona. BRRI provided design, drawing, technical and financial support to develop and manufacture the machine in that workshop. The preliminary test of the machine was done in Aman 2020 season at Modan, Netrakona to find out the mechanical faults of the machine. At that time, it was found that the machine had no major faults. After that, the machine was carried to the FMPHT division for a systematic test. The machine performance test was</li> </ul>	A user friendly thresher machine will be available in which cleaning facility will be available and straw remain intact condition.

Sl. no.	Research Progress	Expected output
	organized at BRRI threshing yard in Boro 2021season. Few faults were found and modifications were done for eliminating that faults. Machine capacity was not adequate due to the low speed of the feeder chain and feeding mechanism. Some modification was done and methodical test will be organized in the upcoming season. Another prototype is needed to be developed for the upgrading of the capacity and other functions up-gradation of the machine. <b>Duration:</b> 2019 - 2022	
	<ul> <li>1.3 Title:</li> <li>Design and development of semi-automatic rice transplanter</li> <li>Progress: A research was conducted to design and fabricate a semi-automatic rice transplanter utilizing locally accessible materials at RK</li> <li>Metal in Faridpur. For the development and fabrication of this machine, BRRI offered design, drawing, technical, and financial support by the SFMRA project of BRRI. The study was aimed at design, fabrication, and testing the performance of the prototype. The machine has already been manufactured by the local workshop. A preliminary test of the machine was done at BRRI regional station, Bhanga to find out the mechanical faults of the machine. It was found that the machine has no major faults. Fine-tuning is going on. The performance test of the machine will be done thoroughly in the upcoming season.</li> <li>Duration: 2019 - 2022</li> </ul>	In existing manual rice transplanter, operator pulls the machine by his left hand and pushes the machine picker by the right hand. This is very physical labour intensive work. In the developed new semi automatic rice transplanter, operator will pull the machine by his hands and transplanting picker will operated by gear mechanism. Thereby, physical drudgery will be less.
	<ul> <li>1.4 Title: Design and development of a manual seed sower machine for raising mat type seedling</li> <li>Progress: A study was conducted to design, fabricate and performance evaluation of BRRI manual seed sower machine in the FMPHT research workshop. The fabrication of the designed machine was completed using AutoCAD tools. Seed hopper, seed metering device and rubber wheel was fabricated using dice. The machine was fabricated using locally available material considering accurate metallurgy. It was calibrated for different grain sizes. The performance of the prototype is tested primarily in research workshop. The result of the primary test was satisfactory.</li> <li>Duration: 2019 - 2024</li> </ul>	Uniform seedling density is essential for a mechanical rice transplanting system. It is very difficult to get uniform seedling density by hand broadcasting method. Therefore, an appropriate seed sower machine can solve the existing problem and from this attempt a proper seed sower machine is expected

Sl. no.	Research Progress	Expected output
	1.5 Title: Mitigation of biotic and abiotic stress in mat type	
	<b>1.5 Title:</b> Mitigation of biotic and abiotic stress in mat type seedlings <b>Progress:</b> A research was conducted to mitigate the biotic and abiotic effect on germination and mat type seedling growing during Boro season. Six treatments were taken under two different thickness (0.04 mm and 0.08 mm) of white polythene shed covered day time only (12 hour) and day and night time (24 hour) as abiotic stress control factors. Along with that two fungicide (Atavo and Autostin) and MoP fertilizer were used to control biotic stress on young seedling raised in plastic tray. Plant height, number of leaf, leaf length, stem length, stem thickness, rolling resistance and density was measured in two interval (after 15 and 30 days). The highest temperature (40°C) was observed inside 8 grade (0.08 mm thickness) polythene shed covered day and night time (24 hour). The combine effect of 0.08 mm thick polythene shed and MoP treatment showed highest value for seedling height (167.3 mm), number of leaf (4), leaf length (99.8 mm), stem length (73.5 mm), stem thickness (1.1 mm), seedling density (18/cm <sup>2</sup> ). Fungal infection was found lowest in 0.08 mm polythene covered day and night time. Seedling raised plastic trays are much more effective than conventional way in terms of germination and quality. Hence, 0.08 mm thick white polythene was recommended as covering mechanism and MoP as treating mechanism for seedling raising in cold weather.	A proper mat type seedling raising technique will be identified for Boro season.
	<b>Duration:</b> 2020 - 2021	
	<ul> <li>1.6 Title: Design and development of a medium type combine harvester</li> <li>Progress: The fabrication of a medium type combine harvester has completed and preliminary field performance test was completed at Noornagar BADC farm of Chuadanga district. Thoroughly performance test will be conducted in upcoming Boro season.</li> <li>Duration: 2018 - 2024</li> </ul>	An appropriate combine harvester will be available in Bangladesh condition.
2.	Project II: Milling and Processing Technology	
	<ul> <li>2.1 Title: Effect of ageing on milling performance of premium quality rice</li> <li>Progress: The experiment on effects of aging was conducted using BRRI dhan50 and higher head rice yield was found in plastic drum after nine month of aging period. The result is promising for premium quality rice. To get more precious result</li> </ul>	Suitable milling time of premium quality rice will be identified.

Sl. no.	Research Progress	Expected output
	paddy could be stored in temperature control room and air tight	
	storage structure.	
	<b>Duration:</b> 2018 - 2021	
	2.2 Title: Test, evaluation and modification rubber roll de-	
	husker for commercial use	An appropriate small
	Progress: The commercial value of rice milling parameter for	scale milling machine
	BRRI dhan90 was evaluated by BRRI modified rubber roll	will be developed for
	husker and MN-15 polisher. Husking efficiency of modified	consumer level which
	rubber roll de-husker was around 90.67% for BRRI dhan90.	existing engleberg
	Milling recovery of BRRI dhan90 was 65.7 % polished in	huller mill from
	MNMP - 15 type polisher. The average head rice recovery based	Bangladesh.
	on input paddy was 60.7 %, which is promising for processing	-
	of quality rice. Steel engelberg huller may be replaced with one	
	rubber roll de-husker and a polisher for better quality rice.	
	Beside this, rubber roll de-husker separates husk and friction	
	type polisher separates bran. Separately collected husk and bran	
	is suitable for briquette and edible oil production.	
	<b>Duration:</b> 2018 - 2022	
2	Project III. Depularization of DDDI developed form	
3	Project III: Popularization of BKKI developed farm	
	machinery and rostnarvest teenhology	
	3.1 Title: Training on operation, repair and maintenance of farm	
	machinery	01-111-1 1
	<b>Progress:</b> Ninety three batches of two day long residential	Skilled machine
	training programme were conducted under financial and	and small
	technical support from SFMRA project of FMPHT division	entrepreneur for
	during the period of 2020-2021. Participants of the training	machine hiring
	programme were attended from all BRRI RSs and its adjacent	system will be
	area and total 1,865 participants were trained among them1,836	developed throughout
	were male and 29 were female. Participants were trained on	the country.
	operation, repair and maintenance of different agricultural	
	machinery and technologies like; transplanter, combine	

Sl. no.	Research Progress	Expected output
	harvester, diesel engine, power weeder, prilled urea applicator, self propelled reaper, power tiller , tractor etc theoretically and	
	practically in the threshing floor and in the main field. At the	
	end of the training, a post-evaluation and trainees reactions	
	regarding the training were collected. Certificates, leaflets and	
	a set of tools were distributed among the participants. Trainees	
	opined that they are now more confident about the use of the	
	agricultural machinery.	
	<b>Duration:</b> 2019 - 2024	
	<ul> <li>3.2 Title: Training on manufacturing, safety and work environment to the workshop personnel of local farm machinery manufacturing industries</li> <li>Progress: Three training programmes on manufacturing, safety and work environment to the workshop personnel of local farm machinery manufacturing industries were conducted in R K Metal, Faridpur; Janata Engineering, Chuadanga and Alim</li> </ul>	Capable technician of manufacturing workshop will be developed.
	Industries, Sylhet. Three days long hands on training were conducted on machine tools used in the agriculture machinery fabrication workshop, welding, filing, grinding, drilling, power transmission system, operation and maintenance of workshop machinery, safety and work environment of the workshop. The trainees were upgraded to fabricate good quality machine using appropriate tools and accurate measurement through these training. <b>Duration:</b> 2019 - 2024	
	Agricultural Economics Division	
	Socioeconomic and Policy Programme area	
	Sub-Sub-Program I: Rural Institution and Economic Consequences	
1	Farm Level Adoption and Evaluation of Modern Rice	Variety wise adoption
	Cultivation in Bangladesh	rate and constraints of different MVs and LVs be evaluated.
	Progress: Partial results	
	In Aus season, overall adoption of modern rice varieties was 91.96% of which BRRI varieties' coverage was about 65.35%	
	BRRI dhan48 ranked the top position (46.35%) in terms of area	
	coverage, followed by BRRI dhan28 (9.82%). In T. Aman	
	season, though overall adoption of BRRI varieties seemed	
	apparently low (45.0%); but adoption in some regions, namely	

Sl. no.	Research Progress	Expected output
	Dhaka and Rangamati, was substantially high (67-78%). BRRI	
	dhan49 (14.04%) and BRRI dhan34 (9.03%) were the most	
	adopted BRRI varieties in T. Aman season. Adoption of Indian	
	varieties in this season was 36.05%. BRRI dhan48 produced the	
	highest yield (4.25 ton/ha) in Aus season, whereas in T. Aman	
	season, both BRRI dhan49 and BRRI dhan52 were the top	
	yielder (4.60 ton/ha).	
2	Prospect and Constraints to Adoption of BRRI Released	Drivers, constraints,
	Modern Rice Varieties in Bangladesh: A Case of Cumilla	and potential
	District	adoption of BRRI
	Progress:	varieties be
		identified.
	Data collection was completed, and analysis is ongoing.	
	Sub-Sub-Program II: Production Economics	
3	Estimation of Costs and Return of MV Rice Cultivation at the	Profitability, factor,
	Farm Level	and income share of
		MV rice cultivation
		be estimated
	<b>Progress</b> . Per bectare the gross margin of rice cultivation in	
	the Aman season (Tk. 76,518) was higher, followed by Boro	
	(Tk. 68,304) and Aus season (Tk. 43,817.2). Similarly, per	
	hectare net returns for Aman (Tk. 44,995) was higher, followed	
	by Boro (Tk. 34,159) and Aus paddy (Tk. 13,660.2). Overall,	
	rice cultivation was profitable in current years due to higher	
	yield and market price. Gross profit ratios are 40.06, 52.83, and 41.33 for Aug. Aman and Boro, respectively. An increased	
	benefit ratio is an indication that the farmers are selling their	
	produce at a high profit level.	
4	Drivers Influencing Adaption Desision of Arguestic Disc in	Adaption status and
4	Some Selected Areas of Pangledesh: An Econometric	drivers for the
	Approach	decision of adopting
	Арргоасн	PQR varieties be
		identified.
	<b>Progress:</b> The majority of aromatic naddy produced in	
	Bangladesh is grown in the districts of Dinainur and Sherpur	
	BRRI dhan 34 cultivated in 1.92 percent area of the Dinajpur	
	district and 0.01 percent of the Sherpur district of Bangladesh's	
	total Aman acreage and produced 2.55.615 and 1.789 tons of	
	clean rice, respectively. At the same time, Tulshimala rice	
	adopted 0.22 percent area of Sherpur district and produced	

Sl. no.	Research Progress	Expected output
	19,799 tons of clean rice. Both BRRI dhan34 and Tulshimala is profitable farm enterprise and also an important source of cash income. The Tobit marginal effects findings indicate that ln farm size, price difference, market demand, eating quality, extension service, distance to UAO, and credit are positive and significant. Increasing farm size, price difference, market demand, eating quality, extension service, distance to UAO, and credit would boost the adoption of more aromatic cultivars in the research region.	
5	An Economic Investigation of Rice Seed Production Status in A Selected Area of Bangladesh <b>Progress:</b> Rice seed production is dominated by Bangladesh Agricultural Development Corporation (BADC) through the production of Truthfully Labelled Seed (TLS) in its contract growing zones. Contract growers (CG) play a key role supplying seed to the farmers through BADC and non-contract growers (non-CG) supplies their seed to local farmers, dealers, and private seed companies etc. Good quality seed alone can increase the yield by 15-20%. The study was conducted in Tangail district taking 60 seed growers evenly from the contract and non-contract growers of both Aman and Boro seasons. In Boro season, CGs used 33 kg seed per hectare while non-CGs used 39 kg per hectare on average. Both type of growers used more fertilizer than the recommended dose in two seasons. In Boro season, the total cost of contract growers and non-contract growers was Tk 164527 and Tk 157684, respectively, while In Aman season, it was Tk 1,43,687 and Tk 1,37,623, respectively. In Boro season, the cost of seed production was Tk 27.11 per kg for CGs and Tk 25.46 for non-CGs, while in Aman season, it was Tk 28.05 for CGs and Tk 27.13 for non-CGs. Labor unavailability and the high wage rate of labor were the prime constraints of seed production. Mechanization in transplanting and harvesting is required to address as those practices are highly labor-intensive.	Economics of seed production be measured, Farmer's choice on seed technology adoption be identified
6	Assessment of Selected Popular Local Rice Varieties Cultivated in Different Seasons in Bangladesh <b>Progress:</b> Data analysis going on.	Adoption pattern, profitability and problems of rice cultivation will be identified.
	Sub-Sub-Program III: Rice Marketing and Price Policy	
7	Resilience of Rice Value Chain: Recent Transformation and Vulnerabilities	

Sl. no.	Research Progress	Expected output
51. 110.	<b>Progress:</b> At the expansion of telecommunication network and development of roads and transportation in the fur flung villages and higher use of mobile phone, has cut the length of marketing chain, though the price is being marked up absorbing the profit by the intermediary actor himself. In the midstream of rice value chains, consumers' demand-driven operation and changes were recorded. Furthermore, auto-rice millers reported an inclusive use of whitening and polishing rice to acquire the expected grain quality that has higher market demand. Aratdar and commission agents directly send paddy to auto-mills at a price mostly set by the millers. The resilience of the rice value chain is financed by the actors themselves.	Expected output
8	<ul> <li>Spatial Market Integration and Price Transmission of Rice in Bangladesh: Co-integration and Vector Error Correction Model Approach</li> <li><b>Progress:</b> The monthly wholesale price of four spatially separated rice markets namely, Dhaka, Rangpur, Sylhet and Barisal from 2012 to 2020 have been analyzed to investigate the market integration, price leadership and extent of price adjustment. The Johansen co-integration test discovered at least two co-integrating vectors implying that the four rice markets in Bangladesh during the study period linked together and therefore the long-run equilibrium is stable. Granger causality test revealed that Dhaka acts as the central market and leads the price of Rangpur, Sylhet and Barisal while Rangpur also leads the price of Sylhet and Barisal. All though, VECM confirms that all the four markets are poorly integrated in short-run and only Sylhet and Barisal markets show convergence to the equilibrium in long-run though the extent is trivial. Dhaka market shows more rigidity in case of long-run adjustment process to equilibrium followed by Rangpur. Results highlight the compulsion of Government investment for better market infrastructure and transportation networks.</li> </ul>	Linkage among major rice markets across the country be examined.
9	<ul> <li>Economic Assessment and Utilization Pattern of Rice By-products (Broken Rice, Dead Rice, Rice Bran and Rice Husk) in Bangladesh</li> <li>Progress: Data analysis ongoing</li> <li>Partial results</li> <li>62 % cleaned head rice, 8 % bran, 20 % husk, 8 % broken rice, and 2.5 % dead rice was obtained after milling parboiled paddy. While 53 % cleaned head rice, 9 % bran, 21 % husk,</li> </ul>	Estimate rice byproducts and its utilization patterns will be evaluated

Sl. no.	Research Progress	Expected output
	14.5 % broken rice, and 2.5 % dead rice was obtained after	
	milling aromatic paddy.	
	• Supply chain of rice bran in Sherpur District	
	Rice miller> Bran party> Rice bran oil mill	
	Rice miller> Bran party> Feed industry	
	Rice miller> Retailer> Rural farmer	
10	Present Scenario of Milling and Branding System of Rice and	Degree of milling
	its Impact on Price in Bangladesh	and branding and its
		effect on rice price be
	Progress:	evaluated.
	Most paddy is processed in automatic rice mills in the study	
	regions. Automatic rice mills processed 78%, 83% and 80%	
	paddy in Mymensigh, Sherpur and Netrakona Districts.	
	Semi-automatic rice mills processed 15%, 10% and 13% paddy	
	in Mymensigh, Sherpur and Netrakona Districts, respectively.	
	About 48% of the bold grain were being processed by standard	
	degrees of milling. As most of the bold grains were processed	
	to meet up the demand of government procurement, millers	
	were reluctant to go for medium or high degrees of milling.	
	However, head rice recovery is higher in case of standard DOM	
	as 64 kg of head rice could be obtained from every 100 kg of	
	bold grain.	
	On the other hand, about 83% of medium bold grain were	
	processed with high degree of milling which was the highest	
	which clarifies that most of the medium bold grain are treated	
	with high degree of milling. However, head rice recovery is	
	lower in case of high DOM as 60 kg of head rice could be	
	Brand name rice are being formalized by the DOM Bold type	
	grain turned into 28 Miniket. 29 Miniket, when high DOM was	
	done. Medium type of grain, i.e., BR 28 and BR29 became	
	Miniket, Nazir and Pajam etc. branded rice at high DOM.	
	Likewise, similar fate happened to fine and aromatic rice.	
	turning them into Katari, Zira, Chinigura, Basmati and	
	Banglamati.	
11	Tracking Rice Varietal Authentication: A Pathway from	The originality of the
	Farm to Market	deviated name of rice
		varieties given in the

Sl. no.	Research Progress	Expected output
	<b>Progress:</b> Data analysis ongoing	local market be identified.
	Partial results	
	In the surveyed Upazila and union level markets, BRRI dhan28 captures 40% of the available rice brands, followed by	
	Minikit (18%), Swarna (14%), and BRRI dhan29 (12%).	
	On the other hand, in the surveyed city level markets, Minikit captures 36% of the available rice brands, followed by BRRI dhan28 (19%), Zira (19%), and Nazirshail (9%).	
	Sub-Sub-Program IV: Agricultural Policy and Development	
12	Comparative Advantage of Export Potential Aromatic Rice (BRRI dhan50) Variety in Selected Areas of Bangladesh	Export and import potential of BRRI released rice varieties
	Progress:	in the national context
	The analyses show that, in an import parity situation, DRC values were 0.65 and 0.73, respectively, when head rice	be evaluated.
	recovery was 56 and 52%. It means Bangladesh has comparative advantage for producing export potential aromatic rice (BRRI dhan50) at import substitution.	
	On the other hand, in the export parity situation, DRC values	
	were 0.91 and 1.06, respectively, when head rice recovery was $56$ and $520$ /. This implies that Danaladash has comparative	
	advantage in exporting the potential aromatic rice like BRRI	
	dhan50 at export substitution with head rice recovery at 56%.	
14	Evolving Rice Consumption Patterns of Different Groups in	Rice consumption
	Bangladesh: Evidence from Household Survey	patterns of different
	Progress: Data analysis and report writing	change be examined.
	Partial results	
	Consumption pattern has been changing by region, age group,	
	gender, and farm category. The average national per capita consumption of rice is 384.5 gm/day, of which in rural and	
	urban areas are 405 and 349 gm/day, respectively.	

Sl. no.	Research Progress	Expected output
	Agricultural Statistics Division Socioeconomic and Policy Programme area	
1.	<ul> <li>Project I: Statistical methodology and computer programming</li> <li>1.1 Title: Stability Analysis of BRRI varieties</li> <li>Progress: Report complete.</li> <li>Duration: Date of initiation: 2001-02</li> <li>Date of completion: Continuous</li> </ul>	• Stability index of BRRI varieties according to seasons
	<ul> <li>1.2 Title: Improvement of BRRI Stability model by incorporate multiple factors</li> <li>Progress: Report Complete.</li> <li>Duration: Date of initiation: 2020-21</li> <li>Date of completion: Continuous</li> </ul>	• Best model selection for BRRI stability model improvement.
	<ul> <li>1.3: Title: Scopes of Bioinformatics in Rice Research</li> <li>Progress: Already Completed the literature review of the Scopes of Bioinformatics in rice science</li> <li>Duration:</li> <li>Date of initiation: 2020-21</li> <li>Date of completion: 2021-22</li> </ul>	Research fields and scopes of Bioinformatics in Rice Research
	<ul> <li>1.4 Title: Statistical Modeling and RNA-seq data Analysis</li> <li>Progress: Different statistical analysis such as principal component analysis, factor analysis, cluster analysis computing program has been completed.</li> <li>Duration:</li> <li>Date of initiation: 2020-21</li> <li>Date of completion: 2021-22</li> </ul>	<ul> <li>Application fields of bioinformatics in rice research</li> <li>Analytical skills on the application of bioinformatics in rice research</li> </ul>
	<ul> <li>1.5: Title: Digitalized Salary Management System for BRRI HQ Employee</li> <li>Progress: Developed the software and host in BRRI LAN and it is currently running.</li> <li>Duration: Date of initiation: 2020-21</li> <li>Date of completion: Continuous</li> </ul>	• Digitalized salary management system for BRRI HQ employee
	<ul> <li>1.6: Title: Digitalized Labour Management System for BRRI HQ</li> <li>Progress: Already Developed the software and host in BRRI LAN and it is running.</li> <li>Duration: Date of initiation: 2019-20</li> </ul>	• Updated Digitalized attendance as well as Wages system

Sl. no.	Research Progress	Expected output
	Date of completion: Continuous	for BRRI HQ
		Labour.
	1.8: Title: Digitalized Casual Leave Application System	
	<b>Progress:</b> Already Developed the software and host in BRRI	• Digitalized casual
	LAN and it is running.	leave application
	<b>Duration:</b> Date of initiation: 2019-20	system for
	Date of completion: Continuous	Agricultural
		Statistics Division
		Statistics Division
2.	Project II: Multivariate analysis of BRRI varieties	
	2.1 Title: Genotyne X Environment Interaction of BRRI	Genotype x
	Varieties	Environment
	<b>Progress:</b> Aman and Boro report complete	Interaction effect of
	<b>Duration:</b> Date of initiation: 2017-18	BRRI varieties
	Date of completion: Continuous	
	<b>2.2 Title:</b> Maintenance of rice database	
	Progress: Existing databases have been updated. After	
	necessary correction the data were analyzed and the outputs	• Database on rice
	were available in BRRI website in different form under different	and related crops.
	scenarios. Using the time series data (area data from 1971-72 to	• Year wise GR of
	2018-19 and production data from 1971-72 to 2018-19) we	in Bangladesh
	produced rice cultivated area and production graph of	Database on
	Bangladesh	climatic factors
	Duration:	Various climatic
	Date of initiation: 1996-97	maps.
	Date of completion: Continuous	Growth rate and trend
		scenario of area,
		production and yield
		of rice in Bangladesh
3.	Project III: Agro Meteorology and Crop Modelling	
	3.2 Title: Minimizing agro micro climatological risk factors	• Forecast and
	for maximizing sustainable rice production in Bangladesh	validate daily
	Progress: Experimental data analysis has been completed	weather for
	<b>Duration:</b> Date of initiation: 2017-18	sustainable rice
	Date of completion: Continuous	production.
		rechnical capacity
		enriches for crop
		management and
		information of daily
		weather forecasting
		and advisories to the
		farmers

Sl. no.	Research Progress	Expected output
	3.2 Title: Simulating of Climate Change Impact on Rice	• DSSAT model
	Growth and Yield in Bangladesh using DSSAT Model	validation for the
	Progress: Experimental data analysis has been completed	assessment of
	Duration: Date of initiation: 2017-18	climate change
	Date of completion: Continuous	impacts on rice
	1	varieties released
		by BRRI.
		• Genetic
		coefficient of
		eight BRRI
		released rice
		varieties will be
		estimated.
		• Impact of climate
		change on rice
		will be identified
		• Vield of rice
		varieties will be
		forecasted.
		Adaptation options
		for regional rice
		farmers will be
		analyzed
4	Project IV: Utilization of geographical information system (GIS) in rice research	
	<b>4.1 Title:</b> Suitability (Edaphic) Mapping of BRRI dhan90-92	Suitability map of
	Progress: Suitability Map of BRRI dhan90-92 has been	BRRI released rice
	completed.	varieties (BRRI
	<b>Duration:</b> Date of initiation: 2019-20	dhan90 to BRRI
	Date of completion: 2020-21	dhan92)
	<b>4.2 Title:</b> Climate mapping of temperature and rainfall of	Expected maximum
	Bangladesh Drograms a Total minfall and terminations (may and min) 2010	and minimum
	<b>Frogress</b> : Total raintait and temperature (max and min) 2019	rainfall in different
	nas been completed	region for rice in
	<b>Duration:</b> Date of initiation: 2016-17	Bangladesh
	Date of completion: Continuous	Dunghudobh
	4.3 Title: Land use and land cover mapping in some selected	• To identify the
	area of Bangladesh	various objects of
	Progress: Land use land cover map of Habiganj district for rabi	land use/land
	season completed.	cover (agriculture
	<b>Duration:</b> Date of initiation: 2020-21 (01 Year)	land, fallow land,
		Forest, urban
		area, orchard,
		Submergence
		area, water body

Sl. no.	Research Progress	Expected output
		etc. of a specific
		area).
		To calculate the area
		of the objects of land
		use land cover.
	<b>4.4 Litle:</b> Flood mapping using Remote Sensing	• A flood map
	Progress: Flood map of 2020 of Bangladesh has been	The area and extend
	completed.	of flood.
	<b>Duration:</b> Date of initiation: 2020-21 (01 Year)	
5	<b>Project V: Capacity Building Through Training</b>	
	5.1 Title: Training program on experimental data analysis	Skills of BRRI
	<b>Progress :</b> Training program on experimental data analysis has	personal on
	been conducted with the collaboration of Training Division for	experimental data
	5 batches including 16 participants for each batch. A total of	analysis will be
	approximately 80 BRRI scientists were trained about this	enriched
	training	
	<b>Duration:</b> Date of initiation: 2019-20	
	Date of completion: Continuous	
	Date of completion. Continuous	
	5.2 Title: Training program on multivariate data analysis	
	Progress: Training program on multivariate data analysis has	
	been conducted with the collaboration of Training Division for	
	5 batches including 16 participants for each batch. A total of	• Knowledge and
	approximately 80 BRRI scientists were trained about this	skills of BRRI
	training	scientists on
	<b>Duration:</b> Date of initiation: 2019-20	multivariate data
	Date of completion: Continuous	enriched
	Date of completion. Continuous	childhed.
Sl. no.	Research Progress	Expected output
	Programme area/Project (Duration)	
6.	<b>Project VI: Information and Communication Technology</b>	
	6.1 Title: Strengthening Cyber Security System for BRRI	
	Progress:	
	6	• Server will be safe
	• We have already designed the architecture of cyber	and secured.
	security system of BRRI.	• Data
	• Configuration of Virtual Private Network (VPN) is	communication
	completed successfully	will be safe and
	<ul> <li>Configurations of outer and inner turnals are conveleted.</li> </ul>	secured.
	Configurations of outer and inner tunnels are completed	• Virtual Private
	succession.	Network (VPN)
	• Configuration of remote connectivity is going on	connection and
	Duration: Data of initiation, 2020, 21	tunnel will be
	Duration: Date of initiation: 2020-21	developed.

Sl. no.	Research Progress	Expected output
	Date of completion: Continuous	• Secure remote
		connection will be
		developed.
	6.2 Title: BRRI Alapon" Telephone Directory Mobile App of BRRI	• Digitalize internal
	<ul> <li>Progress:</li> <li>Already database has been developed.</li> <li>All types of data have been collected from divisions, sections and regional stations of BRRI for developing the telephone directory mobile app.</li> <li>The BRRI Telephone Directory Mobile app will be named as 'BRRI Alapon' according to the monthly progress review meeting of immediate term in Sentember' 2020.</li> </ul>	<ul> <li>communication system to each other of BRRI.</li> <li>Minimize time, cost and visit (TCV) for sharing instant information using the app.</li> </ul>
	Duration: Date of initiation: 2020-21 Date of completion: Continuous	
	6.3 Title: Vehicle Requisition Management System of BRRI	Disitali-
	<ul> <li>The database has already developed and architecture design has been finalized.</li> <li>The information of all variable of DDDL (driver's normalized)</li> </ul>	Digitalize     Transport     division using     SMS based     VRMS service.
	<ul> <li>The information of all vehicle of BRRI (driver's name, mobile no, vehicle reg. no etc.) has been collected from transport section.</li> <li>According to monthly progress review meeting of innovation team of BRRI on September' 2020 has decided that Vehicle Management System (VMS) and 'BRRI Alapon' mobile app will be developed together in one platform.</li> </ul>	<ul> <li>Manage and maintain the VRMS system.</li> </ul>
	<b>Duration:</b> Date of initiation: 2020-21 Date of completion: Continuous	
	6.4 Title: Training on Innovation, Service Process Simplification (SPS) and e-Nothi management for enhancing capacity of BRRI employee	• Enrich capacity of BRRI scientists and officers through various
	<ul> <li>Progress:</li> <li>Day-long 'Innovation &amp; SPS' workshop has already completed on 11 October' 2020 in spite of Covid-19 situation following social distance and health rules;</li> </ul>	<ul> <li>PSI and SPS training.</li> <li>Skills of implementation process will be</li> </ul>

Sl. no.	Research Progress	Expected output
	<ul> <li>Two day-long 'Public Service Innovation' training has completed on 12-13 October' 2020 in spite of Covid-19 situation following social distance and health rules;</li> <li>'E-Nothi System' training will be held on last week of February' 2021 for all division and section of BRRI HQ at BRRI premises;</li> </ul>	developed through innovative approach.
	<b>Duration:</b> Date of initiation: 2020-21	
	Date of completion: Continuous	
	<ul> <li>6.5 Title: Rice Doctor" Apps for BRRI. Progress:</li> <li>Developed final version of BRRI rice doctor mobile app and web application.</li> <li>Included diagnosis tool technique on BRRI Rice doctor mobile and web application</li> </ul>	• Manage and maintain rice doctor.
	<ul> <li>Included 'Feedback' option to provide necessary advice for improving the quality of app.</li> </ul>	
	<b>Duration:</b> Date of initiation: 2018-19 Date of completion: Continuous	
	<ul> <li>6.6 Title: Strengthen and dissemination of modern rice technology and its management information at the farmer door step through RKB Mobile Apps</li> <li>Progress:</li> <li>For dissemination, we have trained sixty (60) DAE officers in two batches. We have also developed a web page to get feedback from those DAE officers. All officers gave their feedback through the web page. DAE officers are using the</li> </ul>	<ul> <li>Disseminate RKB at all regional stations of BRRI as well as in almost all corners of Bangladesh.</li> <li>Extend and update regularly</li> </ul>
	RKB mobile apps and they are encouraging farmers to use the mobile apps. RKB is regularly updating with the latest information. It has included rice cultivation methods, rice production methods, soil and fertilizer management, insects and their management, diseases and their management, irrigation & water management and call center.	as routine work.
	<b>Duration:</b> Date of initiation: 2019-20	
	Date of completion: Continuous	
	6.7 Title: BRKB Website Management Progress:	• Provide more benefit to all users specially

<ul> <li>In this reporting year we have developed sixty-seven web and mobile based fact sheets. And all fact sheets have been uploaded into BRKB website.</li> <li>Updated with the latest information of Aman, Aus and Boro rice varieties included the latest variety of BRRI dhan99, BRRI dhan98 and BRRI dhan97.</li> <li>All types of information i.e. soil and fertilizer management, insects and rice diseases management etc. also updated regularly. It is routine work.</li> <li>Duration: Date of initiation: 2014-15 Date of completion: Continuous</li> <li>Farm Management Division Socioeconomic and Policy Program area</li> <li>Project I: Rice Production Management</li> <li>I.I. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.</li> <li>Factor A: Transplanting Date (Main Plot)</li> <li>Factor B: Spacing (Sub Plot)</li> <li>T. Aman Season</li> <li>I. 15 July</li> <li>I. 15 Locember 2. 1 August</li> <li>I. 20cm × 15cm 4. 1 September</li> <li>I. 15 December</li> <li>I. 1</li></ul>	<ul> <li>In this reporting year we have developed sixty-seven web and mobile based fact sheets. And all fact sheets have been uploaded into BRKB website.</li> <li>Updated with the latest information of Aman, Aus and Boro rice varieties included the latest variety of BRRI dhan99, BRRI dhan98 and BRRI dhan97.</li> <li>All types of information i.e. soil and fertilizer management, insects and rice diseases management etc. also updated regularly. It is routine work.</li> <li>Duration: Date of initiation: 2014-15         Date of completion: Continuous     </li> <li>Farm Management Division         Socioeconomic and Policy Program area     </li> <li>Project I: Rice Production Management         I. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.     </li> <li>Factor A: Transplanting Factor B: Spacing (5.4)</li> <li>T. Aman Season</li> <li>The Spacing (5.4)</li> <li>T. Aman Season</li> <li>The splanting 2. 10 August 2. 20 cm × 15 cm 4. 1 September</li> </ul>	<ul> <li>farmers, extension workers, researchers etc.</li> <li>Include more information as well as national issues associated with rice production and training.</li> </ul>
Farm Management Division         Socioeconomic and Policy Program area         1       Project I: Rice Production Management         and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.       During T. Aman season. The experiment is in the field.         Factor A: Transplanting Date (Main Plot)       Factor B: Spacing (Sub Plot)       During T. Aman season         T. Aman Season       Factor S: Spacing (Sub Plot)       The spacing (15 cm × 15 cm) (5.27 t ha <sup>-1</sup> ). The spacing (15 cm × 15 cm) (13 to 115 cm) (25.27 t ha <sup>-1</sup> ) in T. Aman season of short 4. 1 September         1. 15 July       1. 15 Laugust       2. 20 cm × 15 cm         3. 15 August       3. 25 cm × 15 cm       Aman season of short duration (growth duration 113 to 115 days) rice varieties which is statistically identical with the spacing 20 cm × 15 cm. 0n the other 4. 1 February	Farm Management DivisionSocioeconomic and Policy Program area1Project I: Rice Production Management1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.Dur sea dateFactor A: Transplanting Date (Main Plot)Factor B: Spacing (Sub Plot)pro ide hig (5.41. 15 July1. 15cm × 15cm 3. 15 August 4. 1 September1. 15cm × 15cm 3. 25cm × 15cmhig dur	
Socioeconomic and Policy Program area         1       Project I: Rice Production Management         1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.       During T. Aman season, transplanting date 15 July to 31 July produced statistically identical and the highest grain yield (5.40 to 5.75 t ha <sup>-1</sup> ).         Factor A: Transplanting Date (Main Plot)       Factor B: Spacing (15 cm × 15 cm 15 cm) produced statistically identical and the highest grain yield (5.40 to 5.75 t ha <sup>-1</sup> ).         T. Aman Season       The spacing (15 cm × 15 cm 15 cm) produced the highest grain yield (5.27 t ha <sup>-1</sup> ) in T. Aman season of short 4. 1 September         Boro Season       1. 20 cm × 15 cm 15 cm         1. 15 December       1. 20 cm × 15 cm         2. 1 January       2. 20 cm × 20 cm         3. 15 January       3. 25 cm × 15 cm         3. 15 January       3. 25 cm × 15 cm         4. 1 February       3. 25 cm × 15 cm	Socioeconomic and Policy Program area         1       Project I: Rice Production Management         1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.       Due to the properties of the properite of the properties of the properties of the properies of the pr	
1       Project I: Rice Production Management         1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.       During T. Aman season, transplanting date 15 July to 31 July produced statistically identical and the highest grain yield (5.40 to 5.75 t ha <sup>-1</sup> ).         T. Aman Season       Factor A: Transplanting Date (Main Plot)       Factor B: Spacing (5.40 to 5.75 t ha <sup>-1</sup> ).         T. Aman Season       The spacing (15 cm × 15 cm 15 cm 2. 1 August 3. 25 cm × 15 cm 3. 15 August 3. 25 cm × 15 cm 4. 1 September       The space of short duration 113 to 115 days) rice varieties which is statistically identical with the spacing 20 cm × 15 cm 3. 15 January 3. 15 January 4. 1 February	1       Project I: Rice Production Management         1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.       Duration and Boro season. The experiment is in the field.         Factor A: Transplanting Date (Main Plot)       Factor B: Spacing (5.4)         I. 15 July       1. 15 cm × 15 cm         1. 15 July       1. 15 cm × 15 cm         2. 1 August       2. 20 cm × 15 cm         3. 15 August       3. 25 cm × 15 cm         4. 1 September       duration of the second sec	
I.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.During T. Aman season, transplanting date 15 July to 31 July produced statistically identical and the highest grain yield (5.40 to 5.75 t ha <sup>-1</sup> ).Factor A: Transplanting Date (Main Plot)Factor B: Spacing (Sub Plot)During T. Aman season, transplanting date 15 July to 31 July produced statistically identical and the highest grain yield (5.40 to 5.75 t ha <sup>-1</sup> ).T. Aman SeasonThe spacing (15 cm × 15 cm) 3. 15 August 4. 1 September1. 15 cm × 15 cm 3. 25 cm × 15 cm 3. 25 cm × 15 cmBoro Season1. 20 cm × 15 cm 2. 1 January 3. 15 January 4. 1 February1. 20 cm × 15 cm 3. 25 cm × 15 cmCon the other pacing 20 cm × 15 cm. On the other	1.1. Title: Effect of transplanting date and spacing on the yield and yield components of different short duration rice varieties in T. Aman and Boro season. The experiment is in the field.Dure sea date pro idea (Sub Plot)Factor A: Transplanting Date (Main Plot)Factor B: Spacing (Sub Plot)Dure sea date (Sub Plot)T. Aman SeasonThe 151. 15 July1. 15cm × 15cm 2. 1 August 3. 15 August 4. 1 September3. 25cm × 15cm dure	
T. Aman Season $(5.40 \text{ to } 5.75 \text{ tha}^{-1}).$ T. Aman Season1. 15 July1. 15 cm × 15 cm1. 15 July1. 15 cm × 15 cm15 cm) produced the2. 1 August2. 20 cm × 15 cm $(5.27 \text{ tha}^{-1})$ in T.3. 15 August3. 25 cm × 15 cmAman season of short4. 1 September1. 20 cm × 15 cmduration 113 to 1151. 15 December1. 20 cm × 15 cmdays) rice varieties2. 1 January2. 20 cm × 20 cmidentical with the3. 15 January3. 25 cm × 15 cmcm. On the other4. 1 February0. 20 cm × 15 cmcm. On the other	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Puring T. Aman eason, transplanting ate 15 July to 31 July roduced statistically dentical and the ighest grain yield
1.15 July1.15 cm15 cm1.15 July1.15 cm $\times$ 15 cm15 cm) produced the2.1 August2.20 cm $\times$ 15 cm15 cm3.15 August3.25 cm $\times$ 15 cmAman season of short4.1 September1.20 cm $\times$ 15 cmAman season of shortBoro Season1.20 cm $\times$ 15 cmduration(growth1.15 December1.20 cm $\times$ 15 cmduration113 to 1152.1 January2.20 cm $\times$ 20 cmwhich is statistically3.15 January3.25 cm $\times$ 15 cmspacing 20 cm $\times$ 154.1 February0.15 cmcm. On the other	1.         15         1.         15           1.         15         1.         15 mig           2.         1         100 mig         1.           2.         1         100 mig         1.           3.         15         15 mig         15 mig           3.         15         15         15 mig           4.         1         September         15 mig	5.40 to 5.75 t ha <sup>-1</sup> ). The spacing (15 cm $\times$
Progress: The experiment was conducted during T. Aman 2020 and Boro 2021. Duration:	Boro Season       dur         1.       15 December       1.       20cm × 15cm       wh         2.       1 January       2.       20cm × 20cm       ide         3.       15 January       3.       25cm × 15cm       spa         4.       1 February       3.       25cm × 15cm       spa         Progress: The experiment was conducted during T. Aman 2020         and Boro 2021.       pro       gra         Juration:       "1       stat	highest grain yield (5.27 t ha <sup>-1</sup> ) in T. Aman season of short duration (growth duration 113 to 115 days) rice varieties which is statistically identical with the spacing 20 cm $\times$ 15 cm. On the other hand, during Boro season, 31 December produced the highest grain yield (7.85 t ha <sup>-1</sup> ) which was statistacally similar with 15 December (7.54 t ha <sup>-1</sup> ) and the

Sl. no.	Research Progress	Expected output
		(6.48 t ha <sup>-1</sup> ). Among
		the spacing the 20 cm
		$\times$ 15 cm produced the
		highest grain yield
		$(7.65 \text{ t ha}^{-1})$ followed
		by $25 \text{ cm} \times 15 \text{ cm}$
		spacing and the
		lowest in 20 cm $\times$ 20
		cm spacing.
	<b>1.2. Title:</b> Yield maximization of rice through integrated	Grain vield, tiller
	nutrient management	number. panicle
		number, plant height
	Treatments:	and grain number
		were significantly
	$T_1 =$ Absolute control	affected by the
		different nutrient
	$I_2 = BKRI$ recommended dose	management in both
	T Soil Tost Paged (STP) Fortilizer Dese	T Amon and Boro
	13 – Soli Test Based (STB) Fertilizer Dose	1. Annan and Boro
	$T_4 = STB dose + 1 t/ha Cowdung$	with noultry litter (1 t
		with poundy fitter (1 t $he^{-1}$ ) STD does with
	$T_5 = STB \text{ dose} + 1 \text{ t/ha Poultry manure}$	VC $(1 \text{ t } ha^{-1})$ and
		BRRI recommended
	$I_6 = SIB dose + I t/ha Vermicompost$	dose were performed
	$T_7 = STB dose + 0.33 t/ha CD + 0.33 t/ha PM + 0.33 t/ha VC$	better in all the
		narameter except
	<b>Progress:</b> The experiment was conducted during T. Aman 2020	1000-grain weight
	and Boro 2021.	(TGW) On the other
		hand control plot (no
	Duration: 2019-2022	nutrient supply)
		showed the lowest
		result
	<b>13 Title:</b> Efficacy of mechanical seedling transplanter and	Growth parameters
	deen placement of mixed fertilizer on rice yield	such as plant height
	deep placement of mixed fortilizer on file yield	seedling number leaf
	Treatments:	number nonicle
		length at and wield
	$T_1$ = Mechanical transplanting along with 100% fertilizer (Urea,	contributing
	TSP, MoP and Gypsum) deep placement, $T_2$ = Mechanical	norameters such as
	transplanting along with 80% fertilizer (80% Urea and 100%	tiller number manial
	TSP, MoP and Gypsum) deep placement, $T_3$ = Mechanical	uner number, panicle
	transplanting along with 70% fertilizer (70% urea and 100%	number, nined grain,
	TSM, MoP and Gypsum) deep placement, $T_4$ = Mechanical	unfilled grain and
	transplanting along with 100% fertilizer hand broadcasting	1000 grain-wt, etc
	(TSP, MoP and Gypsum fertilizer as basal dose and urea	were not significantly
	fertilizer in three split) and $T_5 =$ Hand transplanting along with	attected by
	100% fertilizer hand broadcasting (TPS, MoP and Gypsum in	mechanical
	basal dose and urea fertilizer in three split)	transplanting with
		fertilizer deep
		placement and hand
		transplanting with

Sl. no.	Research Progress	Expected output
	<ul><li><b>Progress:</b> The experiment was conducted during T. Aman 2020 and Boro 2021.</li><li><b>Duration:</b> 2020-2023</li></ul>	hand broadcasting of fertilizer. Mechanical transplanting with 80% fertilizer deep placement gave the highest yield and reduces 20% of fertilizers cost and transplanting costs.
	<b>Project II:</b> Survey and development of data base for labor management	
	<ul> <li>2.1. Title: Monitoring the laborers' wages rate for rice cultivation around BRRI Farms at different locations of Bangladesh.</li> <li>Progress: The experiment was conducted during 2020-2021.</li> <li>Duration: Continuous survey</li> </ul>	The average wage rate day <sup>-1</sup> varies from Tk 505-553. The wage rate day <sup>-1</sup> during the peak periods of the year Tk 540 to 570 in May, Tk 520 to 575 in July-August and Tk. 530 to 575 in December -January were existed. The average labour wage rate with food varied between Tk 389-436 and without food Tk. 543-614 respectively at different locations surrounding of BRRI R/S. The working time (8 hrs day <sup>-1</sup> ) of labourers was more or less similar except Satkhira and Gopalgonj.
	<b>Project III:</b> Rice seed production, and management and utilization of land, labour and other resources.	
	<ul> <li><b>3.1. Title:</b> Performance of Boro varieties in seed production plots during 2020-21</li> <li><b>Progress:</b> Conducted during 2020-2021.</li> <li><b>Duration:</b> These are the continuous routine activities</li> </ul>	Total 11 varieties were cultivated in BRRI research field for TLS seed production purpose during Boro, 2021. The varieties were harvested at 80-90% maturity and yields (tha <sup>-1</sup> ) were adjusted

Sl. no.	Research Progress	Expected output
		to 14% moisture
		content. Yield of the
		varieties ranged from
		5.96 t ha <sup>-1</sup> (BRRI
		dhan58) to $9.61$ t ha <sup>-1</sup>
		(BRRI dhan89).
	<b>3.2. Title:</b> Ten activities were done on land and labor	These are for the
	management and utilization, and different management	better outcome from
	activities like irrigation, drainage, beautification etc.	farm land and
		researchers. This
	<b>Progress:</b> Conducted during 2020-2021.	division produced
	Duration: These are the continuous routine activities.	7839 kg breeder seed
		of which 1942 kg
		2817  kg and $3080  kg$
		in Aus T Aman and
		Roro season
		respectively BRRI
		has 717 Jabourers of
		which 497 regular and
		220 irregular In
		BRRI HO total
		labourers number is
		444 of which 289
		regular and 155
		irregular laborers
		Total labourer
		utilization in different
		divisions was 103147
		man days of which
		51 12 % /5 15 % and
		373% were utilized
		for research support
		service and holidays
		respectively BRRI
		has 286.33 ha of land
		of which 172 64 ha is
		cultivable A total of
		77 59 ha of land were
		utilized by different
		research divisions in
		different season of
		which 7 57 ha in Aug
		3654 has in T Amon
		and 33.48 ha in Roro
		season This division
		manages the DDDI
		flower corden to
		mointain the earth the
		maintain the aesthetic
		view of the office
		premises and it has

Sl. no.	Research Progress	Expected output
		created visible flower
		garden during
		summer and winter
		season.
	Training Division	
	Technology Transfer Programme area	
1.	Project I:	
	<b>1.1 Title: Training on modern rice production technologies</b>	381 Sub Assistant
	(Regular)	Agriculture Officers
	<b>Progress:</b> Fifteen training courses on modern rice production	of DAE were trained
	technologies were conducted during the reporting period.	through this training.
	Duration: One day	
	1.2 Title: Training on Laboratory Accreditation for RDDI	
	Scientists	A total of 59
	<b>Progress:</b> Five training programmes on Laboratory	participants were
	Accreditation for BRRI Scientists have been completed.	trained through this
	<b>Duration:</b> Seven to ten days.	course. The
		participants of this
		course were Scientific
		Officer and Senior
		Scientific Officer of
		BRRI.
	1.3 Title: Training on Scientific Depart Writing	
	<b>Progress:</b> Five training programmes on "Scientific Report	
	Writing" for BRRI Scientists were completed	78 participants were
	Duration: Five days	trained in five
		batches through this
		training.
2.	Project II:	
	2.1 Title: Hands on training for using high throughput	74 participants were
	phenotypic system for C4 Rice research	trained through this
	Progress: Five training batched for using high throughput	course.
	phenotypic system for C4 Rice research were conducted during	
	the reporting period for the BRRI Scientific Officer and Senior	
	<b>Duration:</b> Two days	
	2.2 Title: Training on Transforming Rice Breeding	
	Progress: Four training programmes on "Transforming Rice	79 participants were
	Breeding" were conducted for the Scientific Assistant and	trained through this
	Senior Scientific Assistants of BRRI in 2020-21.	course.
	Duration: One week	
	2.3 Title: Training on Integrated Rice Disease Management	
Sl. no.	Research Progress	Expected output
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	Progress: Training programme on "Integrated Rice Disease	A total of 51
	Management" was conducted for the Scientific Assistant and	Scientific Assistant
	Senior Scientific Assistant of BRRI.	and Senior Scientific
	Duration: One day	Assistants of BRRI
		were trained through
		this course
	Adaptive Research Division:	
	Technology Transfer Program Area	
1.	Project I: Technology Validation	
	1.1 Title: 1.1 Advanced Line Adaptive Research Trial	
	(ALART) for favorable environment (FE) T Aus 2020	One advanced line
	Progress: completed	(BR9006-40-2-3-1)
	Progress: completed	has been
	Duration: April- August, 2020	recommended for PVT.
	1.2 Title: ALART for Non-saline tidal environment	
	(NSTE) T. Aus, 2020	One advanced line
	Progress: completed	(BR8781-16-1-3-P2)
	Duration: April- August, 2020	has been
		recommended for
		PVT.
	1.3 Title: ALART Deep Water Rice (DWR) Deep flooded (1	None of the advanced
	to 2 meter), B. Aman, 2020	line was
	Progress: completed	recommended for
		PVT
	Duration: April- December, 2020	
	1.4 Title: ALART Stagnant Water Rice (SWR) Shallow	
	flooded (50 to 100 cm), Early T. Aman 2020	
	Progress: completed	None of the advanced
	Duration: April- December, 2020	line was
		recommended for
		PVT
	1.5 Title: ALART, Rainfed lowland rice (RLR), T. Aman	
	2020	Two advanced lines,
	Progress: completed	BR9571-13-1-9-1-1
	Duration: June- December, 2020	and BR9574-9-5-3-1-
		1 along with BRRI
		dhan49 and BRRI
		dhan87 as checks
		were tested at
		farmers' field in ten
		locations None of the
		advanced line was
		recommended for
		PVT

Sl. no.	Research Progress	Expected output
	1.6 Title: ALART, Zinc enriched rice (ZER), T. Aman 2020	
	Progress: completed	The advanced line
	Duration: June- December, 2020	BR10001-94-2-B was
		not recommended for
		PVT.
	1.7 Title: ALART, Insect Resistant Rice-Brown Plant	
	Hopper (IRR-BPH) in T. Aman 2020	None of the advanced
	Progress: completed	line was
	Duration: June- December, 2020	recommended for
		PVT
	1.8 Title: ALART Premium quality rice (PQR), T. Aman	
	2020	None of the advanced
	Progress: completed	line was
	Duration: June- December, 2020	recommended for
		PVT
	1.9 Title: ALART Premium Quality Rice (PQR), Boro 2021	
	Progress: completed	None of the advanced
	Duration: November, 2020-May 2021	line was
		recommended for
		PVT
	1.10 Title: ALART, Zinc enriched Rice (ZER), Boro 2021	
	Progress: completed	None of the advanced
	Duration: November, 2020-May 2021	line was
		recommended for
	1 11 Title: ALADT Dectorial Dight Desistant Diag (DDD	PVI None of the advanced
	Dia) Dava 2021	line was
	<b>Di0</b> ), <b>D</b> 010 2021	recommended for
	Duo guossi completed	PVT
	Progress: completed	
	Duration: November, 2020-May 2021	
	1.12 Title: ALART Favorable Boro Rice-Bhanga (FBR-	None of the advanced
	Bhanga). Boro 2021	line was
	Progress: completed	recommended for
	Duration: November 2020-May 2021	PVT
2.	Project II: TECHNOLOGY DISSEMINATION	
	2.1 Title: New model demonstration using 4 stabaholders	Four stakeholders
	for ranid dissemination of rice technology	(One researcher of
	Progress: Completed	ARD BRRI the DAE
	Duration: June2020- May 2021	personnel (SAAO)
	L'ul autono d'alla d'alla d'alla de la constante de	one local seed dealer
		and one farmer) were
		involved in these
		demonstrations
		Dealers purchased
		seed from the
		farmers. store/sale the
		seeds for next year

use. Thus both grow	ver
and distributor we	ere
supposed to	be
mutually benefit	ed.
In addition to it, me	ore
quality seed w	ere
available to the lo	cal
farmers	
2.2 Title: Seed Production and Dissemination Program	
2.2	
221 Title: Seed Production and Discomination Program	
2.2.1 True: Seeu Frouuction and Dissemination Frogram (SDDD) during D. Aug. 2020 under Co.D.	1-~
(SPDP) during B. Aus, 2020 under GOB A total of 0,275	кg
grains were produce	
Duration: April- August, 2020	ted
plots and 1540	кg
quality seeds we	ere
retained by	the
farmers for the no	ext
year use. A total	of
363 farmers we	ere
motivated a	and
showed their inter	est
to cultivate the	ese
varieties in the ne	ext
year	
<b>2.2.2 Title: SPDP during T. Aus, 2020 under GoB</b> A total of 24291	kg
grains were produc	ced
Progress: completed from all demonstration	ted
Duration: April- August. 2020 plots and 2630	kg
quality seeds we	ere
retained by	the
farmers for the ne	ext
year cultivation. 11	99
farmers were inter	est
to cultivate the	ese
varieties in the ne	ext
year.	<u> </u>
<b>2.2.3 Title: SPDP in Jhum cultivation during Aus 2020</b> BRRI dhan48 was	the
Progress: completed most prefer	red
Duration: April- August, 2020 variety. A total of 3	\$40
kg seeds of differ	ent
varieties w	ere
retained by	the
farmers for next Jh	um
cultivation and	60
farmers	ere
motivated to gr	ow

Sl. no.	Research Progress	Expected output
		BRRI varieties in next
		year
	2.2.4 Title: SPDP in Valley of hills during T. Aus, 2020	Total 80 kg seeds of
	Progress: completed	BRRI varieties were
	Duration: April- August, 2020	retained for seed and
		33 farmers were
		motivated to grow
		these varieties.
	2.2.5 Title: SPDP during T. Aman, 2020 under GoB	About 5.22 ton rice
	Progress: completed	grains were produced
	Duration: June- August, 2020	from all demonstrated
		plots from which
		6,141 kg quality seeds
		were retained by the
		farmers for the next
		year use. A total of
		1877 farmers were
		motivated and
		showed their interest
		to cultivate these
		varieties in the next
		year.
	2.2.6 SPDP in Valley of hill during Aman 2020 under GoB	A total of 13.4 ton
	Progress: completed	grains were produced
	Duration: June- August, 2020	from all demonstrated
		plots and 1645 kg
		quality seeds were
		retained by the
		farmers for the next
		year use. About 1920
		farmers acquired
		awareness and
		knowledge about the
		varieties through field
		visits, discussion and
		knowledge sharing. A
		total of 442 farmers
		were motivated and
		showed their interest
		to cultivate these
		varieties in the next
		year.
	2.2.7 Title: SPDP during T. Aman, 2020 under SPIRA	About 50.12 ton
	Duration: June- August, 2020	grains were produced
		from all demonstrated
		sites and 4640 kg
		quality seeds were
		retained by the
		farmers for the next
		vear use. A total of

Sl. no.	Research Progress	Expected output
		818 farmers were
		motivated and
		showed their interest
		to cultivate BRRI
		dhan87 in the next
		year.
	2.2.8 Title: Dissemination of BRRI hybrid dhan4 and BRRI	About 22.82 ton
	hybrid dhan6 in T. Aman 2020	grains were produced
	Progress: completed	from all demonstrated
	Duration: June- August, 2020	plots. About 2,257
		farmers acquired
		awareness and
		knowledge about the
		varieties. A total of
		398 farmers were
		motivated and
		showed their interest
		to cultivate these
		varieties in the next
		year.
	2.2.9 Title: Performance of BRRI dhan71 and BRRI dhan75	About 10 ton grains
	in T. Aman-potato-Boro cropping pattern during T. Aman	were produced from
	2020	all demonstration
	Progress: completed	plots and 1735 kg
	Duration: June- August, 2020	quality seeds were
		retained by the
		farmers for the next
		year cultivation.
		About 1339 farmers
		acquired awareness
		and knowledge about
		the varieties. About
		775 farmers were
		motivated to grow
		BRRI dhan71 and
		BRRI dhan75 during
		the next season.
	2.2.10Title: SPDP during T. Aman, 2020 under TTFP	About 15.44 ton
	Progress: completed	grains were produced
	Duration: April- August, 2020	from all
		demonstrations from
		where farmers
		retained 2392 kg as
		seed for the next year
		cultivation. 595
		farmers were
		motivated by the
		varieties for the next
		year cultivation.
		Plastic drums having

Sl. no.	Research Progress	Expected output
		capacity of 75-80 kg
		were supplied to each
		farmer of the project
		plots to preserve
		paddy for the next
		vear cultivation.
	2.2.11 Title: SPDPs in Aman 2020 under TRB project	Total production of all
	Progress: completed	the varieties was
	Duration: June- August, 2020	43778 kg from which
		6280 kg was retained
		as seeds by the
		farmers for next
		season cultivation
		About 4610 farmers
		gained awareness and
		knowledge about the
		varieties and 730
		farmers were
		motivated to cultivate
		the varieties
	2 2 12 Title SPDP during Boro 2021	A total of 2.875
	2.2.12 Thic. SEDT during DOIO 2021 Progress: completed	farmers were
	Duration: November 2020, May 2021	motivated and
	Duration. November 2020- May 2021	showed their interest
		to aultivate these
		to cultivate these
		varieties in the next
		year. DKKI ullariy2
		and DKKI unano9
		by the former and for its
		by the familiers for its
		nigher yield.
	2.2.15 Litie: Introducing BKKI dnan81 and 88 in 1 Aman-	A total of 15 tons of
	Potato-Boro Cropping Pattern during Boro 2021	seeds were produced
	Progress: completed	from those varieties
	Duration: November 2020- May 2021	and 1485 kg seeds
		were retained for next
		year cultivation.
		Mean growth
		duration of BRRI
		$anan \delta I$ and $BKRI$
		ananov was 140 days
		which was 5 days
		earlier than BKRI
		dhan28. So farmers
		can easily cultivate
		these two varieties
		atter harvesting
		potato in the T.
		Aman-Potato-Boro
		Cropping Pattern

Sl. no.	Research Progress	Expected output
	2.2.14 Title: Introducing Double Transplanting method in	About 9.4 tons grains
	Potato/Mustard-Boro-Fellow cropping pattern under GOB	were produced from
	during Boro 2021	all varieties and 1440
	Progress: completed	kg seeds were
	Duration: November 2020- May 2021	retained for next year
		cultivation. About
		2475 farmers gained
		awareness and
		knowledge about the
		varieties and 475
		farmers were
		motivated to cultivate
		the varieties. Farmers
		did not prefer double
		transplanting over
		normal transplanting
		method for its higher
		cost and longer
		growth duration
	2.2.15 Title: SPDP during Boro, 2021 under TRB	Total produced grains
	Progress: completed	of all the varieties
	Duration: November 2020- May 2021	were 101568 kg from
	•	which 9535 kg was
		retained as seeds by
		the farmers for next
		season cultivation.
		About 5046 farmers
		gained knowledge
		about the varieties
		and 1005 farmers
		were motivated to
		cultivate the varieties.
2.3	2.3 Title: Adaptive Trial (HHAT)	
	2.3.1 Title: Head to Head Adaptive Trial (HHAT) during	A total of 200 Head to
	Aman 2020 under TRB	Head Adaptive Trials
	Progress: completed	(HHAT) were
	Duration: June-December 2020	conducted throughout
		the country under
		TRB project. The
		program was
		executed at forty-
		seven districts of the
		country with the
		active collaboration
		of nine different
		BRRI regional
		stations, Department
		of Agricultural
		Extension (DAE) and

Sl. no.	Research Progress	<b>Expected output</b>
		seventeen private
		organizations. Four
		categories of HHAT
		having some modern
		rice varieties were
		conducted at concern
		rice growing eco-
		system.
	2.3.2 Title: Adaptive trial of BRRI varieties during Boro	Irrespective of
	2021	locations, BRRI
	Progress: completed	dhan74 (6.61 t ha-1)
	Duration: November 2020- May 2021	and BRRI dhan88
		(6.60 t ha-1) yielded
		higher than the other
		varieties. BRRI
		dhan74 was better
		yielder especially in
		hilly areas and
		farmers of these areas
		are very much
		interested to grow it.
		In plain land area,
		BRRI dhan88 was
		better performer
		specially it showed
		Manileani and
		Munchiconi where it
		was grown after
		mustard and notato
		harvested
	233 Title: Head to Head Adantive Trial (HHAT) during	A total of 200 Head to
	Boro 2021 under TRB	Head Adaptive Trials
	Progress: completed	(HHAT) with five
	Duration: November 2020- May 2021	categories according
		to rice eco-system
		were conducted
		throughout the
		country through
		public and private
		partnership (PPP).
		The trials were
		categorized in five
		different groups
		considering the agro-
		ecology and used rice
		varieties. The major
		groups were Short
		growth duration rice
		variety (<150 days),

Sl. no.	Research Progress	Expected output
		Long growth duration
		rice variety (>150
		days), Saline
		Ecosystem (SE), Haor
		Ecosystem (HE) and
		Hilly Eco-system
		(HE).
3	PROMOTIONAL ACTIVITIES	(112):
	3.1Title: Farmers' Training:	ARD conducted 103
	Progress: completed	farmers' training at
	Duration: July 2020- June 2021	different locations of
		the country in which
		3140 trainees (2859
		farmers and 281
		SAAOs of DAE)
		participated during
		the reporting period
		of 2020-21.
	3.2 Title: Field day/Farmers' rally	ARD conducted 68
	Progress: completed	field days at different
	-9 ····· F ····	locations in different
	Duration: July 2020- June 2021	seasons of the country
		under GoB and two
		projects (SPIRA and
		TRB) Around 4 935
		participants including
		farmers local leaders
		and DAE personnel
		narticipated in the
		field days
	3 3Title: Distribution of plastic drum under GoB during	30 plastic drums were
	Boro 2021	provided in each seed
		center of 10 districts
	Progress: completed	Around 80 kg seeds
	Duration: July 2020- June 2021	were preserved in
		each drum
	3.4 Title: Farmer seed center (FSC)	Two farmers' seed
	Progress: completed	centers were
	Li ugi css. cumpicieu Durationi lulu 2020, luna 2021	established during the
	Duration. July 2020- Julie 2021	reporting neriod
		TRB-BRRI period.
		6 plastic drums in
		each center Around
		960 kg seeds were
		nreserved hv the
		concern farmer
		Farmers will be
		canable to use these
		seeds through seed
		seeus unougn seeu

Sl. no.	Research Progress	Expected output
		exchange or selling
		among the interested
	2 <b>5</b> T:41 C	farmers.
	5.5 The: Seed support program (SSP)	By the technical and financial
	Progress: completed	
	Duration: July 2020- June 2021	I KD-AKD
		distributed 3.25 tons
		seeds among the
		farmers and
		stakeholders. Around
		700 farmers will be
		benefitted through
		getting seed and
		technologies directly
		and indirectly
4.0	Title: Seed Production at BRRI Farm	6052 kg quality seeds
	Progress: completed	of different BRRI
	Duration: July 2020- June 2021	varieties were
		form during the
		reporting period
		Total 1020 kg seeds
		of 13 varieties were
		produced during T.
		Aman 2020, whereas
		5032 kg TLS of 15
		BRRI developed and
		one BINA developed
		rice varieties were
		produced during Boro
		2021 season.
	Pagional Station, Cumilla	
	Regional Station, Cumma	
1.	Program area 1: Varietal Development	
	1.1. Hybridization	High yielding new
	Progress: In T. Aman season, 22 crosses were made and in	breeding lines will be
	Boro season 20 crosses were made.	developed.
	Duration: July 2020 to June 2021	
	<b>1.2.</b> F <sub>1</sub> Confirmation	High vielding new
	<b>Progress:</b> In T. Aman 26 crosses and in Boro season 13 crosses	breeding lines will be
	were confirmed and registered in BRRI Cumilla.	done
	Duration: July 2020 to June 2021	
	1.3. Crowing of Fe nonulation	High vielding now
	<b>Progress:</b> About 630 progenies in T Aman and 58 in Boro	hreeding lines will be
	season were selected.	done

Sl. no.	Research Progress	<b>Expected output</b>
	Duration: July 2020 to June 2021	
	<b>1.4. Pedigree Nursery (F3, F4, F5 and F6 generations)</b> <b>Progress:</b> In T. Aman season, 197, 78 and 21 plants were selected from F3, F4 and F5 generation, respectively and 27 breeding lines were bulked from F5 and F6 generation. In Boro season, 272, 379, 204 progenies were selected from F3, F4 and F5 and 47 lines were bulked from F6. In LST, total 232 entries were selected from six crosses. <b>Duration:</b> July 2020 to June 2021	High yielding new breeding lines will be done
	<b>1.5. Observational Yield trial (OYT)</b> <b>Progress:</b> In T. Aman season, four genotypes performed better than check varieties in OYT (Cum) based on high yield performance, disease reaction and other good agronomic characters. In Boro season, 16 genotypes performed better than check varieties in OYT (Cum) based on high yield performance, disease reaction and other good agronomic characters. <b>Duration:</b> July 2020 to June 2021	High yielding with short duration new breeding lines will be developed
	<ul> <li>1.6. Preliminary Yield Trial (PYT)</li> <li>Progress: In T. Aman season, no entry was selected from PYT (Cum). In Boro season, seven and four entries were selected from PYT#1 and PYT#2 respectively.</li> <li>Duration: July 2020 to June 2021</li> </ul>	High yielding with desirable characteristics new breeding lines will be developed
	<b>1.7. Secondary Yield Trial (SYT)</b> <b>Progress:</b> Three (3), 3, 4, 3, 5 genotypes were selected from SYT#1 (Cum), SYT#2 (Cum)-INGER, SYT#3 (Cum)- GSR, AYT#1 (Cum) and AYT#3 (Cum) respectively during T. Aman season. Four and two genotypes were selected from SYT#1 and SYT#2 respectively during Boro season <b>Duration:</b> July 2020 to June 2021	High yielding with desirable characteristics new breeding lines will be developed
	<b>1.8. Regional Yield Trial (RYT)-Cumilla</b> <b>Progress:</b> In Boro season, BRC366-2-2-4-2-1, BRC389-4-2-4-2, BRC401-1-1-1-1B and BRC366-2-2-4-2-3 were performed better than check varieties from RYT#1 (Cum) and no genotype performed better than check varieties in RYT#2 (Cum). <b>Duration:</b> November 2020 to June 2021	High yielding with desirable characteristics new breeding lines will be developed
	<b>1.9 Yield Trial from HQ and RS</b> <b>Progress:</b> No genotype performed better than check varieties in AYT#2 (Cum)-WS, SYT#2 (PSR), RYT#1 (BPH & GM) and in RYT#1 (ZER) during T. Aman season. Three (3), 1, 3, 2, 2, 1, 4, 2, 2 genotypes performed better than check varieties in AYT (SSG), AYT (LSG), RYT#2 (BPH & GM), RYT (BB), RYT#1 (RLR), RYT#2 (RLR), RYT#1 (PQR), RYT#2 (PQR) and RYT#2 (ZER) respectively during T. Aman season. In Boro season, 1, 2, 0, 4, 2, 5, 2, 11 genotypes performed better than	High yielding with desirable characteristics new breeding lines will be developed

Sl. no.	Research Progress	Expected output
Sl. no.	<ul> <li>Research Progress</li> <li>check varieties in RYT (STR), RTY (BB), RYT (GSR), RYT (PQR), RYT (ZER), RYT#1 (Barishal), RYT#2 (Barishal) and RYT (MD) respectively.</li> <li>Under TRB-BRRI project, 15, 2, 9 and 7 genotypes performed better than check varieties in PYT (IRR) (BPH and GM), PYT#1(BB), PYT#2 (BB) and in PYT (DTR) respectively during T. Aman season. Thirty-nine (39) and 44 genotypes performed better than check varieties in OYT (BB) and OYT (IRR) (BPH and GM), respectively during T. Aman season. Five genotypes performed better than check varieties in AYT (IRR) (BPH and GM) during T. Aman season. In Boro season, 31 entries gave yield more than 6.50 t/ha in OYT (BB) and 67 entries gave yield more than 7.50 t/ha in OYT (FBR). In Boro season, 1, 15 entries performed better than check varieties in PYT#1 (BB) and PYT#2 (BB) respectively. Thirty (30) entries gave yield more than 7.0 t/ha in AYT (FBR) and 17 genotypes gave yield more than 6.50 t/ha in AYT (BPH) during Boro season. Twenty-four (24) entries gave yield more than 7.00 t/ha in BVE during Boro season. Under HRP project, three entries performed better than standard check variety in Confined Field Trial (CFT) during Boro season.</li> <li>Duration: July 2020 to June 2021</li> <li>Programme Area 2: Pest Management</li> <li>2.1. Survey and monitoring of rice diseases in selected areas in 2020-21</li> <li>Progress: During T. Aman 2020, disease incidence of neck blast (in aromatic rice), sheath blight, bacterial blight, tungro, false smut, sheath rot and brown spot were 1-35, 22-70, 26-53, 29-90, 1-20, 1-2 and 20-60 % respectively. Upazila-wise diseases status was presented in the Fig. 2. During Boro 2020-21 season, major rice diseases neck blast, bacterial blight, Tungro, sheath blight and brown spot were recorded ranged from 1-6, 10-45, 20-100, 10-60 and 22-90 % in BRRI released and local varieties respectively. Neck blast along with other major rice diseases were observed very low during the reporting season.</li> <th>Expected output</th></ul>	Expected output
	2.2 Multi Location Trial (MIT) of Plast resistant adversad	Plast diagona registert
	lines in Debidwar, Cumilla during Boro 2020-21	rice lines will be developed.

Sl. no.	Research Progress	Expected output
	<b>Progress:</b> Out of 11 advanced lines, 6 lines showed resistant from leaf and neck blast. Grain yield was obtained more than 6 t/ha and very good phenotype from the blast disease free 3 lines BR(path)13784-BC3-61-1-6-HR3, BR(path)13784-BC3-62-3-5-HR2, BR(path)13784-BC3-63-6-4-HR out of 6 lines, whereas BRRI dhan28 showed susceptible to blast (18 % DI, DS 9). <b>Duration:</b> November 2020 to June 2021	
	2.3. Field evaluation of blast resistant lines in blast hot spot area in Debidwar, Cumilla during Boro 2020-21 Progress: All 38 genotypes showed neck blast resistant whereas, susceptible checks showed 10-30 % neck blast with severity score 9. Four entries Q-180, L-24, L-227, M-207 showed leaf blast symptom but the severity score was 1 and free from neck blast. The yield ranged from 5.3 to 12.9 t/ha. Duration: November 2020 to June 2021	Blast disease resistant rice lines will be developed.
	2.4. Effectiveness of formulated biopesticides to control bakanae disease of rice in field condition Progress: The bakanae disease was not found both in the seedbed and in the main field after transplanted. Some bakanae disease was found in both trials during split booting stage which is negligible in yield reduction. No significant differences were found among the treatments of yield parameters.	Biopesticides for Bakanae disease will be developed.
	Duration: March 2021 to June 2021	
	<ul> <li>2.5. Factors affecting rice tungro disease and its management in Cumilla region</li> <li>Progress: The main factors for tungro devastation in Cumilla region were abundant GLH in the seedbed, tungro disease symptom appears in the seedbed, intensive rice cultivation (Rice-Rice-Rice), high rainfall with higher number of rainy days, high temperature 35 °C to 38 °C, susceptible rice cultivars, presence of source plants around the year. RH% has no role on Tungro disease development.</li> </ul>	Factors and Tungro disease management technology will be developed.
	<b>Aus 2020:</b> Tungro disease devastation was found in Hybrid Balia 2, Atakora, Nangalkot, Cumilla, Aus 2020. Tungro disease was recorded as DI 90%, DS 9 and yield was obtained 0.75 t/ha (expected Yield was 6.5 t/ha) with GD 125 days. Yield lose was obtained 89 %.	
	<b>T. Aman 2020:</b> From the field experiment it was obtained that tungro disease devastation in the main field caused by transplanting the infected seedlings with or without tungro disease symptom in the seedbed.	
	<b>Boro 2020-21:</b> Tungro disease was not found in the experimental areas whereas, in adjacent village Atakora BRRI dhan29 and Hybrid Hira-2 was infected by tungro with DI 70-	

Sl. no.	Research Progress	<b>Expected output</b>
	90% and DS 9 and yield loss was obtained upto 75-91 % from the infected plot.	
	Duration: July 2020 to June 2021	
	<ul> <li>2.6. Validation of rice neck blast disease management technology under farmer's field condition</li> <li>Progress: Neck blast disease was obtained severe 46 % disease incidence (DI) in BRRI dhan34 at farmers practice compared to BRRI practice (6 % DI) at BRRI farm, Cumilla during T. Aman 2020 season. Rice yield loss was saved upto 71 % by managing neck blast disease following BRRI developed blast disease management technology.</li> <li>Duration: July 2020 to June 2021</li> </ul>	Farmers awareness about the Blast disease management technology will be increased.
	<ul> <li>2.7. Tracking the infection source(s) of rice false smut disease, T. Aman 2020</li> <li>Progress: The healthy and infected seeds were sown and transplanted in 4 treatments having infected soil and non-infected/sterilized soils to find out the infection source of false smut disease of rice in natural condition. False smut disease was not present in each treatment in the pot experiment. False smut disease was observed in 4<sup>th</sup> set of treated healthy seeds + sterilized soil treatment in the field condition. Therefore, the experiment is needed to repeat in the next T. Aman 2021 season.</li> <li>Duration: July 2020 to November 2021</li> </ul>	Mode of infection of false smut disease will be determined.
	<ul> <li>2.8. Crop loss assessment of different rice varieties in Nangalkot, Cumilla during Boro 2020-21</li> <li>Progress: Two major rice diseases neck blast and sheath blight were observed in Jorpukuria village with DI 2-95 % and 35-55 % respectively. Yield loss was obtained major in BRRI dhan81 in 2 spots about 54 % due to neck blast disease with DI 95 % and DS 9 and in BRRI dhan58 about 5 %. Duration: November 2020 to June 2021</li> </ul>	Crop loss due to rice diseases will be determined.
3.	Programme Area 3: Crop-Soil-Water Management	
	<b>3.1. Long-term missing element trail at BRRI R/S Cumilla</b> <b>2020-21</b> <b>Progress:</b> During T. Aman 2020, BRRI dhan49, BRRI dhan79 and BRRI dhan87 produced 5.86, 6.13 and 6.12 t/ha grain yield, respectively with NPKZnS fertilizers. However, yield differences of K missing plots were found significant among the tested three varieties viz. BRRI dhan49, BRRI dhan79 and BRRI dhan87. On the other hand, omission of N from complete treatment had a significant effect on grain and straw yield of tested varieties indicating that a soil test based dose of fertilizer	Limiting nutrient factor on rice yield in rainfed and irrigated ecosystem will be determined.

Sl. no.	Research Progress	Expected output
	is enough for these varieties. In Boro 2020-21, BRRI dhan84, BRRI dhan86 and BRRI dhan88 produced 6.48, 7.45 and 7.43 t/ha grain yield, respectively with NPKZnS fertilizers. In case of BRRI dhan84 and BRRI dhan88, grain yield was drastically reduced due to omission of Potassium. On the other hand, omission of N from complete treatment had a significant effect on grain yield and straw yield of tested varieties indicating that a maintenance dose of fertilizer was enough for these entries. <b>Duration:</b> July 2020 to November 2021	
	3.2. Influence of nitrogen and potassium rates on performance of modern rice Progress: The experiment was conducted to find out suitable ratio of N and K for MV rice cultivation and to study N and K dynamics in soil and plant. Five doses of K (0, 50, 100, 150 and 200 kg/ha) in the main plot and four doses of N (0, 50, 75 and 100 kg/ha during T. Aman 2020 with BRRI dhan87 and 0, 100, 120 and 140 kg/ha in Boro 2020-21 with BRRI dhan89) in the subplots were tested. The experimental design was split-plot with three replications. Phosphorus and S was applied as blanket dose. Twenty five day old seedlings in T. Aman season and 43 day-old seedlings in Boro season were transplanted maintaining 20×20 cm spacing. Different levels of K and N application showed significant interaction effects on yield and yield contributing characters of both T. Aman and Boro rice. A combination of 200 kg K and 100 kg N for T. Aman rice (BRRI dhan87) and 200 kg K and 140 kg N for Boro rice (BRRI dhan87) and 200 kg K and 140 kg N for Boro rice (BRRI dhan87) and 200 kg K and 140 kg N for Boro rice (BRRI dhan89) cultivation seems to be suitable for desired yield. Duration: July 2020 to November 2021	NK interaction effect on rice yield can be determined.
	<b>3.3. Efficiency of DAP for the supplementation of nitrogen fertilizer</b> <b>Progress:</b> In T. Aman, DAP + Urea appli 60% STB (15+30+45 DAT) produced highest grain yield (5.21 t/ha) and DAP + Urea appli 100% STB (30+45 DAT) produced the highest straw yield (6.77 t/ha) in BRRI dhan87. In Boro season, DAP + Urea appli 100% STB (15+30+45 DAT) produced highest grain yield (7.33 t/ha) and DAP + Urea appli 80% STB (15+30+45 DAT) produced highest straw yield (7.26 t/ha) in BRRI dhan96. <b>Duration:</b> July 2020 to November 2021	Economic and efficient Urea and DAP fertilizer dose will be determined
	<b>3.4. Effect of planting time on growth and grain yield of newly released rice varieties</b> <b>Progress:</b> All varieties including check produced higher yield in planting time of 25 July. After 4 Aug, the yield of all tested varieties decreased sharply. Among all the varieties, BRRI dhan93 produced higher grain yield (4.2 t ha <sup>-1</sup> ) upto 04 August planting. During Boro season, BRRI dhan89, BRRI dhan92 and BRRI dhan29 produced the highest grain yield within 150-156 days in first two planting time 25 December and 10 January (40	Suitable sowing/ planting time of newly released rice variety will be determined.

Sl. no.	Research Progress	Expected output
	days-old-seedling). BRRI dhan88 and BRRI dhan96 showed expected higher yield with wide range of planting time. It was	
	observed that the best sowing time for long varieties (>140	
	days) was 15 and 30 November. Duration: November 2020 to November 2021	
	<b>3.5.</b> Effect of polythene covering on seedling raising in Boro	Effective seedling
	<b>Progress:</b> The results obtained from the seedbed exhibited that all-time polythene cover with round shape opening produced the highest seedling dry matter (2.54g) followed by polythene covering from 11.0 am to sunset (2.36g). Likewise, the highest seedling height was noticed by the application of all-time polythene cover with round shape opening treatment (28.52 cm). However, under field conditions, an insignificant effect of different seedling raising techniques was recorded on yield and yield components of BRRI dhan92 except for grains/panicle. Similar to the seedbed results, the highest grains/panicle (102) was generated from the plot which received all-time polythene cover with round shape opening treatment. <b>Duration:</b> November 2020 to November 2021	cold condition will be explored.
4.	Programme Area 4: Socio-Economics and Policy	
	<b>4.1. Stability Analysis of BRRI developed rice varieties</b> <b>Progress:</b> Under stability analysis BRRI hybrid dhan7 (5.11 t/ha), BRRI hybrid dhan6 (5.60 t/ha) and BRRI hybrid dhan3 (9.52 t/ha) gave the highest yield during T. Aus 2020, T. Aman 2020 and Boro 2020-21, respectively. <b>Duration:</b> July 2020 to June 2021	Adaptation model of BRRI released rice varieties will be developed.
5.	Program Area 5: Technology Transfer	
	5.1. Varietal replacement through Head to Head (HTH)	New high yielding
	<b>Progress:</b> During T. Aman 2020 five HTH trials with 5 rice varieties and during Boro 2020-21, six HTH trials with 6 varieties were conducted to test the adaptability and replacement ability of newly released rice varieties in Cumilla and Brahmanbaria districts. Seedling age was 20-25 and 35-40 for the respective seasons. One bigha of land was used for each trial. Among the tested T. Aman varieties, the yield of BRRI dhan87 and BRRI dhan93 was the highest (upto 6.28 & 6.39 t/ha, respectively) compared to other rice varieties. During Boro 2020-21 season, the maximum yield was obtained form BRRI dhan92 (upto 10.50 t/ha) followed by BRRI dhan89 (upto 9.99 t/ha), BRRI dhan67 (upto 7.90 t/ha), BRRI dhan84 (upto 7.88 t/ha), BRRI dhan58 (upto 7.88 t/ha), BRRI dhan21 (upto 7.70 t/ha) while the minimum yield was recorded in BRRI dhan28	disseminated quickly and directly to the farmers.

Sl. no.	Research Progress	<b>Expected output</b>
	(medium short duration) and BRRI dhan71 (SD) for T. Aman; BRRI dhan81 (SD) and BRRI dhan89 (long duration) for Boro season due to their higher yield. <b>Duration:</b> July 2020 to June 2021	
	<ul> <li>5.2. Block demonstration, dissemination and quality seed production (SPIRA project):</li> <li>Progress: Three block demonstrations using new rice varieties BRRI dhan87, BRRI dhan90, BRRI dhan93, BRRI dhan94 and BRRI dhan95 during T. Aman 2020 and 3 block demonstrations using BRRI dhan84, BRRI dhan86, BRRI dhan89 and BRRI dhan92 during Boro 2020-21 were conducted to investigate the performance and dissemination of newly released promising rice varieties in the farmers field levels. About 2 acres of land was selected for each block demonstration in different locations of Cumilla and Brahmanbaria districts. The average yield of BRRI dhan87, BRRI dhan90, BRRI dhan93, BRRI dhan94 and BRRI dhan87, BRRI dhan90, BRRI dhan93, BRRI dhan94 and BRRI dhan86, BRRI dhan90, D2020-21, the yield of BRRI dhan84, BRRI dhan86, BRRI dhan89 and BRRI dhan92 were 6.51, 6.21, 8.63 and 8.60 t/ha, respectively. Demo farmers as well as neighbor farmers were interested to cultivate BRRI dhan87 in T. Aman; BRRI dhan89 and BRRI dhan92 in Boro season due to thei higher yield and grain quality.</li> </ul>	New high yielding rice varieties will be disseminated quickly and directly to the farmers.
	<ul> <li>5.3. Field demonstration of BRRI rice varieties by BBRI Cumilla</li> <li>Progress: A total of 133 (12 in T. Aus, 54 in T Aman and 67 in Boro) field demonstrations (above 1 bigha each) of newly released BRRI varieties were conducted in Cumilla (82 trials), Chadpur (24 trials) and Brahmanbaria (27 trials) districts. The average yield of BRRI dhan82 and BRRI Hybrid dhan7 were 3.62 and 4.54 t/ha, respectively. The average yield of BRRI dhan87 were 4.75 and 6.13 t/ha, respectively. Farmer's acceptance of BRRI dhan87 for T. Aman season and for Boro varieties, BRRI dhan88 (7.54 t/ha), BRRI dhan89 (8.15 t/ha), BRRI dhan92 (8.23 t/ha) and BRRI dhan96 (8.12 t/ha) were very high in those respective areas for its grain size, panicle length and higher yield.</li> <li>Duration: July 2020 to June 2021</li> </ul>	New high yielding rice varieties will be disseminated quickly and directly to the farmers.
	<b>5.4. Farmer's training, Field day and Fair</b> <b>Progress:</b> Fourteen farmers' trainings were conducted in different locations of Cumilla region (9 GoB and 5 SPIRA funded). A total of 470 farmers (8 SAAO male, 423 male farmers and 39 female farmers) were trained up. Eleven field days were conducted in the block demonstration areas at Cumilla region funded by GoB,SPIRA-BRRI and BMGF	Farmers knowledge on modern rice cultivation and technologies will be enhanced

Sl. no.	Research Progress	Expected output
	project. About 1479 farmers as well as extension personnel's were attended in the field days. Most of the farmers got interested to cultivate new rice varieties in their areas specially BRRI dhan87, BRRI dhan88, BRRI dhan89, BRRI dhan92 and BRRI dhan96. BRRI Cumilla also participated in two Krishimela, one agricultural fair and one development fair. <b>Duration:</b> July 2020 to June 2021	
	<ul> <li>5.5. Breeder and TLS seed production</li> <li>Progress: In T. Aman 2020 and Boro 2020-21 seasons 25.15 ton breeder seeds of different BRRI varieties shown in Table 64 were produced and sent to GRS division, BRRI Gazipur. However, 44.375 tons TLS of BRRI rice varieties were produced and distributed all over the country.</li> <li>Duration: July 2020 to June 2021</li> </ul>	Quality seed demand of the seed companies, dealers and farmers will be fulfilled.
	Regional Station, Habiganj	
	Varietal Development	
	Project I: : Improvement of B Aman and T Aman, 2020-21	
1	Advance Yield Trial (AYT), B Aman	Deep water rice genotypes; BR7733- 2-1-2B, BR7735-1-1- 2B and BR7920-1-2- 3B produced 0.3 t ha <sup>-1</sup> more yield over the check Hbj. Aman-I in AYT-1 and genotypes; BR7730- 1-1-2B, BR7918-1-2- 3B and BR7919-1-1- 3B produced 0.5 t ha <sup>-1</sup> more yield over the check Hbj. Aman-IV in AYT-2 during Broadcast Aman.
2	Regional Yield Trial (RYT), B Aman	All advanced lines (BR7730-1-1-2B, BR7918-1-2-3B and BR7919-1-1-3B) gave higher yield than Lalmohon and other checks.
	Project II: Transplanted Aman rainfed	
1	Growing of F <sub>3</sub> population in Field RGA (Pigmented/Anti- oxidant Rice)	Seven crosses were made with selected traits. On the other hand, 15 germplasm

Sl. no.	Research Progress	Expected output
		were collected and
		evaluated.
	Project III: Irrigated Rice (Boro)	
1	Regional Yield trial (RYT) (ZER),	Zinc enriched rice
		genotype; None of the
		genotype produced
		higher yield over
		BRRI dhan89 (ck),
		but the genotype
		BK8913-12-4-8-9-2-
		3-11-22 (7.2 t ha <sup>-</sup> ,
		159 days) gave nigner
		BRRI dhan74 (6.96 t
		$ha^{-1}$ ) and BRRI
		dhan $84$ (6.80 t ha <sup>-1</sup> )
		during Boro season.
2	Regional Yield trial (RYT) (GSR)	None of the genotype
		produced higher yield
		than the check
		varieties. The
		genotype FBR189
		produced higher grain
		yield $(/.05 \text{ t ha}^{-1})$ than
		in PVT during Boro
3	Regional Vield trial (RVT) (CUM-1)	The genotype
		BRC366-2-2-4-2-1
		produced the highest
		yield (8.0 t ha <sup>-1</sup> ) than
		BRRI dhan84 and
		BRRI dhan88.
4	Regional Yield trial (RYT) (CUM-2)	None of the genotype
		produced higher yield
		than the check BKRI
		genotype BRC30/1
		$1_{-1}^{-1} = 54 (7.21 \text{ t } \text{ha}^{-1})$
		$160  ext{ days}  ext{ and } 160  ext{ days}  ext{ and } 160  ext{ days}  ext{ days}  ext{ and } 160  ext{ days}  ext{ days} $
		BRC335-1-3-2-2-1
		(8.55 t ha <sup>-1</sup> , 159 days)
		showed higher yield
		over the checks BRRI
		dhan50 and BRRI
-		dhan58.
5	Regional Yield trial (RYT) (Ba-1)	The genotype
		bKBa1-4-9 gave the
		mgnest yield $(8.02 \text{ L})$
		na jamong the tested

Sl. no.	Research Progress	Expected output
		entries with 162 days
		growth duration.
		Besides, the genotype
		BRBa2-1-3 (8.21 t ha
		$^{1}$ , 160 days) and
		BRBa3-3-1 (8.45 t ha <sup>-</sup>
		<sup>1</sup> , 158 days) showed
		almost same yield and
		growth duration with
		the check BRRI
		dhan92 (8.54 t ha <sup>-1</sup> ,
		162 days).
6	Regional Yield trial (RYT) (Ba-2)	The genotype
_	6 ( )( )	IR12A329.
		IR13A515 and
		IR15A3466 gave
		higher vield over the
		checks and among
		them: the genotype
		IR12A329 produced
		the highest yield (9.18
		t ha <sup>-1</sup> ) with 164 days
		growth duration.
7	Regional Yield trial (RYT) (DRR-BB)	None of the genotype
,	Regional Flora and (RTF) (DRR DD)	produced higher yield
		than the check BRRI
		dhan $89$ (8.83 t ha <sup>-1</sup> )
		but the genotype
		BR9943-2-2 (7.76 t
		$ha^{-1}$ ) BR9650-108-2-
		$3 (7.96 \text{ t} \text{ ha}^{-1})$
		BR9943-35-2-1-2-B2
		$(7.36 \text{ t } \text{ha}^{-1})$ and
		BR9943-26-2-3-5
		$(8.25 \text{ t } \text{ha}^{-1})$ showed
		higher yield over the
		checks BRRI dhan58
		and IRBB60 with
		almost same growth
		duration
8	Multi location vield trial (MLT# Path)	The genotype
		BR(Path)12452-BC6-
		36-11-5
		BR(Path)12452-BC6-
		48-18-7
		BR(Path)13784-BC3-
		$5_{-3-8-\text{HR4}}$ and
		BR(Path) 13784 - RC3
		63-6-4-HR6 gave
		almost similar grain
1		annosi sinna giani

Sl. no.	Research Progress	Expected output
		yield with similar
		duration of the check
		Variety BKRI dnan28 $(6.74 \text{ t } \text{hs}^{-1} \text{ 145})$
		(0.74  t  lia, 143)
9	Vield maximization trail (YMT# FB)	The genotype
		BRH11-9-11-4-5B-
		HR3 and BRH13-2-4-
		6-4B showed almost
		similar yield and
		growth duration with
		the check variety
		BRRI dhan63 (6.82 t
10	Internetional Indiana Diagonal Management	$ha^{-1}$ , 148 days).
10	(IRON2020)	genotypes were
	(IIKO1V2020)	selected according to
		their vield
		performance,
		phenotypic
		acceptance and
		growth duration.
		These materials will
		be re-tested in the
11	ALADT in Doro (7ED)	Among the tested
11	ALARI III DOIO (ZER)	entries showed
		significantly lower
		yield than check
		variety (BRRI dhan74
		and BRRI dhan89).
12	ALART in Boro (FBR-Bhanga)	All the genotypes
		gave statistically
		similar yield where
		bighest vield (7.75 t
		$ha^{-1}$ followed by
		BRRI dhan29 (7.60 t
		ha <sup>-1</sup> ), SVNO63-Boro-
		18-Bhanga (7.67 t ha
		<sup>1</sup> ) and SVNO76-
		Boro-18-Bhanga
1.2		$(7.66 \text{ t ha}^{-1}).$
13	ALAKI IN BORO (BBKK-BIO)	Among the line $DP(Dio) 11447 = 10$
		DK(DI0)1144/-5-10-
		significantly higher
		vield (7.78 t ha <sup>-1</sup> ) with
		shortest growth
		duration (147 Days)

Sl. no.	Research Progress	Expected output
		followed by
		BR(Bio)11447-1-28-
		14-3 and check
	Drogrom Anos Cron Soil Water Management	variety.
	rrogram Area: Crop-Son-water Management	
1	Long-term missing element trial for diagnosing the limiting	Yield decrease was
	nutrient in soil.	higher in NK, N and
		K omission plots
		for long time (13
		years).
2	Influence of nitrogen and potassium rates on performance of	Application of N @
	modern rice	140 kg ha <sup>-1</sup> with 50 kg
		K ha <sup>-1</sup> BRRI dhan92
		produced
		grain yield of 8.40 t
		ha <sup>-1</sup> than other
		combination of N and
		K fertilization during
		Boro in Habiganj
		Farm.
3	Greenhouse gas emission and global warming potential under	Vermicompost
	organic amendment at Kushtia region	organic manure
		cultivation could be
		very useful of
		atmospheric and soil
		management strategy
		to reduce about 31-62
		% of GHG intensity,
		21-53% of GWP and
		of rice yield than that
		of cowdung and
		poultry manure.
4	Greenhouse gas emission and Global warming potential as	The AWD and
	influence by water management during Boro rice cultivation	irrigation suspension
		AWD (ISAWD)
		system significantly
		reduced about 66-
		08% of total GWP and $43.63\%$ of GHG
		intensity than
		continuous flooding
		because of reducing
		CH <sub>4</sub> emission rates.

Sl. no.	Research Progress	Expected output
5	Design and development of fertilizer deep placement mechanism for existing rice transplanter	Significant difference of grain yield and GWP among the
		mechanical transplanting and top
		and mechanical transplanting along
		with mixed fertilizer deep placement from
		rice soil in Kushtia and Gazipur
		use efficiency was
		mechanical transplanter with
		mixed fertilizer.
6	Performance of grain yield and emission under newly rice verities at Sylhet regions.	Long duration BRRI dhan89 and BRRI
		dhan92 showed significantly higher
		grain yield (8.5-9.5 t
		ha <sup>-1</sup> ) than BRRI
		dhan29. BRRI dhan89 and BRRI
		dhan92 also reduced
		about 7-10% CH <sub>4</sub>
		emission than BRRI dhan29.
7	Effect of planting time on growth and yield of some BRRI released Boro varieties	The results showed that irrespective of
		variety and sowing
		time BRRI dhan74
		gave highest yield $(0.54 \text{ t} \text{ hg}^{-1})$ in solving
		time of 10 December
		with 140 days growth
		duration. Besides this
		BRRI dhan28 and
		gave highest vield
		$(8.18 \text{ and } 8.49 \text{ t ha}^{-1})$
		in the sowing time of
		10 December
		dhan29. BRRI
		dhan67, BRRI
		dhan84 and BRRI
		dhan89 gave

Sl. no.	Research Progress	Expected output
		maximum yield when seeded in 1 <sup>st</sup> November where maximum growth duration occurred. BRRI dhan58 gave highest yield in sowing time of 1 <sup>st</sup> December.
8	Seedling raising techniques through polythene covering	Weather report showed that the mean maximum and minimum temperature during the experiment period was 24.4°C and 13.44 °C respectively that means there is such cold period happening during this experimental time. As a result no covering treatment gave good seedling with a highest seedling strength value is 4.56 mg cm <sup>-1</sup> . So this experiment will repeat in next boro season.
	Seed production	
1	Truthfully labeled and Breeders Seed production	About 17 tons truthfully labeled seeds were distributed to the stakeholders from previous year's produce and more than 20 tons produced during the reporting year. About 27 tons breeders seeds were also produced and sent to the Genetic Resource and Seed Division.
	Technology transfer	
1	Technology transfer and seed dissemination	The station conducted one special workshop

Sl. no.	Research Progress	Expected output
		for high officials of
		MoA, DAE and
		NARS Institutes. It
		has also trained 400
		farmers and DAE
		personnel of Sylhet
		Region on rice
		production
		technology for
		submergence and
		cold environment
	<b>Regional Station, Rangpur</b>	
	Program area Varietal Development	
1.	Development of rice varieties suitable for Rangpur region	Thirty one single
		crosses were made
		and six $F_1$ 's were
		confirmed. 6000
		progenies from four
		F <sub>3</sub> and twenty F <sub>5</sub>
		generations were
		advanced through
		field RGA nurseries
2.	Breeding for Second Generation Rice (SGR)	In total 250 plants and
		four fixed genotypes
		were selected from
		observational yield
		trial (OYT) with
		modified plant
		architecture
	Crop-Soil-Water Management	
1.	Long term missing element trial at BRRI regional station	N is the most limiting
	Rangpur	nutrient for rice
		growth and vield
		followed by
		nhosnhorus
		potassium and
		sulphur irrespective
		of seasons.
	Regional Station Kushtia	
1.	Project I: Vareital Development	
	<b>1.1 Title:</b> Regional Yield Trial Aus 2020	BR9830-53-3-5-2
	(Including 3 entries against 2 standard checks)	was found the highest
	Progress: Trail completed	vielder
	<b>Duration:</b> One season (T Aus $2020$ )	yicidoi
	<b>Duration.</b> One season (1. Aus 2020)	

Sl. no.	Research Progress	Expected output
	<ul> <li>1.2 Title: Regional Yield Trial (RYT-1, 2), Special Yield Trial (RLR-1, 2) T. Aman, 2020 (Including 8 varieties)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	The entry SP02, SP06 and SP05 performed better (5.78, 5.69 and 5.60t/ha) in on farm (Baradi farm, Kushtia) and SP02, SP06 and SP05 performed better (5.78, 5.69 and 5.60t/ha) in on Station
	1 3 Title: Pagional Vield Trial (DVT 2) DI D 2 T Amon 2020	(BRRI farm, Kushtia)
	<ul> <li>I.S Title: Regional Yield Trial (RY1-3) RLR-3 T. Aman, 2020 (Including 7 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	Ine tested lines IR98386-B-B-B- 33 yielded significantly higher than check variety BRRI dhan87 (5.59t/ha)
	<ul> <li>1.4 Title: Regional Yield Trial (RYT-4) RLR-4 T. Aman, 2020 (Including 7 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	All the tested lines yielded lower than check variety BRRI dhan87 and BRRI dhan49 except BR9840-52-1-2-1 (5.96 t/ha) with shorter growth duration.
	<b>1.5 Title:</b> Regional Yield Trial (RYT-5), Zinc Enriched Rice (ZER-1), T. Aman, 2020 (Including 2 entries against 3 standard checks)	Among the tested two lines, IR101757-146-
	<b>Progress:</b> Trail completed <b>Duration:</b> One season (T. Aman 2020)	higher (5.85 t/ha) than Zinc enriched check variety BRRI dhan72 (5.63 t/ha)
	<ul> <li>1.6 Title: Regional Yield Trial (RYT-6), Zinc Enriched Rice (ZER-2), T. Aman, 2020 (Including 2 entries against 3 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	None of the tested lines yielded higher than check varieties and BRRI dhan87 was highest yielded variety
	<ul> <li>1.7 Title: Regional Yield Trial (RYT-7), Premium Quality Rice (PQR-1) T. Aman, 2020 (Including 3 entries against 1 standard check and 1 local variety)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	All of the tested genotypes were out yielded over local and standard checks
	<b>1.8 Title:</b> Regional Yield Trial (RYT-8), Premium Quality Rice (PQR-2) T. Aman, 2020 (Including 3 entries against 1 standard check and 1 local variety)	All of the tested genotypes were out yielded over standard

Sl. no.	Research Progress	Expected output
	Progress: Trail completed	check with similar
	<b>Duration:</b> One season (T. Aman 2020)	growth duration
	<b>1.9 Title:</b> Regional Yield Trial (RYT-9) for Disease Resistance Rice (BB), T. Aman, 2020 (Including 6 entries against 2 standard checks)	The standard check variety BRRI dhan87 performed better
	<b>Duration:</b> One season (T. Aman 2020)	(4.90 t/ha) than the all tested lines.
	<b>1.10 Title:</b> Regional Yield Trial, Insect Resistant Rice (IRR-1), T. Aman, 2020 (Including 13 entries against 3 standard checks)	None of the tested genotypes performed
	Duration: One season (T. Aman 2020)	considering yield parameter. Actually, the result revealed a significant yield difference between the line BR9888-15- 3-7-2 (5.25 t/ha) and the check BRRI dhan49 (4.88 t/ha).
	<ul> <li>1.11 Title: Regional Yield Trial, Insect Resistant Rice (IRR-2), T. Aman, 2020 (Including 12 entries against 3 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman 2020)</li> </ul>	None of the tested genotypes appeared as promising in context of yield. The highest yield was recorded from the check variety BRRI dhan93 (5.61 t/ha)
	<ul> <li>1.12 Title: Identification and screening of prospective aerobic rice from local and BRRI developed rice varieties, Boro, 2020-21 (Including 10 entries against 1 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: Repeatedly in Boro season</li> </ul>	Among the tested lines, six lines gave higher yield than the check variety BRRI dhan92 (7.47 t/ha) and highest yield found from the line IR16L1293 (8.08 t/ha). It was observed that growth duration of all the tested lines were shorter than check variety
	<ul> <li>1.13 Title: Regional Yield Trial, Disease Resistant Rice (DRR-BB) lines, Boro,2020-21 (Including 5 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (Boro 2020-21)</li> </ul>	All of the tested genotypes were out yielded over susceptible check BRRI dhan58 and resistant check IRBB60

Sl. no.	Research Progress	Expected output
	1.14 Title: Regional Yield Trial (RYT-7), Favorable Boro Rice	All of the tested
	(FBR-MD) lines, Boro,2020-21	genotypes were
	(Including 17 entries against 3 standard checks)	outyielded over
	Progress: Trail completed	standard check BRRI
	Duration: One season (Boro 2020-21)	dhan81. Among them
		highest yield was
		found from the line
		TP30610 (8.69 t/ha).
	1.15 Title: Regional Yield Trial (RYT-7), Premium Quality	BR9930-2-3-2-2
	Rice (PQR-1) T. Aman, 2020	(6.68 t/ha) genotype
	(Including 5 entries against 3 standard checks)	performed better over
	Progress: Trail completed	standard checks
	Duration: One season (Boro 2020-21)	
	1 1( Titles Degianal Vield Triel (DVT 5) Zing Engished Diag	A many a the tested true
	( <b>7</b> ED 1) Dana 2020 21 (Including 2 antriag against 2 standard	Among the tested two
	(ZER-1), BOIO, 2020-21 (Including 5 entries against 5 standard	1111es, DK0419-0-2-1-
	Due much Trail complete l	4-1-3-8-3 Outyleided
	Progress: I rail completed	(7.54 t/na) than all the
	<b>Duration:</b> One season (Boro 2020-21)	DDDL dlaw 74 DDDL
		BKKI dnan/4, BKKI
		dhan84 and BKKI
	1 17 Titles Designal Vield Maximization Trial (DVMT) Dage	Doth tosted advanced
	<b>1.17 The:</b> Regional Yield Maximization That (KYMT), Boro, 2020 21 (Including 2 antriag account 2 atom dand checks)	Boin lested advanced
	2020-21 (including 5 entries against 5 standard checks)	lower than sheek
	Puration: One season (Dere 2020 21)	DDDI dhan62 (7.80
	Duration. One season (Doro 2020-21)	$t/h_2$ ) BRH11 0 11 /
		5B HB3 would be a
		promising line
		through mitigating
		less number of
		unfilled grains at
		bottom of the panicle
	1.18 Title: Regional Yield Trial Barishal-1 Boro 2020-2021	Most of the tested
	-Including 6 entries against 2 standard checks	genotypes found
	Progress: Trail completed	higher vielder than
	Duration: One season (Boro 2020-21)	both checks BRRI
		dhan 58 $(7.35 \text{ t/ha})$
		and BRRI dhan97
		(7.49) t/ha. BRBa2-1-
		3 was the highest
		vielder (7.82 t/ha)
		among lines.
<u> </u>	<b>1.19 Title:</b> Regional Yield Trial. Barishal-2. Boro. 2020-2021	The tested genotypes
	-Including 7 entries against 2 standard checks	appeared as verv
	Progress: Trail completed	promising materials
	<b>Duration:</b> One season (Boro 2020-21)	IR12A329 outvielded
		(7.92  t/ha) (with
		satisfactory panicle
		per meter square

Sl. no.	Research Progress	Expected output
		(278) and grains per
		panicle (116)) both
		checks BRRI dhan58
		and BRRI dhan92
		(7.08 and 7.42 t/ha,
		respectively)
	1.20 Title: Regional yield trial (RYT), Cumilla-1, Boro, 2020-	BRC366-2-2-4-2-1
	21	genotype performed
	-Including 6 entries against 3 standard checks	exceptional yield
	Progress: Trail completed	(7.04 t/ha) compared
	Duration: One season (Boro 2020-21)	to all genotypes and
		check varieties.
		BRC366-2-2-4-2-1
		genotype would be a
		promising line.
	<b>1.21 Title:</b> Regional yield trial (RYT), Cumilla-2, Boro, 2020-	BRC335-1-3-2-2-1
	21	genotype performed
	-Including 7 entries against 3 standard checks	exceptional vield
	Progress: Trail completed	(8.08 t/ha) compared
	<b>Duration:</b> One season (Boro 2020-21)	to all genotypes and
		check varieties
	<b>1.22 Title:</b> Regional yield trial (RYT) GSR, Boro 2020-21	FBR350 genotype
	-Including 5 entries against 2 standard checks	performed
	Progress: Trail completed	exceptional vield
	Duration: One season (Boro 2020-21)	(7.68 t/ha) compared
		to all genotypes and
		check varieties
	1 23 Title: Multi Location Trial Blast Boro 2020-2021	Among the tested
	(Including 11 entries against 1 standard checks)	genotypes total five
	Progress: Trail completed	number of promising
	<b>Duration:</b> One season (Boro 2020-21)	lines vielded more
	Duration. One season (Doro 2020-21)	then 7.0 t/he Most of
		the others also
		outvielded check
		BPDI dhan 28 (6.52
		$t/h_2$
2	Project II: Technology Transfer	<i>t</i> /II <i>a</i> ).
2.	Troject II. Technology Transier	
	2.1 Title: ALART for Favorable Environment (FE), T. Aus,	BR9006-40-2-3-1
	2020	was found the highest
	(Including 2 entries against 2 standard checks)	yielder
	Progress: Trail completed	
	Duration: One season (T. Aus, 2020)	
	2.2	The four advanced
	Title: ALART for Insect Resistant Rice (IRR_RDH) T	breeding lines vielded
	Aman 2020 (Including 3 entries against 2 standard sheets)	higher than both of
	Progress: Trail completed	the checks <b>DD</b> I
	<b>Duration:</b> One season $(T, Amon, 2020)$	dhop02 and T274
	Dui aton. One season (1. Annan, 2020)	(4.57  t/ha) and $1.04$
		(4.3/ Vna and 1.04

Sl. no.	Research Progress	Expected output
		t/ha, respectively). BR9881-24-2-2-25 was found the highest vielder
	<ul> <li>2.3 Title: ALART Rainfed Lowland Rice (RLR), T. Aman, 2020 (Including 2 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (T. Aman, 2020)</li> <li>2.4 Title: ALART Zinc Enriched Rice (ZER), T. Aman, 2020</li> </ul>	None of the tested lines performed better than checks BRRI dhan49 and BRRI dhan87 (5.73 t/ha and 6.3 t/ha, respectively) The advanced
	(Including 1 entries against 2 standard checks) <b>Progress:</b> Trail completed <b>Duration:</b> One season (T. Aman, 2020)	genotypes yielded (6.09 t/ha) very similar to BRRI dhan87 (6.06 t/ha)
	<ul> <li>2.5 Title: ALART Zinc Enriched Rice (ZER), Boro, 2020-21 (Including 2 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (Boro, 2020-21)</li> </ul>	None of the tested advanced genotypes performed better than both checks BRRI dhan74 and BRRI dhan89 (8.04 t/ha & 8.97 t/ha, respectively). Advanced breeding lines IR225837-8-95- 2-1 yielded higher (7.37 t/ha) than another one BR8912- 12-6-1-1-1 (7.15 t/ha).
	<ul> <li>2.6 Title: ALART Premium Quality Rice (PQR), Boro, 2020-21</li> <li>(Including 1 entries against 3 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (Boro, 2020-21)</li> </ul>	BR8526-38-2-1-HR1 yielded higher (6.82 t/ha) than only check BRRI dhan81
	<ul> <li>2.7 Title: ALART Favorable Boro Rice-Bhanga (FBR-Bhanga), Boro,2020-21 (Including 2 entries against 2 standard checks)</li> <li>Progress: Trail completed</li> <li>Duration: One season (Boro, 2020-21)</li> </ul>	SVIN076-BORO-18- BHANGA yielded higher (7.31 t/ha) than check BRRI dhan29. But the highest yielder was BRRI dhan89
3.	Project III: Socio Economic	
	<ul> <li><b>3.1 Title:</b> Stability analysis of BRRI varieties, T. Aman, 2020 (Including 46 varieties)</li> <li><b>Progress:</b> Trail completed</li> <li><b>Duration:</b> Repeatedly in T. Aman season</li> </ul>	In T. Aman, 2020 trial, among medium duration varieties the highest yielder was BRRI dhan94 (5.3

Sl. no.	Research Progress	Expected output
		t/ha) and the lowest
		was BRRI dhan70
		(3.45 t/ha). Among
		long duration
		varieties the highest
		yielder was BRRI
		dhan41 (5.38 t/ha)
		and the lowest was
		BRRI dhan91 (2.47
		t/ha). Among short
		duration varieties the
		highest vielder was
		BRRI dhan87 (5.39
		t/ha) and the lowest
		was BRRI dhan57
		(3.78 t/ha).
	<b>3.2 Title:</b> Stability analysis of BRRI varieties. Boro. 2020-21	In Boro 2020-2021.
	(Including 46 varieties)	among 21 short
	Progress: Trail completed	duration varieties the
	<b>Duration:</b> Repeatedly in Boro season	highest vield was
	1 5	obtained by BRRI
		Hybrid dhan2 (8.32
		t/ha) and the lowest
		by BRRI dhan36
		(5.53 t/ha). Among 25
		long duration
		varieties the highest
		vield was obtained by
		BRRI dhan89 (7.79
		t/ha) and the lowest
		by BR17 (3.08 t/ha).
4.	Project IV: Rice Farming Systems	, , ,
		A 1
	4.1 Inte: Yield response of rice to different rates of Nitrogen	A very clear
	and Polassium letunzer in Boro-Fallow 1. Aman cropping	interaction effect of N
	pattern in Kushtia	and K on BKRI
	Progress: On-going	from the experiment
	Duration: 5 years	in T Amon 2020
		111 1. Annali 2020
		The highest yield
		(6.81  t/ha) was
		recorded from the plot
		which was treated
		with Urea@STR
		20% less and
		$M_0 P @STR + 30\%$
		additional
5	Project V: Cron-Soil-Water Management	
	rejeer () or op oon () and manufolitent	

Sl. no.	Research Progress	Expected output
	5.1 Title: Effect of polythene covering on seedling raising in	Actually, during the
	Boro season, 2020-2021 (BRRI dhan81 was used for this	seedbed period in
	experiment)	Kushtia favorable
	Progress: Completed	Boro environment
	Duration: One Season, Boro,2020-21	had been existed.
		That's why the main
		purpose of the
		experiment remains
		to uncover for this
		year. Though the best
		seedling strength
		(0.08) was found
		from the treatment
		T5. And the highest
		yield (5.49 t/ha) was
		recorded from the
		control plot.
	5.1 Title: Evaluation of drought tolerance ability of newly	Due to huge rainfall
	released BRRI variety (Aman) in drought prone area (BRRI	throughout the
	dhan/1 was used for this experiment)	growing period, there
	Progress: Completed	was no significant
	Duration: One Season, Boro, 2020-21	difference of
		irrigation
		management in any
		treatment. All the
		gives almost similar
		gives annost similar
		AWD 15 cm and rain
		fed condition
	5.2 Title: Determining minimum irrigation water requirement	In Aus 2020 season
	of rice at different regions of Bangladesh through water balance	due to huge rainfall
	from on-farm demand and model simulation.	throughout the
	Progress: Completed	growing period, there
	Duration: 2 years	was no need to apply
		irrigation in any
		treatment. In T. Aman
		2020 season, both
		AWD and model
		prediction treatment
		saved irrigation
		compared to
		continuous standing
		water treatment.
		Yields were
		statistically similar in
		all treatments. During
		Boro 2020-21, the
		experiment received
		no rainfall water. The

Sl. no.	Research Progress	Expected output
		yields were varied
		greatly in different
		treatment. Irrigation
		scheduling by
		CROPWAT model
		might be a potential
		approach to save
		irrigation water, but
		still needed in depth
		evaluation in terms of
	5.2 Tilles Treastreautories reinfall groups imigation anglish and	yields.
	<b>5.5 The:</b> I reatment wise rainial amount, irrigation applied and	Growin duration
	average yield in different seasons 2020-2021, Kushtia (BKRI dhen06 was used for this experiment)	reduces gradually
	<b>Brogrossi On</b> going	transplanting datas
	Duration: 2 years	which causes force
	Duration. 2 years	maturity On all
		irrigation
		management as
		growth duration
		reduces vield also
		reduces, Highest vield
		showed at T1
		(Transplanted on 20
		January). In terms of
		transplanting date
		transplanted at 20
		January gives highest
		yield. In terms
		interaction,
		transplanted at 20
		January (T1) with
		Continuous Irrigation
		(I <sub>1</sub> ) and transplanted
		at 20 January (T1)
		with Irrigation when
		water level goes 15
		cm below ground
		surface in PVC pipe
		(I2) gives best result.
	BRRI Regional Station, Gopalganj	
1.	Project I:	
	<b>1.1Title:</b> Collection of local rice landraces from Gopalgani.	
	Narail and Bagerhat District	
	<b>Progress:</b> A total of 30 landraces has been collected	Collected germplasm
	Duration: 3 years	conserved safely in
		Genebank

Sl. no.	Research Progress	Expected output
	1.2 Title: Characterization of local rice landraces from	
	Faridpur region	
	Progress: Characterization of 34 local rice landraces has been	Data generated
	completed.	through
	<b>Duration:</b> 3 years	morphological
		characterization
		would be helpful in
		future- breeding
		programme and to
		establish IPR of
		Bangladehi rice
		germplasm
	1 3 Title: Breeder good production	
	<b>Progress:</b> A total of 1.6 ton breeder seed (BRRI dhan87) were	
	produced in T Aman 2021	
	Duration: 5 years	
	DDDL Degional Station Codeking	
	BKRI, Regional Station, Satknira	
1.	Programme area I:	
	1 1 Title: Variatal Development Program (VDP)	Selected lines could
	<b>Progress:</b> In T. Aman 2020 under regional yield trial (RVT)	be used for further
	for POR the entries BR8493-3-5-1-P1 BR9590-45-1-3-2-P2	advancement
	BR9054-6-1-2-3 and BR9844-7-4-1-2-4-2 better over the	
	checks Kalizira and Binadhan-13. In RYT for IRR, the entries	The tested lines
	BR10039-19-4-5 and BR10039-21-4-3 performed better over	might be released as
	the checks. In RYT for bacterial blight resistant rice, BR10397-	variety
	3-2-1-1 and BR10397-3-2-1-3 performed better over the check	variety.
	BRRI dhan49. In RYT for saline tolerant rice, the entries	
	HHZ8-SAL14-SAL3-Y2, IR 87870-6-1-1-1-B, TP30649,	
	HHZ18-Y3-Y1-Y1 and IR15T1464 yielded higher than the	
	checks of BRRI dhan54, BRRI dhan73 and BRRI dhan87.	
	In Boro 202-21, under RYT for Barishal-1, the entries BRBa2-	
	1-3 and BRBa2-5-3 performed better over the check variety	
	BRRI dhan58 and in RYT for Barishal-2, the entry IR12A329	
	performed better over the check variety of BRRI dhan58. In	
	RYT for Cumilla-1, BRC401-1-1-1-1B performed better over	
	the checks of BRRI dhan81 and BRRI dhan84. In case of RYT	
	for Cumilla-2, BRC428-2-2-1, BRC428-3-1-1 and BRC394-1-	
	1-1-2 performed better over BRRI dan50 and BRRI dhan58. In	
	RYT for yield maximization trial, BRH11-9-11-4-5B-HR3 and	
	BRH13-2-4-6-4B performed better over the check variety of	
	BRRI dhan63. In Boro 2020-21, under RYT for saline tolerant	
	rice 44 genotypes were evaluated and among them a total 27	

Sl. no.	Research Progress	Expected output
	genotypes were selected based on phenotype. The entries BR9620-4-3-2-2, BR9620-2-4-1-5, BR11723-4R-48, BR11712-4R-227, BR11716-4R-123, BR11716-4R-102 gave higher yield against their respective check varieties.	
	In T. Aman 2020, none of the tested entries performed better against their respective check varieties in ALARTs for RLR, IRR and ZER. In Boro 202-21, under ALART for FBR-Bhanga, the entry SVINO63-Boro-18-Bhanga gave higher yield than the checks BRRI dhan29 and BRRI dhan89. In ALART for BBRR- Bio, both the tested entries gave similar yields to their respective check. <b>Duration:</b> Year-round	
2.	Programme area II:	
	<ul> <li>2.1 Title: Crop-Soil-Water Management</li> <li>Progress: Nitrogen is the most critical yield limiting nutrient and balanced fertilizer application needed for getting maximum yield as well as maintain soil health.</li> <li>Combined application of ash and manure (1:1) @ 5 t ha<sup>-1</sup> + 70% BRRI recommended fertilizer (RF) could be a good fertilizer management option for increasing rice yield in saline soil. However, in another study, application of increased N (20%) and K (60%) from the recommended dose of N (124 kg ha<sup>-1</sup>) and K (60 kg ha<sup>-1</sup>) increased rice yield in saline soil. Foliar application of Flora did not show any yield advantage on BRRI dhan92 at Satkhira.</li> <li>Duration: Year-round</li> </ul>	Productivity and profitability of the farmers will be increased.
3.	Programme area III:	
	<ul> <li>3.1 Title: Socio Economic and Policy</li> <li>Progress: In T. Aman, BRRI hybrid dhan6, BR11 and BRRI dhan54 and in Boro season, BRRI hybrid dhan2, BRRI hybrid dhan5, BR8, BRRI dghn29, BRRI dhan47, BRRI dhan58, BRRI dhan69, BRRI dhan89 and BRRI dhan97 appeared as good yielder in stability analysis at BRRI farm, Satkhira.</li> <li>BRRI hybrid released hybrid rice varieties performed better than the company hybrid rice varieties at Assasuni, Satkhira district in Boro 2020-21 season.</li> <li>Duration: Year-round</li> </ul>	Dissemination of newly released BRRI varieties and rice production technologies.
4.	Programme area IV:	
	<b>4.1 Title: Technology Transfer</b> <b>Progress:</b> In T. Aus 2020, BRRI dhan48 performed better over the other Aus varieties and under water stagnant condition,	Productivity and profitability of the

Sl. no.	Research Progress	Expected output
	BR23 gave the highest yield followed by BR10, BRRI dhan30, BRRI dhan79 and BRRI dhan49, respectively.	farmers will be increased
	Under head-to-head trial, in T. Aman 2020, for coastal ecosystem BRRI dhan73 and BRRI dhan78 performed better and in RLR long duration, BRRI dhan95 gave the highest yield followed by BRRI dhan94 and BRRI dhan80. In Boro 2020-21, under HHAT for coastal ecosystem, RLR long duration and RLR short duration BRRI dhan67, BRRI dhan92 and BRRI dhan88 gave the highest yield. <b>Duration:</b> Year-round	
5.	Project II:	
	<ul> <li>5.1 Title: Breeder and Truthfully Labelled Seed Production Progress: A total of 26.57 tons of breeder seed of different T. Aman and Boro rice varieties were produced and sent to the GRS division. In addition, 21.93 tons of truthfully labelled seed of different Aus, Aman and Boro rice varieties were produced, stored, sold and distributed to the farmers, NGOs and DAE as well.</li> <li>Duration: Year-round</li> </ul>	Production of breeder seed to meet up the demand of BRRI HQ. Dissemination of newly released BRRI varieties and rice production technologies.
	<b>Regional Station, Bhanga, Faridpur</b>	
1.	Project I: Varietal development	
	<ul> <li>1.1 Title: Breeding for developing high yielding Transplanted Aman rice varieties (Hybridization)</li> <li>Progress: In <i>Aman</i> 2020 season, 12 crosses were made and 586 F<sub>1</sub>seeds were produced for developing high yielding transplanting <i>Aman</i> rice varieties with desirable characters with emphasis on water stagnation tolerance, anaerobic tillering, earliness, and good grain quality.</li> <li>Duration: July - December</li> </ul>	Desirable genotypes with high yield potential and acceptable grain quality will be developed.
	<b>1.2 Title:</b> Breeding for developing high yielding shallow	
	<ul> <li>Progress: 15 crosses were made and 706 F<sub>1</sub> seeds were produced with desirable characters with emphasis on kneeing ability, nodal tillering, earliness and awnless good grain quality.</li> <li>Duration: July - December</li> </ul>	Breeding population with suitable traits of deepwater Aman rice will be developed.
Sl. no.	Research Progress	Expected output
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	1.3 Title: Breeding for developing high yielding Aus rice	
	varieties (Hybridization)	Breeding population
	<b>Progress:</b> 10 crosses were made and 402 F <sub>1</sub> seeds were	with heat tolerance,
	produced with desirable characters with emphasis on heat	short duration and
	tolerance, short growth duration and awnless good grain quality.	good grain properties
	Duration: April July	be developed.
	Duration. April - July	
	1 4 Titles Eigld Danid Compartian Advance (EDCA)	
	<b>D D D D D D D D D D</b>	
	<b>Progress:</b> In Boro 2020-21, 2930 plants were grown in $F_6$	
	generation in Field RGA condition followed by single seed	Rapid advancement
	descent (SSD) targeting to develop high yielding Boro varieties	of segregating
	and 2671 F <sub>6</sub> progenies were maintained by collecting single	population for
	panicle from each plant.	shortening the
	Duration: November - June	breeding cycle.
	<b>1.5 The:</b> Breeding for developing high yielding fice varieties	with higher yield
	for single Boro cropping pattern (Hybridization)	potential, tall plant
	Progress: In Boro 2020-21 season, 15 crosses were made and	along with earliness and acceptable grain
	500 F <sub>1</sub> seeds were produced for developing high yielding <i>Boro</i>	quality will be
	rice varieties with good grain quality	developed for single Boro cropping pattern
	Duration: November - June	of Faridpur region.
	<b>1.6 Title:</b> Collection and conservation of local Aus, Aman,	Local Aus, Aman,
	Boro and Deep water rice (DWR) germplasm (On going)	Boro and Deep water rice (DWR)
	Progress: Around 50 Aus rice germplasm were collected from	germplasm collected
	different locations of Faridpur.	also preserved in the
	Duration: January - December	BRRÎ gene Bank.
	17 Titles Champtonization of Deer water rise (DWD)	Diag comparing we'll
	1.7 The: Characterization of Deep water rice (DWK)	be characterized and
	germplasm	evaluated as per
		BRRI prescribed
		descriptor and UPOV

Sl. no.	Research Progress	Expected output
	<b>Progress:</b> From the qualitative and quantitative	convention for
	characterization results, it revealed that wide diversity existed	biopiracy.
	in the DWR rice germplasm and the germplasm having higher	
	yield would be utilized in a crossing program, if other characters	
	satisfy the breeder's objectives.	
	Duration: July - December	
2.	Project II: Farming Systems Research	
	2.1 Title: Introduction of intercropping system in different	
	farmer led cropping pattern for medium high land area in	System productivity
	Faridpur region. (On going)	will be increased
	Progress: Onion+Pumpkin-Jute-T. Aman cropping pattern	the cropping intensity
	gave higher rice equivalent yield (REY) (25.2 t ha <sup>-1</sup> yr <sup>-1</sup> against	and in Faridpur region
	existing cropping pattern (23.2 t ha <sup>-1</sup> yr <sup>-1</sup> ). Higher rice equivalent	
	yield was obtained in alternate cropping pattern due to	
	introduction of new crop (Pumpkin) and varieties. REY was	
	found to increase 8.62% over existing cropping sequence.	
	Farmer's cropping pattern onion-jute-T. Aman required in an	
	average 297 days field duration and alternate cropping pattern	
	Potato+Maize-Jute-T. Aman required 335 days (excluding	
	seeding age of rice) to complete the cycle. BCR, OER and NIFR	
	of improved cropping pattern is 2.92, 34.28 and 65.72 where	
	2.86, 35.2, 64.98 in existing cropping pattern respectively.	
	Duration: Year round	
	<b>2.2 Title:</b> Validation of improved fertilizer management option	
	in Aman rice relayed with jute at farmers field in shallow	
	flooded area	Improved fertilizer
	Progress: In validation of improved fertilizer management	management option at
	option in Aman rice relayed with jute at farmers field in shallow	farmers' field will be
	flooded area, highest yield (4.68 tha-1) was obtained from	validated and fine-
	researcher fertilizer management practice (Fertilizer rate (Urea-	tuned.

Sl. no.	Research Progress	Expected output
	TSP-MP-Gypsum-Zinc): 225-105-90-135-7.5 kg/ha through	
	top dressing at weeding time than farmer practice	
	Duration: July - December	
3.	Project III: Crop-soil-water management	
	<b>3.1 Title:</b> Effect of polythene covering on seedling raising in	The most suitable
	Boro season, 2020-2021	protecting Boro rice
	<b>Progress:</b> Considering all the treatments we found the highest	seedling from cold
	shoot height (49.22 cm), shoot weight (2.35 g), root weight	injury will be identified.
	(0.98 g), mortality rate (421) with lowest growth duration (146	
	days) in treatment 5 (T <sub>5</sub> ): Polythene covering for all time with	
	round shape opening (20 cm diameter) at both end of the	
	seedbed cover). We also observed the highest root length (19.45	
	cm) and leaf number (6) in T6: No polythene covering/ Control	
	and T <sub>3</sub> : Polythene covering from 11.0 am to sun set respectively	
	but the lowest value was observed for both root length (11.41)	
	and leaf number (4) in $T_1$ (Table 22). Thus treatment 5 ( $T_5$ )	
	found suitable technique for protecting Boro rice seedling from	
	cold injury.	
	Duration: July - December	
	<b>3.2 Title:</b> Effects of planting time on Aus rice in Charland area	
	of Faridpur, Bangladesh (On going)	Planting time will be
	<b>Progress:</b> From the first year result, we found that in treatment	To adjusted for escaping the crop
	2 (15 April) BRRI dhan83 and BRRI dhan82 gave the	from the flood.
	maximum yield 4.66 tha <sup>-1</sup> and 4.29 tha <sup>-1</sup> with 104 days and 107	
	days growth duration. Porangi and Kalo Saitta gave 2.72 tha <sup>-1</sup>	
	and 2.52 tha <sup>-1</sup> grain yield with 80 days and 77 days growth	
	duration. If seed are sown after 15 April, there would be a risk	
	of flood.	
	Duration: April - July	
4.	Project IV: Technology transfer	
	4.1 Title: Dissemination of newly released BRRI varieties in	
	Aus T Aman and Boro seasons in greater Faridpur region	Newly released BRRI
1	rus, i rinar and Doro seasons in greater i anapar region	The willy released Britti

Sl. no.	Research Progress	Expected output
	Progress: BRRI Regional Station, Bhanga implemented 200	demonstrated in the
	demonstration and 6 farmer field day of newly released modern	farmers' fields to
	rice varieties across Faridpur, Shariatpur and Madaripur and	disseminate and
	Rajbari district during 2020-21.	gaining popularity.
	BRRI Regional Station, Bhanga, Faridpur also conducted 24	
	training programmes where 770 participants consisting of	
	farmers, DAE personnel and mechanics of greater Faridpur	
	region took part in the training on 'modern rice production	
	technologies; and farm machineries operation and maintenance	
	with the cooperation of DAE under the financial assistance of	
	GOB, SMPRA-BRRI and BRRI-SPIRA project.	
	Duration: Year round	
	Regional Station, Sirajganj	
1.	Programme area I: Crop-Soil-Water Management	Reduction of regional problems for the better management of rice crop.
	<b>1.1 Title:</b> Performance of different organic manure for the	<b>.</b>
	amendment of Char land soil.	Increasing organic matter and water
	<b>Duration:</b> Year round	holding capacity in char land soil.
	<ul> <li>1.2 Title: Improving soil water availability for crop production in char land by amendment practices.</li> <li>Progress: Second year ongoing</li> <li>Duration: Year round</li> </ul>	Improving the physical properties (texture) of Char land soil
	<ul> <li>1.3 Title: Effect of biochar on rice yield and soil health on problem soils</li> <li>Progress: Third year ongoing</li> <li>Duration: Year round</li> </ul>	Observing the effect of biochar on rice yield and nutrient use efficiency in problem
	<ul> <li>1.4 Title: Response of latest BRRI varieties in Char land areas of Sirajganj.</li> <li>Progress: First year ongoing</li> <li>Duration: Year round</li> </ul>	Adaptation of newly released BRRI varieties in char land areas.
	<ul><li><b>1.5 Title:</b> Effect of transplanting date and spacing on the yield of different short duration rice varieties.</li><li><b>Progress:</b> Second year ongoing</li></ul>	Finding suitable transplanting date of short duration rice

Sl. no.	Research Progress	Expected output
	Duration: Year round	variety in terms of
		maximum benefit.
2.	Programme area II: Pest Management	Determining the
		incidence and
		abundance patterns of
		rice insect pests and
		their natural enemies
		in Bogura region for
		better management.
	2.1 Title: Insect pests and natural enemies in light trap.	Observing the
	Progress: Ongoing	incidence patterns of
	Duration: Year round	rice pest and their
		natural enemy in rice
		fields to develop a
		Interesting system.
	<b>2.2 Title:</b> Study on entomogenous rungi to control BPH.	Identifying the
	Progress: Third year ongoing	infection mechanism
	<b>Duration:</b> Year round	of entomogenous
	<b>7.3 Title:</b> Evaluation of RDH NII s under selected botcoats of	Tuligi oli dr fi.
	2.5 The. Evaluation of BTH WES under selected hotspots of Bangladesh	
	Progress: Second year ongoing	Identifying BPH
	Duration: Vear round	resistant lines under
	Duration. Tear found	field conditions
	2.4 Title: Establishment of prevention network for migratory	Exploring and sharing
	pests in Asian region	the real-time
	Progress: Second year ongoing	occurrence
	Duration: Year round	information to
		AMIVS for optimum
		timing to control of
		RPH (BPH, WBPH
		and SBPH)
	BRRI Regional Station, Rajshahi	
	1.0 Programme Area: Crop Soil Water Management	
	Title: 1.0 Response of T. Aman and Boro rice to applied	To create database
	nutrients in Barind tract and calcareous soil	and to make fertilizer
		recommendation for
	Progress: The calculated rate of N that maximizes the yield of	AEZ basis
	BRRI dhan87 (Aman rice) was around 96 kg/ha for AEZ 26 and	
	AEZ 11 while it was 150 kg/ha for AEZ 26 and 125 kg/ha for	
	AEZ11 in case of BRRI dhan81 (Boro rice). The calculated rate	
	of P that maximizes the vield of BRRI dhan87 was around 21.8	
	kg/ha for AEZ26 and AEZ11 while it was 30 kg/ha for AEZ26	
	and 20 kg/ha for AE711 in ange of DDDI dhen01 The	
	and 20 kg/ha for ALZII in case of DKKI unanol. The	
	calculated rate of K that maximizes the yield of BRRI dhan87	
	was 98.7 kg/ha for AEZ26 and 91.9 kg/ha for AEZ11.	

Sl. no.	Research Progress	Expected output
	Potassium rates for BRRI dhan81 were found enough 125 kg/ha	
	for AEZ26 and 75 kg/ha for AEZ11.	
	The calculated rate of Zn that maximizes the yield of BRRI	
	dhan87 was 1.3 kg/ha for both AEZ26 and AEZ11. Zinc rates	
	for BRRI dhan81 were found enough 2.0 kg/ha for AEZ26 and	
	1.5 kg/ha for AEZ11. The calculated rate of B that maximizes	
	the vield of BRRI dhan87 was 1.25 kg/ha for both the AEZ26	
	and AEZ11. Boron rates for BRRI dhan81 were found enough	
	1.5 kg/hafor both AEZ26 and AEZ11. The suitable combination	
	of N and K for BRRI dhan49 was 50 kg N and 40 kg K/ha. On	
	the other hand, this combination for BRRI dhan29 was 150 kg	
	N and 40 kg K/ha.	
	Duration: 2020-21	
	Duration: 2020-21	
	2.0 Programme Area: Pest Management	
	Title: 2.1 Resposne of new fungicides against Sheath blight	Could be used as
	and Bacterial Blight diseases	disease control
	Progress: Six new fungicides were found effective against	enectively
	sheath blight disease in T. Aman season. Sheath blight was	
	found in higher incidence and bacterial blight was found in	
	moderate incidence in Rajshahi region.	
	Duration: 2020-21	
	Title: 2.2 Effect of selected insecticide for stem borer	Could be used as
	management	effectively
	<b>Progress:</b> Fipronil 50SC and Cartap 50SC were found as most	enteenvery
	effective insecticide against stem borer control.	
	Duration: 2020-21 Title: 2.3 Species composition of stom hover in Deishahi	Can be used for
	ragion	research management
	Programs: The highest number of vallow stem herer (VSP) lange	program
	was found at Paba while the highest number of dark headed horer	
	larvae was found at BRRI RS, Rajshahi. The highest number of dark	
	headed borer larvae were also found in Tanore Upazila.	
	3.0 Programme Area: Variety Development Program (VDP)	
	Title: 3.1 Regional Yield Trial (RYT), T. Aus 2020-21	Better genotypes
	Progress: In Aus, one entry (BR9830-53-3-5-2) out of 18	could be used for
	appeared promising against BRRI dhan48	and some lines may
	<b>Duration:</b> 2020-21	be released as variety.
	Title: 3.2 Observational Yield Trial (OYT), T. Aus 2020-21	Better genotypes
	Progress: In OYT Aus, the genotype IR99853-B-B-B-509 gave	could be used for
	significantly higher grain yield but 20 days longer growth	turther advancement
	duration than the check BRRI dhan48.	be released as variety
	<b>Duration:</b> 2020-21	be released as variety.

Sl. no.	Research Progress	Expected output
	Title: 3.3 Hybridization, T. Aman 2020-21	Better genotypes
	Progress: In hybridization program of T. Aman, a total of 2297	could be used for
	F1 seeds were produced from 32 crosses.	further advancement
		be released as variety
	Title: 3.4 Regional Yield Trial (RYT), T. Aman 2020-21	Better genotypes
	<b>Progress:</b> Eleven RYTs were conducted in T. Aman in which a	could be used for
	total of 60 breeding lines were evaluated and 6 entries found	further advancement
	promising for further advancement.	and some lines may
	<b>Duration:</b> 2020-21	be released as variety.
	Title: 3.5 Aggri Network Trials for Favourable	Better genotypes
	Environment, IRRI-Irrigated rice breeding program, OYT,	could be used for
	T. Aman 2019-20	further advancement
	Progress: In OYT, T. Aman under Aggri Network Trial, 30 out	and some lines may
	of 254 entries showed 5.0-6.1 t/ha vield with 95 days to 113	be released as variety.
	days' growth duration.	
	vielded 4.3 t/ha and 5.1 t/ha, respectively.	
	<b>Duration:</b> 2020-21	
	Title: 3.6 Evaluation of the agronomic performance of	Better genotypes
	RCP1.0 core panel under normal and stress conditions at	could be used for
	the selected test locations, OYT, T. Aman 2020-21	further advancement
	Progress: In OYT T. Aman under RCP1.0 core panel, 15	and some lines may
	genotypes were selected under stressed condition for further	be released as variety.
	trial. Out of 15 local germplasm, 7 landraces showed good field	
	performance in Aman season.	
	<b>Duration:</b> 2020-21	
	Title: 3.7 Rapid Generation Advance of Segregating	Better genotypes
	Nursuries, Boro 2020-21	could be used for
	Progress: In Rapid Generation Advance of Segregating	further advancement
	Nursuries, Boro, 34,904 individual progenies from 25 crosses	and some lines may
	were grown comprising $F_2$ , $F_3$ and $F_4$ population. Overall	be released as variety.
	recovery of the lines across the generations was 86.66%.	
	Duration: 2020-21	
	Title: 3.8 Regional Yield Trial (RYT), Boro 2020-21	Better genotypes
	Progress: Twelve RYTs were conducted in Boro in which a	could be used for
	total of 63 breeding lines were evaluated against different	further advancement
	varieties and 12 entries found promising for further	be released as variety
	advancement.	be released as variety.
	Duration: 2020-21	
	Title: 3.9 Establisment of AGGRi Network Trials For	Better genotypes
	Favorable Environment, AYT, Boro 2020-21	could be used for
	Progress: In AYT Boro under AGGRi Network trial, the	iurther advancement
	genotype IR17A1293 performed the highest grain yield with a	be released as variety
	growth duration of 148 days.	se released as variety.
	<b>Duration:</b> 2020-21	

Title: 3.10 Observation Yield Trail (OYT) and Preliminary Yield Trial (PYT) and Advance Yield Trial (AYT) T. Aus 2020 under Transform Breeding Rice (TRB) Project Progress: Under TRB project, in OYT Aman, 6 genotypes out of 127 produced higher grain compared than check BRRI dhan87 and the genotype BR11869-5R-16 gave best performance among six entries and all checks. In PYT Aman, the genotype BR10923-4-1-1 and BR10913-21- 1-1) produced highest grain compared than three checks. In OYT Aman of estimation of breeding value of rice elite breeding pool (EBV) trial, 2 genotypes viz. IR98841-GAZ 8-1- 3-1 and Lal Swarna gave highst yield than the checks. In PYT- DTR Aman, the genotype BR10535-14-1-3-1-1 and BR10535- 5-1-3-3-1 showed better performance on grain yield. In Aman OYT insect resistant rice (BPH and GM), IRBPHN-SVIN352-18 and BR10422-1-4-1 gave significantly highest yield than BRRI dhan49. In Boro PYT#1, bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield and similar growth duration with BRRI dhan88. In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield In Boro AYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21Ether table40. Programme Area: Rice Farming Systems DivisionEther tableEther table	Sl. no.	Research Progress	Expected output
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and GM), IRBPHN-SVIN352-18 and BR10422-1-4-1 gave significantly highest yield than BRRI dhan49. In Boro PYT#1, bacterial blight (BB) tolerant rice, the genotype BR11606-4R-142 produced significantly higher grain yield and similar growth duration with BRRI dhan88. In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield. In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21Juration: 2020-21		than BRRI dhan49. In Aman AYT insect resistant rice (BPH	
significantly highest yield than BRRI dhan49.In Boro PYT#1, bacterial blight (BB) tolerant rice, the genotypeBR11606-4R-142 produced significantly higher grain yield andsimilar growth duration with BRRI dhan88.In Boro PYT#2), bacterial blight (BB) tolerant rice, thegenotype BR11607-4R-153 performed the highest grain yield.In Boro OYT, insect resistant rice (BPH), 35 out of 320 entriesproduced higher grain compared than check BRRI dhan88 andBRRI dhan89.In Boro AYT, insect resistant rice (BPH), the highest grain yieldwas produced by the genotype BR 11593-5 R-55.Ten advanced breeding lines are found as resistant materialsagainst bacterial blight in Boro season.Duration: 2020-21		and GM), IRBPHN-SVIN352-18 and BR10422-1-4-1 gave	
In Boro PYT#1, bacterial blight (BB) tolerant rice, the genotype BR11606-4R-142 produced significantly higher grain yield and similar growth duration with BRRI dhan88. In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield. In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. <b>Duration:</b> 2020-21		significantly highest yield than BRRI dhan49.	
BR11606-4R-142 produced significantly higher grain yield and similar growth duration with BRRI dhan88.       In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield.         In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89.         In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55.         Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season.         Duration: 2020-21		In Boro PYT#1, bacterial blight (BB) tolerant rice, the genotype	
<ul> <li>similar growth duration with BRRI dhan88.</li> <li>In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield.</li> <li>In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89.</li> <li>In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55.</li> <li>Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season.</li> <li>Duration: 2020-21</li> </ul>		BR11606-4R-142 produced significantly higher grain yield and	
In Boro PYT#2), bacterial blight (BB) tolerant rice, the genotype BR11607-4R-153 performed the highest grain yield. In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21		similar growth duration with BRRI dhan88.	
genotype BR11607-4R-153 performed the highest grain yield. In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21Division4.0 Programme Area: Rice Farming Systems DivisionEnded to the back block bloc		In Boro PYT#2), bacterial blight (BB) tolerant rice, the	
In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries produced higher grain compared than check BRRI dhan88 and BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. <b>Duration:</b> 2020-21 <b>4.0 Programme Area: Rice Farming Systems Division</b>		genotype BR11607-4R-153 performed the highest grain yield.	
produced higher grain compared than check BRRI dhan88 and BRRI dhan89.         In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55.         Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season.         Duration: 2020-21		In Boro OYT, insect resistant rice (BPH), 35 out of 320 entries	
BRRI dhan89. In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21 4.0 Programme Area: Rice Farming Systems Division		produced higher grain compared than check BRRI dhan88 and	
In Boro AYT, insect resistant rice (BPH), the highest grain yield was produced by the genotype BR 11593-5 R-55. Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season. Duration: 2020-21 4.0 Programme Area: Rice Farming Systems Division		BRRI dhan89.	
was produced by the genotype BR 11593-5 R-55.         Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season.         Duration: 2020-21         4.0 Programme Area: Rice Farming Systems Division		In Boro AYT, insect resistant rice (BPH), the highest grain yield	
Ten advanced breeding lines are found as resistant materials against bacterial blight in Boro season.       Duration: 2020-21         4.0 Programme Area: Rice Farming Systems Division       Image: State Stat		was produced by the genotype BR 11593-5 R-55.	
against bacterial blight in Boro season.         Duration: 2020-21         4.0 Programme Area: Rice Farming Systems Division         The back of Farming Systems Division		Ten advanced breeding lines are found as resistant materials	
Duration: 2020-21       4.0 Programme Area: Rice Farming Systems Division		against bacterial blight in Boro season.	
4.0 Programme Area: Rice Farming Systems Division		<b>Duration:</b> 2020-21	
4.0 Programme Area: Kice Farming Systems Division			
Title 41 Evaluation of eron productivity and soil health   Productivity and		4.0 rrogramme Area: Kice Farming Systems Division Title: 4.1 Evaluation of crop productivity and soil health	Productivity and
under four crops cropping patterns		under four crons cronning netterns	profitability of the
farmers will be		under four crops cropping patterns	farmers will be
<b>Progress:</b> Considering higher productivity cropping pattern increased.		<b>Progress:</b> Considering higher productivity cropping pattern	increased.
Potato/Pumpkin (relay)-T Aus-T Aman (BRRI dhan75) found		Potato/Pumpkin (relay)-T Aus-T Aman (RRRI dhan75) found	
as most promising A(Rice equivalent yield 27.8 T/ha)		as most promising A(Rice equivalent yield 27.8 T/ba)	
Duration: 2020-21		Duration: 2020-21	
Title: 4.2 Evaluation of crop productivity under four crops         Productivity         and		Title: 4.2 Evaluation of crop productivity under four crops	Productivity and
cropping patterns in farmers field profitability of the		cropping patterns in farmers field	profitability of the

Sl. no.	Research Progress	Expected output
	Progress: Two row potato/Two row Maize-T Aus (BRRI	farmers will be
	dhan82)-T. Aman (BRRI dhan75) was also found as a highly	increased.
	productive pattern (Rey 29.23 t/ha).	
	<b>Duration:</b> 2020-21	
	Title: 4.3 Evaluation of crop productivity and soil health	Productivity and
	under strip tillage system in maize-mungbean-rice cropping	profitability of the
	pattern	tarmers will be
	Progress: Considering cropping system yield, the rice	increased.
	equivalent yield (REY) remained higher in conventional rice	
	transplanting followed by strip tillage maize followed by strip	
	tillage mungbean systems.	
	Duration: 2020-21	
	Title: 4.4 Effect of time of planting on rice varieties in Boro	Time of planting of
	Season	selected variety will
	Progress: Yield performance of BRRI dhan89 remained higher	be fixed and yield will
	in early seeding (upto 15 December) while it was remained	be increased
	higher of BRRI dhan58 in late planting situation (upto 30	
	January seeding).	
	Duration: 2020-21	
	Title: 4.5 Evaluation of rice varieties in late Aus condition	Yield will be
	under Tomato-Boro-Aus systems	increased
	Progress: In late Aus condition, the highest grain yield was	
	found in BRRI dhan75 followed by BRRI dhan48 while the	
	lowest yield was recorded in BRRI dhan28.	
	Duration: 2020-21	
	Title: 4.6 Performance evaluation of Aman rice in Rajshahi	High yielding variety
	Region	will be selected and
	<b>Progress:</b> In on-station and in farmer's field, the highest grain	yield will be
	yields were found in BRRI dhan51 and the lowest yields were	Increased
	recorded in BRRI dhan87 in Aman season.	
	Duration: 2020-21	
	5.0 Programme Area: Socio-Economics and Policy	
	Title: 5.1 Stability analysis of BRRI developed Aus varieties	Stable variety will be
	<b>Progress:</b> Among the 12 varieties in Aus stability trial, BRRI	selected
	dhan82 were top in ranked followed by BRRI dhan65.	
	In Aman stability trial, BRRI dhan93 were top ranked in terms	
	of yield followed by BRRI hybrid dhan4. In Boro	
	stability trial, the highest yield was found in BRRI	
	hybrid dhan5.	
	Duration: Continued	
	6.0 Programme Area: Technology Transfer	
	Title: 6.1 Farmers training and seed distribution	Productivity and
		profitability of the
		farmers will be

Sl. no.	Research Progress	Expected output
	Progress: BRRI Regional Station, Rajshahi arranged 49	increased and food
	training programs on modern rice cultivation, farm	security will be
	mechanization, cropping pattern etc. where 1660 participants	ensured.
	were participated in the training programs.	
	Duration: Continued	
	Title: 6.2 Demonstration of BRRI released varieties	Productivity and
	Progress: Around 100 crop cut was done in Aus season and the	profitability of the
	local 76 Aus variety gave the highest vield closely followed by	farmers will be
	BRRI dhn48. A total of 149 demonstrations was established in	increased and food
	Aman season and 37 crop cut were done where the highest yield	security will be
	was found in BRRI dhan95 followed by BRRI dhan94. In Boro	ensured.
	season around 900 demonstrations were established in farmer's	
	field and 70 crop cut were done where the highest yield was	
	found in <b>PDPI</b> dhan <sup>80</sup> followed by <b>PDPI</b> dhan <sup>02</sup>	
	Duration: 2020-21	
	Title: 6.3 Head to Head Adaptive Trial Boro 2020 21	High vielding variety
	<b>Progress:</b> In Head-to-Head adaptive trial in Boro season, the	will be selected and
	highest grain yield was found in BRRI dhan81 in short duration	yield will be
	nackage while the grain yield remained higher in BRRI dhan89	increased
	in long duration package	
	Duration: 2020 21	
	BRRI Regional Station Barishal	
1.	Project I: Variety development	
	1.1.Title: Development of varieties for tidal submergence	To develop better
	Progress: Fourteen new crosses were made, and 375 F1 seeds were collected	genotypes for tidal
	to develop tidal submergence tolerant rice varieties. Twenty four crosses were	ceosystem
	confirmed and registered in the BRRI cross-list with station code BRBa125 to	
	BRBa148. A total of 657 plants were selected from Twenty one $F_5$ population	
	during 1. Aman 2020.	
	Duration: On going	
	<b>1.2.</b> Title: Development of rice varieties for favorable	To develop better
	ecosystem	genotypes for favorable
	<b>Progress:</b> A total of 26 crosses were done and 1953 $F_1$ seeds were obtained	ecosystem
	to develop high yielding Boro rice varieties during Boro 2020-21. Besides,	
	code BRBa78 to BRBa124 in T. Aman 2020. A total of 672 plant progenies	
	from 44 $F_2$ populations, 887 plant progenies from five $F_3$ populations, and	
	582 plant progenies from 5 $F_4$ populations were selected during Boro 2020-	
	21. Duration: On going	
	Dui auoii: On going	
	1.3. Title: Introgression of dense and erect panicle gene into	To develop better
	<i>indica</i> rice	genotypes with dense and
	Progress: To develop improved varieties with dense and erect panicles,	erect panicie
	2,579 plant progenies were selected from the 21 $F_4$ Populations, and 125	

Sl. no.	Research Progress	Expected output
	homogenous lines were bulked from the $F_6$ generation during T. Aman 2020. A total of 1626 plants were selected from five $F_5$ populations during Boro 2020- 21. To explore the attributes of new generation rice (NGR) in exotic populations 936 plant progenies were selected from 47 $F_3$ population during T. Aman 2020 and out of then 847 plant progenies were selected from subsequent $F_4$ generation planted during Boro 2020-21. <b>Duration:</b> On going	
2	<ul> <li>1.4. Tittle: CHARACTERIZATION AND UTILIZATION OF LOCAL GERMPLASM</li> <li>Progress: A total of 369 local Aman germplasms were grown in six-line of each entry for characterization, utilization and maintenance. Seven local germplasms viz., Lalpaika, Moulata, Nakuchimota, Sahi Balam, Sada Chikon,Sada Chikon and Shada Pajam, were utilized in hybridization in breeding programme during T aman 2020 for developing tidal submergence genotypes. Seeds were harvested and preserved for further evaluation and utilization.</li> <li>Duration: On going</li> </ul>	To develop better genotypes adaptive to tidal submergence ecosystem
2.		
	<b>2.1. Title: Observational trial (OT) during 2020-2021</b> <b>Progress:</b> Two (OTs) were conducted during T. Aman 2020. One for tidal submergence consisting 101 advanced breeding lines along with five checks BR23, BRRI dhan52, BRRI dhan76, BRRI dhan77 and BRRI dhan87 were grown in BRRI Sagardi farm, Barishal. Among them, 46 genotypes were selected based on yield and yield contributing traits. The other OT for dense and erect panicle comprising 145 entries along with five checks BR 23, BRRI dhan52, BRRI dhan76, BRRI dhan77 and BRRI dhan87 were grown in Charbadna farm of BRRI RS, Barishal. A total of 37 advanced breeding lines were selected for preliminary yield trial based on phenotypic attributes viz. plant height, growth duration and phenotypic acceptability. <b>Duration:</b> On going	Selection of better genotypes adaptive to tidal submergence ecosystem and genotypes with dense and erect panicle
	<ul> <li>2.2. Title: Observational yield trial (OYT) Boro 2020-21</li> <li>Progress: Two OYTs were conducted in Charbadna farm during Boro 2020-21. The OYT#1 consisting 104 entries along with four checks, BRRI dhan58, BRRI dhan74, BRRI dhan88 and BRRI dhan92 were grown. Based on phenotypic acceptability (4-5) and grain yield performance (5.12-6.95t/ha) twenty-nine genotypes were selected for further evaluation. The OYT#2 comprising 194 entries along with five checks BRRI dhan58, BRRI dhan67, BRRI dhan74, BRRI dhan88 and BRRI dhan92. Among the tested materials, 63 lines were selected based on phenotypic acceptability, growth duration and grain yield further trial.</li> <li>Duration: On going</li> </ul>	Selection of better genotypes based on growth duration and yield performance.
	<b>2.3. Title: Preliminary yield trial (PYT) 2020-2021</b> <b>Progress:</b> Two PYTs were conducted during Boro 2020-21. Thirteen entries out of thirty-five advanced breeding lines along with four checks, BRRI dhan58, BRRI dhan74, BRRI dhan88 and BRRI dhan92 were selected from the PYT-1 based on plant height, growth duration, phenotypic acceptability and grain yield. None of the tested materials were found out yielded over the check varieties in the PYT-2 trial which comprising of	To identify better genotypes for further study

Sl. no.	Research Progress	Expected output
	eleven advanced breeding lines along with four checks BRRI dhan58, BRRI	
	dhan74, BRRI dhan88 and BRRI dhan92.	
	Duration: November, 2020 – May, 2021	
	<b>2.4. Title:</b> Regional yield trial (RYT).	
	<b>Progress:</b> RYT consisting of four advanced breeding lines along with the	
	two checks BRRI dhan27 and BRRI dhan48 was conducted at three locations	
	of the Barishal region, namely Ghatkhali, Amtali; South Ghatkhali and	
	Manikjhuri, Amtali, Barguna during T Aus 2020 Tested materials were	
	evaluated based on their yield and yield contributing traits to find better	
	genotypes.	
	Two regional yield trials of insect-resistant rice (IRR) were conducted at	
	BRRI Charbadna farm, Barishal during T Aman 2020. The RYT#IRR-1	
	comprising 13 entries along with the three checks BRRI dhan33, BRRI	
	dhan49 and BRRI dhan93 were evaluated. The RY1#IRR-2 consisting of	
	twelve entries along with the three checks BKKI dnan33, BKKI dnan49 and	
	BKKI dhan 95 were grown. The highest panicle number per hill $(11.7)$ was found in BPBI dhan 40, while the lowest panicle number per hill $(7.4)$ was	
	recorded in the genotype BR10039-19-1-3. The highest grain yield was	
	found in the genotype BR9880-24-2-1-14 (5.90 t/ha) followed by BR9882-	
	17-2-2-32 (5.88 t/ha) and BR9888-26-9-14-3 (5.81 t/ha) which are	
	signicantly higher than that of BRRI dhan33 and BRRI dhan49 with similar	
	growth duration of check varieties, BRRI dhan 49 and BRRI dhan93.	
	Two RYTs of saline tolerant rice (STR) were conducted at BRRI Charbadna	
	farm, Barishal. The RYT#STR-1 comprising nine entries along with the	
	three checks BRRI dhan54, BRRI dhan73 and BRRI dhan87 were grown.	
	The highest grain yield was found in the genotype IR108158-B-2-AJY1-1 $(5.56 \text{ t/hs})$ followed by PR0526.2 17 (5.40 t/hs) and IR102400 P.2 AIV1	
	(5.30  //Ia), followed by BK9550-2-1/ $(5.49  //Ia)$ and IK105499-B-2-AJ11 $(5.48  //Ia)$ The RVT#STR-2 consists of ten entries along with the three	
	checks BRRI dhan54. BRRI dhan73 and BRRI dhan87 were grown. The	
	highest grain yield was found in the genotype TP30649 (5.71 t/ha), followed	
	by HHZ18-SAL14-SAL13-Y2 (5.63 t/ha) and HHZ18-DT7-SAL1-SAL1	
	(5.46 t/ha). The lowest grain yield (4.53 t/ha) was recorded in the genotype	
	IR15T1408. A BYT for forenal la Dana communicing conventions entries along with the three	
	A KY I for lavorable Boro comprising seventeen entries along with the three aboats DDDI dhan 1 DDDI dhan 24 and DDDI dhan 20 were grown. The	
	genotype BRC297-15-1-1-1 produced the highest number of tillers (18.1)	
	and nanicle (15.9) per hill that produced similar yield (6.35t/ha) of BRRI	
	dhan84 (6.19 t/ha). The genotype SVIN069 provided the highest grain yield	
	(6.92 t/ha) similar to that of BRRI dhan89 (6.88t/ha) but growth duration is	
	15 days shorter in SVIN069 (141).	
	A regional yield maximization trial (RYMT) consisting two entries BRH11-	
	9-11-4-5B-HR3 and BRH13-2-4-6-4B along with the check BRRI dhan63	
	were grown at BRRI Charbadna farm, Barishal. Both the entries produced	
	similar yield (6.88 t/ha and 6.86t/ha) to BRRI dhan63 (6.74 t/ha) but with fine days larger growth dwarfer (145 days) that that of DDDL dhan $(2, (140))$	
	days)	
	In RYT for zinc enriched rice, three entries along with three checks BRRI	
	dhan74, BRRI dhan84 and BRRI dhan89 were tested. at BRRI Charbadna	
	farm, Barishal, during Boro 2020-21. Test line BR9674-5-6-2-1-7-22	
	(6.71t/ha) produced similar yeld to BRRI dhan74 (6.68t/ha) but had six days	
	longer growth duration. None of the test entries out yielded the check variety	
	BRRI dhan89 that provided the highest grain yield (6.98 t/ha).	
	In RYT GSR, five entries along with the two checks BRRI dhan58 and BRRI	
	dhan88 were grown. FBR350 produced the highest grain yield (7.16 t/ha)	
	tollowed by FBR336 (6.91t/ha), BRRI dhan58 (ck) (6.80 t/ha) with similar	
	growin duration of 146 days.	

Sl. no.	Research Progress	Expected output
	A RYT for bacterial blight resistance, comprising of five entries along with	
	two susceptible checks, BRRI dhan58 and BRRI dhan89, and a resistant check	
	IRBB60, was conducted. None of the test entries outyielded BRRI dhan89	
	(7.45 t/ha) but BR9943-26-2-3-6 (6.97 t/ha), BR9943-2-2 (6.94 t/ha)	
	outyielded the check variety BRRI dhan58 (6.77 t/ha). The lowest grain yield	
	was found in resistant check IRBB60 (6.06 t/ha).	
	Two regional yield trials of saline tolerant rice (STR) were conducted at	
	farmer's fields of Latifpur, Kalapara, Patuakhali. The RYT STR-1	
	comprising 14 entries along with the four checks BRRI dhan67, BRRI	
	dhan89, BRRI dhan97 and BINA dhan-10 were grown . In this trial, the	
	check variety BRRI dhan97 produced the highest grain yield (6.80 t/ha)	
	followed by BINA dhan-10 (6.70 t/ha), IR96184-24-1-1-AJY2 (6.58 t/ha)	
	and BR9625-B-2-4-6 (6.23 t/ha). The RYT STR-2 consists of 14 entries	
	along with the four checks BRRI dhan67, BRRI dhan89, BRRI dhan97 and	
	BINA dhan-10 were grown. The check variety BRRI dhan89 took the	
	longest period to get maturing (146 days), followed by IR 100638-6-CMU3-	
	CMU1 (145 days), while BR9154-2-7-1-2 and BR9620-4-3-2-2 took the	
	shortest period (134 days). BR9625B-1-4-6 produced the highest grain	
	yield (7.50 t/ha) followed by IR 100638-6-CMU3-CMU1 (7.13 t/ha),	
	BR9156-4-1-7-9 ( $6.92$ t/ha) and BRR1 dhan97 ( $6.69$ t/ha). The lowest grain	
	yield was found in BRRI dhan89 (5.36 t/ha).	
	I wo regional yield trials of favorable Boro rice (RY I were conducted in	
	cumilla region. The RYT Cumilla-Icomprising of six entries along with the	
	checks BRRI dhan81, BRRI dhan84 and BRRI dhan88 were evaluated. DDC2( $(2, 2, 4, 2, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,$	
	BRC366-2-2-4-2-3 provided nightst grain yield ( $7.00$ t/ha) followed by	
	BRC366-2-2-4-2-1 (6.88 t/ha), BRC389-4-2-4-2 (6.62 t/ha), BRC401-1-1- 1 1D (6.48 t/ha) and DDDL dhan $84$ (6.20 t/ha). The lawset grain wield was	
	1-1B (0.48 Una) and BKKI dnan84 (0.29 Una). The lowest grain yield was	
	outling of Seven	
	ware grown. The check variety <b>BBPI</b> dhan <sup>80</sup> produced the highest groin	
	vield (8 27 t/ba) followed by BRC428-2-2-1 (7 66 t/ba) BRC335-1-3-2-2-	
	1(7.61t/ha) and BRRI dhan58 (7.55 t/ha) The lowest grain yield was found	
	in BRRI dhan50 (6.02 t/ha)	
	Under the RYT program of BRRI regional station Barishal. Six entries along	
	with two checks BRRI dhan58 and BRRI dhan92 were evaluated in twelve	
	locations of all the BRRI regional stations and HQ. Among the tested	
	materials, the plant height was ranged from 96.2 cm of BRBa3-2-4 to 113.2	
	cm of BRBa1-4-9. BRRI dhan58 took the shortest period (152 days) to get	
	matured while BRBa1-4-9, BRBa2-1-3 and BRRI dhan92 took the longest	
	period (159 days) to get matured. The highest average grain yield (8.21 t/ha)	
	was found in BRRI dhan92 and the lowest average grain yield (7.09 t/ha) was	
	found in BRRI dhan58. There was significant yield variation among 12 test	
	locations. All the tested materials provided statistically similar grain yield with	
	the check BRRI dhan92 but produced the higher grain yield than the check,	
	BRRI dhan58. (Table 3).	
	Under the another RYT program of BRRI regional station Barishal, Seven	
	entries along with two checks BRRI dhan58 and BRRI dhan92 were tested	
	in twelve locations. Among the tested materials, the plant height was ranged	
	trom 96.0 cm of BRRI dhan58 to $104.9$ cm of IR12A329. The genotype	
	IK15A2854 took shortest period (150 days) to get maturing while BRRI	
	unany2 took longest period (158 days) to get maturing. The highest average	
	grain yield (8.09 $V$ na) was found in BKKI dhan92 which is statistically similar with these of ID12A220 (8.00 $t/t_{rel}$ ) ID04A420 (7.00 $t/t_{rel}$ ) and	
	similar with those of $1K12A329$ (8.00 t/ha), $1K04A429$ (7.99 t/ha) and $1P12A515$ (7.75 t/ha). The lowest grain yield (6.00 t/ha) was found in	
	INISASIS (7.75 VIIa). The lowest grain yield (0.90 VIIa) was found in IP15A2854 which is statistically similar with IP15A2820 (7.02 $t/t_{r}$ ) and	
	RTJA2034 which is statistically similar with IRTJA2020 (7.03 V/ha) and BRRI dhan58 (7.06 t/ha)	

Sl. no.	Research Progress	Expected output
	Duration: November, 2020- May-2021	
	2.4. Title: Advanced vield trial (AYT)	To Identify better
	<b>Progress:</b> Seventeen entries along with four checks BR23 BRRI dhan49	genotype (s) for further
	BRRI dhan52 and BRRI dhan87 were evaluated in T Aman 2020 None of	study
	the tested entries was found out vielded over checks	5
	Two advanced yield trials of favorable Boro rice were evaluated during Boro	
	2020-21 The AVT-SB1 consisting 18 entries along with four checks BRRI	
	dhan58 BRRI dhan74 BRRI dhan88 and BRRI dhan92 Maturity duration	
	of BRRI dhan92 was the longest (144 days) followed by BRBa2-9-4	
	(143days), while BRRI dhan88 took the shortest period (130 days), BRBa3-	
	1-6 gave the highest grain yield (6.81 t/ha) followed by BRBa3-4-2 (6.59	
	t/ha), BRBa3-2-2 (6.55 t/ha), BRBa5-4-1 (6.46 t/ha) and BRBa3-3-3 (6.15	
	t/ha). The AYT-SB2 comprising of eighteen entries along with four checks	
	BRRI dhan58, BRRI dhan74, BRRI dhan88 and BRRI dhan92 were grown.	
	Among the test entries, Ba Boro20-SVIN302 (6.83 t/ha) and Ba Boro 20-	
	SVIN311 (6.73 t/ha) gave the significantly higher yield than those of BRRI	
	dhan92 (6.12t/ha), BRRI dhan74 (5.92t/ha), and BRRI dhan58 (5.96t/ha)	
	even though growth duration of both the test entries were 8-9 days shorter	
	than that of BRRI dhan 92. Beside those entries, Ba Boro 20-SVIN044 (6.39	
	t/ha), Ba Boro 20-SVIN036 (6.32 t/ha) and Ba Boro 20-SVIN330 (6.27 t/ha),	
	produced significantly higher yield than that of BRRI dhan88 (5.47 t/ha).	
	Another AYT consisted of a total 521 promising breeding lines were	
	planted in seven sets, SetA (8), SetB (46), SetU (38), SetD (48), SetE (184), SetE (52) and SetC (148), for hotton evolution during Dana 2020 21	
	(184), Self (52) and SelG (148), for belief evaluation during Boro 2020-21	
	NCP Set A Fight entries along with four checks BPRI dhan74 BPRI	
	dhan89 BRRI dhan92 and BRRI hybrid dhan5 were grown in three blocks	
	with different spacing, 20cmX25cm, 20cmX20cm, and 20cmX15cm. Most	
	of the test entries along with BRRI hybrid5 produced higher yield in wider	
	spacing (20cmX25cm) but irrespective of spacing NGR1019-2 and BRRI	
	dhan74 performs equally. Even in lower spacing (20X15cm) NGR 1161-3	
	and BRRI dhan89 produced higher yield. Among the test entries, NGR1019-	
	2 produced higher average yield (8.8t/ha) and that had also higher	
	grain/panicle (308). BRRI dhan74 showed higher stable yield (8.2t/ha) than	
	those of BRRI dhan89 (7.4t/ha) and BRRI dhan92 (7.2t/ha).	
	NGR Set-B. Forty-six entries along with the four checks BRRI dhan74,	
	BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5 were grown in two	
	blocks with spacing 20X20cm and 20X15cm. Among the test materials- three entries NCP417.2 (10.14 t/he) NCP418 1(10.22 t/he) and NCP440	
	2 (10 6t/ha) from 20X20cm spacing block out vielded BPBI Hybrid dhan5	
	(9.96t/ha) and two entries NGR453-1(9.78 t/ha) and NGR414-1(10.69 t/ha)	
	from 20X15cm spacing block out vielded BRRI Hybrid dhan5 (9.68t/ha).	
	NGR Set-C. Thirty-eight entries along with four checks. BRRI dhan74.	
	BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5, were grown in three	
	blocks with three different spacing viz. 20cmX25cm, 20cmX20cm, and	
	20cmX15cm. Four test entries, NGR1258-2(10.02t/ha), NGR721-2(9.9t/ha),	
	NGR796-2(9.69t/ha), and NGR1258-1(9.67t/ha) produced higher yield than	
	BRRI dhan89 (9.52t/ha) and five entries produced higher yield than BRRI	
	hybrid dhan5 (9.38t/ha) in wider spacing (25cm) while nine entries gave	
	higher yield than those of BRRI dhn89 (8.59t/ha) and BRRI hybrid dhan5	
	(8./3t/ha) in 20cmX20cm spacing but in closer spacing (20cmX15cm) none	
	of the tested entries found as out yielded over BKKI Hybrid dhan5(9.91t/ha) but one NGP1010.2 (0.5 t/ha) was found out wielded over DDDL the 0.2	
	(9.35t/ba)	
	NGR Set-D. Forty-eight entries along with four checks BRRI dhan 74 BRRI	
	dhan89, BRRI dhan92 and BRRI hybrid dhan5 were grown in two blocks	

Sl. no.	Research Progress	Expected output
	with spacing 20cmX20cm and 20cmX15cm. The maximum seventeen test entries were found out yielded (range 9.1-10.38t/ha) over the check variety BRRI hybrid dhan5 (9.01t/ha) with a spacing 20cmX20cm but in case of closed spacing, 20cmX15cm, only NGR1255-2 (10.75t/ha) gave more yield over BRRI hybrid dhan5 (9.96t/ha). It indicated that the test entries performed better in 20cmX20cm spacing. NGR Set-E. A total of 184 entries along with four checks, BRRI dhan74, BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5 were evaluated. Out of those 11 entries were showed similar growth duration and out yielded over all the check varieties. Among the test entries NGR1255-1 produced the highest yield of 11.61t/ha followed by NGR1331-1(10.99t/ha), NGR988- 1(10.80t/ha), NGR857-1(10.42t/ha), NGR736-1(10.29t/ha), NGR986- 1(10.23t/ha), and NGR839-1(10.22t/ha). The check varieties, BRRI dhan74, BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5, produced the yield of 7.98t/ha, 8.95t/ha, 9.96t/ha and 9.11t/ha respectively. NGR Set-F. A total of 52 entries along with four checks, BRRI dhan74, BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5 were evaluated. Out of them, NGR1203-2 (9.36t/ha) gave more yield over the checks including BRRI hybrid dhan5 (8.98t/ha). NGR Set-G. A total of 145 entries along with four checks, BRRI dhan74, BRRI dhan89, BRRI dhan92 and BRRI hybrid dhan5 were evaluated. Out of these, NGR1308-2 (11.76 t/ha) produced the highest yield followed by NGR467-2 (11.44t/ha), NGR315-3(11.22t/ha), NGR268-2 (11.11 t/ha), NGR857-2 (11.10/ha), and NGR350-2 (10.73 t/ha) and these seven entries were found out yielded over the check varieties including BRRI hybrid dhan5 (10.52 t/ha) with similar growth duration. <b>Duration:</b> June-October, 2020 November, 2020-May, 2021	
	<ul> <li>2.5. Tittle: INTERNATIONAL NETWORK FOR GENETIC EVALUATION OF RICE (INGER), BORO 2020-21</li> <li>Progress: A total of 125 entries along with five checks BRRI dhan58, BRRI dhan67, BRRI dhan74, BRRI dhan88 and BRRI dhan89 were evaluated at BRRI Charbadna farm, Barishal during Boro 2020-21. Fourteen genotypes having grain yield of 7.17-7.92 t/ha were selected on the basis of yield and other phenotypic acceptability for further evaluation in the advanced yield trial.</li> <li>Duration: November, 2020-May, 2021</li> </ul>	I o identify the better genotype(s)
	<b>2.6. Tittle:</b> DEVELOPMENT AND VALIDATION OF HIGH IRON AND ZINC RICE IN CONFINED FIELD TRIAL(CFT), BORO 2020- 21 <b>Progress:</b> Eleven transgenic lines along with non-transgenic control as standard check variety BRRI dhan28 were evaluated at CFT site of BRRI RS, Barishal. There was a little variation among the transgenic lines in respect of plant height (range 103.7-107.9 cm), panicle number per plant (range 12.6-13.4); growth duration (range 133-135days) and the thousand- grain weight (range 20.0-21.4g) were found. But in respect of spikelet fertility, a significant variation was observed. The highest spikelet fertility was observed in IR133904TR-B-B 2-B-25(92.9%) followed by genotypes IR133904TR-B-B-1-B-3(89.7%) and IR133904TR- B-B-3-B-28 (88.9%), whereas the lower lebel of spikelet fertility was observed in IR135161TR-4- B-6(78.5%), IR135161TR-4-B-35(79.5%) and IR135161TR-4-B-4 (79.6%). There was variation observed in grain yield which was ranged between 7.18t/ha to 8.61 t/ha. Three transgenic lines, IR133904TR-B-B-1-B-3 (8.52 t/ha), IR133904TR-B-B-2-B-25 (8.53 t/ha) and IR133904TR-B-B-3-B-	To identify better genotype(s)

Sl. no.	Research Progress	Expected output
	28(8.61 t/ha), produced significantly higher yield over non transgenic check BRRI dhan28 (7.86 t/ha). The transgenic entries IR135161TR-4-B-35, IR135161TR-4-B-2 and IR133904TR-B-B-1-B-3 got 5-20% neck blast infestation.	
	Duration: November, 2020-May, 2021	
	<b>2.7: Tittle: Advanced line adaptive research trial (ALART)</b> There were eleven ALARTS comprising of six in Aus 2020, two in T. Aman 2020 and three in Boro 2020-21, in the farmers' field of Barishal to select the better genotype (s) adaptive to non-saline tidal ecosystem, favorable ecosystem, rainfed lowland rice ecosystem, Zinc enriched rice, Bacterial blight resistant <b>Duration:</b> On going	To identify the suitable rice genotypes against non-saline tidal ecosystem, favorable ecosystem, rainfed lowland rice ecosystem, Zinc enriched rice, Bacterial blight resistant.
	<b>2.8. Stability analysis of BRRI released varieties</b> <b>Progress:</b> Twelve, forty seven, and forty six released varieties of BRRI were evaluated under the stability study program during T Aus, T Aman and Boro seasons respectively at Charbadna farm, BRRI RS, Barishal. In T Aus season 2020, the highest yield was achieved by BRRI hybrid dhan7 (5.43 t/ha) followed by BRRI dhan27 (4.19 t/ha) and BRRI dhan48 (4.18 t/ha). The lowest yield was found in BR21 (3.15 t/ha). In T Aman season 2020, The highest and the lowest yield were found in BRRI dhan76 (5.43 t/ha) and in BRS (3.17 t/ha). Among the Boro varieties, the highest yield was observed in BRRI hybrid dhan5 (8.14 t/ha) followed by BRRI hybrid dhan5 (7.47 t/ha) and BRRI hybrid dhan2 (7.25 t/ha). The lowest yield was found in BRRI dhan61 (5.16 t/ha). <b>Duration:</b> On going	To find out the stable rice varieties in the Barishal region.
3.	Project-III. Pest mangement	
	<ul> <li>3.1. Tittle: Insect Management Incidence of insect pests and natural enemies in light traps.</li> <li>Progress: Data were collected from July 2020 to June 2021 at Sagordi farm, BRRI Barishal. Appearance of insect pests was higher than previous reporting year. Reporting year highest brown planthopper (8562nos.) followed by yellow stem borer (8442nos.) and green leaf hopper(7546nos.). In case of natural enemy highest staphylinid beetle (14526nos.) followed by green mirid bug (9415nos.) and carabid beetle (1228nos.). Reporting year found higher insect than natural enemy.</li> <li>Duration: On going</li> </ul>	Database generate which may use to develop forecasting models.
	<b>3.2 Tittle:Species composition of stem borer</b> <b>Progress:</b> BRRI dhan28 found highest 82.93% larvae of yellow stem borer followed by BRRI dhan67, 76% and BRRI dhan89, 73.91%. Yellow stem borer found higher than dark headed borer. BRRI dhan89 found highest dark headed borer 26.08% followed by BRRI dhan67, 24% and BRRI dhan28, 17.03%. Comparatively new released variety is more susceptible of dark headed borer. <b>Duration:</b> On going	Comparatively study of Yellow stem borer and Dark headed stem borer
	3.3. Tittle: Survey of insect pest and natural enemy in seedbeds	To find out the incidence patterns of the major rice

Sl. no.	Research Progress	Expected output
	<b>Progress:</b> Brown planthopper (BPH), yellow stem borer (YSB), green leafhopper (GLH), Grass hopper (GH), rice hispa and long horn cricket (LHC) insect found in yellow sticky trap. Carabid beetle (CDB), lady bird beetle (LBB), green mirid bug (GMB), damsel fly and spider (SPD) natural enemy were also found. Higher no. of thrips found in BR23, BRRI dhan44, BRRI dhan49, BRRI dhan52, BRRI dhan76 and BRRI dhan78. Green leafhopper insect found higher in BR23, BRRI dhan34, and BRRI dhan77. Higher no. of natural enemy green mired bug found in BR23, BRRI dhan44, BRRI dhan52 and BRRI dhan76. Spider found higher in BRRI dhan44, BRRI dhan57. Damsel fly found higher in BRRI dhan44, BRRI dhan57. Damsel fly found higher in BRRI dhan44, BRRI dhan57. On going	insect and their natural enemies in rice seedbed
	<ul> <li>3.4. Tittle: Survey of insect pests and natural enemies in Barishal region</li> <li>Progress: Higher no. of Brown Plant hopper (BPH) found in BR23, BRRI dhan49, BRRI dhan51, BRRI dhan57, BRRI dhan77. In case of local cultivar higher BPH found both varieties in Shakhorkhura and Mithamota. Green mirid bug(GMB) found higher in HYV and higher no. of spider found in local cultivars.</li> <li>Duration: On going</li> </ul>	To find out the incidence patterns of the major rice insect pest and their natural enemies in Barishal region
	<b>3.5. Tittle: Insecticide free rice production in BRRI RS farm, Barishal</b> <b>Progress:</b> T.Aman 2020 found higher no. of insect in BRRI dhan77 followed by BR23 and BRRI dhan76. Green leafhopper (GLH), white leafhopper (WLH), yellow stem borer (YSB), white backed plant hopper(WBPH), Leaf folder(LF) and brown plant hopper (BPH) found all three variety plot. Other hand, higher no. of natural enemy in BRRI dhan77 than BR23 and BRRI dhan76. Higher yield performance in BR23 (4.75 t/ha) than BRRI dhan76 (4.31t/ha) and BRRI dhan77 (3.54). Finally, we successfully cultivated Breeder, TLS and Experiment plot crop without any insecticides spray at BRRI Charbadna and Sagordi farm. Perching was done all plot at BRRI recommendation practice. Every full plot sweeping after 15 days of transplanting upto flowering. After every 20 complete sweeping release natural enemy and where damaged harmful insect. Morning time yellow stem borer harbor upper portion of leaf. So, we did sweeping early morning 6.00am to 10.00am.	Conservation of natural enemy
	Duration: On going	
	<ul> <li>3.6. Tittle: Fall armyworm monitoring in BRRI, Barishal farm</li> <li>Progress: 4th January, 2021 setup 5 lure trap for fall armyworm in BRRI, Charbadna farm. Every 07 days interval counted FAW population. After 16 weeks population counting results shown in the below figure. Trap no. 4 found higher no. FAW population during Boro 2020-21 season. None of leaf symptom found in rice plants.</li> <li>Duration: On going</li> </ul>	To identify the incidence of fall armyworm population in rice field.
4.	Project IV: DISEASE MANAGEMENT	

Sl. no.	Research Progress	Expected output
	4.1. Tittle: Screening of available pesticides for controlling	To identify the best
	blast disease of rice. Aman 2020	chemical to control the blast
	<b>blast disease of rice, Aman 2020</b> <b>Progress:</b> Nine pesticides namely Zeal (dose 3.38 g/10L), Difa (dose 3.6 g/10L), Hayconazole 5EC (dose 4.5 ml/10L), Amister Top (dose 4.5 ml/10L), Tilt 250 EC (dose 4.5 ml/10L), Score 250 EC (dose 4.5 ml/10L), Trooper 75WP (dose 18.0 gm/10L), Bir 70WP (dose 18.0 gm/10L) and Nativo (dose 2.7 gm/10L) were used as test pesticides with one control (plain water). All the pesticides were tested on BRRI dhan34, a susceptible Aman HYV of rice to blast disease. Among the nine chemicals, Difa, Nativo, Amister Top, Trooper 75WP and Zeal significantly reduced neck blast (NB) disease at rates of 90.32%, 90.27%, 79.11%, 75.90% and 73.63%, respectively. Rest of the chemicals were ineffective (<70 % reduction) in reducing the blast disease. Further test of those effective chemicals was suggested for the next season.	disease in Aman rice field.
	Duration: On going	
	4.2. Tittle: Survey and monitoring of rice diseases in selected areas of Barishal region Progress: In Aman and Boro seasons, a survey on rice disease was conducted in 162 farmers' fields of Barishal district (Sadar, Ujirpur, Babuganj and Bakerganj upazila). Cropping pattern, rice growing ecosystem and cultivar adoption of the surveyed area were observed during the survey. Data on percent disease incidence (%DI) and severity (0-9 scale) were collected following the standard evaluation system (SES) for rice (IRRI, 2013). A zigzag pattern for the survey was followed in this study (Savaryet <i>al.</i> , 1996). From each plot, randomly 20 hills were selected for recording the disease incidence and severity. (Fig. 8.) <b>Duration:</b> On going	To find out the disease prone area of the Barishal region.
	<b>3.3. Tittle: Screening of available pesticides for controlling blast disease of rice, Boro 2020-21</b> <b>Progress:</b> Ten pesticides namely Zeal, Tilt 250 EC, Hayconazole 5EC, Amister Top, Chemojol Plus, Score 250 EC, Trooper 75WP, Filia, Hayconazole 5EC and Nativo were used as test pesticides keeping one negative control (plain water). Dose of pesticides in Boro were the same as in T. Aman (follow the previous section). Pesticides were tested on BRRI dhan28, a susceptible Boro HYV of rice to blast disease. Among the ten chemicals, Nativo, Trooper 75WP, Amister Top, and Zeal significantly reduced neck blast (NB) disease at rates of 76.37%, 71.50%, 64.53% and 60.01%. The rest of the chemicals were not effective (<60 % reduction) in reducing the blast disease. A further test of those effective chemicals was suggested for the next season. <b>Duration:</b> On going	To identify the best chemical to control the blast disease of rice in Aman season
5	Project-V: Technology Transfer	
	<ul> <li>5.1: Tittle: Varietal replacement through head to head trial in Boro 2020-21 under TRB project.</li> <li>Progress: Three groups (short growth duration, long growth duration, saline tolerant) of modern rice varieties were tested at six locations of Barishal region during Boro 2020-21. The short duration group, comprising BRRI dhan28, BRRI dhan67, BRRI dhan81, BRRI dhan84, and BRRI dhan88, were tested in Barishal sadar and Bakerganj upazila of Barishal district. The long duration group, comprising BRRI dhan29, BRRI dhan58, BRRI dhan89 and BRRI dhan92 were tested in Nolcity, Jhalokathi and Kaukhali, Pirojpur. The saline</li> </ul>	To popularize the BRRI varieties in the Barishal region

Sl. no.	Research Progress	Expected output
	tolerant group consists of BRRI dhan28, BRRI dhan67, BRRI dhan97, BRRI dhan99 and BINA dhan10, were tested in Babuganj, Barishal and Jhalokathi sadar, Jhalokathi. Among the short duration varieties, BRRI dhan28 provided the highest yield (6.57 t/ha) followed by BRRI dhan88 (6.44 t/ha), BRRI dhan84 (6.41 t/ha), BRRI dhan81 (5.98 t/ha) and BRRI dhan67 (5.96 t/ha). Comparing all long duration varieties, BRRI dhan92 gave the highest yield (7.8 t/ha <sup>-1</sup> ) followed by BRRI dhan29 (7.35 t/ha), BRRI dhan67 (5.96 t/ha). Comparing all long duration varieties, BRRI dhan92 gave the highest yield (7.8 t/ha <sup>-1</sup> ) followed by BRRI dhan29 (7.35 t/ha), BRRI dhan89 (7.2 t/ha <sup>-1</sup> ) and BRRI dhan58 (7.1 t/ha <sup>-1</sup> ). Among all saline tolerant varieties, the highest yield was found in BRRI dhan67(6.14 t/ha <sup>-1</sup> ) followed by BRRI dhan28 (5.99 t/ha <sup>-1</sup> ), BRRI dhan97 (5.92 t/ha <sup>-1</sup> ), BRRI dhan99 (5.57 t/ha <sup>-1</sup> ) and BINA dhan-10 (5.41 t/ha <sup>-1</sup> ). The trials suggested that despite BRRI dhan28 yielded the highest rice grain compared to other short duration varieties, BRRI dhan84 could be popular and be disseminated among the farmers as a newly released variety. This fact is also reflected the farmers choice since farmers stored 20 kg of BRRI dhan84 seed for use in the next Boro season. <b>Duration:</b> On going	
	<ul> <li>5.2 Title: Demonstration under SPIRA Project</li> <li>Progress: A total of seven varietal demonstrations among the selected groups of farmers received seed, fertilizer, insecticides, pesticides, irrigation and labour support. Three demonstrations of two bighas each were conducted in Babuganj of Barishal, Kolapara of Patuakhali and Chunahali, Amtali of Barguna under SPIRA during T. Aman 2020. The highest yield was obtained by BRRI dhan23 (5.07t/ha) followed by BRRI dhan77 (4.93 t/ha) and BRRI dhan76 (4.91 t/ha), Four demonstrations were conducted with four vatieries viz., BRRI dhan47, BRRI dhan74, BRRI dhan84 and BRRI dhan88 during Boro 2020-21 and the highest yield was achieved by BRRI dhan74 (6.96 t/ha) and lowest yield was achieved bt BRRI dhan47 (6.04 t/ha). Therefore, BRRI dhan74 were very promising to this region and farmers' were willing to cultivate these varieties next season</li> <li>Block demonstrations of BR23, BRRI dhan52, BRRI dhan76, BRRI dhan77, BRRI hybrid dhan4 and BRRI hybrid dhan6 were established in T. Aman 2020 at five upazilas, namely Agailjhara, Babuganj, Amtoli, Kalapara under SPIRA. The selected groups of farmers received seed, fertilizer, insecticides, pesticides, irrigation and labour support. The highest yield was obtained by BRRI dhan52 (4.29t/ha) followed by BRRI dhan23 (4.15 t/ha) and BRRI dhan76 (3.98 t/ha). The yield of BRRI hybrid rice varieties ranged from 3.11 to 3.18 t/ha could be attributed to the prolonged water logging during high tides. Farmers' stored seeds of BRRI dhan76 and BRRI dhan77 for the next Aman season and agreed to cultivate along with surrounding farmers.</li> </ul>	To popularize the BRRI varieties in the Barishal region
	<b>5.3. Tittle: Seed support demonstration</b> <b>Progress:</b> In total 126 block demonstrations were established by BRRI RS, Barishal in six districts of Barishal region. Total land under the demonstration programme was 1,212 acres. Farmers were supplied BR3, BRRI dhan29, BRRI dhan47, BRRI dhan58, BRRI dhan67, BRRI dhan74, BRRI dhan89, BRRI hybrid dhan3, BRRI hybrid dhan5 seeds free of cost. Scientists of BRRI RS, Barishal were assigned and monitored all demonstrations. BRRI dhan89 (7.43 t/ha) performed the best among all inbred varieties. However farmers preferred BRRI dhan74 for yield (7.28 t/ha) its medium bold grain, shorted duration course and zinc content. BRRI hybrid dhan3 and 5 yielded 7.82 and 8.14 t/ha, respectively. Several field days were also conducted in different blocks where hundreds of direct and indirect farmers received knowledge and build their awareness about Boro cultivation and	To popularize the BRRI varieties in the Barishal region

management. From this research program, it can be concluded that block	
demonstrations are effective for the expansion of Boro cultivation in the fallow lands of Barishal region using the surface water. From the farmers opinion, if canals in Barishal region are re excavated and Boro seeds are available, more fallow lands in this region can be brought under Boro cultivation and the cropping intensity could be increased. <b>Duration:</b> On going	
5.4. Tittle: Farmers' training under different projects/GoB Up	Jp gradation of the
<b>Progress:</b> BRRI RS, Barishal conducted 29 farmers' training in different locations of Barishal region during the reporting period. Twenty-four farmers' trainings were conducted under GoB programme, while five were under SPIRA project. A total of 710 male, 149 female farmers, 29 Imam and 22 NGO personnel were trained under GoB training programme. Under SPIRA project a total of 135 male, 47 female farmers, 11 Imam and seven NGO personnel received training on modern rice production technologies. Duration: On goingIar model	armers knowledge on nodern rice echnologies.
5.5. Tittle: Farmers' field day under different projects/GoB To	o popularize the BRRI
<b>Progress:</b> Thirteen field days were conducted and of then five were funded by BMGF and six were under SPIRA project and two under GoB during T. Aman 2020 and Boro, 2020-21. About 1,450 (703male and 747 female) farmers, extension personnel, administrative people, public leaders were targeted to participate in these programmes.Val reg <b>Duration:</b> On going	arieties in the Barishal egion
5.6. Tittle: Workshops for T. Aman, Boro rice cultivation To	o bring more field
Progress: One regional workshop was conducted at BRRI RS, Barishal Shagordi conference room where more than 100 personnel from different stakeholders in Agriculture sectors participated. The workshop title was "বৃহস্তর বরিশাল অঞ্চলে চলমান রোপা আমন আবাদ পরিস্থিতি ও আগামী রবি ও বোরো মণ্ডসুমের করণীয়". The workshop was chaired by the Director General of BRRI. Honorable Secretary of the Agriculture Ministry was the chief guest, Vice-chancellor Patuakhali Science and Technology University and Additional Director of Barishal Region, DAE were the special guests. DD, UAO, AEO, SAAO from DAE, Scientists from BRRI, BARI, BINA, BJRI, SRDI, and higher officials from BADC and other organizations, and farmers attended the meeting both physically and online platform. Presented Dr Md Alamgir Hossain, CSO and Head, BRRI RS, Barishal the keynote paper. Papers also presented on behalf of DAE, BINA and BADC. <b>Duration:</b> On going	nder BRRI rice arieties cultivation in he Barishal region.
5.7. Tittle: Breeder seed and TLS production	o support rice growers
<b>Frogress:</b> Nucleus seeds of BR 23, BRRI dhan34, BRRI dhan49, BRRIOfdhan52, BRRI dhan76 and BRRI dhan77 for T. Aman 2019, while BR 26,OutBRRI dhan28, BRRI dhan29, BRRI dhan47, BRRI dhan67 and BRRIdhan67 and BRRIdhan74 for Boro 2019-20 were supplied by GRS Division, BRRI, HQ,Gazipur.A total of 43,265 kg of breeder seed (BS) and 23,283 kg of truthfullylabelled seed (TLS) were produced, processed and distributed in 2020-21. <b>Duration:</b> On going	ur national food ecurity.

Sl. no.	Research Progress	Expected output
	BRRI Regional Station, Sonagazi	• •
1.	Project I: Variety Development Program (VDP)	
	1.1 Title: Regional Yield Trial (RYT-1) in Aus 2020 Progress: Completed	Three advanced lines BR9829-80-2-2-1, BR9830-53-3-5-2 and BR9830-74-4-3-1 along with two standard check BRRI dhan48 and BRRI
	<b>Duration:</b> April to August 2020	dhan82 were evaluated at BRRI, Sonagazi, Feni during Aus 2020. The advanced lines BR9829- 80-2-2-1, BR9830-53-3- 5-2 and BR9830-74-4-3-1 produced 4.87, 5.52 and 5.83 t/ha, respectively. The advanced lines BR9829-80-2-2-1
		produced higher yield with shorter growth duration than standard checks that may be recommended for further trial.
	1.2	Four advanced lines
	Title: RYT-2 in Aus 2020	BR9829-78-1-3-2, BR9830-5-2-2-3 and BR9830-44-1-8-2
	Progress: Completed	supplied by <b>Plant</b> <b>Breeding</b> division along with two standard checks BRRI dhan48 and BRRI dhan27 were evaluated at
	<b>Duration:</b> April to August 2020	BRRI, Sonagazi, Feni during Aus 2020. The advanced lines BR9829- 78-1-2-1, BR9829-78-1- 3-2, BR9830-5-2-2-3 and BR9830-44-1-8-2 produced 6.58, 5.44, 5.38 and 4.95 t/ha, respectively. The advanced lines BR9829- 78-1-2-1 produced higher yield than standard checks
	1.3 Title: Advanced Yield Trial (AYT) in Aus 2020	BRRI dhan48 along and Bindhan-19 were evaluated at BRRI, Sonagazi, Feni during Aus
	Progress: Completed	2020. BRRI dhan48 produced 5.77 t/ha grain yield while Bindhan- 19produced 4.91 t/ha grain yield, but Binadhan- 19 was found about 4 to 5

Sl. no.	Research Progress	Expected output
	Duration: April to August 2020	days earlier than BRRI
		dhan48. Therefore, BRRI
		dhan48 showed better
		Binadhan-19 in respect of
		yield.
	1.4	Two advanced lines
		IR101757-46-1 and
	Title: RYT Zinc Enriched Rice-1 (ZER-1) during T. Aman 2020	IR101/56-146-1 along
		BRRI dhan49 check
		BRRI dhan72 and BRRI
	Progress: Completed	dhan87 were evaluated at
	Trogress. Completed	BRRI, Sonagazi, Feni
		during Aman 2020. The
		advanced lines IR101757-
	<b>Duration:</b> July to December 2021	produced 5.58 and 4.69
		t/ha, respectively. None of
		the tested lines showed
		better performance than
		standard checks.
	1.5	Five advanced lines
	Title: RVT 7ine Enriched Rice_? (7FR_?) during T_Amen 2020	BR9674-1-1-5-4-P4
	THE, KIT Emelancieu Kee-2 (ZEK-2) uuring 1. Aman 2020	BR9674-3-2-4-2-P3,
		BR9674-3-3-1-1P3 and
		BR7528-2R-HR16-2-24-
	Progress: Completed	1-HR1 along with three
		dhan49 check BRRI
		dhan72 and BRRI dhan87
		were evaluated at BRRI,
	<b>Duration:</b> July to December 2020	Sonagazi, Feni during
		Aman 2020. The
		advanced lines $BR96/4-1-$ 1_5_2_P4 BR9674-1_1_5_
		4-P4. BR9674-3-2-4-2-
		P3, BR9674-3-3-1-1P3
		and BR7528-2R-HR16-2-
		24-1-HR1 produced 5.71,
		4.0/, 4.40, 4./8 and 4.59
		the tested lines showed
		better performance than
		standard checks.
	1.6	Seven advanced lines
	Title: DVT 1 Dainfed I owland Diss in T Amon 2020	БКУ85/-/-0-3-1, IR100122-R-R-R-R-2
	THE. RTT-I Ranned Lowiand Rice in T. Aman 2020	IR1003352-B-B-205.
		IR98377-B-B-B-B-24,
		IR98381-B-B-B-71,
	Progress: Completed	IR98386-B-B-B-33 and
	- •	IKY8390-B-B-B-B-40
		check BRRI dhan49 and
		BRRI dhan87 were
	<b>Duration:</b> July to December 2020	evaluated at BRRI,
		Sonagazi, Feni during
		Aman 2020. The

Sl. no.	Research Progress	Expected output
		advanced lines BR9857-7-
		6-5-1, IR100122-B-B-B-
		IR98377-B-B-B-203,
		IR98381-B-B-B-B-71,
		IR98386-B-B-B-B-33 and
		IR98396-B-B-B-B-40
		produced 5.60, 5.69, 5.82,
		5.71, 6.14, 6.13 and 6.52 t/ha, respectively.
	1.7	Nine advanced lines
		BR9536-2-1-7,
	Litle: RYT Salinity tolerant Rice-1 (STR-1) in T. Aman 2020	IR103499-B-2-AJY1,
		1K1511349, K1511464, ID100120 D 1 A IV2 D
		1 IR108128-B-1-AJY2-B-
	Progress: Completed	IR15T1376. TP30656 and
	Tigress. completed	IR108158-B-2-AJY1-1
		along with three standard
		check BRRI dhan73 (T.
	<b>Duration:</b> July to December 2020	ck), BRRI dhan54 (10).
		(Sus Ck) were evaluated
		at farmer's field of
		Chakoria, Cox'sbazar
		during Aman 2020.
		The advanced lines
		BR9536-2-1-7, IR103499-
		B-2-AJY1, IR15T1349,
		R15T1464, IR108128-B-
		IR15T1376 TP30656 and
		IR108158-B-2-AJY1-1
		produced 5.51, 5.70, 5.77,
		5.54, 5.38, 5.43, 5.57, 4.43,
		4.63, 5.19, 4.54 and 6.03
		the tested lines showed
		better performance than
		standard checks.
	1.8	Nine advanced lines IR15T1408, BR 10061-B-
	Title: RYT Salinity tolerant Rice-2 (STR-2) in T. Aman 2020	1-2-1, IR87870-6-1-1-1-
		1-B, TP30649, BR10045-
		15-23-5, IR15T1451,
		HHZ18-Y3-Y1-Y1
		HHZ11-DT7-SAL1-
	Progress: Completed	SAL1 and HHZ8-SAL14-
		SAL3-Y2 along with three
		standard check BRRI
		dhan 54 (Tol Ck) and
	<b>Duration:</b> July to December 2020	BRRI dhan87 (Sus. Ck)
	-	were evaluated at farmers
		field of Chakoria,
		Cox'sbazar during Aman
1		2020. The advanced lines

Sl. no.	Research Progress	Expected output
		IR15T1408, BR 10061-B-
		1-2-1, IR87870-6-1-1-1-
		1-B, 1P30649, BR10045-
		HH715-SAI 13-V3
		HHZ18-Y3-Y1-Y1
		HHZ11-DT7-SAL1-
		SAL1 and HHZ8-SAL14-
		SAL3-Y2 produced 4.64,
		5.83, 3.96, 5.67, 4.50,
		4.91, 4.60, 4.48, 5.41 and
		5.65 t/ha, respectively.
		None of the tested lines
		snowed better
		checks
	1.9	A total of 17 breeding
		lines of favorable Boro
	Title: RYT Favorable Boro Rice-Medium Duration (FBR-MD) in Boro	rice along with three
	2021	check varieties (BRRI
		dhan81, BRRI dhan84 and
		BRRI dhan89) were tested
		at BRRI Sonagazi in Boro
		2020-21. Among the
	Progress: Completed	the entries were found
		better than BRRI dhan89
		in respect of vield.
		however but six lines
	<b>Duration:</b> December 2020 to May 2021	(IR108000-B-BRGA-
		BRGA-185-1, SVIN069,
		IR15A3500, IR106236-B-
		B-B-B-PRN-B-PRNB-
		PRN261, IR16A1135 and $SVIN100$
		significantly higher grain
		vield than the check BRRI
		dhan81. Moreover, the
		entry SVIN109 showed
		significantly higher grain
		yield than BRRI dhan81
		and BRRI dhan84.
	1.10	Two breeding lines of
	Title, DVT Francish, Draw Dire Vield Marini-sting (EDD VM) in	tavorable Boro rice were
	Title: RYT Favorable Boro Rice-Yield Maximization (FBR-YM) in	tested at BRRI Sonagazi
	Boro 2020-21	experimental field with
		dhan63) in Boro 2020.21
	Progress: Completed	Among the two entries no
	Tigress. Completed	lines were found better
		than BRRI dhan63.
	<b>Duration:</b> December 2020 to May 2021	
		1

Sl. no.	Research Progress	Expected output
	<ul> <li>1.11</li> <li>Title: RYT Zinc Enrich Rice (ZER) in Boro 2020-21</li> <li>Progress: Completed</li> <li>Duration: December 2020 to May 2021</li> </ul>	Three breeding lines of zinc enriched rice (ZER) were tested at BRRI Sonagazi with three check varieties (BRRI dhan74, BRRI dhan84 and BRRI dhan89) in Boro 2020-21. Out of three lines, no lines were found better than BRRI dhan74 (7.31 t/ha) and BRRI dhan89 (8.42 t/ha), however, one line BR9674-5-6-2-1-7-22 was produced significantly higher grain yield (7.15 t/ha) than BRRI dhan84.
	1.12 Title: RYT Favorable Boro Rice (FBR) Barisal-1 in Boro 2020-21	Six breeding lines of Favorable Boro Rice (FBR) Barisal-1 were tested at BRRI Sonagazi
	Progress: Completed Duration: December 2020 to May 2021	experimental field with two check varieties (BRRI dhan58 and BRRI dhan92) in Boro 2020-21. Out of six lines, none of the entries were found better than BRRI dhan92 (8.52 t/ha) but two lines
		BRBa1-4-9 (8.15 t/ha), BRBa3-1-7 were observed significantly higher grain yield (than BRRI dhan58.
	1.13 Title: RYT Favorable Boro Rice (FBR) Barisal-2 in Boro 2020-21	Favorable Boro Rice (FBR) Barisal-2 were tested at BRRI Sonagazi
	Progress: Completed	experimental field with two check varieties (BRRI dhan58 and BRRI dhan92) in Boro 2020-21.
	<b>Duration:</b> December 2020 to May 2021	lines were found better than BRRI dhan92 (8.21 t/ha) but three lines IR04A429 (8.04 t/ha), IR12A329 (7.93 t/ha) and IR13A515 (7.80 t/ha) were produced significantly higher grain yield than BRRI dhan58.
	1.14 Title: RYT Salinity Resistant Rice-1 (STR-1) in Boro 2021	A total of 14 breeding lines of Salinity Resistant Rice (STR-1) were tested at BRRI Sonagazi experimental field with four check varieties

Sl. no.	Research Progress	Expected output
	Progress: Completed	(BRRI dhan67, BRRI
	8 1	dhan89, BRRI dhan97 and
		BINA dhan10) in Boro
		2020-21. None of the
	Duration: December 2020 to May 2021	entries were found better
	Duration: December 2020 to May 2021	than BRRI dhan89 (8.04
		t/ha) but four lines
		BR9625-B-2-4-6,
		BR9625-B-2-4-8,
		IR96184-24-1-1-AJY2
		and IR9130-4-1-7-9 were
		grain yield than BRRI
		dhan67 (6.81 t/ha) On the
		other hand, seven lines
		BR9625-B-2-4-6.
		BR9625-B-2-4-8,
		BR9626-1-2-12,
		IR96184-24-1-1-AJY2,
		IR103512-B-AJY2-2,
		IR9156-4-1-7-9 and
		BR9625-4-1-2-8 were
		found significantly higher
		grain yield than BRRI
		dhan9/. In addition, eight
		BR9625 B 2 4 8
		BR9626-1-2-12
		IR96184-24-1-1-4 IV2
		IR106466-30-CMU3
		IR103512-B-AIY2-2
		IR9156-4-1-7-9 and
		BR9625-4-1-2-8 were
		obtained significantly
		higher grain yield than
		Binadhan-10.
	1.15	A total of 14 breeding
		lines of Salinity Resistant
	Title: RYT Salinity Resistant Rice-2 (STR-2) in Boro 2020-21	Rice (STR-2) were tested
		at BRRI Sonagazi
		experimental field with
	Progress: Completed	(DDDI dhan67 DDDI
		dhan 89 BRRI dhan 97 and
		BINA dhan10) in Boro
		2020-21. Among the
	Duration: December 2020 to May 2021	tested entries, BR9620-2-
		1-1, IR103854-8-3-AJY1,
		BR9625-3-1-1-2,
		IR100638-6CMU3-
		CMU1, IR92860-33-
		CMUI-ICMU2-AJYB,
		BK9620-4-3-2-2,
		BK9023-B-14-0, DD0627 1 2 1 10
		DK902/-1-3-1-10, ID03015 82 CMU2 2
		CMU3_AIVE ID104002
		CMU28-CMU1-CMUR
		and BR9620-2-4-1-5 were
		produced significantly
		produced Significantly

Sl. no.	Research Progress	Expected output
		higher grain yield than
		BRRI dhan67 and
		Binadhan-10. The entry
		1K93915-82-CMU2-2-
		performed better than
		BRRI dhan89 (8 10 t/ha)
		in respect of vield
		Similarly eight lines
		BR9620-2-1-1,
		IR103854-8-3-AJY1,
		BR9625-3-1-1-2,
		IR100638-6CMU3-
		CMU1, BR9627-1-3-1-10
		a), IK93915-82-CMU2-2-
		CMU28-CMU1-CMUB
		and BR9620-2-4-1-5 were
		attained significantly
		higher grain yield than
		BRRI dhan97.
	1.16	Five of Drought Resistant
		Rice (DRR-BB Barisal-2)
	Title: RYT Drought Resistant Rice (DRR-BB) Barisal-2 in Boro 2020-	breeding lines were tested
	21	at the research field of BPRI Sonagazi with two
		suscentible check varieties
		(BRRI dhan58 and BRRI
	Progress: Completed	dhan89) and one resistant
		check variety (IRBB60) in
		Boro 2020-21. Among the
		entries, none were found
	<b>Duration:</b> December 2020 to May 2021	better than BRRI dhan89
		(8.10  t/ha), however, the
		gave significantly higher
		grain vield than BRRI
		dhan58. Similarly two
		lines BR9650-108-2-3
		(8.31 t/ha) and BR9943-
		26-2-3-6 (7.75 t/ha) were
		found better than IRBB60
	1 17	(7.04 t/ha).
	1.17	Green Super Rice (GSR)
	Title: RVT Green Super Rice (GSR) in Boro 2020-21	were tested at BRRI
		Sonagazi with two check
		varieties (BRRI dhan58
	Progress: Completed	and BRRI dhan88) in
	110gress. Completed	Boro 2020-21. Among the
		five lines, FBR336
		produced better yield
	Duration: December 2020 to May 2021	checks but three lines
	<b>Dur unon.</b> December 2020 to way 2021	FBR189. FBR350 and
		WANHAN7777 were
		showed significantly
		higher grain yield than
1		BRRI dhan88.

Sl. no.	Research Progress	Expected output
	2	A confined field trial (CFT) was conducted at
	Title: Confined Field Trial (CFT) of High Iron and Zinc Rice (HIZR)	BRRI Sonagazi in Boro
	in in Boro 2020-21	2020-21 season. Eleven
		with a check BRRI
		dhan28 with 3 replications
	Progress: Completed	following randomized
	Trogress. Completed	complete block design
		(RCBD). The unit plot size was 5 $m^2$ Standard
		uniform and prescribed
	<b>Duration:</b> December 2020 to May 2021	management practices
		were followed for all the
		none of the line gave
		statistically higher yield
		than the check BRRI
		dhan28, The lines IR
		133904 TR-B-B 3-B-28 (6.71 the <sup>-1</sup> ) and IP 132004
		$TR-B-B 1-B-3 (6.80 \text{ tha}^{-1})$
		were showed statistically
		similar grain yield with
		check variety BRRI dhan 28 (6.48 tha <sup>-1</sup> ) but IP
		133904 TR-B-B 3-B-28
		(108 cm) and IR 133904
		TR-B-B 1-B-3 (102 cm)
		were found shorter plant
		BRRI dhan28 (114 cm)
		which was statistically
		significant. None of the
		lines was found better than check in respect of tillers
		and panicles per hill,
		panicle length, flag leave
		length, flag leave width
		and spiklets fertility.
		135161 TR-4-B-6 (22.44
		g) and IR 133904 TR-B-B
		2-B-25 (22.12 g) were
		found higher thousand
		check variety BRRI
		dhan28 (20.73 g).
	Project II. CROP SOIL AND WATER MANAGEMENT	
	4.1	Two field experiments were conducted at BRRI Sonagazi
	Title: Effect of Potassium and Sulphur on the performance of modern	Feni; and farmer's field at
	rice varieties during Boro season	Guimara Upazila of Khagrachari. These experiments
		were done in RCB design with
		three replications. BRRI dhan67 and BRRI dhan88 were used as
		test variety at Khagrachari and
		Feni, respectively. Six different fertilizer dose were applied in the

Sl. no.	Research Progress	Expected output
	Progress: On going	experiments. Data on yield, yield
	5 5 5	components, nutrient status of
		collected. Standard and Uniform
		management practices except
	<b>Duration:</b> December 2020 to May 2021	fertilizer doses were followed in
		an the plots.
		The field trial was conducted at Guimara. Khagrachari district
		with 6 different fertilizer
		treatments in Boro 2020-21 season In this trial BRRI dhan88
		was used. The results showed that
		the treatment Soil test based
		and Sulphur (S) $(6.59 \text{ tha}^{-1})$ gave
		maximum grain yield which was
		statistically similar with the treatment STB dose but
		significantly higher than other
		treatments. The lowest grain was
		control (3.39 tha <sup>-1</sup> ) followed by
		farmer's practice $(5.59 \text{ tha}^{-1})$ ,
		tha <sup>-1</sup> ), and BRRI recommended
		rate (6.10 tha <sup>-1</sup> ) respectively
		(Table 21). The field trial was conducted at BRRI farm SonagazI
		with 6 different fertilizer
		treatments in Boro 2020-21 season In this trial BRRI dhan88
		was used. The results showed that
		the treatment Soil test based (STB) $(6.27 \text{ ths}^{-1})$ and STB +
		40% more potassium (K) and
		Sulphur (S) (6.27 tha <sup>-1</sup> ) gave
		statistically similar with the
		treatment STB dose + 20% more $K \approx S$ (6.10 thereb) and DDDI
		recommended rate $(6.19 \text{ tha}^{-1})$ but
		significantly higher than other
		found in the treatment absolute
		control (3.60 tha <sup>-1</sup> ) followed by
		farmer's practice (5.57 that), respectively
	4.2	A field trial was conducted at
		BRRI Sonagazi farm during
	<b>Title:</b> Effect of micronutrient Zinc on the performance of modern rice	Boro 2020-21. Eight treatments having Zinc (Zn)
	varieties	and without Zn were applied
		in three varieties BRRI
		dhan74, BRRI dhan84 and
	Progress: On going	the effect of Zinc on the
	rogrosse on going	performance of the rice
		varieties. The trial was
		conducted following split-
	Duration: December 2020 to May 2021	replications. All the
		intercultural activities and
		data collection were done
		tollowing standard methods.
		irrespective of variety. the
		treatments T5 (STB $+$ 100%
		Zn) was gave the highest
		mean grain yield (6.27 t ha-1)

Sl. no.	Research Progress	Expected output
		followed by T4 (T1 + 50%
		Zn) and the lowest $(3.00 \text{ t ha})$
		Among the varieties BRRI
		dhan74 $(5.56 \text{ tha}^{-1})$ gave
		significantly higher grain
		yield followed by BRRI
		dhan84 (5.36 tha $^{-1}$ ) and BRRI
		dhan88 $(5.15 \text{ tha}^{-1})$
		BRRI dhan74 $(5.72 \text{ tha}^{-1})$ and
		BRRI dhan84 (5.45 tha-1)
		gave significantly highest
		grain yield in T5
		Recommended rate $+ 100\%$
		dhan88 produced the highest
		grain yield in T4
		(Recommended rate + 50%
		Zn). This is one year season
		results. Both the nutrient
		repeated for better
		understanding and
		conclusive findings.
3	Project III. PEST MANAGEMENT	
	3.1	Surveys was carried out at
		farmers' fields of Feni,
	Title: Survey and monitoring of rice diseases	Noakhali, Laxmipur,
		and Khagrachari districts
		in T. Aman, 2020 and
		Boro, 2020-21. Sites were
		selected with the
	Decouver Completed	suggestion and
	rogress: Completed	Department of
		Agricultural Extension
		(DAE). Bacterial Leaf
	Duration: July 2020 to June 2021	Blight (BLB), Bacterial
		Leaf Streak (BLS), Sheath
		rot, False smut and Sheath
		observed in different
		scores during T. Aman
		season. BRRI dhan49
		were affected by false
		smut disease in different
		locations due to fluctuation
		conditions during Amon
		season. BRRI dhan28 and
		BRRI dhan29 were affected
		moderately by blast during
		Boro season. The farmers
		were suggested for
		fungicide.

Sl. no.	Research Progress	Expected output
	<ul> <li>3.2</li> <li>Title: Monitoring of insect pests and natural enemies by using light trap</li> <li>Progress: Completed</li> <li>Duration: July 2020 to June 2021</li> </ul>	Rice insect pests and their natural enemies were monitored throughout the reporting period by Pennsylvanian light traps at the research farm of BRRI Sonagazi from July 2020 to June 2021. The abundance of leaf folder, stem borer, rice bug, green leafhopper, grasshopper, mole cricket, field cricket, and stink bug were found in the light trap during the reporting period. Some beneficial insects like lady bird beetle, spider, damsel fly, carabid beetle, staphynilid beetle were
4	Project IV: Socio – Economic and Policy	also found.
		Plana di 11
	<ul><li>4.1</li><li>Title: Stability Analysis of BRRI Developed Rice Varieties in Aus 2020</li></ul>	Eleven rice varieties were evaluated during Aus 2020 at BRRI Sonagazi farm. Among the varieties, BRRI Hybrid dhan48 ranked the top in
	Progress: Completed	terms of yield (5.71 t ha <sup>-1</sup> ) followed by BRRI dhan82 (4.69 t ha <sup>-1</sup> ). The variety BR21, BRRI dhan24, BRRI dhan42 were found low yielding varieties
	<b>Duration:</b> April to August 2020	having grain yield 3.16, 3.52 and 3.35 t ha <sup>-1</sup> , respectively.
	4.2	Forty two Aman rice
	<b>Title:</b> Stability Analysis of BRRI Developed Rice Varieties in Boro 2020-21	during Aman 2020 at BRRI Sonagazi farm. Among the rice varieties, BRRI dhan87 produced the highestgrain yield
	Progress: Completed	(6.55 t ha <sup>-1</sup> ) followed by BRRI hybrid dhan4 (6.49 t ha <sup>-1</sup> ). The variety BR3, BR5, BRRI dhan37, BRRI dhan40, BRRI dhan57
	<b>Duration:</b> July to December 2020	were found low yielding varieties and the yield ranging from 3.29 to 4.41 t ha <sup>-1</sup> .
	4.3	Forty Six Boro rice varieties were evaluated at BRRI Sonagazi farm during Boro 2020-21. Among the rice varieties,

Sl. no.	Research Progress	Expected output
	Title: Stability Analysis of BRRI Developed Rice Varieties in	BRRI hybrid dhan3
	Boro 2020-21	ranked the top in terms of
		yield (8.99 t ha <sup>-</sup> ) followed
		$(8.33 \text{ t ha}^{-1})$ The variety
		BR6, BR7, BRRI dhan26,
	Progress: Completed	BRRI dhan27, BRRI
		dhan36 were found low
	<b>Duration:</b> December to May 2020-21	yielding varieties and the
		yield ranging from 3.83 to $4.86 \text{ t h}^{-1}$
5	Project V. TECHNOLOCV TRANSFER	4.00 t lla .
5	Troject V. Technologi TRANSFER	
	5.1	Two advanced lines
		BR9005-53-1-1 &
	<b>Ittle:</b> Advanced Lines Adaptive Research Trial (ALART) FE Aus 2020	BR9006-40-2-3-1 along
	Progress: Completed	BRRI dhan48 & BRRI
	Trogress. Completed	dhan82 were tested. None
	Duration: April to August 2020	of the tested lines
	Duration. April to August 2020	performed better than
	5.2	standard checks.
	5.2	BR 8784-4-1-2-P2 &
	Title: Advanced Lines Adaptive Research Trial (ALART) NSTE Aus	BR8781-16-1-3-P2 along
	2020	with two standard checks
		BRRI dhan48 & BRRI
	Progress: Completed	dhan27. None of the tested
		line performed better than
	<b>Duration:</b> April to August 2020	standard checks.
	5.3	Two advanced lines
		BR9571-13-1-9-1-1 &
	Title: Advanced Lines Adaptive Research Trial (ALART) RLR Aman	BR9574-9-5-3-1-1 along
	2020	with two standard checks
		dhan87 were tested None
		of the tested line
	Progress: Completed	performed better than
	Tigress. Completed	standard checks
	<b>Duration:</b> July to December 2020	
	54	The advanced line
		BR10001-94-2-B along
	Title: Advanced Lines Adaptive Research Trial (ALART) ZER Aman	with two standard checks
	2020	BRRI dhan72 & BRRI
		dhan87 were tested. None
	Progress: Completed	or the tested line
	Duration July to Describer 2020	standard checks.
	Duration: July to December 2020	
5.	5.5	Four advanced lines
		BR9880-40-1-3-34,
	Title: Advanced Lines Adaptive Research Trial (ALART) IRR-BPH	BR9881-24-2-2-25,
	Aman 2020	BR9880-27-4-1-18 &
		вк9880-2-2-2-1 along

Sl. no.	Research Progress	Expected output
	Progress: Completed Duration: July to December 2020	with one standard checks BRRI dhan93 & one resistant check T27A (R. Ck) were tested. None of the tested lines performed better than standard checks.
	56	Two advanced line
	Title: Advanced Lines Adaptive Research Trial (ALART) PQR Boro 2021	BR8526-38-2-1-HR1 & Lata Balam along with three standard checks BRRI dhan50, BRRI dhan63 & BRRI dhan81
	Progress: Completed	were tested. None of the entries performed better than standard checks.
	Duration: December 2020 to May 2021	
	5.7	Two advanced line
	Title: Advanced Lines Adaptive Research Trial (ALART) ZER Boro 2021 Progress: Completed	BR8912-12-6-1-1-1-1 & IR225837-8-95-2-1 along with two standard checks BRRI dhan74 & BRRI dhan89 were tested. None of the tested line performed better than standard checks.
	Duration: December 2020 to May 2021	
	5.8	Two advanced lines
	Title: Advanced Lines Adaptive Research Trial (ALART) FBR- Bhanga Boro 2021 Progress: Completed	SVIN063-BORO-18- BHANGA & SVIN076- BORO-18-BHANGA along with two standard checks BRRI dhan29 & BRRI dhan89 were tested. None of the tested line performed better than standard checks.
	Duration: December to May 2020-21	
	5.9	Two advanced lines
		вк(Bio)1144/-1-28-14-3 & BR(Bio)11447-3-10-7-

Sl. no.	Research Progress	Expected output
	Title: Advanced Lines Adaptive Research Trial (ALART) BBRR Biotechnology Boro 2021	1 along with one standard checks BRRI dhan28 were tested. None of the tested line performed better than standard checks.
	Progress: Completed	
	Duration: December 2020 to May 2021	
	5.10	Three HHAT (RLR-SD,
	Title: Head to Head Adaptive trial (HHAT) under TRB Project during Aman 2020 and Boro 2021	RLR-LD and Salinity) were conducted at Sonagazi & Fulgazi Upazila of Feni districts
	Progress: Completed	during Aman 2020 (Fig. 4, 5 & 6)). For long duration five varieties <i>viz</i> BRRI dhan80, BRRI dhan87 BRRI dhan93
	Duration: July 2020 to June 2021	dhan87, BRRI dhan93, BRRI dhan94 and BRRI dhan95 were used and for short duration six varieties <i>viz</i> BRRI dhan57, BRRI dhan71, BRRI dhan75, BINA dhan16, BINA dhan17 and BINA dhan22 were used in those adaptive trial. In case of long duration BRRI dhan87 yielded highest in both locations (6.42 t ha <sup>-1</sup> at Sonagazi & 6.53 t ha <sup>-1</sup> at Fulgazi). In case of short duration BRRI dhan71 yielded highest 5.43 t ha <sup>-1</sup> than other short duration varieties at Sonagazi Feni.Among the salinity tolerant varieties, BRRI dhan97 gave the highest yield (7.30 t ha <sup>-1</sup> ) followed by BRRI dhan99 (7.16 t ha <sup>-1</sup> ) while Binadhan-10 produced 6.34 t ha <sup>-1</sup> .
	5.11	A total of 54 SPDPs were executed in 54 bigha land
	Title: Seed Production and Dissemination Program (SPDP) during T. Aus 2020 under GOB	under nine Upazila of four districts (Feni, Noakhali, Chattogram, and Khagrachari) during Aus 2020 in collaboration
	Progress: Completed	of Department of Agricultural Extension (DAE). BRRI dhan48, BRRI dhan82, BRRI

Sl. no.	Research Progress	Expected output
		dhan83 and BRRI dhan85
		were used in the SPDPs.
	<b>Duration:</b> April to August 2020	BRRI provided input
	1 6	support like quality seeds,
		fertilizer and signboard
		while crop managements
		were done by the farmers
		DAE and DDDI DDDI
		dhan48 gave the highest
		mean grain vield (5.07
		tha <sup>-1</sup> ) followed by BRRI
		dhan $85$ (4.43 tha <sup>-1</sup> ) and
		the lowest grain yield was
		found in BRRI dhan83
		(3.95 tha <sup>-1</sup> ). Mean growth
		duration BRRI dhan48,
		BRRI dhan82, BRRI
		dhan83 and BRRI dhan85
		was 109, 102, 104 and
		108 days, respectively.
		variaties was 34155 kg
		from which 4303 kg was
		retained as seeds (12.6%
		of total production) by the
		farmers for next season
		cultivation. About 1409
		farmers gained awareness
		and knowledge about the
		varieties and 237 farmers
		(16.8% of total farmers)
		were motivated to
-	E 10	cultivate the varieties.
	5.12	A total of 35 SPDPs were
	Title: Soud Production and Dissomination Program (SPDP) during T	under 11 Upazila of five
	Amon 2020 under COP	districts (Feni Noakhali
	Aman 2020 under GOB	Chattogram, Laxmipur and
		Khagrachari) during Aman
		2020 in collaboration with
	Progress: Completed	DAE. BRRI dhan71, BRRI
	rigress. Completed	dhan76, BRRI dhan78 and
		BRRI dhan87 were used in
		the SPDPs. Area of each
	Duration. July to December 2020	SPDP was 1 bigha and
	Duration. July to December 2020	bigha PPPI provided
		input support like quality
		seeds fertilizer and
		signboard while cron
		managements were done
		by the farmers under the
		supervision of DAE and
		BRRI. BRRI dhan87 gave
		the highest mean grain
		yield (6.36 t ha <sup>-1</sup> ) followed
		by BRRI dhan71 (5.54 tha
		') and the lowest grain
		yield was tound in BRRI

Sl. no.	Research Progress	Expected output
		dhan78 (4.33 tha <sup>-1</sup> ). Mean
		dhan71 DDDI dhan76
		BRRI dhan78 and BRRI
		dhan87 was 112, 160, 136
		and 127 days, respectively.
		Total production of all the
		varieties was 25664 kg
		from which 5546 kg was
		retained as seeds (21.6% of
		formers for next season
		cultivation. About 2118
		farmers gained awareness
		and knowledge about the
		varieties and 418 farmers
		(19.7% of total farmers)
		were motivated to cultivate
	5.12	the varieties.
	5.15	conducted in eleven
	Title: Seed Production and Dissemination Program (SPDP) during T.	Upazila of five districts
	Aman 2020 under SPIRA	(Feni, Noakhali,
		Chattogram, Laxmipur and
		Khagrachari) during Aman
		2020. BRRI dhan71, BRRI
	Progress: Completed	dhan /8 and BRRI dhan 8/
		Area of each SPDP was 6
		bigha and total area of
		SPDP was 18 bigha. The
	<b>Duration:</b> July to December 2020	program was executed in
		collaboration of
		Department of
		(DAE) BRRI provided
		input support like quality
		seeds, fertilizer and
		signboard while crop
		managements were done
		by the farmers under the
		supervision of DAE and
		the highest mean grain
		vield (6.47 tha <sup>-1</sup> ) followed
		by BRRI dhan71 (5.53 tha
		<sup>1</sup> ) and the lowest grain
		yield was found in BRRI
		dhan78 (4.64 tha <sup>-1</sup> ). Mean
		growth duration BRRI
		BRRI dhan 87 was 112
		140 and $127$ days
		respectively. Total
		production of all the
		varieties was 14093 kg
		from which 3110 kg was
		retained as seeds (22.1% of
		total production) by the
1		farmers for next season
Sl. no.	Research Progress	Expected output
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		cultivation. About 632
		farmers gained awareness
		and knowledge about the
		varieties and 120 farmers $(10.0\%)$ of total farmers
		(19.0% of total farmers)
		the varieties
	514	A total of 90 SPDPs were
		conducted in 90 bigha
	Title: Seed Production and Dissemination Program (SPDP) during	land under 11 Upazila of 4
	Boro 2021 under GOB	districts (Feni,
		Chattogram, Noakhali and
		Khagrachari) during Boro
		2021. Area of each SPDP
	Progress: Completed	was I bigha. BRRI
		DDDL dhan74 DDDL
		dhan79 BRRI dhan88
		BRRI dhan89 and BRRI
	<b>Duration:</b> December 2020 to May 2021	dhan92 were used in the
		SPDPs. BRRI dhan92
		gave the highest average
		grain yield (7.80 tha <sup>-1</sup> )
		followed by BRRI dhan89
		$(7.76 \text{ tha}^{-1}), \text{BRRI dhan}58$
		$(6.94 \text{ tha}^{-1})$ , BRRI dhan74
		$(6.82 \text{ tha}^{-1})$ , BRRI dhan88
		$(6.51 \text{ tha}^{-1})$ and BKRI dhen 70 (6.15 tha^{-1}). The
		lowest grain was produced
		by BRRI dhan67 (5.82 tha <sup>-</sup>
		<sup>1</sup> ). Total production of all
		the varieties was 81240 kg
		from which 12985 kg was
		retained as seeds (16.0% of
		total production) by the
		farmers for next season
		cultivation. About 5755
		farmers gained awareness
		varieties and 1105 farmers
		(20.1% of total farmers)
		were motivated to cultivate
		the varieties.
	5.15	A total of 3 SPDPs were
		conducted in 3 (Sonagazi,
	Title: Seed Production and Dissemination Program (SPDP) during	Fulgazi and Dagonbhuiyan)
	Boro 2021 under SPIRA	Upazila of Feni district
		under SPIRA project. Area
		of each SPDP was 6 bigha.
		dhan74 RRRI dhan80 and
	Progress: Completed	BRRI dhan92 were used in
		the SPDPs. BRRI dhan92
		gave the highest average
		grain yield (8.31 tha <sup>-1</sup> )
	Duration: December 2020 to May 2021	followed by BRRI dhan89
		(8.11 tha <sup>-1</sup> ) and BRRI
		dhan74 $(7.16 \text{ tha}^{-1})$ . The
		lowest grain was produced

S1 no	Research Progress	Expected output
51. 110.	Research 110gress	has DDDL dhar 67 (6, 18 that
		by BKKI dnano/ (6.18 tha
		). Total production of all
		the varieties was 18486 kg
		from which 3120 kg was
		retained as seeds (16.9% of
		total production) by the
		farmers for next season
		cultivation. About 705
		farmers gained awareness
		and knowledge about the
		varieties and 142 farmers
		(20.1% of total farmers)
		were motivated to cultivate
		the varieties.
	5.16	Farmers' trainings were
		arranged in Noakhali,
	Title: Farmers Training	Feni, Chattogram, Coxes
		bazar and Khagrachari
		districts with the
		collaboration of DAE as
	Progress: Completed	an important tool to train
	Tigress. Completed	up farmers on updated
		modern rice cultivation
		technologies and to
		encourage them to adopt
	Duration: July 2020 to June 2021	modern rice varieties with
		associated technologies. A
		total number of 35farmers
		trainings on "Modern Rice
		production technology"
		were conducted in five
		different districts during
		the reporting period. In
		farmers training 784 male
		and 226 female farmers
		along with 79 male and 11
		female DAE field stuffs
		participated in which they
		were trained up with rice
		production technology in
		different ecosystem
		especially on tidal
		submergence, salinity and
		favorable environment. A
		total of 1100 farmers and
		DAE staffs were trained
		during the reporting
		period.
	5.17	Field days were arranged
		for awareness building and
	Title: Field Day	create interest among the
		farmers and concerned
		extension agents about the
		modern rice production
		technologies These aided
	Progress: Completed	in wide publicity and
		familiarity of the institute
		our technologies and
		BDDI's contribution
		towards notional aconomic
1		towards national economy.

Sl. no.	Research Progress	Expected output
	Duration: July 2020 to June 2021	About 150-200 persons
		(farmers, researchers,
		extension service
		providers, local leaders, public representatives and
		administrative people etc.)
		were invited in a field day.
		A total of 14 field days
		were arranged during Aus,
		T. Aman & Boro season.
		funded by GOB and 6 by
		SPIRA. Nearly 2250
		progressive farmers, local
		leaders, DAE field stuff,
		public representatives &
		NGO workers participated
	5 10	in those occasions.
	5.18	(TLS) production
	Title: Truthfully labeled Seed (TLS) Production	activities were undertaken
		at BRRI research field
		during Aus, 2020, Aman
		2020 and Boro 2020-21.
		This seed production
		category was an easy way
	Progress: Completed	SCA but quality was
		maintained providing our
		own facilities and
	Durations Luky 2020 to Lung 2021	declared truthfully. Seeds
	Duration: July 2020 to June 2021	were produced as per
		physical and technical
		local need of BRRI.
		Sonagazi. As a result,
		farmers purchased the
		seeds of BRRI released
		varieties. Seeds were also
		organizations Total
		production of TLS during
		Aus, Aman and Boro were
		1500 kg, 11500 kg and
	<b>Z</b> 10	5300 kg respectively.
	۷۱.۶	Nucleus seeds were supplied from Genetic
	Title: Breeder Seed Production	Resources and Seed
		(GRS) Division for
		breeder seed production
		during Aman and Boro
		seasons. BRRI dhan34,
		dhan 82 were cultivated
	Progress: Completed	during Aman season
		where as BRRI dhan28,
		BRRI dhan29 and BRRI
	Durations Luky 2020 to Law 2021	dhan92 during Boro
	Duration: July 2020 to June 2021	season. A total of Breeder
1		seed during Aman and

Sl. no.	Research Progress	Expected output
		Boro were 3.57 tons and
		10.5 tons respectively. All
		produced seeds were sent
		to GRS division of BRRI,
		Gazipur.