BANGLADESH RICE RESEARCH INSTITUTE

SUMMARY OF THE ANNUAL RESEARCH PLAN 2022-2023

Programme Area 05: Farm Mechanization and Postharvest Technology
Program Performing Unit 01: Farm Machinery and Postharvest Technology Division
Program Performing Unit 02: Workshop Machinery and Maintenance Division

Project No.	Title (Project/Experiment)	Name of PL/PI/CI	Year of initiation	Objectives (General/Specific)	Season	Location	Budget Tk (lakh)	Budget Source
01	**Development of Agricultural Machines**	PL: MAH	**1998**	• Development of farm machinery adaptable to rice eco-system • Reduction of human drudgery	**All seasons**	**Gazipur**	96.00	**GoB**
	1.1: Evaluating and modifying of BRRI developed machines	PI: MDH CI: All divisional scientists	1998 (Cont.)	• To verify the quality of BRRI machines • To identify the functional problems of farm machines • To improve the performance of farm machines	Aus, Aman, Boro, Wheat	FMPHT div. res. workshop and BRRI farm	0.50	GoB
	1.2: Design and development of a head feed power thresher	PI: SP CI:MDH,MGKB, MAH, SI, AUK	2013 (Cont.)	• To design and develop a head feed thresher • To conduct test of the thresher for its performance and capacity • To compare the performance with the existing threshers	All seasons	FMPHT divisional lab	1.0	GoB
	1.3: Design and development of whole feed mini combine harvester	PI: MDH CI: MGKB, SP, AKMSI, SI, AUK	2017 (Cont.)	• To assess combine harvester field performance, general condition, durability, repair and maintenance requirements • To check the fuel consumption and hourly production of the combine harvester under different working conditions • To obtain operator views regarding suitability of combine harvester.	All seasons	FMPHT divisional lab and Janata Engineering	15.0	GoB
	1.4: Development of a forward motion manual rice transplanter	PI: MAH **CI:** MGKB,MMI, HR (WMM)	2019 (Contd..)	• Design and fabrication of a manual operated forward motion rice transplanter • Performance evaluation of the developed rice transplanter	All	FMPHT divisional lab and field	4.0	GoB

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	1.5: Development, validation and adoption of power weeder for wet land rice cultivation	PI : MAH CI: MMI, SI, HP	2019 (Contd..)	▪ To develop and multiplication of the power weeder ▪ To demonstration, validation and adaptation the weeder in different location under different rice seasons ▪ To reduce the rice production cost	All	Gazipur, Mymensigh, Netrokona Habigonj, Rangpur and Comilla	20.0	GoB
	1.6: Design and development of walking type power operated rice transplanter	PI: MAH CI:AKMS, MMI, HP, SI	2019 (Contd..)	• To design and develop a power operated rice transplanter • To test performance of the developed rice transplanter	All	Gazipur, Mymensigh, Netrokona Habigonj, Rangpur and Comilla	25.0	GoB
	1.7: Design and development of a diesel engine operated high speed hydro-tiller for marshy land	PI: SI CI: MAH, SP, HP	2021 (contd..)	• To design a variable power transmission mechanism of the diesel engine operated hydro-tiller • To design a rotary casing of hydro tiller suitable for marshy land • To develop a prototype based on engineering design • To evaluate the prototype in different soil condition	All seasons	BRRI, Gazipur and Fermers' field	3.0	GoB
	1.8: Postharvest loss assessment of whole and head feed combine harvester under different soil condition	PI: HP CI: MDH, MAH, SP, SI	2021 (contd..)	• To assess the loss of grain. • To identify the suitable operation system to minimize the loss.	All seasons	BRRI, Gazipur and Fermers' field	0.50	GoB
	1.9: Determination of optimum seed rate for *Hybrid* rice variety for mechanical transplanting in Bangladesh	PI: MAH CI: MKP, SI, HP, AUK, MMS	2021 (contd..)	• To identify the optimum seed rate for different h*ybrid* rice variety to produce quality seedlings and minimize the missing hills of mechanical transplanting. • To identify suitable seedling adjustment options to dispense optimum number seedling per stroke (seedlings hill^{-1}) of the rotary picker of rice transplanter.	All seasons	BRRI, Gazipur and Fermers' field	0.50	GoB

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					Season	Location		
	1.10: Development of mat type seedling using hydroponic technique	PI: HR CI: MKM, MMI, MMR, MMS, RA, HAD	2021 (contd..)	To develop a mat type seedling using hydroponic technique Performance test of developed seedling for rice transplanter	All seasons	BRRI, Gazipur and Fermers' field	3.00	GoB
	1.11: Identification and fabrication of fast-moving spare parts of combine harvester and rice transplanter enhancing sustainable mechanization in Bangladesh	PI: MAH CI: SI, HP, MMS, SP, MMR	2022 (New)	▪ To listed down the fast-moving spare parts of the different make and model ▪ To identify strength and quality of the major parts ▪ To take initiative for fabrication of the parts	All seasons	BRRI, Gazipur and Fermers' field	10.00	GOB
	1.12: Ground pressure and bearing capacity of combine harvester in different soil conditions	PI: MAfH CI: MAH, SP, MMA, AUK	2022 (New)	• To estimate ground pressure and bearing capacity of combine harvester in different soil condition • To estimate required force in cutting, threshing, cleaning, bagging of rice through combine harvester	All seasons	BRRI, Gazipur and Fermers' field	2.00	GoB
	1.13: Design and development of self-propelled fertilizer deep placement applicator	PI: SP CI: MGKB, MAH, MKP, HP, MMR	2022 (New)	• To design, fabricate and develop a power-operated fertilizer deep placement applicator using existing developed manual applicator. • To compare with other fertilizer applicators.	All seasons	BRRI, Gazipur and Fermers' field	3.00	GOB
	1.14: Modification of power transmission system of BRRI hydro-tiller	PI: MAfH CI: MGKB, HR, MMA	2022 (New)	• To detect the causes of frequent tearing of hydro tiller chain • To modify the power transmission system for increasing longevity of hydro tiller	All seasons	BRRI, Gazipur and Fermers' field	0.50	GOB
	1.15: : Design and development of a single row wet land power weeder	PI: SP CI: SI, HP, MMI, MMR, MMS, AUK	2022 (New)	• 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	All seasons	BRRI, Gazipur and Fermers' field	1.00	GOB
	1.16: Design and development of a self-propelled multi-rows power weeder for both wet and dry land condition	PI: MAH CI: SI, HP, MMS, SP	2022 (New)	• To design and fabricate the self-propelled weeder • To evaluate the weeding performance in different locations • To improve the developed weeder based on evaluation • To reduce the weeding cost in rice production	All seasons	BRRI, Gazipur and Fermers' field	5.00	GoB

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02	**Milling and Processing Technology**	**PL: MDH**	**2001**	• To reduce loss, improve quality and addition of value to the farm products	**All seasons**	**All over the country**	**10.0**	**GoB**
	2.1: Design and development of solar dryer	PI: SP CI: MDH, BCN,MGKB,	2015 (Cont.)	▪ To design, fabricate and develop solar dryer ▪ To compare with traditional sun drying of paddy	All seasons	FMPHT divisional lab	1.0	GoB
	2.2: Test, evaluation and modification rubber roll de-husker for commercial use	PI: MGKB CI: AKMSI, MDH, MMI	2015 (Cont.)	• To modify and development of a rubber roll de-husker • To evaluate the performance of paddy de-husker	All season	FMPHT division milling laboratory	3.0	GoB
	2.3: Drying and tempering effect on Kernel Strength and milling recovery of the parboiled and un-parboiled Paddy	PI: MMS CI: MAH, SI, HP, MMR	**2022 (New)**	• To determine the kernel strength of paddy in terms of drying and tempering effect. • To make a relation between kernel strength and milling recovery.	Aman and Boro, 2019-2022	FMPHT division milling laboratory	6.0	GoB
03	**Development of stores and storage technology**	**PL: MDH**	**2004**	• To increase shelf life of rice in store	**All seasons**	**FMPHT Lab and Gazipur**	**4.00**	**GoB**
	3.1: Effect of ageing on milling performance of premium quality rice	PI: SI CI: MAH, MDH, MGKB, MMR, HP	2017 (Contd.)	• To observe the milling performance of BRRI dhan50 at different aging	All season	FMPHT division milling laboratory	2.0	GoB
	3.2: Validation and adaptation of hermetic storage structure in household level of Bangladesh	PI: MAfH CI: HR, BKB, MGKB, AS (Agronomy) and MPA (Ento.)	2020	• to compare the performance of traditional and hermetic storage technologies in rice storage	All season	FMPHT division milling laboratory	1.0	GoB
	3.3 Effect of different storage structure of milled rice in long-term storage	PI: HP CI: SP, SI, AUK	2021 (Contd..)	• To find out the suitable storage structure • To investigation the influence of moisture content of storage time • To observe the prevalence of insect/ diseases infestation of storage time • To determine the effect of length of storage time on the quality of milled rice	All season	FMPHT division milling laboratory	1.0	GoB
04	**Renewable Energy Technology**	**PL : MGKB**	**1998**	• Development of renewable energy extraction technologies from solar, agri-residues and waste products	**Aus, Aman/ Boro**	**BRRI , Gazipur**	**6.00**	**GoB**
	4.1: Study the briquette production from rice by product	PI : SI CI : MGKB, MAH, HP	2016 (Cont.)	• To prepare briquettes from rice straw and husk • Characterization of different briquettes originated from agricultural residue • To measure the calorific value of the briquettes	All season	FMPHT Lab and Gazipur	1.00	GOB

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	4.2: Study on solar energy utilization for small agricultural machinery	PI : SP CI : MDH, MGKB, MMR, MAH, HR (WMM)	2017 (Contd..)	• To design mechanism of solar energy utilization • To evaluate the performance of the developed machine	All season	FMPHT Lab and Gazipur	3.00	GOB
	4.3: Design, development and performance evaluation of briquetting machine using rice husk with different ration of maize steam	PI: MMS CI: MMI, HR, MMR, MKM, MKP	2021 (Contd..)	• To design and develop a briquetting machine using rice husk with different ratio of maize steam. • To determine the physical and combustion properties of the final product. • To evaluate the performance of the briquetting machine.	All season	FMPHT Lab and Gazipur	2.00	GoB
05	**Popularization of BRRI developed farm machinery and Postharvest technology**	**PL: AKMSI**	1998	• Awareness build up about the benefit of using BRRI machines among the farmers • Motivation of the local manufacturer to manufacture the BRRI agricultural machinery	**All seasons**	**All over the country**	**10.0**	**GoB**
	5.1: Industrial and farm level extension of BRRI machinery and Postharvest technology	PI : AKMSI CI : All division scientistes	1998 (Cont.)	• To create awareness and demonstrate the benefit of using BRRI machines among the farmers • To motivate the local entrepreneurs to manufacture BRRI developed machinery	Aus, Aman Boro	All over the country	10.0	GoB
06	**Precision Agriculture**	**PL: MKM**	2019	• **To apply ICT in Agriculture**	Aus, Aman Boro	All over the country	2.0	GoB
	6.1: Detection of rice leaf diseases and early diagnosis using faster regional convolutional neural networks (R-CNN)	PI: MKM CI: AIK	**2022 (New)**	• To develop and enhance an image processing system and deep learning techniques to advance the agricultural sector.	Aus, Aman Boro	All over the country	1.0	GoB
	6.2: Application of machine learning techniques in predicting agricultural drought: A regional examination of Bangladesh	PI: MKM CI: MMR	**2022 (New**	❖ Development of machine learning techniques in predicting standardized precipitation evapotranspiration index (SPEI)	Aus, Aman Boro	Rajshahi	1.0	GoB

Strengthening Farm Machinery Research Activity for Mechanized Rice Cultivation Project (SFMRA)

Project No.	Title (Project/Experiment)	Name of PL/PI/CI	Year of initiation	Objectives (General/Specific)	Experiments/Studies		Budget Tk (Lac)	Budget Source
					Season	Location		
07	**Strengthening Farm Machinery Research Activity for Mechanized Rice Cultivation Project (SFMRA)**	**PD: AKMSI**	2019 (Cont.)	**Strengthening farm machinery research activities through development and modernization of appropriate agricultural machinery for sustainable rice cultivation**	**All seasons**	**Through out the country**	4400.00	SFMRA Project
	7.1: Design and development of 4-row walking type power operated rice transplanteer	PI: MKM CI : AKMSI, MDH, MAA, MMI	2020 (Cont.)	• Design of power transmission system of rice transplanter • To fabricate power operated rice transplanter according to design • To investigate the performance of the developed rice transplanter	All seasons	BRRI, Gazipur and Farmers' field	20.00	SFMRA Project
	7.2: Design and development of power operated seed sower machine for raising mat type seedling	PI: HP CI : AKMSI, SP, MGKB, SI, MAA	2020 (Cont.)	• Design and fabrication of a BRRI power operated seed sower machine for mat type seedling preparation	All seasons	Alam Engineering and BRRI, Gazipur	2.00	SFMRA Project
	7.3: Design and development of a power operated straw rope maker	PI: MMI CI :AKMSI, MGKB, MKM, HR, MMR, MMS	2020 (Cont..)	• To design a straw rope making technology for different length of paddy straw • To fabricate the technology as per design • To evaluate the performance of the developed machine • To analyze the strength and properties of the straw rope • To analyze the economic performance	All seasons	Alam Engineering and BRRI, Gazipur	5.00	SFMRA Project
	7.4: Design and development of a semi-automatic rice transplanter	PI: MKM CI: AKMSI, HR, MMI, MGKB, MMR, MMS	2021 (Cont..)	• Design and fabricate a Semi-Automatic Rice Transplanter	All seasons	BRRI, Gazipur and R K Metal, Faridpur and	10.00	SFMRA Project
	7.5: Design and development of a manual seed sower machine for raising mat type seedling	PI: AKMSI CI : MGKB, MKM, MMI, HP, MAA+	2021 (Cont..)	• Design and fabrication of a manual seed sower machine for mat type seedling preparation	All seasons	Alam Engineering and BRRI, Gazipur	5.00	SFMRA Project

Project No.	Title (Project/Experiment)	Name of PL/PI/CI	Year of initiation	Objectives (General/Specific)	Experiments/Studies Season	Experiments/Studies Location	Budget Tk (Lac)	Budget Source
	7.6: Design and development of double row skid type power weeder for wet land paddy field.	PI: MMI CI :AKMSI, MGKB, MKM, HR, MMR, MMS	2021 (Cont..)	• To design and develop of the power weeder • To design and attach adjustable type skid mechanism in the power weeder • To demonstrateand validate the weeder in different soils under different rice seasons • To reduce the input cost of rice production	All seasons	BRRI, Gazipur and Alam Engineering	5.00	SFMRA Project
	7.7: Design and development of a full feed combine harvester	PI: AKMSI, CI : MGKB, AUK, MAA, MMH	2021 (Cont..)	• To design and develop of a full feed mini combine harvester • To evaluate the field performance of the developed combine harvester	All seasons	BRRI, Gazipur and Janata Engineering and BRRI Workshop	50.00	SFMRA Project
	7.8: Improvement of solar light trap	PI: MGKB CI: AKMSI, NB, MMR, MMI, MDH	2021 (Cont..)	• Introducing of remote sensing system in existing solar light trap • To evaluate the developed solar light trap in farmers field	All seasons	BRRI research workshop	10.00	SFMRA Project
	7.9: Performance evaluation of a rice husk-straw pellet machine	PI: SI CI: AKMSI, HP, MKM, SP	2021 (Cont..)	• To evaluate the performance of a pellet machine	All seasons	Alam Engineering and BRRI, Gazipur	10.00	SFMRA Project
	7.10: Design and development of a compact rice mill	PI: MGKB CI: AKMSI, MDH	2021 (Cont..)	• To design and fabricate of a compact rice mill • To evaluate the performance of fabricated rice mill	All	FMPHT division milling laboratory	10.00	SFMRA Project
	7.11: Performance evaluation of laser land leveler with conventional method	PI: MMR CI: AKMSI, AUK	2021 (Cont..)	• To evaluate the performance of laser land leveler and conventional systems • to find the feasibility of the laser land leveler in Bangladesh	All seasons	All over Bangladesh	10.00	SFMRA Project
	7.12: Land suitability mapping of farm machinery operation in Bangladesh using GIS based Multi criteria decision technique	PI: MMR CI: AKMSI, MKM	2021 (Cont..)	• To generate a suitable map for the operation of farm machinery in the crop (rice) field of Bangladesh	All seasons	All over Bangladesh	250.00	SFMRA Project

Project No.	Title (Project/Experiment)	Name of PL/PI/CI	Year of initiation	Objectives (General/Specific)	Experiments/Studies		Budget Tk (Lac)	Budget Source
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	7.13: Adaptive trial of newly developed farm machinery and technology	PI: AKMSI CI: All scientists	2021 (Cont..)	• To demonstrate the field performance of farm machinery and technology • To collect feed back from the farmers on the overall performance of farm machinery • To record the technical performance and social acceptance	All seasons	All over Bangladesh	60.00	SFMRA Project
	7.14: Training on operation, repair and maintenance of farm machinery	PI: MGKB CI: All divisional scientists	2020 (Cont..)	• To impart knowledge to the farmers/operators/mechanics/extension workers/entrepreneurs about the effective use of farm machinery • To develop skilled operators and mechanics	All seasons	BRRI HQ and RS	300.00	SFMRA Project
	7.15: Training on manufacturing, safety and work environment to the workhop personnel of local farm machinery manufacturing industries	PI: AKMSI CI: MGKB	2020 (Cont..)	• To impart knowledge on handtools operation and maintenance • To create awareness on safety and precaution • To improve the knowledge on quality control • To aware the workshop personnel on work environment	All seasons	BRRI HQ and RS	10.00	SFMRA Project
	7.16: Design and development of a reaper binder	PI: MMI CI: AKMSI, MKP, HR, MGKB, MMR	2022 (New)	• To evaluate the performance of the imported reaper binder machine • To design and develop of the reaper binder • To demonstrate and validate the reaper binder machine in different soils under different seasons • To reduce the input cost of production	All seasons	BRRI HQ and RS	10.00	SFMRA Project
	7.17: Design and development of a head feed combine harvester	PI: AKMSI CI: MGKB, MKP, MMI, AUK, MMA, MAA, MMH	2022 (New)	• To design a head feed combine harvester • To manufacture the designed combine harvester prototype • To evaluate the field performance of the developed combine harvester	All seasons	BRRI HQ and RS	20.00	SFMRA Project
	7.18: Design and Development of a Rice Transplanter cum Fertilizer Applicator	PI: MKP CI: AKMSI, MGKB, SP, MMI	2022 (New)	• To design a power transmission mechanism from gearbox to applicator • To fabricate the rice transplanter cum fertilizer applicator • To evaluate the field performance of the developed machine	All seasons	BRRI HQ and RS	20.00	SFMRA Project

Project No.	Title (Project/Experiment)	Name of PL/PI/CI	Year of initiation	Objectives (General/Specific)	Experiments/Studies Season	Experiments/Studies Location	Budget Tk (Lac)	Budget Source
	7.19 Improvement and validation of solar energy utilization system for small type of different agricultural machineries	PI: SP CI: AKMSI, MGKB, MMR, HP, MDH, MAfH	2022 (New)	• To design a mechanism of solar energy utilization • To evaluate the performance of the developed machine using solar energy	All seasons	BRRI HQ and RS	7.00	SFMR A Project

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

MDH = Md.Durrul Huda, CSO	SI = Sharmin Islam, AE	MAfH = Mohammad AfzalHossain, SSO, (WMM)
AKMSI = AKM Saiful Islam, PSO	HP = Haimonti Paul, AE	HR = HafizurRahman, SO, (WMM)
MGKB = Md.GolamKibriaBhyiuan, SSO	MMI = Md. Monirul Islam, SO	MMA = Md. Moudud Ahamed, SO (WMM)
MAH = Md.Anwar Hossen, SSO	MMR = Md. Mizanur Rahman, SO	HBS = Habibul Bari Shozib, SSO, (GQN)
BCN = Bidhan Chandra Nath, SSO	MMS = Md. Mahir Shahriyar, SO	TKS = Tapas Kumar Sarker, SSO, (GQN)
MKM = Md. KamruzzamMilon, SSO	AUK = Arafat Ullah Khan, SO	AS = Amina Sultana, SSO, (Agronomy)
SP = Subrata Paul, SSO	MPA = Md.Panna Ali, SSO (Entomology)	RA = Romana Akter, SO, (Agronomy)
MKP = Md. Kamruzzaman Pinto, SSO	MMH = Md. MozammelHaque, SSO, (Soil)	HAD = Hosne Ara Dilzahan, SO, (Pathology)