Proposed Research Program 2025-2026

Program Area: Varietal Development program (VDP)
Plant Breeding Division

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
1a	Development of Upland Rice (Broadcast Aus)	Development of high yield new rice varieties in combination of multiple traits such as adaptable to direct seeded condition, quick seedling emergence and vigorous growth, short growth duration (90-95 days), tolerance to lodging, drought and pre-harvest sprouting and good eating quality	For B. Aus, promising lines/ varieties will be developed with short duration: 90-95 days, yield potential: 4.0-4.5 t/ha, with early vigor, adaptable to aerobic upland conditions through DSR and dibbling method	1500
1b	Development of Jhum/Hill Rice	Development of high yielding rice variety with low (10-19%) to intermediate (20-25%) and high (25%) grain amylose content and drought tolerance suitable for Jhum cultivation	For Jhum rice, 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 tribal people of Chattogram hill districts will be developed.	800
2	Development of Transplanted Aus (T. Aus) Rice	Introgression of earliness, pre-harvest sprouting tolerance and tolerance to high temperature into high yielding varieties for developing rice varieties with	Promising lines/ varieties will be developed with better yield potential (5.0–5.5 t/ha) and shorter growth duration (105-	2000

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
		slender grain, short growth duration and resistance to major diseases under field condition.	110 days) in comparison to existing varieties	
3	Development of rice for shallow flooded & Deep-water environment	Development of high yielding (4.0-5.0 t/ha) rice varieties for shallow flooded area (up to 1.0 m depth), shallow deep area (30 cm water) and medium deep area (50-60 cm water) along with submergence, facultative/slow elongation and hypoxia tolerance.	High yielding (4.0-5.0 t/ha) rice varieties for shallow flooded area (up to 1.0 m depth), shallow deep area (30 cm water) and medium deep area (50-60 cm water) along with submergence, facultative elongation and hypoxia tolerance will be developed.	1700
4	Development of Rainfed Lowland Rice (RLR) (T. Aman)	Introgression of genes from diverged genetic background for the improvement of standard T. Aman varieties.	Short duration varieties (105-115 days) with 5.0-5.5 t/ha yield potential and medium duration (116-130 days) varieties with 6.0-7.0 t/ha yield potential will be developed.	5000
5	Development of heat tolerant rice (HTR)	Development of varieties/lines tolerant to heat stress with good grain qualities.	Short duration varieties (110-115 days) with 6.0-6.5 t/ha yield potential will be developed.	1000
6	Development of Salt Tolerant Rice variety for T. Aman and Boro Season	Introgression of salinity tolerant traits/ gene (s) in high yielding varieties suitable for RLR and irrigated Boro ecosystem.	Salt tolerant varieties will be developed based on farmers, consumers, miller's preference of target region with seedling stage (EC 14 dS/m) & reproductive stage tolerance (EC 8-10 dS/m) and better	10000

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
			yield potential (5.5-6.5 t/ha for the T. Aman and 7.5-8.0 for Boro season) in comparison to existing varieties	
7a & 7b	Development of Premium Quality Rice (PQR) for T. Aman and Boro Season	National grade (Kalizira, Chinigura, Kataribhog, Banglamoti and BRRI dhan34 type) and international grade (Basmati, Jasmine,) high yielding aromatic varieties with earliness, good plant type, anti-oxidant potential will be developed.	National and international grade premium quality rice variety/line(s) of higher yield potential with or without aroma will be developed for T. Aman and Boro season. At the same time premium quality rice production will be increased in the country.	7000
8	Development of favorable Boro Rice (FBR)	Development of new genotypes based on the farmers and consumers preference with better plant type and major insect and disease resistance.	Rice varieties for favorable irrigated ecosystem will be developed with high yield potential (7.0-8.5 t/ha), earliness to long duration and acceptable grain quality.	5500
9	Development of Cold Tolerant Boro Rice (CTR)	Introgression of cold tolerance gene into high yielding rice genetic background.	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).	9000
10	Development of Pigmented Rice with Nutraceutical Properties for	Development of anthocyanin-enriched, value-added rice genotypes with high yield potential for both rainfed and	High-yielding, anthocyanin-enriched rice variety with enhanced nutraceutical properties will be developed.	1000

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
	T. Aman and Boro season	irrigated ecosystems in Bangladesh.		
11	Development for Zinc Enriched Rice (ZER) for T. Aman & Boro	Development of high yielding rice varieties with improved nutritional quality in term of high zinc (Zn≥24 mg/kg) in polished grain as well as development of stress tolerant with zinc enriched rice varieties like submergence + zinc, drought + zinc, salinity + zinc and cold + zinc with improved grain yield.	Rice varieties with high iron and zinc content with resistance to major insect pests and diseases, abiotic stress tolerance and acceptable grain quality will be developed.	5000
12	Development of Insect Resistant Rice (IRR) for T. Aman & Boro Season	Introgression of genes of BPH, WBPH, GLH and Gall midge resistance into high yielding rice genetic background.	BPH, WBPH, GLH and Gall midge resistant variety 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.	3500
13	Development of Disease Resistant Rice (BB, Blast & RTV) for T. Aman and Boro season	Introgression of high yield, lodging tolerance and disease resistance trait for BB, Blast & RTV.	BB, Blast and RTV resistant varieties will be developed with better yield potential (5.5 – 6.0 t/ha for T. Aman season and 7.5-8.0 t/ha for Boro season).	3000
14	Development of Submergence and Water	Development of high yielding (6.0-6.5 t/ha for non-stress) and (5.0-5.0 t/ha for stress condition) rice varieties tolerant to	High yielding rice varieties with different growth duration and three weeks submergence, stagnant flood tolerances and	3000

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
	Stagnation Tolerance Rice	submergence (flash flooding) and medium stagnant water (MSW) stresses with short/long growth duration, weakly/strongly photoperiod sensitivity, acceptable grain quality etc.	anaerobic tillering capacity with yield target 6.0-6.5 t/ha in normal condition and 5.5 t/ha in stress condition.	
15	Development of Drought Tolerant Rice for T. Aman Season	Development of genotypes superior to standard varieties and adaptable to rainfed lowland drought-prone environment in T. Aman season.	Drought Tolerant Varieties for T. Aman season will be developed with potential yield target (5.0 – 6.0 t/ha).	3000
16	Development of Water Saving Rice	Development of short duration water-use-efficient rice genotypes with 10% more yield than the check varieties under transplanted alternate wetting and drying (AWD) & aerobic condition.	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) & aerobic condition.	1500
17	Development of Transgenic High Beta-carotene Rice and High Iron & Zinc Rice (Healthier Rice), T. Aman and Boro	Ingression of Zmpsy1 and ApFer gene into popular rice varieties through backcross breeding and evaluation of agronomic and product performance (carotenoids/beta-carotene as well as Iron & Zinc level) of the introgressed advanced breeding lines of BRRI dhan29-Golden	Development of high yielding rice varieties with enhanced Provitamin A, high Iron and Zinc content in polished rice grain.	4000

Sl. No.	Program Area/Project (Duration)	Major Objective	Expected output	Annual Budget (Thousand Tk.)
		Rice and High Iron and Zinc Rice (HIZR).		
18	Development of photosensitive Rice for Charland, T. Aman season	Development of strong photo-sensitive (Nizersail type) and medium photo-sensitive (Gainza type) premium quality rice for T. Aman season	Photo-sensitive high yielding varieties will be developed	500
	Total Budget (Thousand Tk.): 68,000/-			

Genetic Resources and Seed Division

Program Area (01): Varietal Development Program (VDP)
Sub-program/VDP component (03): Rice Germplasm and Seed
Program performing unit (04): Genetic Resources and Seed Division (GRSD), BRRI

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
				A. Rice Genebank				
1	**Project 01: Rice Germplasm Collection and Conservation**	Collection and conservation of rice germplasm to enrich the Genebank of BRRI and sharing with rice researchers			**PL: Dr. Md. Abubakar Siddique**			**5.0 GOB**
1.1	Collection of rice germplasm	To collect cultivated and wild rice germplasm from unexplored areas of Bangladesh and to store the collected rice germplasm for different users	1974	At least 200 rice germplasm will be collected from under explored area determined through grid mapping of the genebank accessions.	PI: Head CI:All GRS Scientists.	T Aman and Aus	All over the country.	5.0 and LSTD fun
Expected Output:		• Collected germplasm will be conserved safely and documented along with their characters in Genebank and in computer database. • Conserved germplasm with valuable traits will be made available for utilization as parent material(s) for developing new variety(s)/genotype(s).						
2	**Project 02: Rice Germplasm Maintenance and Management**	Rejuvenation, purification and characterization of rice germplasm for perpetuating genebank accessions and its sharing with rice researchers			**PL: Dr. M Zahidul Islam**			**7.5 GOE**
2.1	Viability testing, periodic evaluation and routine monitoring of stored Germplasm	To investigate status of germination of the Genebank accessions.	1974	Randomly chosen 300 germplasm from short-term, 300 from medium term and 300 from long term storage will be used for germination test. Viability monitoring will be performed twice a year – 1st in March and 2nd in September.	PI: Head CI: MZI (March), MH (September)	T Aman and Aus	BRRI, Gazipur	0.50

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
2.2	Rejuvenation and conservation of rice germplasm	To rejuvenate the Genebank accessions with fresh stock and to register the new collection by giving BRRI Genebank accession number after cross checking the duplication	1974	In T. Aman 2024: 1500 germplasm between acc. no. 5001- 7500	PI: Head CI:All GRS Scientists	T Aman and Aus	BRRI, Gazipur	1.0
2.3	Purification of germplasm in the rejuvenation nursery	To isolate pure and homogeneous germplasm line(s)	2024	In T. Aman 2024: 1500 germplasm between acc. no. 5001- 7500 1. Matching with catalogue 2. Tagging of plants 1) Green Tags – declare Pure 2) Yellow Tags – declare Pure by slight roguing 3) Red Tags – peer review/catalogue call 1. Harvest plants individually from each accession and checking the panicles for genetic purity by the scientists	PI: Head CI:All GRS Scientists	T Aman and Aus	BRRI, Gazipur	0.50
2.4	Purification of germplasm through rapid generation advance	To isolate pure and homogeneous germplasm line(s)	2024	150 priority germplasm that have been used in different breeding programs to address different policies of the government will be purified through application of QC SNP markers followed by SSD based RGA technique will be used.	PI: MMH CI: MZI, PSB	T Aman and Aus	BRRI, Gazipur	5.00
2.5	Morphological characterization and documentation of rice germplasm	To characterize and document the rice germplasm as per BRRI prescribed “Germplasm Descriptors and Evaluation Form" as developed from biodiversity international and UPOV convention	1990	A total of 100 germplasm; 50 each in T. Aman, and T. Aus seasons will be morphological characterized through 53 morpho-agronomic characters by using the ‘Rice Germplasm Descriptors and Evaluation Form (2018) and documented in the database	T Aus: PI: MZI; CI: MMH T. Aman: PI: TC; CI: MSA	T. Aman, and T. Aus	BRRI, Gazipur	1.0

Expected output:

- Genebank accessions will be routinely rejuvenated avoiding duplicates and documented in the restricted database.
- Conserved germplasm with valuable traits will be made available for utilization as parent material(s) for the breeding programs.
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SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
3	**Project 03: Exploratory and Genetic Studies.**	**Exploratory and genetic studies of rice germplasm.**			**PL: Dr. Ebna Syod Md. Harunur Rashid**			**49.5 GOB, KGF-GIF LSDT project**
3.1	Study agronomic performance and photo inductive cycle of the selected photoperiod sensitive rice germplasm collected from Northern districts of Bangladesh	To identify agronomically superior germplasm suitable for post flood late transplanting	2021	A total of 6-8 germplasm selected from previous years trials will be evaluated under late transplanting situation for yield and component traits. Photo-inductive cycle will be studied in collaboration with Plant Physiology Division.	PI: ESMHR CI: Head, Plant Physiology	T. Aman.	GRSD Field and Plant Physiology, Gazipur	0.50
3.2	Development of a duplicate free core set of rice germplasm through QC genotyping and GBS profiling	• to optimize quality checking (QC) standards. • to sort and filter out duplicates of the genebanks accessions. • determination of sequence-based genetic distance and deploying trait-based SNPs.	2024	Around 300 rice germplasm (2400 plant samples) will genotyped using QC-SNP indica panel through outsourcing Extracted DNA of around 300 accessions (1200) plant samples will be used in GBS profiling.	PI: MAS CI: MZI, NM, PSB	Year round	BRRI, Gazipur	KGF, GIF LSTD, PARTNE fund
3.3	Whole Genome Sequencing of GBS purified germplasm	• to develop a sequence repository for downstream analysis. • to facilitate discovery of novel genes and variants associated with traits of interest.	2024	A total of 177 rice germplasm purified through GBS profiling will be used for WGS through outsourcing.	PI: MAS CI: MZI, NM, PSB	**Boro**	GRSD and outside for outsourcing	30.0
3.4	Trait discovery and validation of landrace varieties for specific adaptability (salinity, blast)	• To explore trait marker association for identifying genomic regions/QTLs/genes. • To develop functional makers and validate for specific traits required for climate resilience.	2024	The GBS purified or WGS accessions will be evaluated against salinity/drought tolerance. GWAS will be performed to identify the genomic regions/QTLs/genes based on targeted traits.	PI: MAS CI: MZI, NM, PSB, Scientists from Plant Physiology and Plant Pathology	Year round	GRSD and Plant Physiology	5.0

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
3.5	Deciphering the genetic potential of native rice (Oryza sativa L.) landraces for tolerance to anaerobic germination	To evaluate the rice accessions for anaerobic germination tolerance SNP markers will be used in this study to screen the genotypes for GWAS and to identify the novel QTLs/ genes for AG-related traits by exploring Bangladeshi landraces.	2024	The GBS purified acc. or Aus acc. will be evaluated for tolerance to anaerobic germination.	PI: MZI CI: MMH, MAS, PSB, Head Physiology Div.	Year round	GRSD and Plant Physiology	1.0
3.6	Development of core collection of Pajam group of rice germplasm accessions from BRRI Genebank	To develop the core collection of similar named Pajam group of rice germplasm accessions for pre-breeding materials	2025	Twenty-three (23) similar named Pajam group of rice germplasm accessions from BRRI Genebank along with BR25, BRRI dhan49 and BRRI dhan108 will be evaluated for Agro-morphological and yield contributing traits during T. Aman 2025 for developing its core collection	PI: MSA. CI: TC, NM and MZ	T Aman	GRSD	0.5
3.7	Development of a duplicate free core collection of Nazirsail group of rice germplasm	To identify a duplicate free sub-set of Nazirsail germplasm accessions for future varietal development program	2024	Thirty-three (33) similar named Nazirsail group of germplasm accessions from BRRI Genebank along with BR4, BR22, Nizersail (DA-25) and BRRI dhan49 will be characterized for yield contributing traits	PI: MSA CI: TC, NM and AB.	T. Aman	Field and Mol. Lab, GRSD, BRRI, Gazipur.	2.0
3.8	Evaluation of agronomic performance for Aus rice germplasm of BRRI Genebank for developing its core collection	To evaluate the agronomic performance of Aus germplasm of BRRI Genebank for developing its core collection	2025	A total of 52 Aus rice germplasm accessions of BRRI Genebank along with BRRI dhan42 and BRRI dhan43 will be grown during T. Aus 2026 season. Data on seedling height, culm diameter and height, effective tiller number, panicle length, date of flowering, date of maturity, filled grain number, unfilled grain number, grain length, breadth, decorticated grain length, breadth, TGW, grain yield per hill and plot will be recorded for developing its core collection.	PI: MSA. CI: NM, TC and MMH	T Aus	GRSD field	0.5

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
3.9	Determination of duration of flowering of all Breeder seed producing BRRI developed rice varieties	To determine the duration of flowering of all Breeder seed producing BRRI developed rice varieties for Preparing leaflet on 'Maintaining proper isolation distance in breeder seed plot'	2025	All the Breeder seed producing BRRI varieties at GRSD, BRRI of which 46 in T. Aman 2025 and 27 in Boro 2025-26 seasons will be used for data recording. Sample plants will be the 250 border line plants of each side of each plots. Data on date of flowering (date of anthesis) of both main tiller and panicle bearing tertiary tiller from each variety plot for i) First 5 plants ii) 50% plants iii) Last 5 plants will be recorded.	PI: MSA. CI: ESMHR, MAS, MZI, TC, NM, MMH and PSB.	T Aman	GRSD field	0.5
3.10	Purification and characterization of aromatic rice accessions	To develop a duplicate free aromatic rice germplasm panel	2024	All the aromatic rice accessions present (>150) in the genebank (113) will be characterized for yield and grain size and shape, aroma quality using GCMS trait SNP markers analysis.	PI: AB CI: PSB, GQN Scientist	T. Aman	BRRI, Gazipur & Outsourcing	2.0
3.11	Characterization of Biruin rice germplasm for yield and component traits, amylose and	Investigate amylose and antioxidant content in the Biruin germplasm	2023	Forty-eight Biruin accessions in T. Aman season will be used for this study.	PI: AB CI: MAR, GQN Scientist	T. Aman	GRSD Field and GQND Lab, BRRI	1.0
3.12	Assessment of agronomic performance and trait-based phenotypes of Aus Germplasm	To investigate agronomic performance and response to different biotic and abiotic stress	2023	A total of 100 non-Jhum/non-hilly Aus germplasm available in BRRI genebank will be evaluated against Blast, tungro, heat, preharvest sprouting, anaerobic germination	PI: TC/ESMHR/MZI CI:PSB, Scientists from Plant Pathology and Plant Physiology Division	Aus	BRRI, Gazipur.	1.0
3.13	Molecular characterization of Aus rice germplasm collected from greater Kushtia region of Bangladesh	To characterize the rice germplasm through molecular tools using SNP QC and trait SNP panel	2023	Sixty-six (66) rice germplasm of Aus season from greater Kushtia region (Kushtia, Chuadanga and Meherpur) will be characterized at molecular level using QC and trait SNP panel	PI: NM CI: MAS, TC, MAR	Aus	BRRI, Gazipur.	1.0
3.14	Assessment of agronomic and physico-chemical properties of long slender rice germplasm	• To characterize the rice germplasm • To assess the physico- chemical properties including elongation ratio, amylose and aroma content of the long slender rice germplasm	2023	A total of 20 purified fine rice germplasm which was not will be evaluated for agronomic traits and grain quality	PI: MHKB CI: MSA, ESMHR, MAS, GQN Scientist	T. Aman	BRRI, Gazipur.	0.50

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
3.15	Assesment of physico – chemical properties of red rice germplasm of Bangladesh	To assess the phyco-chemical properties including amylose, mineral and aroma content of the red rice germplasm	2023	A total of 15 Red rice germplasm of Bangladesh will be investigated.	PI: MHKB CI: MSA ESMHR, MAS, Scientist from GQN division	Year round	BRRI Gazipur	0.50
3.15	Morphological and molecular characterization of wild rice accessions	i. To characterize the wild rice accessions. ii. To make a core collection of wild rice accessions.	2024	A total of 77 accessions of wild rice from BRRI Genebank will be characterized. The duplicates will be identified through molecular fingerprinting.	PI: MHKB CI: PSB, MAS, AB and MSA	Year round	BRRI Gazipur	1.0
3.16	Field validation of Blast resistant rice germplasm of Bangladesh.	To validate the rice germplasm for blast resistance in different areas of Bangladesh	2019	A total of 11 resistant genotypes selected from a previous study with 303 rice germplasm will be investigated. BRRI dhan74 as resistance check and BRRI dhan28 and BRRI dhan64 as susceptible check will be used.	PI: MHKB CI: MSA, ESMHR, MAS, MAIK	**Boro**	BRRI R/S Cumilla, Barishal, Rangpur and Gazipur	1.5
3.17	Selection of superior genotypes from T. Aman rice germplasm based on agro-morphological traits	To identify rice germplasm with higher total biomass yield and higher phenotypic acceptance	2024	A total of 50 germplasm will be grown in T Aman season and data will be collected according to the objective. Preliminary selected germplasm will be characterized in details and in a systematic way (with replication) for identification of the better genotypes which will ultimately be used for crossing program.	PI: ESMHR. CI: TC and NM.	T Aman		0.5
3.18	Screening of rice germplasm against pre harvest sprouting (PHS)	To identify rice germplasm resistant to pre harvest sprouting	2024	A total of 100 germplasm will be screened. Standard screening protocol will be followed for screening. Identified genotypes will ultimately be used for crossing program.	PI: ESMHR. CI: TC and NM.	T Aus	BRRI Gazipur	0.5
	Expected output: The genetic parameters/genetic studies of respective year will be helpful for varietal development and other plant breeding related issues.							

	B. Breeder Seed Unit (BSU)							
4	**Project 04: Seed Production and Variety Maintenance**	**Maintenance of nucleus seed stock and production for supplying breeder seeds as per national demand**			**PL= Dr. Mir Sharf Uddin Ahmed.**			**86.0 GOE**

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
4.1	Maintenance of BRRI released and recommended varieties	To maintain genetic purity and homogeneity in morphological characteristics	1990	A total of 107 BRRI developed rice varieties including 56 of T. Aman (up to BRRI dhan111) and 51 of Boro (up to BRRI dhan117) seasons. Also, a total 22 BRRI recommended rice varieties inclusing 10 of both T. Aman and Boro and 12 of T. Aus seasons will be maintained thorough head to row method and roguing.	PI: ESMHR CI: PSB	T. Aman and T. Aus.	BRRI, Gazipur.	1.00
4.2	Nucleus seed production	To produce source seeds for breeder seed production of different BRRI varieties	1990	500-50,000 panicles of each of 67 varieties (42 T.Aman & Aus varieties and 25 Boro varieties) will be produced through head to row method and thorough roguing	Coordinator: MAS PI: All scientists of GRSD	T.Aman	BRRI, Gazipur and all BRRI R/S	20.0
4.3	Breeder seed production	To produce the breeder seed (BS) of BRRI invented rice varieties as per indent of GO, NGOs and PS seed producing organizations/companies/entrepreneurs	1990	• Tentatively a total of 200 tons of breeder seed from 63 varieties (50 tons from 42 T. Aman & Aus varieties and 150 tons from 29 Boro varieties) will be produced. • Each variety will be sown from stored nucleus seed as 'intact panicles' using 'Head/panicle to row' method. • Time isolation distance (21 days gap) will be properly maintained between two adjacent different rice varieties. • Thorough roguing will be done at every crop stage. • Seeds from individual variety will be separately harvested, processed, dried and stored (20˚C with 50% RH).	Coordinator: ESMHR PI (HQ): All scientists of GRSD PI (R/S): Head, R/S.	T. Aman	BRRI, Gazipur and all BRRI R/S.	65.0

Expected output:
- Varietal purity (both genetic and physical) will be maintained.
- Breeder seed will be supplied to GO, NGOs and private sector seed producing organizations.
- Limited quantity of quality seed (QS) will be supplied to other divisions/Regional stations of BRRI and farmers directly or through DAE personnel for experimental/exhibition purpose.

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
5	**Activities of GRS Division**				**PL: Dr. Partha Sarathi Biswas**			**9.5 GOB**
5.1	Rice germplasm supply and exchange	i. To provide/supply rice germplasm accessions from BRRI Genebank to different divisions of BRRI for screening against biotic and abiotic stresses ii. To share germplasm to researchers from home and abroad under certain MTA.	1974	i. Germplasm request from different divisions of BRRI will be supplied. ii. Germplasm request from others in 'BRRI germplasm requested Form' through BRRI authority and necessary MTA will be considered. iii. Maximum 5 g germplasm seed for each entry will be supplied from BRRI Genebank. iv. Database will be maintained.	PI: Head CI: AB	Year round.	GRSD, BRRI, Gazipur.	0.50
5.2	Sending *khudebarta* (SMS) for breeder seed distribution	To make it easy for the clients of BRRI Breeder Seed Network to get the information of BS distribution	2019	All the foundation seed producing seed dealers of BRRI 'Rice Seed Network' will be requested to submit their application. After authorization of the allotment by BRRI authority and uploading in BRRI website, the text messages (SMS) will be sent through mobile apps to each client of SeedNet before each season for distributing breeder seed. This message includes the name of the variety(ies), allotted quantity(ies) and delivery date etc information.	PI: ESMHR CI: MMH, TC, PSB	Aus, T. Aman	GRSD, BRRI, Gazipur.	0.50
5.3	Breeder seed distribution	To supply the breeder seed of BRRI invented rice varieties as per indent of GO, NGOs and PS seed producing organizations/companies/entrepreneurs	1990	After getting breeder seed tag from SCA for tentatively 140 tons produced breeder seed from 67 varieties; in which 40 tons from 42 varieties in T. Aman and 100 tons from 25 varieties in Boro seasons, will be distributed to all applicants of 'BRRI Rice Seed Network' partners.	PI: Head, GRSD CI: ESMHR	Aus, T. Aman	BRRI, Gazipur.	5.0

SN	Experiments /Activities	Specific Objective(s)	Year of Initiation	Materials and Method	Name of PL, PI and CI	Season	Locations	Budget (Lakh Tk source
5.4	Monitoring of breeder and foundation seed production farms	i. To visit breeder seed plots of BRRI regional stations at flowering and maturity stages for ensuring the quality of produced seed as BS standard ii. To visit foundation seed (FS) plots of seed producing agencies at flowering and maturity stages for improving the quality of produced seed as FS standard by sharing experiences	1990	i. Eleven BRRI regional stations will be visited and will be monitored as per the BS field standard of NSB. ii. In total 10-15 FS producing farms will be visited upon request.	For breeder seed plots: PI: Head, CI: MSA (Cum,). ESMHR(Ran,Sat), MAS (Bar, Bhanga), AB (Sonag), MZI (Habi, Raj), MHKB (Gopal), TC (Siraj) and NM (Kus, So), For foundation seed plots: PI: Head CI: ESMHR, MAS	T. Aman	Breeder seed producing plots at eleven BRRI R/S along with GO NGOs and Private Seed Producing Farms.	1.50
5.5	Publication on seed production technology package	To make seed technology knowledge available to the growers by preparing leaflet on seed production techniques for BRRI Rice Seed Network partners	2024	One Thousand (1000) leaflets will be prepared on 1) Cultivation technology of BRRI released varieties, and 2) Maintenance of isolation distance in breeder /foundation seed production	PI: MSA CI: MAS, ESMHR, AB, MHKB, TC, NM, MAR and PSB.	Year round	BRRI Gazipur	2.0
	Publication (leaflet) on BRRI Genebank	To develop leaflet on BRRI Genebank with latest information and pictures for coming visitor(s) of BRRI Genebank	2025	Two thousands (2000) leaflets will be prepared on Breeder seed production/ BRRI Genebank with latest information for coming visitor(s) of BRRI Genebank	PI: MSA. CI: ESMHR, MAS, MZI, TC, NM, MMH and PSB.	Year round	BRRI Gazipur	0.5

PL=Project Leader, **PI=**Principal Investigator, **CI=**Co Investigator; **TA=**T. Aman, **B=**Boro and **TAS=**T. Aus; **PSB**=Dr. Partha Sarathi Biswas, **MSA**=Dr. Mir Sharf Uddin Ahmed, **ESMHR**=Dr. Ebna Syod Md. Harunu Rashid, **MAS**=Dr. Md. Abubakar Siddique, **AB**=Dr. Armin Bhuiya, **MHKB**=Dr. Md. Humayun Kabir Baktiar, **TC**=Tonmoy Chakrabarty, **NM**= Nashirum Monir, **MAR**=Md. Ashiqur Rahman and **MAIK=** Dr. Mohammad Ashik Iqbal Khan (Plant Pathology Div., Head, BRRI Barishal), **MSR**= Dr. Md. Sazzadur Rahman (Plant Physiology Div).

Program Area: Farm Mechanization and Postharvest Technology

Farm Machinery and Postharvest Technology Division

Programme area	**:**	**Farm Mechanization and Postharvest Technology**
1 Project Title	***:***	***Development of Agricultural Machines***
1.1 Experiment Title	***:***	***Evaluating and modifying of BRRI developed machines***
Objectives	:	• To verify the quality of BRRI machines • To identify the functional problems of farm machines • To improve the performance of farm machines
Location (s)	:	FMPHT div. res. workshop and BRRI farm
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-1998 Expected Completion Date: Continuous
Plan of activities to achieve the objective (s)	:	❖ BRRI power weeder, reaper, and head feed thresher will be modified ❖ A laboratory test will be done at the BRRI workshop ❖ Field tests of BRRI machines (Transplanter, USG/Prilled urea applicator, weeder, mini combine harvester, reaper, etc.) will be conducted to identify the functional problems, ❖ After that, rectify or modify the particular machine to improve its performance.
Expected output	:	• The performance of the machine will be improved
1.2 Experiment Title	***:***	***Design and development of walking type power operated rice transplanter***
Name of Investigator (s)	:	PI: MAH CI: AKMS, MMI, HP, SI
Objectives	:	• To design and develop a power-operated rice transplanter • To test the performance of the developed rice transplanter
Location (s)	:	Gazipur, Mymensingh, Netrokona, Habigonj, Rangpur and Comilla
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2019 Expected Completion Date: Continuous
Plan of activities to achieve the objective (s)	:	❖ Different components/parts of the walking-type transplanter will be studied in laboratory conditions. These parts will be used as reference parts to develop the rice transplanter ❖ The power transmission system will be studied for designing different components. ❖ Engineering drawing will be done with the help of three-dimensional AutoCAD tools to develop the mechanical rice transplanter.

		❖ Based on the design, fabrication works will be done in the BRRI research workshop ❖ The fabricated transplanter will be tested in the field and data to be collected. ❖ The mainframe with an engine, gearbox, propeller shaft, picker, handle with the operating lever, Picker with chain cover, Seedling rack, Seedling rack moveable channel, Wheel with chain box, Ordinary stand, Seedling tray slider, Additional rod of the seedling rack, Floating skid, Lever withstand, Spare seedling tray, Marker with furrow closer, Engine cover, seedling tray or mat will be fabricated and assembled.
Expected output	:	A walking type of power-operated rice transplanter will be introduced to the end-users
1.3 Experiment Title	***:***	***Performance evaluation of the laser land leveler with the conventional method***
Name of Investigator (s)	:	PI: MMR CI: AKMSI, SP, AUK
Objectives	:	• To evaluate the performance of laser land leveler and conventional systems • To find the feasibility of the laser land leveler in Bangladesh
Location (s)	:	All over Bangladesh
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ The present study will be carried out in the research farm of BRRI regional station in Sonagazi, Feni, during the Boro season to evaluate the performance of the laser land leveler with the existing system of leveling. A laser guided land leveler (LAZERLI TESVIYE, Model: 1.JNR. 250.CIFT) will be used for the study. The laser-controlled system consisted of (i) Tripod, (ii) Laser Transmitter, (iii) Laser Receiver, (iv) Control Box, (v) Hydraulic Pump, (vi) Drag Bucket. The wooden pegs, spirit level and measuring tape will be used for marking reference points, to ensure accurate leveling off the field, and to measure the distance between reference points.
Expected output	:	Laser land leveler operation will be well known, and use of laser leveler will be introduced.
1.4 Experiment Title	***:***	***Identification and fabrication of fast-moving spare parts of combine harvester and rice transplanter enhancing sustainable mechanization in Bangladesh***
Name of Investigator (s)	:	PI: MAH CI: SI, HP, MMS, SP, MMR
Objectives	:	• To list down the fast-moving spare parts of the different makes and models • To identify the strength and quality of the major parts • To take the initiative for the fabrication of the parts
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The following activities will be conducted under the proposed program.

		❖ Machine model and brand selection ❖ Data collection from the machine and spare parts importers/companies ❖ Spare category: ❖ Maintenance spares ❖ Consumable spares ❖ Commercially viable numbers identification ❖ Shortlisting of the local manufacturers ❖ Sample product manufacturing ❖ Documentation ❖ Training of the local maintenance technicians and manufacturers
Expected output	:	The use of combine harvesters is rising steadily in the country. Now, farmers are given access to various makes and models of combine harvesters, but because spare parts frequently fail, their operation is often interrupted during the peak season. This study will enable the development of commercially viable parts for domestic production, identifying the fast-moving parts. Additionally, it would increase the number of local small business owners, lessen reliance on imports, and make the combine harvester viable and sustainable.
1.5 Experiment Title	:	***Design and development of self-propelled fertilizer deep placement applicator***
Name of Investigator (s)	:	PI: SP CI: MGKB, MAH, MKP, HP, MMR
Objectives	:	• To design, fabricate, and develop a power-operated fertilizer deep placement applicator using an existing developed manual applicator. • To compare with other fertilizer applicators.
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Engine, motor, battery, GI pipe, GI sheet, MS sheet, MS flat bar, and MS shaft will be procured from local markets. ❖ At first, engineering design will be done, and a prototype will be fabricated according to the design. ❖ The existing developed fertilizer applicator will be used as a baseline or reference model. ❖ Power will be incorporated into the developed manual fertilizer applicator with some modifications. ❖ The fabricated power fertilizer applicator will be tested in the field, and data will be collected. ❖ **Data to be collected during laboratory and research field test** ❖ Fertilizer dispensing rate (%) ❖ Deviation of dispensing rate from design rate (%) ❖ Uniformity of fertilizer dispensing (%) ❖ Depth of dispensing (cm) ❖ Covering performance (%)

		❖ Field capacity (ha/h) at different soil conditions. ❖ Operators' opinion
Expected output	:	• Power-operated fertilizer applicator will be developed • Manually fertilizer deep placement difficulties will be solved. • Losses of fertilizer in different ways will be reduced. • Farmers can save time and costs for fertilizer deep placement with a power-operated fertilizer applicator.
1.6 Experiment Title	:	***Design and development of a single-row wetland power weeder***
Name of Investigator (s)	:	PI: SP CI: SI, HP, MMI, MMR, MMS, AUK
Objectives	:	• To design, fabricate, and develop a power-operated single-row weeder suitable for weeding both in a row-to-row and line-to-line of the lowland and upland fields (line and without line sowing). • To evaluate its performance in the different multi-crop fields. • To compare with other dry and wetland paddy weeders
Location (s)	:	BRRI, Gazipur, and Farmers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Engine, GI pipe, GI sheet, MS sheet, MS flat bar, MS shaft, MS flat bar, etc. will be collected from the local market ❖ Engineering design will be done, and a prototype will be fabricated according to the design. ❖ The fabricated weeder will be tested in the FMPHT divisional workshop, farmers' field, and data will be collected. **Data to be collected during laboratory and research field tests** ❖ Walking speed (km/h) ❖ Weeding efficiency (%) ❖ No plant damage ❖ Field capacity (ha/h) at different soil conditions. ❖ Comparison with the BRRI weeder ❖ Operators' opinion
Expected output	:	• Power-operated single-row paddy weeder, as well as a multi-crop weeder, will be developed • Uprooting weeds from plant to plant will be done mechanically. • Extra labor for uprooting weeds from line to line of paddy fields will be reduced. • Farmers can save time and costs for weeding with power-operated machines.
1.7 Experiment Title	***:***	***Performance evaluation of BRRI whole feed combine harvester (model no.- BRRI WCH 2021) under different soil conditions, crop conditions, and seasons***
Name of Investigator (s)	:	PI: AUK CI: AKMSI, MDH, MKP, MMR, SP, MMS

Objectives	:	• To evaluate the performance of the BRRI combine harvester in respect of soil condition, crop condition, and seasons • To establish a relationship between the machine performance and the plough pan depth of the field • To compare the performance of the BRRI combine harvester with the traditional harvesting systems.
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Performance evaluation of the BRRI-developed whole feed Combine Harvester will be carried out during the harvesting period in the fields of BRRI regional stations (Sirajganj, Cumilla, and Gopalganj). ❖ Specific fuel consumption, field capacities (theoretical field capacity and effective field capacity), field efficiency, plough pan depth, harvesting losses, cost of operation, etc., will be studied for both machine harvesting and manual harvesting. ❖ Cost comparisons will be calculated for machine harvesting compared to manual harvesting, and a plot will be selected to determine the harvester's operational speed, field capacity (ha/h), labor requirements, fuel consumption, and grain losses due to the combine harvester. ❖ The area of the plot will be measured with tape. Also, three small areas in the plot were randomly selected to determine shattering loss. Harvested these plots manually and counted the total spikes to estimate the total yield. ❖ After harvesting, three plots randomly collected scattered spikes from selected areas for both manual and combine harvesting.
Expected output	:	The performance of the BRRI-developed combine harvester will be known, and its suitability in various field conditions will be assessed. All the performance data can be easily compared with the imported combine harvester through data analysis by storing the data.
1.8 Experiment Title (New)	***:***	***Improvement of a BRRI Head Feed Combine Harvester for mechanized rice cultivation (BRRI HCH2023)***
Name of Investigator (s)	:	PI: AKMSI CI: MGKB, MKP, MMI, MMA, MAA, MMH
Objectives	:	• To design a head feed combine harvester • To manufacture the designed combine harvester prototype To evaluate the field performance of the developed combine harvester.
Location (s)	:	BRRI HQ and RS
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The design of the head feed combine harvester was done with the help of AutoCAD engineering tools (software). The prototype of the machine will be fabricated by Alim Industries Ltd, Sylhet, in collaboration with other local agricultural machinery manufacturers, according to the design.

Expected output	:	This research is feasible to design, develop, and fabricate a combine harvester to solve farmers' harvesting problems in Bangladesh. All efforts should be made to ensure that the cost of production is significantly reduced, and the combine harvester is readily accessible to small-scale traders and farmers across the country. Harvesting paddy from fragmented farmland in Bangladesh is more efficient and has a comparative advantage over imported combine harvesters. It would be a tremendous success in Bangladesh to fabricate the combine harvester machine using the capabilities of local agricultural machinery manufacturers and the design and technology of BRRI.
1.9 Experiment Title (New)	***:***	***Performance evaluation of the BRRI auto seed sower machine for raising mat-type seedlings***
Name of Investigator (s)	:	PI: AUK CI: AKMSI, SP, MMI, MS
Objectives	:	• To assess the operational performance of the BRRI Auto Seed Sower Machine • To compare the performance with the imported Power Seed Sower Machine, raising seedlings for a mechanical rice transplanter
Location (s)	:	BRRI, Gazipur, and Farmers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 2024 Expected Completion Date: 2027
Plan of activities to achieve the objective (s)	:	❖ The BRRI developed an automatic seed sower machine that was designed and fabricated using AutoCAD. Jigs, fixtures, and molds for the main basement, soil hopper base, seed hopper base, water tank base, and motor basement were developed for quick replication. ❖ Adjusting the lever achieved calibration for different soil types and various sizes of paddy seeds. The prototype's performance was tested in the FMPHT divisional research workshop at Uttaron Engineering, Dinajpur, as well as in farmers' fields. This machine was developed under the BRRI SFMRA project.
Expected output	:	❖ The BRRI auto seed sower machine prototype performed well in tests conducted at research workshops and farmers' fields, yielding satisfactory results. ❖ This technology is viewed as a time-saving solution for efficiently preparing seedling trays for mechanical transplanting, potentially reducing reliance on manual labor.
1.10 Experiment Title (New)	***:***	***Performance evaluation of BRRI Head Feed Combine Harvester (Model-BRRI HCH2023)***
Name of Investigator (s)	:	PI: AUK CI: AKMSI, SP, MMI, MS
Objectives	:	• To assess the field performance of the developed head feed combine harvester • To compare the performance with imported combine Harvester
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027

Plan of activities to achieve the objective (s)	:	❖ Study location and crop Conditions: The BRRI head feed combine harvester performance will be done during Boro 2024 season at the farmers' field. ❖ elected combine harvester ❖ Paddy harvesting using BRRI Combine harvester ❖ Performance representing parameters ❖ Field Capacity ❖ Determination of mechanical harvesting losses ❖ Time distribution of combined harvester operation
Expected output	:	The performance of BRRI head feed combine harvesters compared with imported combine harvesters under different soil conditions and crop conditions and harvesting a variety of grain crops. The developed BRRI head feed combine harvester would be able to meet the domestic demand for agricultural machinery, reduce import dependence, and export it abroad with more government policy support.
1.11 Experiment Title (New)	***:***	***Improvement of a BRRI whole feed Combine Harvester (Model BRRI WCH2021)***
Name of Investigator (s)	:	PI: AKMSI CI: AUK, MKP
Objectives	:	• To identify areas for improvement in the BRRI Whole Feed Combine Harvester (Model BRRI WCH2021) • To design and fabricate a BRRI whole feed combine harvester based on the performance, repair, and maintenance facility • To evaluate the performance test of the developed combine harvester • To compare the performance with the imported combine Harvester
Location (s)	:	Alim Industries Ltd, Sylhet
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The whole feed mini combine harvester was designed with the help of AutoCAD engineering tools (software). ❖ Alim Industries Ltd, Sylhet, will fabricate the machine prototype according to the design with the help of other local agricultural machinery manufacturers.
Expected output	:	❖ This research shows that it is possible to design, develop, and fabricate a combine harvester to solve farmers' harvesting problems in Bangladesh. ❖ All attempts should be taken to ensure the cost of production is significantly reduced, and the combine harvester is readily accessible to small-scale traders and farmers of the country. ❖ Harvesting paddy from fragmented farmland in Bangladesh is more efficient and has a comparative advantage over imported combine harvesters. ❖ Fabricating the combine harvester machine using the capabilities of local agricultural machinery manufacturers and BRRI's design and technology would be a tremendous success in Bangladesh.
1.12 Experiment Title (New)	***:***	***Design, Development, and Fabrication of a BRRI ride-on rice transplanter for mechanical rice planting***
Name of Investigator (s)	:	PI: AKMSI CI: AUK, MKP

Objectives	:	• To design and develop of BRRI ride-on Rice transplanter • To evaluate the performance test of the developed Rice transplanter • To progress mechanized rice transplanting direct seedlings, including direct and precision rice seedling technologies
Location (s)	:	BRRI, Gazipur
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Conduct a thorough analysis of the requirements and specifications for the ride-on type rice transplanter, considering factors such as field conditions, terrain, planting density, and operational efficiency. ❖ Gather feedback from farmers, agricultural experts, and stakeholders to understand their needs and preferences. Based on the identified requirements and constraints, generate initial design concepts. ❖ Explore different design alternatives and evaluate their feasibility, considering factors such as ease of operation, ergonomics, fuel efficiency, and maintenance requirements. ❖ Develop manufacturing processes for each part of the transplanter. Based on the detailed design, fabricate a prototype of the ride-on type rice transplanter. Conduct rigorous testing and validation of the prototype under controlled laboratory conditions to assess its functionality, durability, and performance. ❖ Conduct extensive field testing of the prototype in real-world agricultural settings, including various soil types, slopes, and weather conditions.
Expected output	:	Continued research in precision technology for rice transplanting remains essential for enhancing efficiency and effectiveness in rice cultivation. The advancement of rice transplanters offers several key benefits. The developed rice transplanter i) saves labour cost, timeliness of transplanting, and water savings ii) The seedlings are planted at uniform spacing and sufficient depth iii) Increase in productivity compared to hand transplanting.
1.13 Experiment Title (New)	***:***	***Harvesting Performance and grain losses: Impact of paddy harvester type, speed, and crop density***
Name of Investigator (s)	:	PI: MAH CI: BCN, SP, AUK, JN
Objectives	:	• To assess the harvesting performance of different paddy harvester types under various operational speeds and crop density conditions. • To measure grain losses associated with each harvester type and operational setting. • To identify the optimal operational parameters for different crop densities to minimize losses and enhance efficiency.
Location (s)	:	Different regions of Bangladesh based on BRRI R/S
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	**Experimental Design:** • Three factors factorial design will be applied to conduct the study.

		• Selection of different types of combine harvesters. • Testing at different operational speeds (low, medium, and high) in fields with varying crop densities (low, medium, and high). • Replicated trials in different regions to account for environmental variations. • Other parameters will try to maintain the same for the study. **Data Collection:** • Harvesting efficiency (rate of area coverage, fuel consumption, specific fuel consumption, and field capacity). • Grain losses are categorized as pre-harvest losses, header losses, cylinder losses, separation losses, and total losses. • Crop density measurements and lodging percentage assessment. **Data Analysis:** • Statistical analysis to compare performance and losses across harvester types, speeds, and crop densities. • Regression analysis to determine the relationship between operational parameters and grain losses. • Economic assessment of cost-effectiveness for each harvester type and speed combination.
Expected output	:	• Identification of the most efficient harvester type and operational speed for different crop densities. • Recommendations to optimize mechanized harvesting strategies in Bangladesh.
1.14 Experiment Title	***:***	***Design and Development of an Automated Rodent Trap for Reducing Post-Harvest Losses of Rice***
Name of Investigator (s)	:	PI: MMA CI: BCN, SP, GKB, HR, MMH
Objectives	:	• Design and development of an automated rodent trap • Performance evaluation of the fabricated trap
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The study will be conducted at the Farm Machinery and Post Harvest Technology (FMPHT) Division, BRRI, Gazipur. The layout of the automated mouse trap will be designed in AutoCAD Engineering Drawing tools. The following materials will be used to provide the physical shape of the automated mouse trap: ❖ Motor (6 V DC) ❖ PIR Sensor ❖ Circuit ❖ LED light ❖ Lithium battery (3.7V, 1000mAh) etc.
Expected output	:	• Eco friendly mouse trap will be developed • Post-harvest loss will be reduced
1.15 Experiment Title (New)	***:***	***Performance Evaluation of the Yanmar Intelligent (Model: 6114R) Combine Harvester***

Name of Investigator (s)	:	PI: MMR CI: MDH, BCN, MKM, SP
Objectives	:	• To evaluate the performance efficiency of the combine harvester. • To assess the yield monitoring and yield loss in real time.
Location (s)	:	FMPHT division and Farmer's fields
Status of the Experiment	:	❖ On-going (Continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ **Field Trials:** Conduct field trials to evaluate the combine harvester's performance. ❖ **Laboratory Analysis:** Perform laboratory analysis on harvested grain samples to assess quality parameters such as moisture content, damage levels, and nutritional value. ❖ **User Experience Assessment:** Gather feedback from operators and farmers through structured interviews and surveys to evaluate the ease of operation, maintenance, and overall user satisfaction. ❖ **Statistical Analysis:** Employ statistical methods to analyze the collected data and derive meaningful insights regarding the combine harvester's performance across various parameters.
Expected output	:	Performance evaluation of the Yanmar Intelligent (Model: 6114R) Combine Harvester will be carried out.
1.16 Experiment Title (New)	***:***	***Design and development of a rice straw-baler***
Name of Investigator (s)	:	PI : BCN CI: SP, MDH, MGKB
Objectives	:	• To design and develop a prototype of a straw baler • To evaluate the performance of the developed straw baler • To assess the straw baler's economic viability
Location (s)	:	FMPHT workshop, BRRI farm Gazipur/ Fulbari, Dinajpur/other locations
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	The following materials and equipment will be used in the design and development of the straw baler: ▪ **Structural Components:** Mild steel, angle bars, and galvanized sheets for the mainframe and housing. ▪ **Baling Mechanism:** Rollers, compression chamber, and binding system for forming compact straw bales. ▪ **Power Source:** Small diesel/petrol engine or tractor PTO (Power Take-Off) for operating the baler. ▪ **Transmission System:** Chain, sprocket, belt, and pulley mechanism to transfer power to the baling components. ▪ **Rubber wheels and chassis** **Data to be collected** **Baler Performance Data** ▪ Bale dimensions (length × width × height, cm)

		▪ Bale weight (kg) ▪ Baling capacity (kg/hour or bales/hour) ▪ Bale density (kg/m³) ▪ Compression ratio (%) **Operational Efficiency Data** ▪ Fuel or power consumption (L/hour or kWh/hour) ▪ Time required per bale (minutes/bale) ▪ Labor requirement (number of workers and time per hectare) ▪ Field capacity (ha/hour) **Economic Data** ▪ Production cost of the baler (BDT/unit) ▪ Operational cost (BDT/hour or BDT/bale) ▪ Cost-benefit analysis (profit/loss per hectare or bale) ▪ Market value of baled straw (BDT/kg or BDT/bale)
Expected output	:	A cost-effective and efficient straw baler will be available
1.17 Experiment Title (New)	***:***	***Effects of Urea Fertilizer Management on GHG Emission and Rice Yield Using BRRI Prilled Urea Applicator***
Name of Investigator (s)	:	PI: MKM CI: MM Haque, MMR
Objectives	:	• To evaluate the impacts of different fertilizer application methods on greenhouse gas (GHG) emissions. • To assess the yield performance of BRRI Dhan 89 under varied fertilizer treatments.
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	**Experimental Design** • Design Type: Randomized Complete Block Design (RCBD) • Replications: 3 • Crop Variety: BRRI Dhan 89 **Treatments** 1. Control: No urea fertilizer applied. 2. Hand Broadcasting: Urea applied 3 times, with a total of 40 kg per bigha. 3. Prilled Urea Applicator: Single urea application, 28 kg per bigha (30% reduced application compared to hand broadcasting). **Plot Layout** • Plots will be arranged randomly with three replications per treatment to ensure reliable statistical analysis.

		• Each plot size and field preparation will follow standardized agronomic practices for BRRI Dhan 89 cultivation. ***Data Collection*** • Agronomic Data: o Days to Sowing (D/S) o Days to Transplanting (D/T) o Yield per plot (kg) o Biomass accumulation • Environmental Data: o Greenhouse gas emissions, specifically nitrous oxide (N2O) flux measurements. **GHG Monitoring** • Gas samples will be collected using static chambers from each plot and analyzed in a laboratory to measure N2O emissions. Data will be recorded at regular intervals post-fertilizer application.
Expected output	:	✓ Identification of the most efficient fertilizer application method to reduce GHG emissions. ✓ Enhanced yield performance of BRRI Dhan 89 under optimized fertilizer management. ✓ Contribution to sustainable agricultural practices through the adoption of Prilled Urea Applicator technology.
1.18 Experiment Title (New)	***:***	***Improvement of BRRI Prilled Urea Applicator***
Name of Investigator (s)	:	PI: MKM CI: MMR
Objectives	:	• To improve the design of the BRRI Prilled Urea Applicator for increased field efficiency. • To redesign the metering device and controlling system for better accuracy and ease of operation. • To modify the skid design to require less power and be easier to manufacture. • To evaluate the improved applicator under field conditions and compare its performance with the existing model.
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	• Review of Existing Design: Analyze the current BRRI Prilled Urea Applicator's performance, identifying key limitations through field observations and farmer feedback. • Design Modifications: Propose and implement design improvements, including nozzle adjustments, metering mechanisms, controlling systems, and ergonomic features. • Skid Enhancement: Develop a new skid design that requires less power to push and is easier to fabricate. • Prototype Development: Fabricate an improved version incorporating the modifications. • Field Trials: Test the improved applicator in multiple rice-growing regions to evaluate efficiency, uniformity, and ease of use.

		• Comparative Analysis: Assess the performance of the improved applicator against the current model in terms of nitrogen use efficiency, yield impact, and labor requirements. • Final Adjustments and Recommendations: Refine the design based on field trial results and farmer input.
Expected output	:	• A more efficient and user-friendly Prilled Urea Applicator. • Improved nitrogen use efficiency leading to better rice yields. • Reduced labor and time required for urea application.
1.19 Experiment Title (New)	***:***	***Design and development of a high-capacity head feed thresher***
Name of Investigator (s)	:	PI: SP CI: MDH, BCN, MGKB, MMR, MMA
Objectives	:	• To develop and fabricate a high-capacity head feed paddy thresher • To evaluate the performance of the developed thresher
Location (s)	:	FMPHT workshop and Agricultural machinery manufacturers (Dinajpur/Netrokona/Choyadanga/ other places)
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Postharvest Technology (FMPHT) Division, BRRI, Gazipur and Fulbari, Dinajpur district. The design, development, and fabrication will be done in the BRRI research workshop/Arfat Engineering at Fulbari, Dinajpur, under a public-private partnership (PPP) to develop a high-capacity head feed thresher. AutoCAD/SolidWorks engineering tools will be used for design. **Prototype development process** ***a. Prototype Development:*** i. Collaborate with local agricultural machinery manufacturers to design and fabricate a high-capacity head feed paddy thresher prototype. ii. Incorporate features addressing challenges Bangladeshi farmers face, such as variations in paddy varieties and field conditions. ***b. Performance Evaluation in Bangladesh Conditions:*** i. Conduct extensive field trials in different regions of Bangladesh to assess the prototype's efficiency and adaptability. ii. Collect feedback from farmers on the usability and practicality of the modified thresher. ***c. Economic Feasibility Assessment:*** i. Analyze the cost of production, maintenance, and potential economic benefits for Bangladeshi farmers. ii. Assess the modified thresher's affordability and return on investment in the local context. **Design considerations**

		❖ The high-capacity head feed paddy thresher should be optimized for Bangladesh's diverse rice varieties (Aus, Aman, Boro) and field conditions, ensuring adaptability to moisture variations and minimizing grain loss. ❖ The design should maximize threshing efficiency while preserving unbroken straws, essential for cattle feed and household fuel in Bangladesh. ❖ Key mechanical improvements should include an optimized drum configuration, efficient feeding mechanisms, durable materials, and a user-friendly operation system. ❖ The machine must balance high performance with economic feasibility, reducing fuel consumption, lowering labor requirements, and ensuring affordability for smallholder farmers. **Data to be collected:** To evaluate the performance and efficiency of the high-capacity head-feed thresher, the following data will be collected: **Machine Performance Parameters** ➢ Threshing capacity (kg/h) – Amount of paddy processed per hour ➢ Threshing efficiency (%) – (Grain threshed / Total grain) × 100 ➢ Cleaning efficiency (%) – (Clean grain / Total threshed grain) × 100 ➢ Grain output rate (kg/h) – Amount of clean grain collected per hour ➢ Unthreshed grain loss (%) – (Unthreshed grain / Total grain) × 100 ➢ Straw length after threshing (cm) – Average length of straw after processing ➢ Fuel/power consumption (L/h or kWh) – Fuel or electricity used per hour **Crop Parameters** ➢ The moisture content of paddy (%) – Measured before and after threshing ➢ Straw moisture content (%) – Water content in straw before threshing ➢ Grain-straw ratio – Ratio of grains to straw in the harvested crop **Economic Parameters** ➢ Labor requirement (person-hours/ton) ➢ Operational cost (BDT/kg or BDT/h)
Expected output	:	i. A high-capacity, cost-effective head feed paddy thresher prototype will be developed. ii. The thresher efficiency and adaptability will be improved in diverse regions of Bangladesh.
1.20 Experiment Title (New)	***:***	***Performance evaluation of the BRRI-developed rice transplanter***
Name of Investigator (s)	:	PI: AUK CI: AKMSI, MSK, JN
Objectives	:	• To assess the performance of the BRRI-developed walking and riding-type rice transplanter • To compare the performance of the imported rice transplanter.
Location (s)	:	All over the country

Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	The developed 6-row rice transplanter will be tested in the research workshop, and its functional trials will be conducted in the farmers' fields at Rajshahi and Bogura. A rice transplanter is used to increase the speed of the transplanting operation and properly place paddy seedlings in rows. It will be developed for rice (Oryza sativa) to find a possible solution to the problems associated with rice transplanting. The machine will be developed considering various factors affecting the performance of the transplanter. The experimental field will be plowed, and the weeds will be removed. Water will be applied to the field to create a steady-state condition for the transplanting operation, and the water will be drained out 24 hours before transplanting. **Data to be collected:** • Line to line and plant-to-plant spacing • Seedling height and density • Seedling depth • Machine adjustment • Missing hills • Floating hills • Damaged hills • Fuel Consumption • Field capacity • Field efficiency
Expected output	:	• Due to its higher yield, the transplanting method is expected to become more popular among farmers for the sustainable future of rice farming. • Coordinating initiatives by implementing appropriate guidelines and collaborative efforts between public and private sector entities is imperative to advance agricultural mechanization effectively.
1.21 Experiment Title (New)	***:***	***Moisture content effect on rice at threshing and cleaning of combine harvester***
Name of Investigator (s)	:	PI: JN CI: MDH, MGKB, MAH, BCN, SP, MMR
Objectives	:	• To assess the field performance of combine harvester at varying moisture levels • To observe the threshing and cleaning efficiency of the combine harvester at varying moisture levels • To quantify grain losses and breakage at varying moisture levels.
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025

		Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	**Study Area and Rice Variety** • The study will be conducted at FMPHT Division, BRRI, Gazipur, Bangladesh. • Focus will be on widely cultivated rice varieties with different moisture content characteristics. **Data Collection and Experimental Design** **Effect of Moisture Content on Rice Harvesting** • Moisture content of rice grains will be measured at different harvesting times (18%, 20%, 22%, and 25%). • Grain loss, breakage, and harvesting efficiency will be analyzed. **Moisture Content vs Time** • The impact of time delays on moisture content reduction and its influence on harvesting efficiency will be studied. **Moisture Content vs Machine Operation Problem** • How different moisture levels cause machine clogging, inefficiencies, and increased fuel consumption will be evaluated. **Moisture Content vs Machine Efficiency** • Machine performance at different moisture content levels will be recorded, focusing on fuel consumption, operational time, and yield loss. **Effect of Moisture Content on Threshing** • The study will examine how moisture levels affect threshing efficiency, grain separation, and threshing losses. **Moisture Content vs Paddy Breakage** • The relationship between moisture content and grain damage during mechanical and manual threshing will be analyzed. **Moisture Content vs Cleaning Problem** • The impact of moisture content on cleaning efficiency and grain purity post-threshing will be studied. **Moisture Content vs Efficiency of the Machine** • Threshing machine performance at different moisture levels will be recorded. **Effect of Moisture Content on Thresher Cylinder Speed** • The correlation between moisture content and optimal cylinder speed to minimize grain damage will be determined. **Effect of Moisture Content on Parboiling** • The effect of moisture content on hydration, gelatinization, and final rice quality during parboiling will be investigated. **The Effect of Moisture Content of Rice on Drying** • Drying performance for different moisture content levels using sun drying and mechanical drying will be compared. **Effect of Moisture Content on Milling**

		• Milling yield, head rice recovery, and grain breakage at varying moisture levels will be assessed. **Effect of Moisture Content on Seed Storage and Germination** • The impact of moisture content on seed viability, fungal growth, and germination rate will be examined over different storage durations.
Expected output	:	• Identifying optimal moisture content levels for harvesting, threshing, drying, and milling. • Reduced grain losses through improved moisture management strategies. • Enhanced milling yield and storage quality for long-term food security.
1.22 Experiment Title (New)	***:***	***Development of an improved multi-crop winnower***
Name of Investigator (s)	:	PI: MSK CI: AKMSI, MDH, MGKB, MAH, BCN, SP, JN
Objectives	:	• To develop an improved multi-crop winnower • To evaluate the performance of the developed multi-crop winnower
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	Developing a power-operated multi-crop winnower involves fabricating prototypes, testing them, and optimizing their performance based on field trials. Key performance indicators include winnowing efficiency (%), throughput capacity (kg/hr), and power consumption (kWh). The economic viability of the machine is also assessed through cost-benefit analysis, labor savings, and return on investment for farmers. The design and development process focuses on utilizing locally available materials and integrating compact, affordable, and compatible technology. **Materials** • Structural Components: Mild steel, sheet metal for the mainframe. • Sieving Mechanism: Multiple sieves with different mesh sizes to separate grains efficiently • Transmission System: Belt and pulley mechanism for power distribution. • Power Source: Electric motor **Design considerations** Crop Versatility: The winnower should be adaptable to different crops like rice, wheat, and maize Winnowing Efficiency: Should effectively separate grains from chaff, husk, dust, and other impurities. Airflow and Fan Design: Energy-efficient fan operation to reduce power consumption. Sieving Mechanism: Multiple sieves with different mesh sizes to separate grains efficiently. Power Source and Energy Efficiency: Low power consumption design for cost-effectiveness. Cost and Affordability: Should be affordable for small and medium-scale farmers. Machine development will be conducted in the FMPHT divisional workshop.
Expected output	:	A cost-effective, improved multi-crop winnower will be developed.

1.23 Experiment Title (New)	***:***	***Design and development of a boat-type hydro-tiller***
Name of Investigator (s)	:	PI: MAfH CI: MMA
Objectives	:	• To design and develop a boat-type hydro-tiller • To evaluate the performance of the developed boat type hydro-tiller
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	
Expected output	:	
2 Project Title	**:**	**Milling and Processing Technology**
Project Objectives	:	• To reduce loss, improve quality, and add value to the farm products
2.1 Experiment Title	***:***	***Design and development of a solar dryer***
Name of Investigator (s)	:	PI: SP CI: MDH, BCN, MGKB, BKB
Objectives	:	• To design, fabricate, and develop a solar dryer • To compare with the traditional sun drying of paddy
Location (s)	:	FMPHT Division Milling Laboratory
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2022 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ GI pipe, GI sheet, MS sheet, MS flat bar, MS shaft, Glass, Solar collector, blower/fan, Wooden bar, etc,. will be collected from the local market ❖ Engineering design will be done, and a prototype will be fabricated according to the design. ❖ The fabricated dryer will be tested in the FMPHT divisional workshop, and data will be collected.
Expected output	:	A new solar dryer will be available for grain drying.
2.2 Experiment Title	***:***	***Design and development of a compact rice mill***
Name of Investigator (s)	:	PI: MGKB CI: AKMSI, MDH
Objectives	:	• To design and fabricate a compact rice mill • To evaluate the performance of the fabricated rice mill
Location (s)	:	FMPHT Division Milling Laboratory
Status of the Experiment	:	❖ On-going (continuous)

		Starting Date: 01-07-2022 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ Two 15 cm rubber rolls will be set for de-husking, and one husk aspirator will be set to collect the husk ❖ Below the de-husker 15 cm diameter and 60 cm length stone polisher will be used for polishing brown rice, and one blower will be used to collect bran ❖ Below the polisher, one sieve will be set for grading rice. ❖ A 22 kW 3 Phase motor will be set up in the base of the compact rice mill that will operate the de-husker, polisher, and sieve through the pulley and shaft **Materials** ❖ 22 kW motor ❖ 15 cm rubber roll ❖ 15cm dia. and 60 cm length stone polisher ❖ Blower, husk aspirator ❖ Angle bar, flat bar, nut bolt, pulley, shaft, etc.
Expected output	:	A compact rice mill will be developed and introduced to the end-users
2.3 Experiment Title	***:***	***Design and development of a mini rice mill for homestead-level use.***
Name of Investigator (s)	:	PI: MAH CI: GKB, HP, SP, AUK
Objectives	:	• To design and develop a mini rice mill suitable for individual households • To evaluate the milling performance using different rice verities under different conditions • To analyze the cost of milling and the pay-back period.
Location (s)	:	FMPHT Division Milling Laboratory
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ Design, fabrication, evaluation, and improvement of the mini rice mill will be part of the proposed program. Standard engineering procedures will be followed to design the size, type, and number of belts, sheave size, take-up allowance for the idler sheave, power transmission mechanism, and other relevant components. **Fabrication** ❖ Prototypes will be fabricated in the FMPHT divisional research workshop based on the design. The existing workshop facility will be used to fabricate all components. **Data to be collected during laboratory and research field tests** ❖ Total weight and weight balance of the developed mill, ❖ Milling performance for different varieties under different conditions ❖ Cost analysis and pay-back period of the mill

		❖ Load-bearing capacity under different feeding rates
Expected output	:	A suitable mini rice mill will be available at the household level.
2.4 Experiment Title	***:***	***Design, development, and fabrication of a recirculating-type smart dryer for drying paddy***
Name of Investigator (s)	:	PI: AKMSI CI: MAfH, AUK, MKP
Objectives	:	• To design and develop a recirculating-type smart dryer tailored specifically for paddy drying applications. • To implement advanced sensing and control technologies to create a smart drying system. • To conduct comprehensive testing and validation of the smart dryer prototype to evaluate its performance. • To assess the economic feasibility and potential scalability of the smart dryer technology for adoption in small to medium-scale rice processing facilities.
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2024 Expected Completion Date: 3-06-2027
Plan of activities to achieve the objective (s)	:	❖ The experimental recirculating type smart dryer is being built to optimize dryer performance, particularly regarding specific energy consumption. However, various factors affect drying economics, such as drying duration, paddy quality, and weather. ❖ It includes an electric heating unit, hot air conveying pipeline, air supply system, and data acquisition unit. The study will vary drying air temperature (45 and 50°C, mass flow rate, grain moisture content, air temperature, and humidity.
Expected output	:	This research could include a functional prototype of the smart dryer, detailed technical documentation for fabrication and operation, implementation of advanced sensing and control technologies, integration of energy-efficient features, comprehensive performance validation, assessment of economic feasibility, and dissemination of findings to promote adoption in the rice industry.
2.5 Experiment Title	***:***	***Design and Development of a Two-Stage Rice Mill***
Name of Investigator (s)	:	PI: MGKB CI: MDH, BCN, SP, MMR
Objectives	:	• To design and fabricate a two-stage rice mill • To evaluate the performance of the fabricated rice mill • Compare the performance with the engelberg huller
Location (s)	:	FMPHT division and M/S Salam Engineering Works, Gopalganj Bazar, Dinajpur
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027

Plan of activities to achieve the objective (s)	:	❖ Design, fabrication, evaluation, and improvement of the two-stage rice mill will be part of the proposed program. Standard engineering procedures will be followed to design the size, type, and number of belts, sheave size, take-up allowance for the idler sheave, power transmission mechanism, and other relevant components. **Fabrication** ❖ Prototypes will be fabricated in the FMPHT divisional research workshop based on the design. **Data to be collected during laboratory and research field tests** ❖ Milling performance for different varieties under different conditions ❖ Cost analysis and pay-back period of the mill ❖ Load-bearing capacity under different feeding rates
Expected output	:	• A suitable two-stage rice mill will be available.
2.6 Experiment Title	***:***	***Design and Development of Paddy Collector***
Name of Investigator (s)	:	PI: MGKB CI: MDH, BCN, SP, HR, MMA
Objectives	:	• To design and develop a Paddy collector • To evaluate the performance of the fabricated collector • Compare the collector with the manual method • Disseminate the Paddy collector
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The study will be conducted at the Farm Machinery and Post Harvest Technology (FMPHT) Division, BRRI, Gazipur. The design will be done using AutoCAD Engineering Drawing tools. ❖ The prototype will be fabricated according to the design and drawing ❖ After fabrication, the FMPHT divisional workshop will evaluate the prototype. ❖ Required data will be collected and analysed.
Expected output	:	❖ An innovative paddy collector will be introduced to the farmers. ❖ Paddy collection will be more accessible in a bag
2.7 Experiment Title (New)	***:***	***Development of a Small-Scale Boiler for Small-Scale Rice Millers***
Name of Investigator (s)	:	PI: MAH CI: BCN, SP, MAUK, MMA
Objectives	:	• Develop a cost-effective, fuel-efficient boiler suitable for small-scale rice millers. • Ensure that the boiler operates safely and efficiently while minimizing environmental impact. • Utilize locally available materials and technology to make it accessible for small millers. • Enhance the parboiling process by improving steam generation and heat transfer efficiency.

Location (s)	:	FMPHT Divisional Workshop
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2029
Plan of activities to achieve the objective (s)	:	• **Compact and Portable:** Designed for ease of transportation and installation. • **Fuel Efficiency:** Ability to operate on locally available biomass, husk, or other alternative fuels. • **Safety Features:** Equipped with pressure relief valves, temperature control systems, and efficient combustion mechanisms. • **High Thermal Efficiency:** Improved heat transfer mechanisms to optimize steam production. • **Ease of Maintenance:** Simple design for easy cleaning and maintenance by small-scale millers.
Expected output	:	• Enhanced efficiency and productivity for small-scale rice millers. • Reduction in energy costs by utilizing locally available biomass. • Improved rice quality due to better steam generation. • Increased sustainability in the rice milling sector.
2.8 Experiment Title (New)	***:***	***Design and development of a portable mini rice mill with an integrated grinder for small-scale use.***
Name of Investigator (s)	:	PI: SP CI: BCN, MDH, MGKB, MR, MMA
Objectives	:	• To develop and fabricate a cost-effective portable mini rice mill • To develop a multifunctional system with a grinding facility • To evaluate the performance of the developed mill
Location (s)	:	FMPHT Divisional Workshop
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	**Design and Fabrication** • Design the machine using CAD/SolidWorks software to ensure optimal dimensions and integration of milling and grinding units. • Fabricate the frame and mount all components, including the milling drum, grinding plates, motor, and transmission system. **Integration of Milling and Grinding Functions** • Install a dual-purpose system, ensuring that the rice milling unit can operate independently or simultaneously with the grinding unit. • Test the compatibility of both functions to ensure smooth and efficient operation without interruptions. **Testing and Optimization** • Test the machine with varying quantities of paddy and by-products to evaluate milling efficiency, grinding performance, and power consumption.

		• Optimize the design by adjusting drum speed, grinding plate clearance, and motor power to achieve maximum efficiency. **Data Collection and Analysis** • Record data on milling capacity (kg/hour), grinding efficiency (fineness of output), energy consumption, and operational costs, etc. • Analyze results to compare performance against traditional methods and large-scale machines. **Field Testing** • Deploy the machine in rural settings for field testing. • Collect feedback from users to identify further improvements
Expected output	:	• A fully functional, lightweight, cost-effective, and user-friendly compact mini rice mill with integrated grinding capability will be developed for easy transportation and use in rural and remote areas. • The efficiency of rice milling will be enhanced with minimal grain breakage and a grinding unit for processing by-products.
3 Project Title	***:***	***Development of stores and storage technology***
Project Objectives	:	• To increase the shelf life of rice in the store
3.1 Experiment Title	***:***	***Effect of ageing on milling performance of premium quality rice***
Name of Investigator (s)		PI: S Islam CI: MAH, MDH, MGKB, MMR, HP
Objectives	:	• To observe the milling performance of BRRI dhan50 at different aging
Location (s)	:	• FMPHT divisional workshop
Status of the Experiment	:	❖ On-going (Modified) Starting Date: 01-07-2017 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Premium quality paddy, rice mill, balance, moisture meter, plastic drum, etc,. will be needed to conduct this program. ❖ BRRI dhan50 will be stored in the proven storage system (plastic drum). ❖ Milling quality will be assessed every two months up to two years from the time of storage.
Expected output	:	The appropriate milling age of BRRI dhan50 will be decided.
4 Project Title	***:***	***Renewable Energy Technology***
Project Objectives	:	• Development of renewable energy extraction technologies from solar, agri-residues, and waste products
4.1 Experiment Title	***:***	***Study on solar energy utilization for small agricultural machinery***
Name of Investigator (s)	:	PI : S Paul CI: MDH, MGKB, MMR, MAH, HR (WMM)
Objectives	:	• To design the mechanism of solar energy utilization • To evaluate the performance of the developed machine
Location (s)	:	FMPHT Lab and Gazipur

Status of the Experiment	:	❖ On-going (Modified) Starting Date: 01-07-2021 Expected Completion Date: 30-07-2026
Plan of activities to achieve the objective (s)	:	❖ Solar (PV) panels, Engine, three-phase motor, controller, inverter, battery, bulb, electric cable, digital multi-meter, GI pipe, GI sheet, MS sheet, MS flat bar, and MS shaft will be used for fabricating the solar system ❖ A flow chart diagram of the developed process will be done ❖ The solar energy system will be developed and tested for the operation of small agricultural machinery.
Expected output	:	• Solar-operated power machinery will be developed. • Operation costs will be reduced
4.2 Experiment Title	***:***	***Design and develop a solar-powered smart bird-repellent***
Name of Investigator (s)	:	PI: MMR CI: MMH, MHR, SP, MDH
Objectives	:	• To design an audio player using Arduino software • To identify the scary melodies for granivorous birds • To test the performance
Location (s)	:	FMPHT Lab and Gazipur
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ The research will be conducted at the Farm Machinery and Postharvest (FMPHT) Division in BRRI, Gazipur. The framework of the bird repellent will be designed using SolidWorks 2013. The physical structure will be constructed using GI pipes, GI sheets, MS sheets, MS flat bars, angle bars, and plain sheets. The power requirements of the entire system will be considered to determine the appropriate size of the solar panel and battery. A custom audio sound system will be devised to discourage birds from entering the crop area. The sound system will incorporate features to produce 20 unsettling melodies to deter birds. These melodies will play for 15 seconds each, effectively notifying the birds of potential danger within the vicinity. These auditory stimuli will be created using Arduino software. The process of developing the audio player will encompass the following steps: ❖ Hardware & software ❖ Design a circuit ❖ Program development ❖ Create an audio file format ❖ Build an external audio amplifier ❖ Testing
Expected output	:	Develop a user-friendly, smart bird repellent that will enhance food security.

4.3 Experiment	***:***	***Design and development of solar power-operated sprayer***
Name of Investigator (s)	:	PI: MMA CI: GKB, HR, SP, MMR, MMS
Objectives	:	❖ To design and fabricate a solar-power-operated sprayer ❖ To evaluate the performance of the sprayer
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Postharvest (FMPHT) Division, BRRI, Gazipur. The solar sprayers will be designed using AutoCAD engineering drawings. After developing this system, it could be automated using a microcontroller that the solar panel rotates according to sunlight. The following materials will be used to fabricate the physical shape of the sprayers: ❖ Solar panel (20W) ❖ Motor (12V) ❖ Battery D.C (12V, 8A) ❖ Charge controller (12 V) ❖ Tank (16 L) ❖ Nozzle (.75 mm) ❖ Connecting wire (4 mm)
Expected output	:	An effective and eco-friendly sprayer will be developed.
4.4 Experiment	***:***	***Design and Development of Automated Rodent Trap for Reducing Post-Harvest Losses of Rice***
Name of Investigator (s)	:	PI: MMA CI: GKB, HR, SP, MMR, MMS
Objectives	:	• Design and development of an automated rodent trap • Performance evaluation of the fabricated trap
Location (s)	:	BRRI, Gazipur, and Fermers' field
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Post Harvest Technology (FMPHT) Division, BRRI, Gazipur. The layout of the automated mouse trap will be designed in Auto CAD Engineering Drawing tools. The following materials will be used to provide the physical shape of the automated mouse trap: • Motor (6 V DC) • PIR Sensor

		• Circuit • LED light • Lithium battery (3.7V, 1000mAh) etc.
Expected output	:	• Eco-friendly mouse trap will be developed • Post-harvest loss will be reduced
4.5 Experiment	***:***	***Production of pellets from rice byproducts***
Name of Investigator (s)	:	PI: BCN CI: SP, MMA, MDH
Objectives	:	• To make pellets from rice straw biomass • To assess the physicochemical properties of the developed pellet
Location (s)	:	FMPHT Lab and Gazipur
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Postharvest Technology (FMPHT) Division, BRRI, Gazipur. The pelleting machine will be purchased from the market. The following materials will be used to manufacture the pellet: Maize starch (Binding material), Crude grease/ used oil (Oily material), and rice straw. **Machinery** The pellet machine, grinding machine, etc. **Data will be collected:** • Moisture content of feed and pellets (%); • Size of feed (mm); • Feed rate (kg/h); • Rotation speed of machine (rpm); • Capacity of machine (kg/h); • Dimensions of pellets (mm); • Bulk density of feed and pellets (kg/m3); • Pellet density (kg/m3); • Calorific value of pellets (kJ/kg).
Expected output	:	A cost-effective mechanical grain collector will be developed
4.6 Experiment	***:***	***Design and development of a pyrolysis oven/kiln for biochar production***
Name of Investigator (s)	:	PI: MMA CI: MAH, BCN, SP, MAfH, JN, MSK
Objectives	:	• To design and fabricate a pyrolysis oven/kiln • To assess the performance of the developed machine

Location (s)	:	FMPHT workshop, BRRI farm, Gazipur, and other locations
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2028
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Postharvest Technology (FMPHT) Division, BRRI, Gazipur. The layout of the pyrolysis kiln will be designed using an AutoCAD Engineering Drawing. The following materials will be used to provide the physical shape of the pelleting machine: • Temperature controller • Electric motor (3 Phase) • Sensor • MS Sheet • MS Bar **Data will be collected:** • Moisture content of biochar (%); • Size of feed (mm); • Feed rate (kg/h); • Rotation speed of machine (rpm); • Capacity of machine (kg/h); • Dimensions of biochar (mm); • Bulk density of biochar (kg/m3); • Biochar density (kg/m3); • Calorific value of biochar (kJ/kg).
Expected output	:	• A cost-effective pyrolysis oven will be developed • A good quality biochar will be developed
5 Project Title	***:***	***The popularization of BRRI-developed farm machinery and Postharvest technology***
Project objective(s)	:	• Awareness builds up about the benefits of using BRRI machines among the farmers • The motivation of the local manufacturer to manufacture the BRRI agricultural machinery
5.1 Experiment Title	***:***	***Industrial and farm-level extension of BRRI machinery and Postharvest technology***
Name of Investigator (s)	:	PI : AKMSI CI: All division scientists
Objectives	:	• To create awareness and demonstrate the benefit of using BRRI machines among farmers • To motivate the local entrepreneurs to manufacture BRRI-developed machinery
Location (s)	:	All over the country

Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-1998 Expected Completion Date: Continued
Plan of activities to achieve the objective (s)	:	❖ BRRI-developed agricultural machines will be demonstrated at selected sites in the presence of farmers Agril. officers/NGO personnel/manufacturers/Bankers ❖ Display of BRRI machines at the exhibition, the agricultural fair will be arranged ❖ Participant's opinions will be recorded after the demonstration ❖ RRA will be conducted before the demonstration
Expected output	:	The entrepreneur will be trained to use the machine in the rental system.
5.2 Experiment Title	***:***	***Training on the operation, repair, and maintenance of farm machinery***
Name of Investigator (s)	:	PI: MGKB CI: All divisional scientists
Objectives	:	• To impart knowledge to the farmers/operators/mechanics/extension workers/entrepreneurs about the effective use of farm machinery • To develop skilled operators and mechanics
Location (s)	:	BRRI HQ and RS
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2020 Expected Completion Date: Continued
Plan of activities to achieve the objective (s)	:	❖ Training in the operation, repair, and maintenance of farm machinery will be organized in different locations in the country
Expected output	:	Skilled machine operators can be found in various locations throughout the country.
6 Project Title	:	**Smart Agricultural Technology**
Project objective(s)	:	To apply ICT in Agriculture
6.1 Experiment Title	:	***Detection of Pests Affected Areas in Rice Farming Using Remote Sensing and Machine Learning Techniques***
Name of Investigator (s)	:	PI: MMR CI: MMH, MKM, AUK, HR, MSH
Objectives	:	• To enhance natural pest control measures for precision rice farming • To limit the environmental hazards • To validate the results with ground truth data
Location (s)	:	All over the country
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2023 Expected Completion Date: 30-06-2026

Plan of activities to achieve the objective (s)	:	❖ This study will be completed using two phases. A time series classification based on SAR imagery is implemented to identify cultivated paddy fields in the first phase. Ratio vegetation index (RVI) and standard difference indices (SDI) will be derived from optical satellite images and used in the second phase to identify regions affected by BPH attacks in paddy fields (Lakmal et al., 2019). A Support Vector Machine is used to detect areas damaged by BPH attacks in the second phase. The Combine approach of the first and the second phases will be applied to detecting Brown Planthopper attacks. The outputs will be validated with the field survey data.
Expected output	:	The rice pests that affect damaged areas will be detected before creating a hazardous situation in rice farming.
6.2 Experiment Title	:	***Assessing the future rainfall and temperature extremes from CMIP6 GCMs and their potential risk to rice cultivation in Bangladesh***
Name of Investigator (s)	:	PI: MKM CI: MSR, MMR
Objectives	:	• Assessing future changes in rainfall and temperature extremes based on data from the CMIP6 global climate models (GCMs). • Evaluating the potential risks associated with these changes to rice cultivation in Bangladesh.
Location (s)	:	All over the country
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2020 Expected Completion Date: 30-06-2026
Plan of activities to achieve the objective (s)	:	❖ Obtain relevant climate data from the CMIP6 GCMs for the region of Bangladesh. This data should include projections of future changes in temperature and precipitation extremes. ❖ Analyze the data to identify trends and patterns in the projected changes. This could involve using statistical methods to quantify the magnitude and frequency of extreme events, such as heat waves, droughts, and heavy rainfall. ❖ Assess the potential impacts of these changes on rice cultivation in Bangladesh. This could involve examining the sensitivity of rice yields to changes in temperature and precipitation and considering other factors, such as soil quality and irrigation availability. ❖ Use this information to develop strategies for adapting to the potential risks identified. This could involve crop diversification, irrigation improvements, and the development of heat- and drought-resistant crop varieties. ❖ Overall, this assessment aims to provide policymakers and stakeholders in Bangladesh with information that can help them prepare for and mitigate the potential impacts of climate change on rice cultivation and food security in the region.
Expected output	:	• Future changes in rainfall and temperature extremes will be known
6.3 Experiment Title	:	***Developing a high-resolution daily gridded precipitation and temperature data set for Bangladesh during 1961–2020***

Name of Investigator (s)	:	PI: MKM CI: MMR, MS
Objectives	:	• Compile high-quality historical rainfall and temperature data. • Preprocess and clean data. • Assess covariates' influence on rainfall patterns. • Develop models using cross-validation. • Homogenize data series. • Interpolate gridded daily data. • Validate and evaluate dataset accuracy. • Adjust the dataset for reliability.
Location (s)	:	All over the country
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Data Collection and Preprocessing ❖ Covariate Assessment ❖ Model Development and Cross-Validation ❖ Data Homogenization ❖ Thin-Plate Spline Interpolation ❖ Data Validation ❖ Evaluation and Adjustment of Spatial Variability
Expected output	:	• High-resolution daily gridded precipitation and temperature dataset for Bangladesh (1-kilometer grid). • Daily data coverage from 1901 to 2020. • Rigorous data quality control and validation processes. • Accessibility to the scientific community, policymakers, and the public. • Detailed documentation on data sources, methodologies, and limitations. • User-friendly data exploration and visualization tools.
6.4 Experiment Title	:	***Assessing Potential Rice Exposure to Heat Stress in Bangladesh under Different SSPs***
Name of Investigator (s)	:	PI: MKM CI: MMR, MS
Objectives	:	• Assess the potential exposure of rice to heat stress in Bangladesh under various Shared Socioeconomic Pathways (SSPs). • Provide valuable insights into agricultural and climate adaptation policies.

Location (s)	:	All over the country
Status of the Experiment	:	❖ On-going (continuous) Starting Date: 01-07-2024 Expected Completion Date: 30-06-2027
Plan of activities to achieve the objective (s)	:	❖ Data collection of rice phenology records in Bangladesh. ❖ Data collection of daily temperature projections under different SSPs. ❖ Development of a regional heat stress index. ❖ Simulation of rice phenology processes. ❖ Assessment of historical data. ❖ Projection of future rice phenology under different SSPs. ❖ Analysis of potential trends in heat stress exposure. ❖ Comparative analysis with Chinese study results. ❖ Policy and adaptation strategy development. ❖ Final report preparation.
Expected output	:	➢ Assessment of spatiotemporal changes in rice phenology. ➢ Identification of hot spots in Bangladesh prone to heat stress. ➢ Development of a heat stress exposure index ➢ Projection of potential trends in rice exposure to heat stress under different SSPs. ➢ Recommendations for mitigation and adaptation strategies to ensure rice production security.
6.5 Experiment Title	:	***Development and Utilization of a Drone in Agriculture***
Name of Investigator (s)	:	PI: SP CI: BCN, MDH, MGKB, MMR
Objectives	:	• To develop and assemble a drone for Agriculture • To evaluate the performance of the developed drone • To deploy the drone in Agriculture
Location (s)	:	FMPHT workshop and Fulbari, Dinajpur and other places
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2030
Plan of activities to achieve the objective (s)	:	The study will be conducted at the Farm Machinery and Postharvest Technology (FMPHT) Division, BRRI, Gazipur and Fulbari, Dinajpur district. The design, development, and assembly process will be done in the BRRI research workshop/ Drone RC BD, Fulbari, Dinajpur, under a public-private partnership (PPP) to develop a drone. AutoCAD/SolidWorks engineering tools will be used for design and drawing. **a. Design Phase:**

		• A needs assessment will be conducted. • Will collaborate with drone experts to design a prototype sprayer system. • Factors such as payload capacity, spraying mechanism, flight stability, and power source will be considered. **b. Development Phase:** • Procure necessary components and materials for developing the prototype. • Assemble the sprayer system according to the finalized design. • Integrate sensors and control mechanisms for precise spraying and navigation. • Conduct rigorous testing in controlled environments to validate performance and identify potential issues. **c. Evaluation Phase:** • Field trials will be conducted in various agricultural settings to assess the effectiveness. • The drone's performance will be compared with that of traditional spraying methods. • Data on coverage, application rate, crop damage, and operational efficiency will be collected. • Feedback will be gathered from farmers and stakeholders to inform them about further improvements.
Expected output	:	• An agricultural drone will be available
6.6 Experiment Title	:	***Assessing Land Suitability for Combine Harvester and Rice Transplanter in Bangladesh Using Remote Sensing and Machine Learning in Google Earth Engine***
Name of Investigator (s)	:	PI: MMR CI: MDH, GKB, MKM, BCN, SP and MSK
Objectives	:	• To generate detailed suitability maps for Combine Harvester and Rice Transplanter in Bangladesh. • To assess the accuracy of these models, and • To estimate for Combine Harvester and Rice Transplanter in Bangladesh
Location (s)	:	All over the country
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2030
Plan of activities to achieve the objective (s)	:	**Study Area** The study will be conducted in Bangladesh based on the target rice cultivation zone. The study area will be defined using administrative boundaries or specific geographical coordinates within the Google Earth Engine platform. **Data Collection & Processing** • Sentinel-2: NDVI (Crop Health) & NDWI (Soil Moisture). • SRTM DEM: Slope (for terrain suitability). • Road Proximity: Accessibility for machinery. • Soil Data: Bulk Density (Soil Compactness). • Sentinel-1 SAR: Flood History.

		• CHIRPS Rainfall: Precipitation data. **Stack Features for Clustering:** All the derived features NDVI, NDWI, slope, road proximity, soil compactness, and flood history will be combined into a feature stack. This comprehensive feature set will be used for clustering farmland into different suitability categories for machinery deployment. **Modeling Process** • K-Means Clustering: Group areas into suitability categories. • Sample Training Data from Clusters: Create a labeled dataset for model training based on cluster categories. • Load Manually Refined Training Data: Integrate manually adjusted data to improve accuracy and refine model classification. • Machine Learning (Random Forest & XGBoost): Classify land suitability for combine harvesters and rice transplanters. **Evaluation:** Accuracy metrics.
Expected output	:	The expected outcomes of this study include detailed suitability maps for mechanized rice harvesting and transplanting, which will help optimize agricultural machinery deployment in the study area. The methodology developed can be scaled to other regions with similar agricultural conditions, contributing to more efficient and sustainable agricultural practices.
6.7 Experiment Title	:	***Application of a drone for the identification of pest-infected rice fields***
Name of Investigator (s)	:	PI: MAfH CI: MMA, MGKB
Objectives	:	• To identify the disease-infected rice field and apply pesticides as per requirement
Location (s)	:	FMPHT division
Status of the Experiment	:	❖ New Starting Date: 01-07-2025 Expected Completion Date: 30-06-2030
Plan of activities to achieve the objective (s)	:	
Expected output	:	

PL= Project Leader, PI= Principal Investigator, CI= Co-Investigator

MAR = Mohammad Abdur Rahman, CSO MDH = Md. Durrul Huda, CSO AKMSI = AKM Saiful Islam, PSO MGKB = Md. Golam Kibria Bhyiuan, SSO MAH = Md. Anwar Hossen, SSO BCN = Bidhan Chandra Nath, SSO MKM = Md. Kamruzzam Milon, SSO SP = Subrata Paul, SSO	MAA = Md. Ashraful Alam, SSO MKP = Md. Kamruzzaman Pinto, SSO SI = Sharmin Islam, AE HP = Haimonti Paul, AE MMI = Md. Monirul Islam, SO MMR = Md. Mizanur Rahman, SO MMS = Md. Mahir Shahriyar, SO MPA = Md. Panna Ali, SSO (Entomology)	MMH = Md. Mozammel Haque, SSO, (Soil) BKB = Biraj Kumar Biswas, PSO, (WMM) MAfH = Mohammad Afzal Hossain, SSO, (WMM) HR = Hafizur Rahman, SO, (WMM)

Program Area: Socio-Economic and Policy
Farm Management Division

Research Program 2025-2026

Sub-Sub-Program: Rice Production Management

Project Leader: Md. Mamunur Rahman

Project.1. Rice Production Management

Expt.1.1. Surface water utilization for irrigation in the rice seed production field.

Rationale: Water scarcity in the rice research and seed production plots of BRRI H/Q is one of the crucial problems in the recent days. Two pumps are facing problems in operation in the last few months. Though they are now in working condition, but their delivery rate is very much poor (nearly half of their capacity). Therefore, the future irrigation of the research and production plots are in a great threat.

Objectives: To select suitable alternate irrigation water for rice seed production field.

Materials and methods: The experiment will be done in RCB design with three replications in the west byde of BRRI H/Q. The treatment combination will be as follows:

Water sources
1. Drain water from SCA/BARI (southern waste water)
2. Drain water from labor colony (south-west waste water)
3. Drain water from western community (western waste water)
4. Internal drain water of BRRI farm
5. Pond water from East byde pond
6. Underground water

Data to be collected: Heavy metal and other related attributes/contamination/content of water sources. (i) Water quality at 15 days interval (ii) Initial soil sample analysis (iii) Final soil sample analysis (iv) Paddy and straw sample analysis
Location: BRRI farm, Gazipur.
Date of initiation: Boro 2024- 25

PI: Md. Mamunur Rahman
CI: MHB Sazib (GQND), AS Ruma, MR Manir.
Status: New
Expected output: Suitable alternate irrigation water source for rice seed production in BRRI.

Expt.1.2. Efficiency of different sprayer in rice seed production field.

Rationale: BRRI are using traditional sprayer which is operated by hand for spraying of spray materials (insecticides/fungicides etc.). There are some other sprayers developed by BRRI and other companies. These are: battery operated sprayer, solar and battery-operated sprayer, multi nozzle sprayer etc. FMD is planning to compare among these types of sprayers in terms of efficiency, effectivity, user friendliness etc. in the seed production plot.

Objectives: To select suitable sprayer for rice field.

Materials and methods: The experiment will be done in RCB design with three or more replications in the west byde of BRRI. The treatment combination will be as follows:

	Sprayer types
1.	Normal sprayer (hand sprayer)
2.	Battery operated sprayer
3.	Solar sprayer
4.	Multi nozzle sprayer

Data to be collected: (i) Sprayer efficiency (ha/hr), (ii) Labor efficiency (no. of labor needed for 1 ha spray), (iii) Sprayer effectiveness (spray reaching upto which level). (iv) BCR.
Location: BRRI farm at Gazipur.
Date of initiation: Boro 2024- 25

PI: Md. Mamunur Rahman
CI: MA Hossain (WMM Div), AS Ruma and MR Manir.
Status: New
Expected output: Suitable sprayer for rice field.

Expt.1.3. **Enhancing Hybrid Rice Productivity with Mechanical Transplanters: The Role of Planting Density on Yield and Growth**

Rationale: Hybrid rice, known for its higher yield potential, has gained importance in addressing the growing global demand for food. The efficient use of mechanical transplanting systems is essential for maximizing productivity, especially in regions with labor shortages or those aiming for large-scale rice production. The spacing between plants is an important factor in rice production, affecting plant growth, resource use efficiency, and ultimately, yield. The BRRI mechanical transplanter is designed for a 30 cm spacing between rows. However, the plant-to-plant spacing can vary, and there is a need to determine how different plant spacings can influence the growth and yield of Hybrid rice. This research will help establish optimal transplanting spacings to improve the mechanization of rice farming, ensuring high yields and cost-effectiveness.

Objectives: To evaluate the effect of different transplanting spacings on the growth, development, and yield of hybrid rice.

Materials and methods: The experiment will be done in RCB design with three suitable replications. The treatment combinations will be as follows:

Control (T_0): 20 cm x 15 cm (Traditional spacing)
T_1: 30 cm x 13 cm (Mechanical transplanting spacing)
T_2: 30 cm x 15 cm (Mechanical transplanting spacing)
T_3: 30 cm x 17 cm (Mechanical transplanting spacing

Data to be collected: (i) Plant height (ii) Yield (iii) Yield components (iv) HI. (v) LAI at PI and flowering (vi) Mechanical Transplanting Data: Missing hill, Floating hill, Drainage hill, Buriet hill, Total time for transplanting per hectare, Fuel consumption per hectare, Labor input (man-hours/ha) (vii) Economic data

Location: BRRI farm, Gazipur
Seasons: Boro and T. Aman
Date of initiation: T. Aman 2025

PI: Afia Sultana Ruma
CI: MM Rahman, MR Manir, A Ansari (Hybrid Div.)
Status: New
Expected output: To identify the optimal transplanting spacing for Hybrid rice varieties that maximizes growth, yield, and the efficiency of mechanical transplanters.

Expt.1.4. Influence of weed inference period on the performance and profitability of BRRI dhan89

Rationale: Weed interference is the detrimental effects of weed on crop resulting from their interaction with each other. Weeds are considered as the most harmful pest of crops, and their interaction with crops have considerable consequences on the economy, society, and the environment

Weed is one of the most significant agricultural pests. Invasion of weed is one of the most important causes for low yield of rice. In Bangladesh, weed infestation decreases the grain yield by 70-80% in Aus rice (early summer), 30-40% for transplanted Aman rice (autumn) and 22-36% for modern Boro rice cultivars (winter rice) (BRRI, 2008). A group researcher listed18 usually growing weed species in aromatic Aman rice cv. Binadhan-9 and identified (Zannat *et al.,*2014). Islam observed 16 species of weeds belonging to 6 families to grow in connotation with transplant Aman rice (BRRI dhan49) (Islam, 2014). Jesmin listed 8 commonly growing weed species in Boro rice (Jesmin,2006).

Weed intrusion period has a considerable influence on weeds and the associated crop performances. Khan observed that weeding rule had significant effect on all parameters except 100-grain weight (Khan, 2003). The high grain yield (6.29 t ha^{-1}) was found from the weed free condition and it produces 37.33% higher yield than the no weeding condition. Average grain yield 4.95 t ha^{-1} under weed free conditions, 3,89 t ha^{-1} with farmers practice (hand weeding at up to 40 DAT) and 3.47 t ha^{-1} in un-weeded controls. Aktaruzzaman reported that weeding regimes exerted significance influence on all the crop characters studied except panicle length (Aktaruzzaman, 2007). Malek observed that the highest plant height (98.04 cm), biological yield (10.79 t ha^{-1}), harvest index (40.88%), grains $panicle^{-1}$ (101.30), grain yield (4.48 t ha^{-1}), straw yield (6.36 t ha^{-1}), number of total tillers $hill^{-1}$ (15.32), effective tillers $hill^{-1}$ (10.91) were found from two weeding at 15 and 30 DAT (Malek, 2008).

In a study stated that crop received weed free treatment up to 60 DAT at which it recorded the least weed density and weed dry weight (Singh *et al.,*1999). Another group researcher observed that weeding interference period significantly affected all the plant characters (Barietal.,1995). Researchers from Assam reported that different weed control practices significantly reduced the dry matter accumulation of weed and increased the rice yield over the un-weeded control in transplanted rice (Gogoi *et al.,*2000). A group researchers stated that hand weeding sowing to 40 DAT, weed free control and weedy control, grain yields were 1.86,1.96 and 0.96 tha^{-1}, respectively and weed dry weight was 93.8, 10.8 and 217.5 gm^{-2} respectively (Mishra *et al., 1985*). Rahman reported that weed dry weight increased up to 40 DAT and was at a maximum between 30 to 40 DAT in unwedded plots, reducing the rice yield by 11.01% (Rahman,1992). A group researcher stated that the highest plant height (111 cm) was produced due to weed free condition and the lowest (87.73 cm) plant height in control plot (Chowdhury *et al.,*1994).

BRRI dhan89 is the long duration (156 days), high tillering capacity and more than higher yield on the others modern Boro rice varieties. That is why, it is important to examine the effect of weed inference period on the yield and yield contributing attributes of BRRI dhan89.Therefore, thepresent research work has been planned and conducted to determine the effect of weed inference period option on the growth, yield and yield contributing character and profitability of BRRI dhan89 under Bangladesh condition.

Objective:

i. To confirm the best weed inference period for maximizing yield
ii. To find out the profitable weed inference period

Materials and methods: The experiment will be conducted at BRRI farm, Gazipur during Boro 2024-26. The treatment combination will be as follows:

W_1 = No weeding (Control)

Year of initiation: Boro **Year of completion:** 2 years **Location:** BRRI farm, **PI:** Mohammad Rezaul **CI:** MM Rahman, AS Ruma **Status:** Continued. **Expected output:** period might be identified performance and BRRIdhan89.	W_2 = Weed free condition (at 12-15 DAT/25-30 DAT/40-45 DAT) W_3= Pre emergence herbicides (Bensulfuran methyl + Actachlor) + 1 hand weeding (HW) at 45 DAT (After 2nd urea top dress) W_4 = Post emergence herbicides (Phenoxlum) + 1 hand weeding (HW) at 45 DAT (After 2nd urea top dress) W_5= Pre emergence herbicides (Butachlor) + Post emergence herbicides (Bispyribac sodium) W_6= BRRI mechanical weeder at 15 DAT + 1 hand weeding (HW) at 45 DAT	2024-26 Gazipur Manir Appropriate weed inference for growth, yield profitability of

Expt.1.5. Efficiency of different live traps for rat controlling in rice field.

Rationale: Rat is one of the major rice pests in all over the world causing different level of damages in every field crop (Krebs, Spratt *et al.* 2003; Singleton, Jacob *et al.* 2005; Phung, Brown *et al.* 2010).Rice is damaged by rat in every stages of its growth, especially, from panicle initiation to maturity stage (Krebs, Spratt *et al.* 2003; Phung, Brown *et al.* 2010). On an average around a quarter yield is lost due to rat damage (Singleton, Jacob *et al.* 2005; Phung, Brown *etal.* 2010).

Objectives: To select suitable rat control for rice field.

Materials and methods: The experiment will be done in RCB design with two or more suitable replications in the cites. Rat damage is reported in many national news giving very crucial importance. The experiment will be conducted in BRRI West Byde and East Byde and Farmers field at Gazipur. The treatment combination will be as follows:

Baits of live trap for rats
1. Coconut meat
2. Snail flesh
3. Aromatic rice
4. Dry fish (Shutki)
5. Wheat grain
6. Cookies biscuits
7. Cheese
8. Paddy

Data to be collected: (i) Dates of case use and number of trapped rats date wise.
Location: BRRI farm and farmers field at Gazipur.
Date of initiation: Boro 2024- 25

PI: Md. Mamunur Rahman
CI:M Hossain (Ent Div), AS Ruma and MR Manir.
Status: New
Expected output: Suitable rat control techniques in rice field.

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Sub-Sub-Program: Labor Management System
Project Leader: Md. Mamunur Rahman

Project 2: Labour Management System

Expt. 2.1. Monitoring labour wage rate at different locations of Bangladesh.

Objective: To find out the laborers' wage for rice cultivation throughout Bangladesh with food and without food.

Materials and Methods: A pre-set proforma will be used for collecting data.
Location: Different locations of Bangladesh.
Season: Aus, Aman and Boro
Date of initiation: April'2003

PI: Mohammad Rezaul Manir
CI: MM Rahman, AS Ruma, Sirajul Islam and MM Rashid
Status: Continued
Expected output: The average wage rate throughout the year may be higher than previous years

Sub-Sub-Program: Rice Seed Production

Project Leader: Md. Mamunur Rahman

Project 3. Rice Seed Production

Expt.3.1. Comparative study on breeder seed, TLS and rice production system

Rationale: BRRI are producing mainly two types of seeds, such as, breeder seed and TLS. In these production plots the yield are not similar compared to rice production plots due to different management practices, such as, use of different number of seedlings per hill, row and logo system, rouging, harvesting time etc. There is not a specific recommendation on the possibility of yield differences among the different production systems. Therefore, we need to determine the performances of these seed production and rice production systems and need to compare them.

Objectives: To identify performances of different seed production and rice production of different varieties.

Materials and methods: Four BRRI developed rice varieties will be evaluated with three production techniques. The experiment will be done in two factorial RCB design with three replications. The treatment combinations will be as follows:

Treat. 1: Variety		**Treat 2: Production system**
Boro	**T. Aman**	
BRRI dhan100	BRRI dhan87	BS
BRRI dhan104	BRRI dhan103	TLS

BRRI dhan105	BRRI dhan75	Rice production
BRRI dhan108	BRRI dhan95	

Data to be collected: (i) Plant height (ii) Yield (iii) Yield components (iv) HI. (v) Tillering dynamics (vi) LAI at PI and flowering (vii) CGR and (viii) RGR.
Location: BRRI farm, Gazipur
Date of initiation: Boro 2024- 25

PI: Md. Mamunur Rahman
CI: AS Ruma, MR Manir.
Status: New
Expected output: Performances of different seed production and rice production system.

Expt.3.2. Performance of BRRI varieties in seed production plots at BRRI Farm

Objectives: To observe potential yield of BRRI varieties

Materials and methods: The data will be collected from the seed production plots at BRRI Farm

Data to be collected:i. Date of sowing, ii. Date of transplanting, iii. Yield and yield components
Location: BRRI farm, Gazipur.
Date of initiation: Boro 2020- 21

PI: Afia Sultana Ruma
CI: MM Rahman, MR Manir.
Status: Continued
Expected output: Actual yield of a variety in farm.

Sub-Sub-Program: Management Activities and Support Services

Project Leader: Md. Mamunur Rahman

Project.4. Management and Utilization of resources

Expt.4.1. Management and Utilization of Land and Labor Resources

Objectives: Efficient utilization of farm land and labor resources of smoothly running of research activities and seed production at BRRI farm.

Materials and methods: Efficient utilization of BRRI land and labor resources, and their management for smoothly running of research and development activities of BRRI.
Location: BRRI farm, Gazipur
Season: Aus, Aman and Boro
Date of initiation and duration: 1985 and thiswill be done in each year

PI: Md. Mamunur Rahman
CI: MR Manir, AS Ruma
Status: Continued
Expected output: Better outcome from farm land, labor and smooth operations of farm implements.

Expt.4.2. Management and Support Services of BRRI

Objectives: Efficient utilization of resources for smoothly runningresearch activities and other activities of BRRI.
Materials and methods: Management and Support service activities of BRRI are carried out by FMD. It is one of the most common and regular activity of this division. The activities are:

1. Garden management
2. Beautification of BRRI
3. Graveyard management
4. Playground management
5. Mosquito control activities
6. Tree plantation

PI: Md. Mamunur Rahman
CI: MR Manir, AS Ruma,
Status: Continued
Expected output: Smooth management and attractive office premises.

Program Area: Technology Transfer
Training Division

Research Program 2025-2026

Sl. No.	Research Program	Expected Output	Comments
1.	Program Area: Technology Transfer Program Performing Unit : Training Division		
	1. Technology Transfer through training	Knowledge and skill of the trained personnel of the subject matter will be increased.	
	1.1 Rice production and communication training course for BRRI scientists. Objectives To acquire and enrich knowledge on: ▪ Modern rice production technologies ▪ Identification of field problems of rice cultivation and its solutions ▪ Research planning and execution. ▪ Data collection, analysis and interpretation ▪ Report/scientific article writing and presentation ▪ Service rule and job description and		Not done

	▪ Help extension personnel for quick dissemination of rice production technologies		
	1.2 Hands on Training on Modern Rice Production Technologies (Yield Maximization) Objectives To train the extension agents so that they can: ▪ Able to use and disseminate modern rice production technologies and ▪ Identify and solve the field problems of rice cultivation and help the farmers to increase productivity.		Not done
	1.3 Modern rice production technology training course for DAE Officers. Objectives To acquire and enrich knowledge on: ▪ Modern rice production technologies ▪ Identification of field problems of rice cultivation and its solutions ▪ Data collection, analysis and interpretation ▪ Help extension personnel for quick dissemination of rice production technologies		Not done
	1.4 Training on advanced research data management using spread sheet Participants: BRRI Scientists	Knowledge and skill of the participants on	

	Duration: 6 days Progress: Completed Total batch: 1 Total Participants: 30	• Proper data collection methods and • Organize and analyzed data properly using R will be improved.	
	1.5 Training on basic research management using R and bioinformatics Participants: BRRI Scientists. Duration: 14 days Progress: Completed Total batch:1 Total Participants: 27	After completion of the training program the scientists can- ▪ Create databases to store experimental data. ▪ Predict the way that proteins fold up and ▪ Create models on how all the chemical reactions in a cell interact with each other.	
	1.6 Training on genome editing in plants using CRISPR/Cas9 system Objectives i. To understand the basic concept of genome editing system ii. To apply the bioinformatics tools for genome editing system iii. To train participants in high-throughput techniques for genome editing application iv. To understand the ethics and biosafety of genome editing system		Not done

	1.7 Training on modern rice production technology Participants: BRRI Scientists Duration: 5 days Progress: Completed Total batch: 1 Total Participants: 30	Trained scientists will be able to identify and solve field problems of rice cultivation and help the farmers to increase productivity.	
	1.8 Training course on maintenance and using of laboratory equipment Participants: LA & SA of BRRI Duration: 14 days Progress: Completed Total batch: 1 Total Participants: 30	Knowledge and skill of the participants on laboratory equipment will be improved.	
	1.9 Training on modern office management and rice production technologies Participants: FM, AFM & SSA of BRRI Duration: 14 days Progress: Completed Total batch:2 Total Participants: 59	Knowledge and skill of the participants on • Modern office management and • Rice production technologies will be improved.	
	2.0 Training on modern office management Participants: Office staff of BRRI Duration: 14 days Progress: Completed Total batch:2 Total Participants: 55	Knowledge and skill of the participants on modern office management will be improved.	

	2.1 Training course on safe use of agrochemicals Participants: Seed/ fertilizer/ pesticide dealers Duration: 3 days Progress: 3 batches completed Total batch: 10 Total participants: 300	The participants will learn about the judicious use of pesticides and also get knowledge about harmful effect of the pesticides on human health and the environment.	

Program Area: Regional Station

Regional Station, Rangpur

Proposed Research programme, 2025-2026

Sl. No.	Programme area/project (Duration)	Major Objective(s)	Expected output	Budget (Thousand)
A. Varietal Development Program (VDP)				
01.	**Development of Second Generation Rice (SGR)** **Principal investigator: Md. Rokebul Hasan** **Co-investigators: RJ Promee and KM Iftekharuddaula** **Initiation of the program: June, 2019** **Termination of first phase: 2026**			
1.1	Germplasm collection and Hybridization	To introgress genes from diverse genetic background	Development of high yielding (≥8.0 t/ha for T. Aman and ≥10.0 t/ha for Boro)	30
1.2	F1 Confirmation	To confirm as true F1s'		20

1.3	Observational Yield Trial (OYT)	Evaluation of promising breeding lines for their homogeneity, phenotypic acceptability and initial yield potentials.	rice varieties with improved modified plant type and accompanied with tolerance to drought/cold, resistance to major biotic stresses (insect and diseases) and acceptable grain quality.	100
1.4	Advanced Yield Trial (AYT)	Selection of promising advanced breeding lines for their homogeneity, phenotypic acceptability and high yield potentials in replicated ways.		50
1.5	Regional Yield Trial (RYT)	To evaluate specific and general adaptability of the advance breeding lines as compared with standard checks in on-station condition		200
			Total	**400**
2.0	**Breeding for Basmati Rice** **Principal investigator: Md. Rokebul Hasan** **Co-investigators: RJ Promee and KM Iftekharuddaula** **Initiation of the program: June, 2019** **Termination of first phase: 2026**			
2.1	Germplasm collection and Hybridization	To introgress genes from diverse genetic background	Development of high yielding (≥6.0 t/ha for T. Aman and ≥8.0 t/ha for Boro) rice varieties with improved	10
2.2	F1 Confirmation	To confirm as true F1s'		10
2.3	F2 Population	To advance segregating generation		50

2.4	Pedigree nurseries	To advance segregating generation	modified plant type giving the thrust is to develop short duration varieties from diverse genetic background for tolerant to drought/cold, sturdy stem, resistance to major biotic stresses (insect and diseases) and international standard basmati grain quality.	50
2.5	Observational Yield Trial (OYT)	Evaluation of promising breeding lines for their homogeneity, phenotypic acceptability and initial yield potentials.		30
2.6	Advanced Yield Trial (AYT)	**Selection** of promising advanced breeding lines for their homogeneity, phenotypic acceptability and high yield potentials in replicated ways.		50
2.7	Regional Yield Trial (RYT)	To evaluate specific and general adaptability of the advance breeding lines as compared with standard checks in on-station condition		200
2.8	Advanced Line Adaptive Research Trail (ALART)	1. To evaluate the performance and adaptability of the advanced genotypes at farmers' field in different agro-ecological zones. 2. To get feedback about the genotypes from		400

		farmers and Extension personnel. 3. To select suitable genotype(s) for proposed variety trial (PVT).		
			Total	**800**
3.0	**Development of Jasmine type rice variety** **Principal investigator: RJ Promee** **Co-investigators: Md. Rokebul Hasan and KM Iftekharuddaula** **Initiation of the program: June, 2025** **Termination of first phase: 2030**			
3.1	Germplasm collection and Hybridization	To introgress responsible genes from diverse genetic background	Development of high yielding (≥6 t/ha for T. Aman and ≥8 t/ha for Boro) fragrant Jasmine type rice varieties with improved modified plant type giving the thrust is to develop short duration varieties accompanied with tolerance to drought/cold,	20

			resistance to major biotic stresses (insect and diseases) and acceptable grain quality.	
3.2	F1 Confirmation	To confirm as true F1s'		10
3.3	F2 Population	To advance segregating generation		70
			Total	**100**
B. **CROP-SOIL-WATER MANAGEMENT**				
1.1	Optimization of rate and application time of Paclobutrazol for lodging management in rice PI: M S Zahan CI: M L H Mondol, R J Promee, M M Rashid and M R Hasan	To find out the optimum rate and application time of paclobutrazol for rice. To find the management to prevent lodging and increase rice yield.	Optimum rate and application time of paclobutrazol reduces plant height and increase stem strength and prevent lodging	50
1.2	Effect of Urea Fertilizer Rate and Split Application Time on Nitrogen Use Efficiency for Long Duration Boro Rice Varieties under different Thermal	To evaluate the effect of different urea fertilizer rates and split application timings on the growth and yield of BRRI dhan102 under different temperatures. To assess the effect of different urea split-	Enhances cold tolerance through improved nitrogen use efficiency, builds fertilizer guidelines specific for	50

	Regimes in the Northen part of Bangladesh PI:M LH Mondol CI: MM Roshid, M S Zahan, MR Hasan and MR Islam	application schedules on nitrogen uptake, growth and yield. To examine the interaction between urea rate and timing under cold stress	BRRI dhan102 in Boro season,	
1.3	Effect of Different Phosphorus Levels on Growth, Yield, and Nutrient Uptake of Rice in Potato-Growing Regions of Northern Bangladesh. PI:M LH Mondol CI: MM Roshid, M S Zahan, MR Hasan and MR Islam	Determine the optimal P fertilizer rate that maximizes rice productivity and minimizes costs in potato-rice systems. Assess the effects of varying P levels on rice growth parameters and yield. Evaluate P uptake, nutrient use efficiency, and overall P dynamics in rice under different application rates.	Identification of an adequate Phosphorus-based nutrient management strategy for Potato-Growing Regions of Northern Bangladesh	50
1.4	Optimizing the Management of BRRI dhan98 as a Late Boro Variety in the Northern Region of Bangladesh PI: M M Rashid CI: M L H Mondol, R J Promee, M S Zahan, and M R Hasan	To find out the suitable seeding time and fertilizer dose for late planting of BRRI dhan98	Suitable seeding time and fertilizer dose for late Boro planting of BRRI dhan98	50

1.5	Integrated Potassium and Elemental Sulfur-Based Nutrient Management for Cold-Stress Mitigation in Irrigated Boro Rice in Northern Bangladesh PI: M M Rashid CI: M L H Mondol, R J Promee, M S Zahan, and M R Hasan	To evaluate the effect of integrated potassium and sulfur application on the growth and yield of Boro rice under cold stress conditions.	Identification of an adequate potassium- and sulfur-based nutrient management strategy to mitigate cold stress in irrigated Boro rice.	50
			Total	**250**
			Grand Total	**1550**

Regional Station, Gopalganj

Research Program 2025-26

Sl. No.	Experiment Title	Major Objectives	Expected Output	Annual Budjet
1	Assesment of anaerobic tillering capacity of local rice germplasm collected from Gopalgonj areas of Bangladesh.	1. To assess the tillering capacity of selected rice germplasm. 2. To select the rice germplasm suitable in stagnant water.	In this cropping pattern; not only three crops will be produced in a single year but also a fish rearing will be done in a single land.	Tk 400000 (Four lac)

2	Improvement of existing cropping pattern through the inclusion of deep-water Aman rice and fish under the deep-water ecosystem in the Gopalganj region.	To increase the system productivity and farmers' income.	Expected output: In this cropping pattern; not only three crops will be produced in a single year but also a fish rearing will be done in a single land.	Tk 1000000/- (Ten lac)
3	Effect of fly ash application on newly developed boro rice varieties cultivated on peat soils at Gopalganj region in Bangladesh.	1. To find the best inbreed boro rice varieties in the peat soil area in the Gopalganj region of Bangladesh. 2. To improve the fertility status in peat soil.		Tk 1000000/- (Ten lac)