

# ABOUT BRRI

A very short introduction



**Bangladesh Rice Research Institute**

# ABOUT BRRI

A very short introduction



**Bangladesh Rice Research Institute**  
Gazipur 1701, Bangladesh

Publication no.: 6  
Eighth edition  
2000 copies  
June 2025

**Published by**

Director General  
Bangladesh Rice Research Institute

**Edited by**

Dr Mohammad Khalequzzaman  
Dr Md Rafiqul Islam  
Dr Munnujan Khanam  
Md Rasel Rana  
Rokib Ahmed

**Proof reading**

Tahamina Sultana

**Funded by:** 'Programme on Agricultural and Rural Transformation for Nutrition, Entrepreneurship and Resilience in Bangladesh (PARTNER)'

**Printed at**

**SRL Printing Press**

25/F, Babupura, Nilkhet, Dhaka 1205

**Contact**

Publications and Public Relations Division  
Bangladesh Rice Research Institute  
Gazipur 1701

Telephone : 88-02-49272061

PABX : 88-02-49272005-14

Fax : 88-02-4927000

E-mail : [brrihq@yahoo.com](mailto:brrihq@yahoo.com), [dg@brri.gov.bd](mailto:dg@brri.gov.bd)

Website : [www.brri.gov.bd](http://www.brri.gov.bd), [www.knowledgedebank-brri.org](http://www.knowledgedebank-brri.org)

## FOREWORD

The Bangladesh Rice Research Institute (BRRI), established in 1970, has played a pivotal role in advancing rice research and development, significantly contributing to food security in Bangladesh, where rice is the primary staple. Over the years, BRRI has developed 121 high-yielding modern rice varieties, including eight hybrids, along with more than 300 production technologies and policy recommendations. The institute has also released 56 rice varieties with enhanced stress tolerance, nutritional value, and health benefits. These include 13 salt-tolerant, four drought-tolerant, four cold-tolerant, four submergence-tolerant, seven zinc-enriched, 13 high-protein, three antioxidant-enriched, one iron-enriched, one GABA (gamma-aminobutyric acid)-enriched, and four low-glycemic index varieties suitable for diabetic patients (glycemic index: 52-55).

These innovations now cover approximately 70% of the country's rice-growing areas and contribute to nearly 80% of total rice production. Since BRRI's inception, national rice production has quadrupled, effectively supporting a population that has more than doubled. The return on investment in rice research and development is estimated at 56 Bangladeshi taka for every taka spent.

BRRI's impact extends beyond national borders, with 23 of its rice varieties cultivated in 14 countries. The institute has also developed 57 profitable rice-based cropping patterns tailored to diverse Agro-Ecological Zones (AEZs) and introduced 50 types of advanced agricultural machinery. Additionally, BRRI produces more than 200 tons of breeder seed annually, maintains a preference model for producers and consumers, and oversees a genebank conserving 9,128 rice germplasm from both local and international sources.

**Dr Mohammad Khalequzzaman**  
Director General

# Table of Contents

Background	05
Vision - Mission	05
Mandate	06
Major Achievements	07
Outstanding Contributions of BRRI	09
On-going Research	12
Pioneer of Food Security	15
Board of Management	18
Research Division and Support Service	19
Accomplishments	25
Plant Breeding Division	25
Hybrid Rice Division	35
Biotechnology Division	36
Genetic Resources and Seed Division	38
Grain Quality and Nutrition Division	40
Agronomy Division	41
Plant Physiology Division	44
Soil Science Division	45
Irrigation and Water Management Division	48
Entomology Division	50
Plant Pathology Division	53
Rice Farming Systems Division	55
Farm Machinery and Post-Harvest Technology Division	58
Workshop Machinery and Maintenance Division	62
Agricultural Economics Division	63
Agricultural Statistics Division	65
Farm Management Division	69
Adaptive Research Division	70
Training Division	72
Publications and Public Relations Division	73
Library	74
Rice Analytical Laboratory: Ensuring safer rice in Bangladesh	75
Agromet Lab	76
Technical Cooperation	78
Funding Sources	79
BRRI Regional Stations	80
Table of BRRI Variety	88
Recognition	92
List of Project	93
04   About BRRI	

## Background

BRRI is a major component of the National Agricultural Research System (NARS) of Bangladesh, dealing with research and development in relation to rice production. Rice research started in this part of the sub-continent in 1910. However, the modern era of rice research and development started in the mid-sixties. The demand for rice was high in the past and it has been increasing day by day because of increasing population size. Realizing the importance of rice in the socio-economy and politics, an autonomous organization in the name of East Pakistan Rice Research Institute (EPRRI) was established on 1 October 1970 with an area of 76.83 hectare at Joydebpur, Gazipur; 36 km north of the capital city, Dhaka.

After independence in 1971, it was renamed as the Bangladesh Rice Research Institute (BRRI) through the Parliamentary Act X, 1973. To make the management system more dynamic, the BRRI Act was further amended in 1996 (Parliamentary Act V of 1996) and in 2017 (Parliamentary Act 19 of 2017).

## Vision - Mission

BRRI's vision is improvement of rice and development of rice production technologies for sustainable food security and its mission is :

- Developing high yielding and quality rice at lower cost through genetic improvement;
- Developing biotic and abiotic stress tolerant variety for stress prone areas of Bangladesh;
- Conserving biodiversity through managing diseases, insects, fertilizers, water and land for the current and future generations;
- Improving institutional capacity and linkage for advanced research; and
- Developing rice production related technologies for the reduction of poverty and hunger in the country.

## Mandate

- i. Conducting research on the development of modern and high yielding rice varieties and increasing rice production in collaboration with national and international institutes and organizations.
- ii. Development of rice varieties and rice production technologies that are tolerant to various adverse environmental conditions including drought, salinity, water logging, cold and heat and to prevent diseases and insects through the application of biotechnology in rice research.
- iii. Conducting collection, conservation, evaluation and development activities of rice germplasm and ensuring intellectual properties.
- iv. Conducting research on agricultural mechanization, nutrition, supply and value chain as well as socio-economic development.
- v. Production and supply of sufficient amount of breeder seed for the rapid dissemination of BRRRI developed rice varieties.
- vi. Establishment of required number of laboratories and libraries.
- vii. Conducting demonstration trials of BRRRI-developed new varieties and technologies and determining areas, adopting scheme for the farmers' training on the above-mentioned topics.
- viii. Organizing training programmes for the staff of government and non-government sectors, as well as for the farmers and researchers from in-country and abroad.
- ix. Creating opportunities for the post-graduate research.
- x. Arranging seminar, symposium and workshop to create opportunities for exchange of views on problems identified by experts from various research institutes and centers to become familiar with recent innovations in the field of rice research.
- xi. Undertaking rice research for addressing the risks caused by climate change.

- xii. Application of ICT in rice research, education and extension.
- xiii. Development of various rice varieties and technologies used by local farmers through verification and selection.
- xiv. Publishing monographs, bulletins, crop calendars and other information about rice research.
- xv. Performing such other duties as may be assigned to it by the government, subject to directions given from time to time;
- xvi. Performing any other necessary functions related to Rice Research and Development.

## Management

BIRRI is an autonomous organization under the Ministry of Agriculture. A 13-member Board of Management (BoM), headed by the Director General (DG), determines and executes the policies and undertakings of the institute. Director (Research) and Director (Admin and Common Service) assist DG to control administrative and financial activities for smooth functioning of the institute's research programmes through 19 research divisions, 17 regional stations, six satellite stations, three support service divisions and eight sections with administrative and technical services. Total manpower provision of the institute is 806, of which 318 are scientists. Most of them are highly trained professionals with MS and PhD degrees from in-country and abroad.

## Major Achievements

Since its establishment BIRRI has made outstanding contributions to national development through the release of high yielding rice varieties and improved packages of production technologies. It has so far-

- Released 121 high yielding rice varieties having three times higher yield potential than the traditional ones. Out of them 113 are inbred and eight are hybrid rice varieties;
- Developed salt, drought, cold and submergence tolerant varieties along with zinc, iron, antioxidant enriched and diabetic-patient friendly low glycemic index rice;
- Developed more than 300 improved technologies on soil, water, fertilizer and cultural practices of rice;

- Developed 57 profitable rice-based cropping patterns for different AEZs;
- Developed and improved 50 types of agricultural machinery;
- Identified 32 rice diseases (8 major) and 232 species of rice insect pests (25 major) and developed control measures for the major insects and diseases including IPM and also identified 372 beneficial insects;
- Developed soil nutrients management systems (Balanced, INM, SSNM, IPNS) for 14 rice based cropping systems, developed technology to reduce 40-50% global warming potential through introducing AWD and urea deep placement;
- Identified 372 beneficial insects;
- Achieved the ability to produce more than 200 tons of breeder seeds per year and supplying them to the farm level by providing foundation seed, certified seed and TLS through GOs, NGOs and PS;
- A total of 9,128 rice germplasm accessions collected from different locations in Bangladesh and abroad are conserved at the BRRI Genebank;
- Ranked Dinajpur Kataribhog (acc. no. 4791) and Bangladesh Kalijira (acc. no 247) germplasm as GI (Geographical Indication) products of Bangladesh from BRRI Rice Genebank;
- Imparted training to more than 1,79,132 personnel including scientists, farmers and extension agents from GOs, NGOs and private sectors;
- Published 436 books, booklets, folders and extension materials;
- Developed dynamic Mobile apps “BRRI Rice Doctor”, “Rice Knowledge Bank (RKB)” and “Modern Rice Nursing”;
- Developed and utilized Bangladesh Rice Knowledge Bank (BRKB), an online information hub of BRRI technologies;
- Developed a stability model for BRRI varieties;
- Developed producer and consumer preference model for BRRI varieties;

- Developed econometric models for rice production;
- Developed optimum plot size and sampling plan for field experiments with rice;
- Developed and updated Salary Management System (SMS), Labour Management System (LMS), Casual Leave Application Management System and Quota Management System;
- Developed sampling techniques for disease assessment in rice fields in collaboration with plant pathologist;
- Identified the probability of low temperature stress at different growth stages of Boro rice;
- Estimated spatial variability of arsenic in soils in arsenic contaminated shallow tube well command areas used for irrigated wet land rice cultivation;
- GIS unit has prepared Aus cultivable suitable area map of Bangladesh and also calculated mouza-wise Aus cultivable suitable area;

### *Moreover*

- Rate of return per one-taka investment in rice research and development is Tk 56;
- A number of BRRI developed rice varieties are cultivated in different countries of the world; and
- GIS unit of BRRI is now enriching about 300 digital maps including suitable areas for BRRI varieties and other agriculture related data.

## **Outstanding Contributions of Bangladesh Rice Research Institute (BRRI)**

The Bangladesh Rice Research Institute (BRRI) has played a pivotal role in transforming Bangladesh from a food-deficit to a rice self-sufficient nation through the development of numerous high-yielding, stress-tolerant, and nutritionally enriched rice varieties suited to diverse agro-ecological conditions. Its innovations address major challenges such as salinity, drought, submergence, zinc deficiency, and disease susceptibility, ensuring both productivity and nutritional security for millions.

## Development of High-Yielding Modern Varieties

Among the most popular BIRRI-developed Boro varieties are BIRRI dhan28 and BIRRI dhan29, while BR11 remains a mega variety for the T. Aman (rainfed) season. Varieties such as BIRRI dhan33, BIRRI dhan39, BIRRI dhan56, and BIRRI dhan57 are early-maturing Aman varieties, helping farmers mitigate seasonal hunger in northern Bangladesh. BIRRI dhan48 is well-suited for the Aus season. Several hybrids – such as BIRRI hybrid dhan3, 5, 4, and 7 – have achieved yields ranging from 6 to 9 tons per hectare across different growing seasons. The record-breaking BIRRI hybrid dhan8 produces up to 10.5 t/ha, underscoring BIRRI's continued innovation in hybrid rice breeding.

## Stress-Tolerant and Resilient Varieties

To ensure rice production stability under climate stress, BIRRI has developed multiple varieties with resistance to drought, flood, and salinity. BIRRI dhan51, BIRRI dhan52, and BIRRI dhan79 tolerate flash floods for up to three weeks. BIRRI dhan56 and BIRRI dhan57 are drought-tolerant Aman varieties, while BIRRI dhan78 exhibits dual tolerance to both salinity and submergence. BIRRI dhan97, BIRRI dhan99, and BIRRI dhan112 represent major progress in salinity-tolerant rice, capable of withstanding up to 14 dS/m salinity at seedling stages. Newly developed flood-tolerant variety BIRRI dhan110 can survive prolonged submergence and are ideal for flood-prone regions. BIRRI dhan109 and BIRRI dhan111 are the tidal submergence and semi-deep water tolerant rice varieties ideal for low-lying or tidal-prone coastal regions.

## Nutritionally Enriched and Specialty Rice

BIRRI's research has extended to developing nutrient-enriched and specialty rice varieties. Zinc biofortification is a notable achievement, with BIRRI dhan62, BIRRI dhan72, BIRRI dhan64, BIRRI dhan74, BIRRI dhan84, BIRRI dhan100, and BIRRI dhan102 containing up to 27.6 ppm Zn, contributing significantly to reducing micronutrient deficiencies in the population. Efforts toward producing vitamin A-enriched BIRRI dhan29 and transgenic rice with high iron and zinc content are underway. Premium-quality and aromatic varieties such as BIRRI dhan50 (Banglamati), BIRRI dhan90, BIRRI dhan104 (Basmati-type), and BIRRI dhan107 (Lata Balam) cater to both domestic and export markets. BIRRI dhan105, a low glycemic index (GI 55) rice, has been developed for diabetic consumers, reflecting the institute's focus on health-oriented rice innovations.

## Recent Varietal Innovations (BRRI dhan96–BRRI dhan114)

Since 2020, the Bangladesh Rice Research Institute (BRRI) has released 19 modern rice varieties (BRRI dhan96–BRRI dhan114), integrating high yield potential, stress tolerance, and superior grain quality.

- BRRI dhan96: A short-duration, protein-rich (10.8%) Boro variety yielding 7.0 t/ha; ideal as a substitute for BRRI dhan28.
- BRRI dhan97 and BRRI dhan99: Salinity-tolerant Boro varieties with yield potential more than 7.0 t/ha.
- BRRI dhan98: A high-yielding T. Aus variety with a yield potential of 5.0–6.0 t/ha.
- BRRI dhan100 and BRRI dhan102: Zinc-enriched Boro varieties (25–26 ppm Zn) producing 8–9.6 t/ha grain yield.
- BRRI dhan101: The first bacterial blight (BB)-resistant Boro variety, incorporating three resistance genes (*Xa21*, *Xa7*, *Xa4*).
- BRRI dhan103: A high-yielding T.Aman (Transplanted Aman) variety (6–8 t/ha) with long slender grains.
- BRRI dhan104: A high-yielding, Basmati-type Boro rice variety with a yield potential of 7.3 t/ha.
- BRRI dhan105: A medium slender, low GI Boro rice variety with a yield potential of 7.6 t/ha.
- BRRI dhan106: A high-yielding T.Aus (Transplanted Aus) variety suitable for non-saline tidal ecosystems.
- BRRI dhan107: A premium-quality Boro variety with a yield potential of 8.2 t/ha.
- BRRI dhan108: A Jira-type Boro variety producing up to 8.5 t/ha.
- BRRI dhan109: A submergence-tolerant T.Aman (Transplanted Aman) variety suitable for non-saline tidal areas, with a yield potential of 6.0 t/ha.
- BRRI dhan110: An enhanced submergence-tolerant (about three weeks) T. Aman (Transplanted Aman) variety suited to flash-flood-prone ecosystems.
- BRRI dhan111: A semi-deep-water T.Aman (Transplanted Aman) variety can tolerate water depths around 0.6 m.
- BRRI dhan112: A salt-tolerant T.Aman (Transplanted Aman) variety yielding 4.4–6.1 t/ha, enhanced by the *Gn1a* gene that increases spikelet number.

- BRRRI dhan113: A high-yielding Boro alternative to BRRRI dhan88, capable of producing up to 10.1 t/ha.
- BRRRI dhan114: A long-duration, blast-resistant Boro variety yielding up to 10.2 t/ha.

Through decades of research and innovation, BRRRI has transformed Bangladesh's rice sector by addressing the challenges of food security, nutritional security and climate resilience. Its diverse portfolio of more than 100 modern varieties meets the country's agro-climatic, nutritional, and market needs. From high-yielding hybrids and stress-tolerant lines to premium-quality and biofortified rice, BRRRI's contributions continue to support livelihoods, enhance nutrition, and strengthen national food sovereignty. Ongoing research in genetic improvement, biofortification, and sustainable input use positions Bangladesh at the forefront of global rice science and innovation.

## Development of Super-Yielding New Plant Type Hybrid Varieties

BRRRI hybrid dhan8 is the most popular Boro hybrid variety having yield potentiality more than 12 t/ha coupled with slender grains, growth duration 145-147 days, less disease susceptibility and erect leaf as well as remains green at maturity. Already identified some new generation hybrids with yield potentiality more than 13 t/ha, growth duration between 144-147 days, medium to slender grains, high F1 seed production ability and moreover tasty to eat. Two salinity tolerant hybrid rice varieties will be declared as BRRRI hybrid dhan9 and BRRRI hybrid dhan10. It will be the first salinity tolerant hybrid rice variety in Bangladesh. It can produce 6.5-7 t/ha yield at 4-8 dS/m salinity level at seedling to maturity stage. In normal conditions, both the hybrids can produce yield about 9.5 -10.7 t/ha. their canopy structure is very strong and resistant to lodge.

## On-going Research

As per Rice Vision 2050, total population of this country will be 215.4 million and production demand of clean rice by that period will be 60.9 million according to Doubling Rice Productivity (DRP) strategies. BRRRI is committed to meet-up this demand to save the nation from hunger and has taken the following strategies to fulfil this commitment.

- Development of short duration early maturing rice varieties preferably with 90 days growth duration for Aus and Aman seasons;
- Development of premium quality inbred and hybrid rice varieties;
- Development of disease and insect resistant varieties;
- Development of salinity, submergence, drought, cold and heat tolerant, early maturing rice varieties;
- Development of iron, zinc, vitamin A enriched, low glycemic index (GI) value and antioxidant enriched rice varieties;
- Development of rice varieties suitable for alternate wetting and drying (AWD) and direct-seeded wetland and dryland conditions;
- Development of deepwater rice varieties suitable for varying water depth conditions and improvement of management packages for obtaining higher yield;
- Development of resource saving rice varieties, which consume less water and less fertilizer;
- Manipulation of planting practices including water, fertilizer and soil health to minimize yield gap;
- Improvement of livelihood of the farming community;
- Development of effective sustainable, eco-friendly control of insect-pests and diseases through biological and chemical methods;
- Intervention of farming systems technologies for improving the livelihood of the resource poor farmers;
- Dissemination of BRRI technologies through field demonstrations, field-day, training, rallies and exhibitions;
- Validation and delivery of some cost-effective input management technologies including USG (Urea super granule), AWD techniques of irrigation, zero tillage surface seeding, use of poultry litter, management of rice blast, sheath blight, tungro disease and farmers training for minimizing yield gap;
- Development of smart profiling of rice varieties in Bangladesh, sensor-based rice pest management system, new version of Rice Knowledge Bank. Enhancing capacity of BRRI officials through innovation, service process simplification (SPS), ICT, MIS and 4th Industrial Revolution training, workshop etc;
- Suitability maps of BRRI released rice varieties and various cropping patterns as well as climatic factors condition maps, various soil properties maps, season wise rice area maps etc;

- Study on improvement of soil health including management of problem soil, efficient use of organic and inorganic fertilizers, improvement of soil biological properties, nutrient use efficient rice varieties, mitigation of greenhouse gas emission, techniques for low carbon emission and precise climate smart soil nutrient management in rice cultivation.
- Development of duplicate free core set of conserved rice germplasm in the BRRI Genebank using quality control (QC) genotyping, genotyping-by-sequencing (GBS) profiling, trait-specific genotyping and whole genome sequencing.
- Development of suitable crop management practices including digital tools both online and offline apps and software for appropriate doses of nutrients as well as the forecasting method against insect-pests and diseases;
- Climatic mapping of weather variables;
- Simulating of climate change impact on rice growth and yield in Bangladesh using DSSAT Model;
- Development of digital salary and labour management system of BRRI;

## How BRRI does it?

Nineteen research divisions at BRRI headquarters (HQ), 17 regional stations and six satellite stations across the country execute the research and technology development programmes of BRRI. Multi-disciplinary problem oriented annual research programmes are developed and executed by involving all scientists. Research at BRRI is organized in eight programme areas. Each programme area is composed of one or more research divisions.

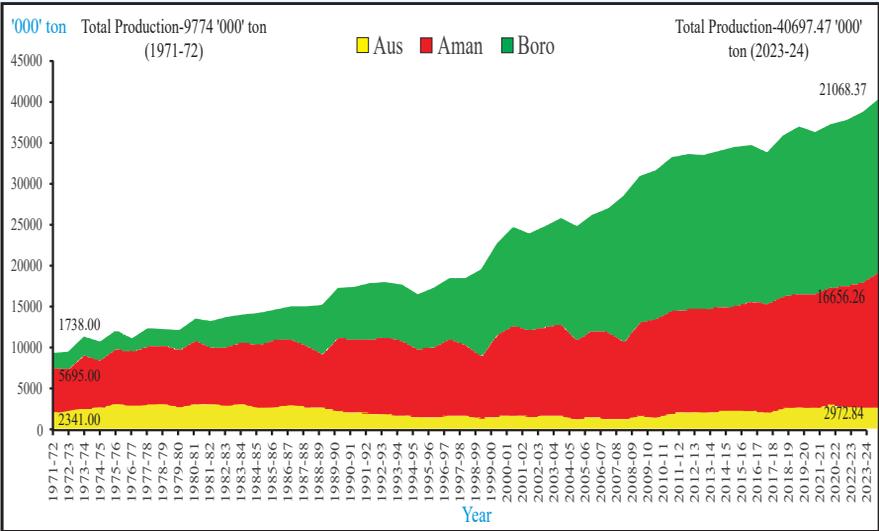
The programme areas are varietal development, crop-soil-water management, pest management, farming systems research, socio-economics and policy, technology transfer, farm mechanization, post harvest technology and regional stations.

Annual research programme is developed and finalized in three steps: a) Intra divisional meeting; b) Programme area meeting and c) Programme committee meeting. Annual research plans are prepared based on priority areas and implemented under different ecosystems.

After finalization, the research programme is executed by the assigned research divisions at HQ as well as at regional stations and at the farmers' field. The head of the concerned research division monitors the programme approved for execution. In addition, Director (Research) and the Director General supervise the overall research activities of the institute. Thereafter, results of the executed programme are presented in the Annual Research Review Workshop, where all the scientists of the institute and also expert members from other institutions take part as a final evaluation process. Director (Research) is the chief coordinator of all research activities of the institute assisted by a Coordinator for Advanced Studies and Research (CASR).

## PIONEER OF FOOD SECURITY

Rice is the staple food of Bangladesh. For the people of this country, it is the major energy source also. Rice covers 77% of the total cropped area, around 16.06 million hectares, and it is the main source of cash income for many farmers. Also, special rice varieties are essential for socio-religious functions. BRRI, as a pioneer institution of its kind, has been dealing with rice since 1970 and showing the nation the way forward to food security. BRRI variety, occupying 70% of total rice area, accounts for 80% of the total rice production of the country.



*Rice production in Bangladesh from 1971-72 to 2023-24.*

## Contributions to the Nation

Since its establishment, BRRI has rendered valuable service to the nation through the development of high-yielding rice varieties and improved production technologies, which have been instrumental in tripling the annual rice output in Bangladesh within four decades. For this, BRRI is well known nationally in Bangladesh as well as in the international rice community.

BRRI developed high-yielding modern rice varieties (MVs) at present covers 90% of the Boro (winter rice), 75% of the Aus (summer rice), and 59% of the transplant Aman (Autumn rice) areas of Bangladesh. These varieties together account for about 70% of the total annual rice production in the country. The BRRI MVs and technology packages played the key role in boosting annual rice production in Bangladesh from 9.93 million tons in 1972-73 to nearly 40.60 million tons annually in 2023-24. The net contribution of modern rice to total rice production was 27.04 million tons in 2013. It grew to 5.1 million tons by 1985 and 8.9 million tons by 1993, more than 10 million tons by 2013 and eventually increased to 40.7 million tons where 5.2 million tons are surplus rice production. In absolute terms, the output from MV rice met the food requirements of almost 170 million people annually during 2023-24. Without BRRI MVs, rice production would have grown at the rate of less than 1% per year, almost half the rate at which the population grew during this period. Thus, unless the deficit would have been covered by additional food import, the price of rice would have increased. The market would have distributed the scarce supplies in favour of the upper income groups, which could have worsened food insecurity and poverty in Bangladesh.

BRRI MVs and production technologies benefited the nation in the form of cost saving rice production. But, there were indirect additional benefits to the society, too. The government saved scarce foreign exchange as additional rice production, made possible through the diffusion of the new technology, prevented the need for an increase in food grain imports. Without BRRI MVs, Bangladesh could not have met the rice needs of the growing population, and would have been forced to import the additional amount to maintain stability in prices in the domestic market. In fact, since the early 1980s the import of food grains declined steadily and the country achieved self-sufficiency by the 2010s.

BRRI technologies also contributed to the income generation and employment opportunities in rural Bangladesh over the past four

decades. In areas where the MV technology has been introduced, the proportion of population living below the poverty line is 31.5% compared to 50% for areas without such technological progress. The net return per agricultural holding using MV technology is about 50% higher than a similar holding using traditional varieties. The expansion of modern irrigation facilities, which concurred with the expansion of MV rice acreage, has also led to increased employment opportunities in non-agricultural activities, with a rise in the income of the rural population. Additional people have been employed indirectly, in fertilizer trade or in the maintenance of pumps and other equipment, for example.

## Rice Seasons

Rice grows under irrigated, rainfed and deepwater conditions in four distinct rice seasons, namely: Aus (Early season Rice), transplant Aman (T. Aman), broadcast Aman (B. Aman) or deepwater Aman (Middle season or wet season) and Boro (Late or Dry season).

**Aus.** It is photoperiod-insensitive and grows generally under rainfed condition both as a broadcast and transplanted crop from March to September. Aus covers 1.34 million hectares with about 90.0% planted to modern variety (MV) Aus.

**Broadcast Aman.** Deep water Aman is planted in two ways: broadcast in March or April alone or sometimes mixed with Aus and transplanted in May following Boro harvest. While Aus is harvested in June and July, B. Aman competes with the monsoon floods at water depths from 0.5 to 4.0 m from June to September and is harvested generally in November and December. About 0.24 million hectare area is planted with different broadcast Aman cultivars.

**Transplant Aman.** T. Aman is planted from July to September in areas where water depths usually do not exceed 0.5 m. T. Aman is the most important rice crop and covers about 40.85% of the total rice area in Bangladesh. All indigenous T. Aman rice is sensitive to photoperiod, but MV rice transplanted in about 80% of the total T. Aman area and is insensitive to sensitive to photoperiod. However, photosensitivity is needed to increase yields of this crop when cropping patterns dictate late planting or farmers are forced to go for late planting due to natural calamities.

**Boro.** Boro grows entirely in the irrigated condition in dry season. Seedbeds are made from October to December. Seedlings are transplanted from December to February and the crop is harvested

from late April to June. Nearly 99% of the 5.00 million hectares of Boro is planted with modern varieties. As the winter is relatively free from insects and diseases and because of higher solar radiation and better water management, Boro yields are higher than any other seasons.

## The BRRI Challenge

As per Rice vision 2050, the total population of the country will be 215.4 million and the production demand of the clean rice by that period will be 60.9 million tons as per Doubling Rice Productivity Strategies. Again this target has to be achieved under the scenario of decreasing resources and changing climate.

### *Where will this come from?*

An answer to this question can be provided only by strengthening research as well as developing appropriate rice production technologies. BRRI, dedicated to develop new rice technology, has identified the strategies to meet the challenge of feeding the extra millions that include:

- Conducting research on all aspects of rice production;
- Developing climate change resilient rice technologies;
- Strengthening on-farm research activities to validate and scale up BRRI developed technologies ; and
- Imparting training of extension agents, other professionals and farmers on improved techniques of rice production and rice science.

## Board of Management

A board of management holds full responsibility to determine and execute policies and undertakings of the institute within the framework of policy directive issued by the government. The Director General is the executive head and works as the chairman on behalf of the board of management. At present the board consists of:

### *Chairman*

Director General, BRRI

### *Members*

Representative of the  
Ministry of Finance, Bangladesh Secretariat, Dhaka.

Representative of the  
Ministry of Agriculture, Bangladesh Secretariat, Dhaka.

Representative of Bangladesh Agricultural Research  
Council (BARC)

Representative of the Department of Agricultural Extension (DAE)

Representative of Bangladesh Institute of Nuclear Agriculture  
(BINA)

Representative of the Senior Scientist of BIRRI

Representative of the Renowned Scientists of BIRRI

Representative of the Renowned Scientists (Social Science)

Representative of the Farmers

Representative of the Non-Government Organization

Director (Junior), BIRRI

### *Member Secretary*

Director (Senior), BIRRI

## Research Division and Support Service

BIRRI has 19 research divisions, 17 regional stations, six satellite stations, three support service divisions and eight sections with administrative and technical services.

### Research Divisions

- Plant Breeding
- Hybrid Rice
- Biotechnology
- Genetic Resources and Seed
- Grain Quality and Nutrition
- Agronomy
- Plant Physiology
- Soil Science
- Irrigation and Water Management

- Entomology
- Plant Pathology
- Rice Farming Systems
- Farm Machinery and Postharvest Technology
- Workshop Machinery and Maintenance
- Agricultural Economics
- Agricultural Statistics
- Farm Management
- Adaptive Research
- Training

## Support Service Divisions/Sections

- Publications and Public Relations
- Library
- Building and Construction
- Planning and Evaluation
- Administration
- Accounts and Finance
- Audit Cell
- Dispensary/Health Centre
- Transport
- Hostel
- ICT Cell

## Regional Stations (RS)

- BRRi RS, Cumilla** PO Box no. 58, Shasongacha, Cumilla 3500  
e-mail : head.comi@brrri.gov.bd
- BRRi RS, Barishal** PO: Ruptali Housing, Sagardi, Barishal 8200  
e-mail : head.bari@brrri.gov.bd
- BRRi RS, Rajshahi** Shampur, Rajshahi 6212  
e-mail : head.rajs@brrri.gov.bd
- BRRi RS, Habiganj** PO Box no. 2, Nagura, Habiganj 3300  
e-mail : head.habi@brrri.gov.bd
- BRRi RS, Sonagazi** South Char Chandia, Sonagazi 3930, Feni  
e-mail : head.sona@brrri.gov.bd
- BRRi RS, Satkhira** Pradip Nibas, Katia, Satkhira 9400  
e-mail : head.sath@brrri.gov.bd

- BRRRI RS, Rangpur** Sardar Para, PO: Cadet College, Rangpur 5404  
e-mail : head.rang@brrri.gov.bd
- BRRRI RS, Bhanga** PO Box no. 7830, Bhanga, Faridpur  
e-mail : head.bhan@brrri.gov.bd
- BRRRI RS, Kushtia** PO Box no. 7000, Sadar Kushtia.  
e-mail : head.kust@brrri.gov.bd
- BRRRI RS, Sirajganj** Konabari, Kamarkhand upazila, Sirajganj  
e-mail : head.sirajganj@brrri.gov.bd
- BRRRI RS, Gopalganj** Ghonapara, Gobra union, Gopalganj 8100,  
e-mail : head.gopalganj@brrri.gov.bd

### **Proposed Regional Stations (RS)**

- BRRRI RS, Cox’s Bazar
- BRRRI RS, Khagrachhari
- BRRRI RS, Tangail
- BRRRI RS, Dinajpur
- BRRRI RS, Sunamganj
- BRRRI RS, Netrakona

### **Proposed Satellite Stations (SS)**

- BRRRI SS, Khulna
- BRRRI SS, Chattogram
- BRRRI SS, Patuakhali
- BRRRI SS, Panchagarh
- BRRRI SS, Sylhet
- BRRRI SS, Mymensingh

## **Problem-oriented Research**

The work of the institute is to organize and manage research on a problem-oriented basis. Scientists follow a 3-step evaluation procedure before finally adopting research programmes. Thus, an interdisciplinary approach is followed to select a particular problem area and accordingly implement the selected programmes through several projects, each of which is performed by one or more divisions of BRRRI HQ at Joydebpur, Gazipur and by the professional staff at the regional stations. BRRRI scientists also expose their research programmes to outside scientists, donors, planners and administrators in the annual research review workshop as well as participating in different national and international workshops and seminars.

## New Strategic Focus

Recently BRRI has strengthened its rainfed Aus and T. Aman research programmes as the part of a new strategic plan for the next decade.

In future, enough water may not be available to irrigate the entire area for Boro cultivation. As a resource saving option, Aus and Aman-based cropping pattern appears to be quite prospective. Around 15% areas of Boro rice (Around 0.9 Mha) can be shifted to Aus rice areas. In order to compensate the reduced amount of Boro production, the cumulative Aus areas should be increased to 1.8 Mha and the total production of Aus will have to be 5.2 million metric tons. To harvest this production, grain yield of modern Aus at farmers' field should be around 4.0 t/ha for which, in addition to other technologies, the assurance of partial or supplemental irrigation facilities are needed. Moreover, location-specific varieties along with production technologies will be the crucial factors for attaining the goal. For the timely establishment and post-harvest operations, particularly for Aus rice, farm mechanization needs to be emphasized. According to Doubling Rice Productivity (DRP) strategies, five fallow areas namely greater Barishal region, North-Eastern Bangladesh predominantly greater Sylhet region, South-West and greater Jashore region, Coastal charland in greater Barishal region and Noakhali district and Chattogram hill tracts especially Kaptai lake areas have been identified, which could be brought under cultivation. Special incentive package for providing inputs to the farmers should be ensured. BRRI developed 51 T. Aman, 53 Boro, 15 Aus rice varieties, another 12 Boro rice varieties which are also good for cultivating as T. Aus. More promising Aus and Aman rice varieties having short duration, biotic and abiotic stress tolerances, and good yield potential should be developed. Suitable cropping patterns based on different ecosystems by the inclusion of 1-2 non-rice crops between Aus and Aman rice should also be developed. Shifting irrigated Boro culture to dry-direct seeded aerobic culture could also be the critical factor to reduce pressure on water consumption during Boro season. Mechanized crop establishment and suitable varieties having aerobic adaptation, cold tolerance and short duration will be required for aerobic culture during Boro season. Considerable amount of water can also be saved by popularizing AWD practice across the country through appropriate policy interventions.

**Short term.** The short-term research strategy is directed to increase rice productivity and devise methodology to increase the farmers' adoption rate of modern rice varieties. In this regard, BIRRI conducts research to:

- Identify major regional, physical, technical and socio-economic rice production problems to develop more site-specific technologies;
- Develop short and long duration varieties for irrigated, rainfed upland and lowland favourable ecosystems and sustainable production technologies;
- Develop climate smart varieties for higher yield per day and production technologies;
- Develop premium quality, micronutrient rich, arsenic tolerant, aerobic and low input rice varieties;
- Develop cost-effective disease, insect and weed management packages and resistant varieties;
- Identify acute and latent soil micronutrient deficiency and develop devices (economical means) for their correction;
- Develop profitable cropping patterns and component technologies for different ecosystems or a specific location;
- Design, develop and distribute farm machinery for sustainable rice production;
- Assess impact of transferred technologies and feedback study to increase production and livelihood improvement of farmers;
- Train farmers and extension personnel on updated rice production technologies to reduce knowledge gap.
- Improve nutrient use efficiency through nano fertilizer, improve rice soil biology, mitigation of greenhouse gas emission through integrated nutrient and water management.
- Develop specialized rice germplasm panels (Aromatic, salinity-tolerant, heat-tolerant, photosensitive, insect and disease resistant etc) from BIRRI Genebank collections using SNP markers (1K RiCA panel or 4K RiCA panel).

**Long term.** The long-term research strategy is directed to:

- Develop and adopt new plant type, hybrid, super hybrid rice and C4 rice for breaking yield ceiling of existing varieties;

- Develop sustainable disease and insect management packages and gene pyramiding of resistance for the development of varieties;
- Develop nutrient and water use efficient short and long duration varieties for maximum yield per day with appropriate management technologies;
- Develop climate smart, facultative, green saving rice and sustainable crop management technologies;
- Develop biorational pesticide, organic fertilizer to reduce pressure on use of chemicals;
- Exploit nano-technologies, artificial intelligence;
- Develop economically profitable farming systems technologies and deliver them to the farmers for adoption of climate change;
- Utilize alternative energy sources in farm machinery and water management for rice production;
- Develop policy research for sustainable rice production to ensure food security of the nation;
- Adopt conservation and precision agriculture, web-based fertilizer management and crop modeling-based carbon trading;
- Use speed breeding, genome editing bioinformatics, next generation sequencing and high through-put phenotyping in order to develop smart rice varieties;
- Digitalize knowledge transfer system for rice production technologies;
- Sustainable soil health improvement by using climate smart precise soil nutrient management technologies such as AI based nutrient management, soil sensor, identifying nutrients use efficient rice varieties;
- Develop duplicate free core set of conserved rice germplasm in the BRRI Genebank through quality control (QC) genotyping, genotyping-by-sequencing (GBS) profiling and whole genome sequencing.

## From Dwarfism to Ecology Oriented

BRRI scientists deviated from the original IRRI concept of dwarfism for high yields and restructured the IR8 plant type to suit local

agro-ecology and socio-economic production environment. The new intermediate-height plant gives equally high yield and, at the same time, grows in uncontrolled water better than the semi-dwarf varieties. Bangladeshi farmers also prefer relatively tall plants to produce cattle feed and roofing materials. BRRI is now expediting research works to develop lodging tolerant rice varieties even though the plant height is a bit taller.

## ACCOMPLISHMENTS

With appropriate management and under favourable soil and environmental conditions, BRRI MVs yield on average 5-6 t/ha in Boro, 3-4 t/ha in Aus, and 4-5 t/ha in transplant Aman seasons compared with 2-3 t/ha of the traditional varieties. A number of BRRI MVs are now widely grown in about 14 other countries including India, Nepal, Bhutan, Myanmar, Vietnam and West Africa.

BRRI cereal chemists regularly evaluate rice grain quality in terms of taste, cooking quality, milling outturn, aroma, protein and amylose contents etc., helping plant breeders develop varieties with desirable grain quality. A total of 9,128 germplasm, of which about 60% are local cultivars, have been collected and conserved in Genebank.

**Improved production technologies:** Through extensive laboratory, greenhouse and field experimentation, BRRI scientists have developed more than 300 crop-soil-fertilizer-water, pest management methods, farm machinery as well as rice-based farming systems for the cultivation of MVs in various agro-ecological zones of the country.

### Plant Breeding Division

The major achievements of variety development programme area including Plant Breeding Division of BRRI are the development of high-yielding modern rice varieties (MVs) for both favourable and unfavourable ecosystems. BRRI has so far developed and released 121 MVs (113 inbred and 8 hybrids). Among 113 inbred rice varieties, 107 inbreds were developed by Plant Breeding Division and six inbred varieties were developed by Biotechnology Division. Season-wise counting of these 121 varieties including hybrids and considering overlapping are as follows:

- |                     |      |                        |      |
|---------------------|------|------------------------|------|
| ● T. Aman (Rainfed) | : 51 | ● Boro (Irrigated)     | : 53 |
| ● T. Aus (Rainfed)  | : 7  | ● B. Aus (Rainfed)     | : 6  |
| ● T. Aus and B. Aus | : 2  | ● Boro good for T. Aus | : 12 |

Plant Breeding Division (PBD) has given considerable efforts to develop modern varieties both for favourable and unfavourable areas. Development of climate smart rice varieties with tolerance against abiotic stresses like salinity, submergence, drought, cold etc., is one of the prioritized breeding targets. BRRI has been applying frontier breeding tools like population improvement, genomic selection, marker assisted selection utilizing high through-put molecular markers, genome editing, genomics-phenomics, techniques to develop rice varieties with high yield, biotic stress tolerances, premium quality and resource saving properties. Recently, scientists of PBD are working relentlessly to keep pace with international level research combining different scientific approaches like RGA (Rapid generation advance), low density and high-density genotyping, digital barcoding, automation in post-harvest technology etc., to develop sustainable rice varieties for future under the jurisdiction of TRB-BRRI (Transforming rice breeding-BRRI) and RCGS (Rapid Cycle Genomic Selection) projects. The scientists of this division have supervised MS and PhD students as part of capacity building and provided non-degree training on modern rice breeding and varieties to students, farmers, NARS and international scientists, extension personnel and NGO staffs. The division published articles in scientific journals, annual reports, proceedings, leaflets and bulletins about the released varieties.

## Rice growing season-wise achievement of PBD at a glance

### Aus Season

- BR21, BR24, BRRI dhan42, BRRI dhan43 and BRRI dhan65 are the rice varieties suitable for the high rainfall upland situation (direct-seeded Aus). BRRI dhan65 is an upland Aus rice variety with around 0.5 t/ha more yield potential than BRRI dhan43. Moreover, this variety has better weed competitiveness than BRRI dhan43 at the earlier growth stages.
- BRRI dhan42, BRRI dhan43 and BRRI dhan83 are the broadcast Aus rice varieties suitable for drought prone areas. BRRI dhan83 is a B. Aus variety with moderate level of drought tolerance at the vegetative stage. The grain colour of this variety is reddish as like as the locally improved variety (LIV) Katakara. Under optimum management this variety can produce on average 3.8 t/ha which is around 1.0 ton higher than BRRI dhan43. This variety is particularly suitable in the charland areas of Noakhali

and Feni. Recently BRRI dhan83 has been recommended to cultivate in T. Aus season also.

- BR26, BRRI dhan48, BRRI dhan55, BRRI dhan82 and BRRI dhan98 are the T. Aus varieties. BRRI dhan55 as T. Aus variety is 10 days earlier than BRRI dhan27 and can produce one ton/ha higher yield than that of BRRI dhan27. Under optimum management BRRI dhan55 can produce 7.0-7.5 t/ha grain yield in T. Aus season.
- BRRI dhan82 has been developed through pure line selection of NERICA10. Under optimum management BRRI dhan82 can produce 4.5-5.5 t/ha grain yield. The growth duration of this variety is 4-5 days shorter than BRRI dhan48. Eventually cultivation of the T. Aus variety will open up the avenue of in-time cultivation of T. Aman varieties. BRRI dhan98 produces 5.1-5.9 ton per hectare grain yield. The grain is long slender and golden coloured. Its growth duration is 112 days which is similar to BR26. Thousand grain weight (TGW) of this variety is around 22.6 grams. The grain contains 27.9% amylose and 9.5% protein. The cooked rice is non-sticky.
- BRRI dhan27 is a T. Aus variety suitable for non-saline tidal wetland areas of greater Barishal region. BRRI dhan48 is the most popular T. Aus variety with 5.5 t/ha grain yield potential and 110 days average growth duration. BRRI dhan85 is the T. Aus variety suitable for comparatively low land waterlogged areas of greater Cumilla region. The grain yield potential of BRRI dhan85 is 4.3 t/ha.
- BRRI dhan106 is a high-yielding T. Aus rice variety suitable for non-saline tidal areas in Bangladesh. Its average yield is 5.0 t/ha which is 17.4 percent higher than the check variety BRRI dhan27. If proper management is ensured, it can produce 5.5 t/ha yield. The special feature of the new variety is having lodging tolerance ability. The grain size and shape of the variety is medium bold and golden in colour. Its growth duration is 117 days, TGW (Thousand Grain Weight) of this variety is around 24.5 grams, which is supposed to be accepted by the farmers of Barishal regions. Its grain contains 27.2% amylose and 8.5% protein. The cooked rice of this variety is fluffy.

## Aman Season

- BRRI dhan49 is a popular T. Aman variety with Nizersail type grain quality with seven days earlier growth duration than BR11 and 5.5 t/ha grain yield potential.

- BRRRI dhan70 and BRRRI dhan80 are the long slender aromatic rice varieties for T. Aman season with shorter growth duration (130 days) and 5.0 t/ha grain yield potential.
- BRRRI dhan90 is a high yielding premium quality T. Aman variety. The grain size and shape of this variety is as like as BRRRI dhan34. The average yield potential of this variety is 5.0 t/ha and average growth duration is 122 days. Importantly, BRRRI dhan90 is 21 days earlier than BRRRI dhan34 but can produce 1.0-1.4 t/ha more grain yield. The clean rice of this variety can be used for preparing special festival cuisines like *polao and paes*.
- BRRRI dhan91 is a semi-deepwater B. Aman rice variety with special adaptive capacities up to one-meter height flood water. This variety is a moderate photo-sensitive variety with average 156 days growth duration, which is 10-15 days earlier than the local deepwater cultivar like Fulkuri. The grain yield potential of BRRRI dhan91 is 3.5 t/ha.
- BRRRI dhan111 possesses slow stem elongation and moderate level of submergence tolerance. The average height of the matured plant of BRRRI dhan111 is 167 cm with growth duration 146-160 days depending on seeding time. The variety has strong photosensitivity. TGW of the variety is 27.5 gram with medium bold and white grain. Amylose content of the grain is 27.5% and protein content is 7.9%. The cooked rice of this variety is non-sticky. The average grain yield performance of the variety is 6.5 t/ha under non-stress condition whereas under tidal submergence condition, the variety can produce 5.40 t/ha average grain yield. Under coastal tidal flood and semi deep situation, the variety can produce around 5.0 t/ha grain yield, whereas, under non-flooded condition and optimum level of management the variety can produce up to 5.7 t/ha grain yield.
- BRRRI dhan93 and BRRRI dhan94 are the modern T. Aman varieties with 134 days growth duration. The average yield potentials of these varieties are 5.8 t/ha. BRRRI dhan95 is another modern T. Aman variety with 125 days growth duration and average yield potential 5.7 t/ha. All these three varieties have Indian Swarna-type grain qualities and adaptive capacities. Therefore, these three varieties can be cultivated in the Swarna-growing border areas of the country.

- BR22, BR23 and BRRRI dhan46 with strong photoperiod sensitivity are suitable for late transplanting in Aman season after the recession of the flood water.
- BRRRI dhan44, BRRRI dhan52, BRRRI dhan76 and BRRRI dhan77 are the T. Aman varieties suitable for tidal non-saline areas of greater Barishal region.
- BRRRI dhan109, a tidal submergence tolerant Transplant Aman rice variety. The pedigree number of BRRRI dhan109 is BR9158-19-9-6-50-2-HR1. The line was developed making cross between BRRRI dhan44 and BRRRI dhan52 in 2008 and developed through Marker-Assisted Backcross breeding. The average height of the matured plant of BRRRI dhan109 is 128 cm with 147 days growth duration. TGW of the variety is 31.0 gram with long bold and white grain. Amylose content of the grain is 25.4% and protein content is 10.6%. The cooked rice of this variety is non-sticky. The seedling height of this variety is 50 cm with 40-day-old seedling. The variety possesses the flash flooding tolerant QTL SUB1, hence can tolerate around two weeks complete submergence. The average grain yield performance of the variety is 6.0 t/ha under non-stress condition, whereas under tidal submergence condition, the variety can produce 5.40 t/ha average grain yield.
- BR25, BRRRI dhan32, BRRRI dhan33, BRRRI dhan39 and BRRRI dhan75 are the short to medium duration photo-insensitive rice varieties. BRRRI dhan75 is a high yielding and short duration T. Aman rice variety with 5.5 t/ha yield potential. The cooked rice of this variety has slight aroma.
- BR10, BRRRI dhan30 and BRRRI dhan31 have been developed for rainfed lowland rice environment. These varieties are weakly photo-sensitive and have 5.0-6.0 t/ha yield potential. Beside these, BR10, BR23 and BRRRI dhan30 are the T. Aman rice varieties with special adaptation ability under the water stagnant areas of southern region of Bangladesh.
- Three submergence tolerant varieties such as BRRRI dhan51, BRRRI dhan52 and BRRRI dhan79 have been developed, which can survive against 2-3 weeks of submergence.
- BRRRI dhan110, a prolonged flash flooding tolerant T. Aman rice variety. The pedigree number of BRRRI dhan110 is IR16F1148. The line was developed making cross between IR262 and PR30245-10-414 in 2013 in IRRI and developed through bulk

method of breeding. The average height of the matured plant of BRR1 dhan110 is 120 cm with growth duration 123 days under non-flooded condition. There is purplish colour at the basal portion of the plant and also at the grain tip. Thousand grain weight of the variety is 19.9 gram with medium slender and white grain. Amylose content of the grain is 24.0% and protein content is 8.8%. The cooked rice of this variety is non-sticky. The variety possesses the flash flooding tolerant QTL SUB1, and can tolerate three to four weeks of complete submergence. The average grain yield performance of the variety is 6.65 t/ha under non-stress condition, whereas under flash flooding condition, the variety can produce 5.0 t/ha average grain yield. Importantly, the variety can produce around 1.0-ton higher grain yield than BINA dhan11 with similar or more submergence tolerance.

- Four varieties viz BRR1 dhan56, BRR1 dhan57, BRR1 dhan66 and BRR1 dhan71 have been developed for T. Aman which are suitable for drought-prone areas of Bangladesh.
- Two zinc (Zn) enriched varieties i.e. BRR1 dhan62 and BRR1 dhan72 (short duration) with 19.8 and 22.8 ppm Zn respectively have been developed for T. Aman season.
- Another five varieties BRR1 dhan40, BRR1 dhan41, BRR1 dhan53, BRR1 dhan54 and BRR1 dhan73 are the salinity tolerant varieties for T. Aman with 8 dS/m salinity tolerance at reproductive stage.
- BRR1 dhan78 is dual tolerant T. Aman variety with tolerance against both submergence and salinity. The growth duration of this variety is 135 days with 4.5 t/ha grain yield potential.
- BRR1 dhan112 is a salt-tolerant, medium-duration T. Aman variety. BRR1 dhan112 can yield between 4.41 and 6.12 tons per hectare. The life cycle of this variety is 120-125 days and plant height ranges from 103 to 105 cm.

## **Boro Season**

- BRR1 dhan58 is a high yielding Boro variety. It is the first variety developed through tissue culture process from BRR1 dhan29, which is 7-10 days earlier than BRR1 dhan29 with more or less similar yield potential. The growth duration of BRR1 dhan58 is 150-155 days and grain yield potential 7.2t/ha. Interestingly, BRR1 dhan58 can be cultivated after potato harvest in late Boro season and in the shrimp Gher of Southern region during Boro season.

- BRRI dhan47, BRRI dhan61 and BRRI dhan67 for Boro season which can tolerate 12-14 dS/m salinity at seedling stage and also withstand 6-8 dS/m salinity during whole life cycle. Newly released BRRI dhan97 and BRRI dhan99 is suitable for Boro season, which can tolerate 14 dS/m salinity at seedling stage and also withstand 8-10 dS/m salinity during whole life cycle.
- Nonetheless, Five zinc (Zn) enriched varieties ie BRRI dhan64, BRRI dhan74, BRRI dhan84, BRRI dhan100 and BRRI dhan102 with 24.5, 24.2, 27.6, 25.7 and 25.5 ppm zn, respectively were developed for Boro season. The average yield of newly released BRRI dhan102 is 8.1 t/ha, however, with proper management, it is possible to get yield up to 9.6 t/ha under favourable environment. Eventually it can play a vital role to meet up the 50-70% zinc requirement of the people of Bangladesh.
- BRRI dhan50 popularly known as Banglamati (Basmati type) and BRRI dhan63 (slender balam type) are the high yielding Boro rice varieties with premium quality for favourable ecosystem.
- The MVs like BR17, BR18 and BR19 are suitable for *haor* areas (depressed basins) in Boro season of Bangladesh. In addition, BR18, BRRI dhan36, BRRI dhan55 and BRRI dhan69 possess cold tolerance at vegetative stages and are suitable for cold stress prone areas of northern region of Bangladesh. BRRI dhan69 is low input potential Boro rice variety with 7.5 t/ha grain yield potential. Importantly, BRRI dhan69 has moderate level of cold tolerance during reproductive stage.
- BRRI dhan55 is a moderately cold, salinity and drought tolerant variety. This variety can be cultivated in the Boro areas with moderate level of salinity, water shortage and cold problems. BRRI dhan55 is five days later than BRRI dhan28 but can produce 1.0 t/ha higher grain yield.
- BRRI dhan59 and BRRI dhan60 have in-between growth duration compared to BRRI dhan28 and BRRI dhan29 have been developed for Boro season. Both of the varieties have yield potential ranging from 6-7.5 t/ha. Importantly, BRRI dhan60 has extra-long slender grain.
- BRRI dhan68 has been developed as standard Boro rice with medium bold grain, lodging tolerance and 13% more grain yield potential than BRRI dhan28 but with around one-week later growth duration.

- The growth duration of BRRRI dhan81 is 140 days and it has 6.5 t/ha yield potential. This variety containing high protein (10.3%) has all the premium quality rice characteristics except aroma. The variety can be exported as the grain size and shape of this variety is long slender as like as Basmati rice. Moreover, the size and shape of clean rice is as like as local Jira cultivar and therefore, the variety has demand in the local market as well. The growth duration of BRRRI dhan88 is 140-143 days with 7.0 t/ha grain yield potential. This variety is particularly suitable as short duration Boro variety.
- BRRRI dhan101 is the first BB (bacterial blight) resistant Boro rice variety. The grain of the variety is long-slender and golden in colour. For being a BB resistant variety, the field appearance of this variety is clean. Growth duration of this variety ranges between 135-152 days with an average of 142 days, which is four days earlier than the popular variety BRRRI dhan58. The average yield of this variety is 7.72 ton per hectare. However, it can produce 8.99 ton per hectare yield under optimum management. Thousand-grain weight of this variety is around 23.1 grams. Rice kernel is long-slender and white. Its grain contains 25.0% amylose and 9.8% protein. The cooked rice is non-sticky. The variety showed strong resistance to BB (BB score-1) under artificial inoculation with virulent BB pathogens. QTL fingerprinting with functional SNP markers for the BB resistance detected three dominant BB resistant genes Xa21, Xa7 and Xa4 in this variety.



*Scientists of the Plant Breeding Division, BRRRI.*

- BRRRI dhan104 is a high yielding premium quality Boro rice variety. Its average height is 92 cm and growth duration 147 days. This variety can produce 7.3 ton per hectare yield. Combined

with favourable environment and proper management, this variety has the potential to yield up to 8.71 ton per hectare. TGW of this variety is around 21.5 grams. Rice kernel is extra-long-slender basmati type and white. Its grain contains 29.2% amylose and 8.9% protein. The cooked rice is non-sticky. This is an important basmati type aromatic rice variety of BRRI.

- BRRI dhan105 is a low glycemic index (GI value 55.0) i.e., diabetic rice variety suitable for Boro season. So, it is expected to gain wide acceptance as a diabetic rice due to its low GI properties. The average grain yield of the variety is 8.1 t/ha. If proper management is provided, it can produce 8.5 t/ha grain yield. Its growth duration is 151 days. The TGW of this variety is 19.4g. The amylose content of BRRI dhan105 is 27.0% and protein content is 7.3%. The grain size and shape of this variety is long slender and the colour of the milled rice is white. The cooked rice is non-sticky and tastes good.
- BRRI dhan107, a premium quality and high protein balam type high yielding Boro rice variety. The local name of BRRI dhan107 is *Lata balam*. BRRI collected this line in 2015 from farmers' field and developed through pure line selection. The average plant height of BRRI dhan107 is 103 cm. The average growth duration of BRRI dhan107 is 143 days, which is approximate to BRRI dhan50. The flag leaf is broad, erect and long. The colour of the leaf is green. The average yield of BRRI dhan107 is 8.2 t/ha, although with appropriate management, under favourable environment it can yield 9.57 t/ha. The result of PVT showed that on average BRRI dhan107 yielded 17.67% higher than the check variety BRRI dhan50 in ten locations. The grain quality of the rice is excellent, that is, the kernel is extra-long slender (7.6 mm). The amount of amylose and protein of the variety is 29.1% and 10.02% respectively. The TGW of BRRI dhan107 is 26.1 grams. The grain colour of BRRI dhan107 is as like as straw and the milled rice of the variety is extra-long slender and white. Therefore, it is expected that the people of Bangladesh will be interested for the cultivation of the variety and as a result BRRI dhan107 will play a major role in the national rice production of Bangladesh.
- BRRI dhan108, a Jira-type high yielding Boro variety. Its pedigree line-BRH11-9-11-4-5B: High-yielding (Jira type) Boro rice variety. This variety has medium slender fine grains *as like as Jira dhan* and a greater number of grains (250-270) per panicle. The breeding line BRH11-9-11-4-5B is a high yielding variety, which has been selected for cultivation throughout the country during Boro

season. BRH11-9-11-4-5B has been developed by hybridization between IR 80561A and China inbred 321 and pedigree selection. The average plant height of BRR1 dhan108 is 102 cm with erect, broad, dark green leaves and it is also lodging tolerant with 150 days growth duration. The grain type of this variety is medium slender *as like Jira dhan*. BRR1 dhan108 has high yield and fine grain. The main characteristics of this variety include densely arranged more number of grains (250-270) per panicle. The average yield of BRR1 dhan108 is 8.52 t/ha, which is 1.0 t/ha more than BRR1 dhan100. The grains of BRR1 dhan108 possess excellent physico-chemical characteristics, with a TGW of 16.3 g, white and medium slender fine grains *as like as Jira dhan*. The content of amylose and protein is 24.5% and 8.8% respectively. Its cooked rice is soft and non-sticky. This variety has been developed for better market price for the farmers and commercial branding.

- BRR1 dhan113, the pedigree number of this variety is BR11337-5R-72. BRR1 dhan113 has been released as a high-yielding alternative to the popular Boro season variety BRR1 dhan29. The variety produces medium-slender grains. The flag leaf is erect, wide, and long and the plant remains green even at maturity. The average height of matured plants is 102 to 105 cm, and the plant is strong and lodging-resistant. The variety has a life cycle of 143 days. The TGW is on average 19.4 grams. The grain is medium-slender and white, dissembling that of the Nazirshail variety. The amylose content in this rice is 28.0% and the cooked rice is fluffy. The protein contains is 8.4%. In yield performance, BRR1 dhan113 showed 11.5% higher yield than BRR1 dhan88, averaging 8.15 tons per hectare. Under optimal conditions and proper management, this variety can yield up to 10.1 tons per hectare.



Scientists of the Plant Breeding Division are at work in the laboratory.

## Hybrid Rice Division

The Hybrid Rice Division is a vital component of the rice variety development programme at BIRRI. Since its inception, this division has focused on developing hybrid rice parental materials such as cytoplasmic male sterile (CMS or A) lines, maintainer (B) lines, and restorer (R) lines adapted to various stress conditions using modern breeding techniques.

Hybrid Rice Division also works to standardize cultivation practices, seed production technologies, and provides training for a wide range of stakeholders, including farmers, government and NGO officials, and seed company personnel, to promote the adoption of BIRRI hybrid rice across the country.

Additionally, the Hybrid Rice Division distributes limited quantities of hybrid seeds and parental materials (A and R lines) of released hybrids to farmers and seed producers to enhance their popularity and adoption nationwide.

### Major achievement

- A total of eight hybrid rice varieties have been developed: five hybrids (BIRRI hybrid dhan1, BIRRI hybrid dhan2, BIRRI hybrid dhan3, BIRRI hybrid dhan5, and BIRRI hybrid dhan8) for the Boro season; one hybrid (BIRRI hybrid dhan7) for the transplant Aus season; and two hybrids (BIRRI hybrid dhan4 and BIRRI hybrid dhan6) for the transplanted Aman season.
- So far, 162 multi-stress tolerant CMS lines for the Boro season and 104 CMS lines for the T. Aman season are being properly maintained. Out of 266 CMS lines, 208 are locally developed.
- A total of 292 restorer lines for the Boro season and 206 restorer lines for the Aman season have been developed, with a focus on adaptation to diverse environmental conditions.
- Leaflets, folders, and books on hybrid rice cultivation and seed production technologies have been published and distributed to the stakeholders.



*Pictorial view of hybrid research field.*

## Biotechnology Division

The Biotechnology Division is one of the major components of the rice variety development programme area in BRRI. Since its inception, the division has been working for generating rice breeding lines through different biotechnological tools. Its major thrust includes the variety development for high yield, grain quality, stress tolerance, and generating information about the genetics of different agronomically important rice traits. Currently, it is mainly involved in tissue culture (seed culture, anther culture, wide hybridization followed by embryo rescue), gene isolation and cloning, genetic engineering including overexpression and genome editing, marker assisted selection (MAS), functional marker validation, gene pyramiding, quantitative trait loci (QTL)/single nucleotide polymorphism (SNP) identification, genome wide association studies (GWAS) and C4 rice development.

### *Major achievement*

- Methods and protocols have been established on culturing explants, such as seed, embryo, young panicle and anther of *indica* rice.
- DNA fingerprinting of 50 BRRI released varieties has been done to protect biopiracy and a book was published about it from the Biotechnology Division of BRRI.
- Molecular characterization of 163 Aus landraces has been done for diversity analysis and variety protection.
- Two (*xa13* and *Xa21*) and three (*Xa4*, *xa13* and *Xa21*) bacterial blight resistant genes have been pyramided in BRRI dhan29 and BRRI dhan28, respectively.
- The Sub1 gene has been introgressed into BRRI dhan44 to confer submergence tolerance; and released as BRRI dhan109 with the collaboration of the Plant Breeding Division.
- Two major QTLs for yield contributing trait were identified in a mapping population developed from a cross between BRRI dhan28/*O. rufipogon* (Accession no. 103404).
- Notable achievements of this division over time are the development of six rice varieties. They are given below-
  - i) BRRI dhan86- a high yielding short duration premium quality Boro rice variety;

- ii) BRRI dhan87- a high yielding medium duration T. Aman rice variety;
- iii) BRRI dhan89- a high yielding long duration Boro rice variety;
- iv) BRRI dhan92- a high yielding long duration water saving Boro rice variety;
- v) BRRI dhan96- a high yielding short duration and protein enriched (10.8%) Boro rice variety;
- vi) BRRI dhan103- a high yielding medium duration T. Aman rice variety.

## *Future plan*

- Development of skilled manpower in modern biotechnology especially in Bioinformatics, for carrying out frontier programmes to meet future needs;
- Identification, introgression and validation of agronomically important QTLs/genes for high yield, biotic and abiotic stress tolerant, photosensitive and aromatic rice;
- Molecular characterization of existing germplasm, landraces and related varieties for identification and usage in breeding programme;
- Exploring available QTLs through MAS (Marker assisted selection) in popular rice varieties;
- Development of transgenic and genome-edited rice for nutritionally enriched, and biotic and abiotic stress tolerant;
- Development of short-duration, stress-tolerant, fine-grain, high-nutritional-quality rice varieties through tissue culture.



*Scientists of the Biotechnology Division at work in the Lab.*

## Genetic Resources and Seed (GRS) Division

**Germplasm conservation.** Traditional rice varieties in Bangladesh have evolved over centuries of diverse agro-climatic and biological stresses. Such materials must be conserved for future use in breeding programme for development of improved varieties.

BRRI's objective is to collect, conserve and characterize local, exotic and improved varieties, important breeding lines of *O. sativa* and *O. glaberima* and wild rice species. Secondly, the development of duplicate free core set of conserved rice germplasm of BRRI Genebank using quality control (QC) genotyping, genotyping-by-sequencing (GBS) profiling, trait-specific genotyping and whole genome sequencing. Accordingly, as of now 9,128 collected local and exotic germplasm, varieties and lines have been registered as accessions and conserved in short (20 to 22°C), medium (0 to 5°C) and long-term (-20±1°C) facilities of BRRI Genebank. The collection process is ongoing, especially in underexplored regions of the country. Besides, 90 wild rice live samples of 11 species are maintained in *ex-situ* field conservation at GRS division. Notably, Dinajpur Kataribhog (Acc. no. 4791) and Kalijira (Acc. no. 247) from BRRI Genebank have been ranked as Geographical Indication (GI) products of Bangladesh.

**Breeder seed and rice seed network.** GRS Division has developed BRRI Rice Seed Network with the partnership of GO- NGO-private sector seed producing organizations for rapid dissemination of breeder seed of BRRI developed rice varieties, which is now a successful model of public-private partnership. In the network, the number of the partner organizations was only three in 1998, which increased to 412 in 2008, and 750 in 2012 and currently includes 645 partners as of 2024. Breeder seed distribution is now managed through notification of allotments on the BRRI website and mobile SMS notification to all clients across the country to meet the national demand of foundation and subsequent classes of seed. As a result of this coordinated approach, the supply of rice seed from formal seed system has increased from 5% to about 31%, which is an ultimate effect of network-based functioning.

## LOOKING AHEAD

Production and distribution of more than 200 tons of breeder seed per year to support sustainable rice seed supply of the country.

### Major Achievement

- Achieved the capacity to produce more than 200 tons of breeder seed per year and delivering them to the farm level through government organizations (GOs), non-government organizations (NGOs) and the private sector (PS);
- Conserved 9,128 rice germplasm collected from home and abroad in the BRRI Genebank.

### On-going Research

- Development of duplicate free core set of conserved rice germplasm in the BRRI Genebank using quality control (QC) genotyping, genotyping-by-sequencing (GBS) profiling, trait-specific genotyping and whole genome sequencing.

### New Strategic Focus

#### Long term

- Develop duplicate free core set of conserved rice germplasm in the BRRI Genebank through quality control (QC) genotyping, genotyping-by-sequencing (GBS) profiling and whole genome sequencing.

#### Short term

- Develop specialized rice germplasm panels (Aromatic, Salinity-tolerant, Heat-tolerant, Photosensitive, Insect and Disease resistant etc) from BRRI Genebank collections using SNP Markers (1K RiCA panel or 4K RiCA panel).



GRS, BRRI Medium Term Storage Genebank    GRS, BRRI Short Term Storage Genebank.



*GRS Breeder seed field of BD29.*



*GRS BRRRI Long-Term Genebank.*

## Grain Quality and Nutrition Division

Grain Quality and Nutrition Division (GQND) is one of the major components of rice variety development programme area in BRRRI. Since its commencement, the division has been working for higher research activities to improve the quality of rice including ensuring the nutrition value in the invention of high yielding rice (HYVs). Its major thrusts include quality characterization for variety development, nutraceutical characterization, quality parameters for consumer preference, chemical analysis of rice and its byproducts, commercial rice-based products and formulation of rice-based food items. GQND is also concerned about methods development and validation of detecting bioactive compounds, phytohormones, vitamins, amino acids, minerals and aroma in rice, anti-oxidative and anticancer properties of black rice, quality improvement of rice bran by inactivating lipase enzyme through physical heat treatment, detection and quantification of heavy metals and toxins in rice bran related products-use of spent bleaching earth as fertilizer, post-harvest loss minimization of rice bran for quality rice bran oil, Gluten free rice-based products formulation such as rice biscuits, cake, bread and noodles.

### ACHIEVEMENT

GQND Scientists have successfully characterized and identified:

- High Zinc Enriched Rice (20.0-27.6ppm) - BRRRI dhan62, BRRRI dhan64, BRRRI dhan72, BRRRI dhan74, BRRRI dhan84, BRRRI dhan100 and BRRRI dhan102 rice;
- High Iron Enriched Rice (10ppm) -BRRRI dhan84;

- Protein Enriched Rice (10 to 10.8%)- BRR1 dhan34, BRR1 dhan36, BRR1 dhan37, BRR1 dhan66, BRR1 dhan81, BRR1 dhan90, BRR1 dhan91, BRR1 dhan96, BRR1 hybrid dhan4 and BRR1 hybrid dhan7 rice;
- Antioxidant Enriched Rice- BR5 and BRR1 dhan84 rice;
- GABA Enriched (Anti-depressive 12.50mg/100g)- BRR1 dhan31 rice;
- Aromatic Rice (2AP-(17.89-147.50ppb) - BR5, BRR1 dhan34, BRR1 dhan37, BRR1 dhan38, BRR1 dhan50, BRR1 dhan70;
- Low Glycemic Index (Diabetic) Rice (52.4-54.9) - BR16, BRR1 dhan46, BRR1 dhan69 and BRR1 dhan105.



*BRR1 scientists are at work in the GQN lab.*

## **Agronomy Division**

Despite the release of high-yielding rice varieties in Bangladesh, farmers often fail to realize their production potential due to suboptimal cultural practices. The Agronomy Division has focused on refining and validating site-specific management strategies to improve productivity, resource-use efficiency, and environmental sustainability under diverse agro-climatic conditions.

### **Priority Agronomic Practices**

- Suitable planting methods for direct-seeded upland, direct wet-seeded rainfed lowland, and irrigated rice.
- Variety- and season-specific planting time optimization.
- Fertilizer management strategies to enhance nutrient-use efficiency.
- Weed management, including herbicide screening and allelopathic variety utilization.

- Stress-resilient practices for submergence, salinity, cold, and drought-prone areas.
- Good Agricultural Practices (GAP) for safe, eco-friendly rice production.
- Herbicide residue dynamics in plant–soil–water systems.
- Eco-friendly technologies, such as integrated nutrient management (INM), bio-herbicides, organic farming, and dry seedbed systems.
- Site-specific and ecosystem-based management to improve productivity sustainably.

## Major Findings

- **Cold stress seedling protection.** Continuous polythene seedbed cover with circular openings significantly improved seedling dry weight and height during Boro season.
- **Flood recovery technique.** Re-transplanting tillers (2–3/hill) from undamaged to damaged plots at 30–40 DAT restored yield potential.
- **Planting time effect.** BRRI dhan100 performed best when seeded 1–16 December; yield declined progressively with later sowing.
- **Nutrient innovations.** 3.4 g NPK briquettes in *Boro* season increased yield by 0.5 t/ha despite reduced nutrient amounts.
- Poultry litter @ 2 t/ha (fresh or 20-day decomposed) saved 50% chemical fertilizer.
- Green manuring reduced nitrogen requirement by at least 50%.
- **Weed management: Effective herbicides for transplanted rice.** Mefenacet+Bensulfuran Methyl, Pyrazosulfuran Ethyl, new-generation herbicides (e.g., Ethoxysulfuron + Penoxulam) achieved >80% control efficiency.
- **Effective herbicide for upland rice.** Pendimethalin, Oxadiargyl, Oxadiazone.
- **Soil microbiology.** Post-herbicide application, bacterial and fungal populations recovered within 10–30 and 7–20 days respectively; *Bacillus tequilensis* identified as a potent pesticide (Virtako) degrader under laboratory conditions
- **Weed-competitive varieties.** BR17, BR23, and BRRI dhan39 effectively suppressed weeds; BR17 exhibited allelopathic activity.
- **Mechanized transplanting.** Required 160 kg N/ha (four splits), yielding 7.70 t/ha.

- **Residue safety.** Bensulfuron methyl, Pendimethalin, and Pyrazosulfuron ethyl residues were below detection limits and MRL (LC–MS/MS).
- **Date of transplanting.** BRRI dhan88 and dhan89 produced maximum yields (7.61 and 8.45 t/ha) on 5 January; each day’s delay reduced yield by 86–93 kg/ha.
- **GAP performance.** GAP consistently outperformed conventional recommendations in yield, safety, and cost-effectiveness.

### Future Research Thrusts

- Develop climate-resilient agronomic packages for submergence, salinity, cold, and drought-prone areas.
- Integrate agrometeorology with crop simulation models (e.g., DSSAT- Decision Support System for Agrotechnology Transfer, APSIM- Agricultural Production System Simulator) and localized weather forecasts to develop adaptive rice management strategies under variable climatic conditions.
- Use metagenomics to evaluate herbicide residue impacts on soil health and microbial diversity in rice-based cropping systems.
- Advance precision nutrient management through remote sensing, GPS, and data analytics to optimize inputs and reduce environmental impact.
- Advanced weed management approaches use smart tools and sensors to detect, map, and target weeds precisely, allowing for efficient weeds control while reducing herbicide use and environmental impact.



*Raising quality seedling for the Rice Transplanter.*

## Plant Physiology Division

The Plant Physiology Division is dedicated to advancing scientific understanding and innovation for sustainable rice production under changing climatic conditions. Its research focuses on the physiological mechanisms that enhance stress tolerance and productivity, thereby supporting BRRI's varietal development and climate-resilient initiatives.

The division is engaged in the following major areas of research:

- Screening and evaluating rice germplasm and breeding lines to identify key physiological traits associated with stress tolerance and yield potential.
- Conducting advanced studies on the physiological mechanisms of abiotic stress tolerance, including salinity, submergence, drought, high temperature, and cold, across various growth stages of rice. Modern tools such as genomics, phenomics, genome editing and other 'omics' technologies are being utilized to understand the physiological bases of stress tolerance and yield potential.
- Strategic research activities are focused on strengthening photosynthetic efficiency and carbon assimilation with the long-term goal of developing C4 rice for improved productivity under climate stress.
- The division also refines screening techniques for multiple stresses and assesses the impacts of climate variables on rice yield and grain quality, while supporting other BRRI programmes through weather data and physiological insights.

The division has achieved the following significant outcomes:

- Developed seedling-raising techniques during the Boro season for cold-prone regions and established standardized screening protocols to assess tolerance to salinity, drought, submergence, and temperature stresses.
- Contributed substantially to the development of improved rice ideotypes by elucidating key physiological traits such as plant growth, root architecture, seed viability, and lodging resistance, thereby strengthening BRRI's overall capacity in physiological and climate-resilient rice research.



*Rainout shelter for drought tolerance study*



*Anatomical section of rice stem*



*Glass chamber for high temperature tolerance study*



*Salinity screening in nethouse*

## Soil Science Division

Soil Science Division has been working for the last 54 years aiming to improve rice soil health and crop productivity following sustainable development goals (SDG). One of the basic technologies of the division is balanced fertilizer techniques for BRRI released rice varieties that boosted national rice productivity. However, reclaim depleted soil nutrition and to improve soil biology is a big challenge to maintain soil health for sustainable rice production and future food security. To ensure healthy rice soil environment, Soil Science Division has:

- Updated soil critical limits and fertilizer recommendations (balanced and integrated) for rice production in favourable and unfavourable (saline, charland, hill and haor) soil ecosystems;
- Introduced integrated plant nutrition system (IPNS), integrated nutrient management (INM) practices, and site specific nutrient management (SSNM) to maintain healthy soil with maximum yield benefit;
- Developed fertilizer recommendations for rice based cropping pattern and sustainable nutrient management in coastal region of Bangladesh;
- Developed technologies for efficient nutrients management in rice production such as urea super granule (USG) for N,

recycling of rice straw for K, and use of poultry manure for P and use of vermicompost;

- Determined soil carbon stocks in different AEZs of Bangladesh and nutrient enrichment by improved cowdung composting method;
- Developed BRRI organic fertilizer and Bio-coated urea to reduce chemical N, P fertilizer use and improve soil biology;
- Developed climate smart, low carbon rice cultivation technology that employs urea deep placement and water saving irrigation (AWD), while reducing greenhouse gas (methane) emissions and maintaining yield;
- Studied risk of heavy metals in polluted soil, water and rice matrix. Introduced alternate wetting and drying irrigation method to reduce arsenic uptake;
- Studied total and beneficial soil microbes and prepared a live microbial library in different AEZs;
- Developed technologies for climate smart soil and nutrient management e.g. conservation agriculture, rice non-rice cropping pattern and nutrient management of fine and aromatic rice in Old Himalayan Piedmont soil.

## Research Thrust

Soil Science Division has been advancing research towards precision nutrient management using nano technology, AI based nutrient management via soil sensor, identifying nutrient use efficient rice varieties. The division has also been developing methods to improve rice soil biology focusing on biodiversity. Another research thrust of this division is to mitigate greenhouse gas emission enabling carbon credit generation through integrated approaches of precise fertilizer and water management following climate smart soil technologies, and determination of location specific GHG emission factor.

## Outstanding Innovation

Soil Science Division has developed BRRI-organic fertilizer to omit 100% TSP/DAP and 30% reduction of urea use in rice cultivation. This technology is patented and certified in the name of BRRI.

## Major Achievement

Soil nutrients management (Balanced, INM, SSNM, IPNS) for 14 rice based cropping systems, developed technology to reduce 40-50% global warming potential through introducing AWD and urea deep placement.

## On-going Research

Study on improvement of soil health including management of problem soil, efficient use of organic and inorganic fertilizers, improvement of soil biological properties, nutrient use efficient rice varieties, mitigation of greenhouse gas emission, techniques for low carbon emission and precise climate smart soil nutrient management in rice cultivation.

## New Strategic Focus

### Long-term:

Sustainable soil health improvement by using climate smart precise soil nutrient management technologies such as AI based nutrient management, soil sensor, identifying nutrients use efficient rice varieties.

### Short-term:

Improve nutrient use efficiency through nano fertilizer, improve rice soil biology, mitigation of greenhouse gas emission through integrated nutrient and water management.



*Scientists of the Soil Science Division visit the research field.*

## Irrigation and Water Management Division

The Irrigation and Water Management (IWM) Division of BRRI plays a vital role in boosting rice productivity by ensuring the efficient use of water resources. Guided by the slogan "More crops per drop," the Division is dedicated to developing and promoting sustainable irrigation methods, water-saving technologies, and climate-resilient water management strategies tailored to the diverse rice-growing regions of Bangladesh. Through cutting-edge research, innovation, and close collaboration with farmers and stakeholders, the IWM Division strives to optimize water use, lower production costs, and make rice cultivation more adaptable to the growing challenges of climate change and water scarcity.

Alternate Wetting and Drying (AWD), a low-carbon, resource-efficient and climate-smart irrigation practice that reduces water use and greenhouse-gas emissions without compromising yield, needs to be scaled up nationwide through targeted policy interventions.

### Major achievement

- Developed portable solar energy based irrigation pump for surface water irrigation.
- Enhancing Boro rice production in drought-prone areas of the haor region during the reproductive stage through supplementary irrigation.
- Validation of agricultural drought forecasting for mitigating drought in T. Aman rice.
- Delineation of freshwater resources for Boro rice cultivation in tidal Barishal region.

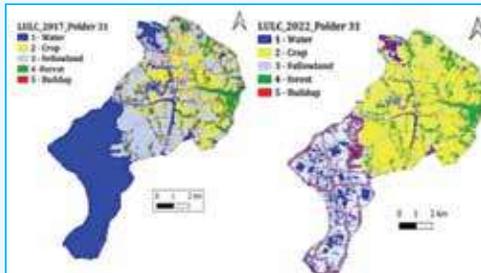
### Ongoing research

- Determination of physical and hydraulic properties of different soil types;
- Internet-of-Things (IoT) based Automated-AWD system for smart rice irrigation;
- Study on water-stress tolerance for advanced rice genotypes of BRRI;
- Performance evaluation of the rice genotypes under different water regimes;

- Optimization of water-use efficiency through precision irrigation system;
- Real-time monitoring system for salt dynamics in soils by using IoT;
- Integrated minor irrigation system for increasing land productivity in the hilly region;
- Development of automated and IoT based precision irrigation system using multiple sensors and control gates;
- Assessment of water resources availability for irrigation in the Barishal region;
- Assessment of water resources availability for dry season crop cultivation in selected polders of the coastal region;
- Studying the impact of saline water irrigation and soil amendment practices on rice yield in the coastal region;
- Monitoring groundwater level fluctuation in different Geo-hydrological regions;
- Assessment of surface and groundwater quality for irrigation use;
- Development of low-cost solar irrigation system in Bangladesh;
- Study on trend and variability analysis of climatic parameters in Bangladesh;
- Productivity enhancement through improved water management technologies in the haor areas;
- Groundwater investigation in haor region;
- Land use land cover change detection and analysis using satellite images.
- Development of automated AWD irrigation system for rice production;
- Surface water utilization for escalating water and land productivity in coastal region;
- Upscaling of improved water management practices for sustainable productivity in the haor areas.

## Future Research Thrust

- Water use efficiency and water productivity improvement;
- Sustainable groundwater utilization;
- 4IR precision technology in irrigation and water management;
- GIS and remote sensing application in water management;
- Crop modeling;
- Renewable energy utilization;
- Smart irrigation system use of artificial intelligence, weather forecasting and automated groundwater monitoring;
- Automated river water salinity monitoring using IoT;
- Water stress detection and mitigation by drone technology.



*Activities of the Irrigation and Water Management Division.*

## Entomology Division

Scientists are at work to introduce an integrated pest management programme for more economical and effective control of pests.

BRRi entomologists have identified about 50 rice genotypes as sources of resistance to green leafhopper and more than a thousand lines against brown planthopper. Mass rearing technique of biocontrol agent, *Trichogramma zahiri* for rice hispa egg has been

developed. Several sources of resistance have also been identified against rice thrips, gall midge, whorl maggot, leaf rollers and rice hispa. By now, 266 arthropod species have been collected from the rice fields of Bangladesh. Among them, 232 have been identified as the rice pests. Moreover, 192 predators and 183 parasitoids of rice insects pests have been recorded.

The magnitude of yield loss due to pest infestation in farmers' fields has been assessed carefully. Sampling methods for determining the economic threshold levels of some of the major pests have been developed. Entomologists helped plant breeders in developing rice varieties with resistance or tolerance to major insects, such as, brown planthopper, rice stem borers, rice hispa, white-backed planthopper and green leafhoppers. Technologies, based on the integrated pest management (IPM) approach, have been developed to control major insects. Insecticides belonging to 43 generic groups that are effective against different insects have been identified. Simple techniques for controlling rats by trapping have been revised.

## **Achievement**

- Identified more than fifty rice genotypes resistant to green leafhopper, thousands of lines resistant to brown planthopper. Resistance also found against gall midge and rice hispa. Resistant/tolerant varieties developed (e.g., against stem borers, planthoppers, hispa)
- 266 arthropod species collected, 232 identified as pests. 192 predators and 183 parasitoids recorded in rice fields.
- Mass rearing of *Trichogramma zahiri* for rice hispa egg parasitism.
- Economic threshold levels (ETL) developed for major pests. Yield loss assessed for for major pests.
- Insecticides belonging to 43 generic groups that are effective against different insects have been identified.
- Simple and effective trapping techniques devised for rat management.
- Developed eco-engineering approach in rice fields that conserved natural enemies, reduced insecticide uses by 70% and harmful insects by 50%, without affecting yield.

- Developed methods for residue analysis of 12 different insecticide in rice grain through LC MS and LCMS/MS machine.

## Future Plan

The future strategy for rice insect pest management will focus on sustainable and eco-friendly approaches. Priority will be given to strengthening Integrated Pest Management (IPM) practices by promoting biological control, host plant resistance, and eco-engineering to conserve natural enemies. Advanced tools like digital pest monitoring, remote sensing, and AI-based decision support systems will be introduced for early pest detection and rapid response. Research will continue on climate-resilient pest management and nano- and bio-based insecticides to reduce chemical dependency. Farmers' training and community-based pest surveillance will be enhanced to ensure safe, effective, and environmentally sound rice production.

## Ongoing Research

Ongoing Research Projects include survey and monitoring of rice arthropods, bio-ecology of rice insect pest and natural enemy, biological control of rice insect pests, crop loss assessment, evaluation of chemicals and botanicals against rice insect pests, insecticide toxicology, host plant resistance, molecular biology of rice insect pests, vertebrate pest management.



*Eco-engineering technique in rice field.*



*Insecticide residue analysis activities at the Entomology Laboratory.*

## **Plant Pathology Division**

Plant Pathologists have identified 32 rice diseases in Bangladesh. These diseases are caused by fungi, bacteria, viruses, nematodes and mycoplasma. Ten of them were recorded as major in the past. Recently, false smut is being included in the major group. On the other hand, the previously recorded major diseases leaf scald and stem rot are being shifted to minor disease group. At present, blast, sheath blight (ShB), sheath rot, bakanae, false smut (FS), brown spot (BS), seedling blight (SB), bacterial blight (BB), tungro and ufra are considered as the major rice disease in Bangladesh.

### **Achievement**

- A blast resistant variety BRRI dhan114 already been released for Boro season having *pita2* blast resistant gene.
- Races and/or pathotypes of bacterial blight (16 race) and blast (267 race) have been identified.
- Major resistance (R) genes *Xa21*, *xa13* and *xa5* for BB and *Pish*, *Pita*, *Pita-2* and *Pi9* for blast have been detected through molecular markers and pathogenicity test.
- Introgression of these R-genes in the background of mega varieties including aromatic rice is in progress through marker assisted selection (MAS) and pathogenicity test.
- A set of standard differential isolates for blast and BB has been developed for resistance screening. International

differential set of monogenic lines (ML) for BB and blast is available and used in Plant Pathology Division for resistance studies.

- To identify disease resistance sources, the division has screened INGER materials obtained from IRRI against bacterial blight, blast and tungro as routine work since 1978.
- In addition, native germplasm, advanced breeding lines and exotic disease resistant materials have been tested against major rice diseases. Blast resistant genes Pish, Pita2 and Pi9 have been detected in native germplasm using diagnostic marker and phenotypic reaction.
- Rayada and Bajail found resistant to ufra while Kumragoir resistant to tungro. New chemicals evaluation and advisory-clinical services are the routine work of the division.
- Epidemiological studies of the diseases in relation to climate change are another research thrust. Integrated rice disease management packages (cultural agronomic practices, botanical, bio control agents and chemical) have been developed for most of the major diseases except BB and false smut.
- Nano based research for disease management is ongoing and have developed neem based silver nano fungicide against bakane disease management.
- Tricoderma based biopesticide for controlling bakanae disease in net house and Trichcompost in field also give some emerging result.
- Water hyacinth based Trichocompost developed from Plant Pathology Division has the similar potentiality as MoP for potash supplement in the field when applied 1.5t/ha during land preparation without compromise of yield potentiality.

### Ongoing research

- Genome editing through CRISPER/Cas9 method for controlling blast and sheath blight disease are being started.

- As bakanae is becoming as an emerging disease in new areas therefore, QTL mapping of this disease is underway to develop resistant line/variety.
- However, research focuses on the false smut disease and gene pyramiding for BB, bakanae and blast resistances have been given the highest priority.



*BARRI Director General and plant pathologists visit the BARRI Greenhouse.*

## **Rice Farming Systems Division**

The Rice Farming System Division (RFS) was established in 1974, a few years after the establishment of BARRI in 1970. The Division has the mandate of conducting research and development activities on all aspects of rice-based cropping pattern and farm production system by utilizing prevailing resources to sustainable improvement of existing cropping and farming systems of different agro-ecological environments for well-being of farm families. Since its establishment, the division has undertaken extensive research across diverse agro-ecological zones of Bangladesh, with a particular emphasis on climate smart cropping system development. Moreover, holistic farming systems research across diverse agro-ecosystems facilitates the development of ecosystem-specific farming system models.

## Major achievement

- RFS Division has characterized farming systems across diverse ecosystems, such as studies on cropping pattern surveys, impact of tobacco cultivation, charland agriculture etc. In 2017, RFS division conducted a comprehensive nationwide documentation to analyze the cropping patterns of Bangladesh. This effort resulted in the first and only online reference on cropping patterns in the country, which continues to serve as a vital resource for agricultural research, policy planning and sustainable farming development.
- RFS Division has developed 57 profitable cropping system technologies tailored to both climate-resilient and favourable ecosystems of Bangladesh.
- The Division has developed farming system technologies for saline, non-saline tidal, favourable and rainfed irrigated ecosystems. These technologies aim to improve overall farm productivity- including crops, livestock, fisheries, homestead gardening and agroforestry- while also enhancing farmers' livelihoods through increased income and the empowerment of rural women and youth.
- Beyond technology development, the division implemented piloting programmes for rapid dissemination and fine tuning of developed cropping system technologies across different agro-ecosystems.

## On-going research activities

- A comprehensive survey is underway to assess the role of hybrid rice in cropping systems and farmers' livelihoods, along with documenting major cropping patterns in the Faridpur region.
- Research activities are ongoing to develop and sustain diverse cropping patterns across different ecosystems of Bangladesh. Efforts emphasize improving resource use efficiency and crop management through conservation tillage, optimized management practices and water use, appropriate planting windows, and improved establishment methods. Integrated systems such as

agroforestry, intercropping, and rice–fish culture are also being evaluated to promote sustainable intensification.

- Research activities further focus on innovation and diversification, including rice ratooning and mustard, adoption of dry direct-seeded rice and deepwater Aman rice, and varietal adaptation for different ecosystems.
- In stress-prone areas, studies aim to intensify and diversify cropping patterns by incorporating Aus, Mungbean, Sweet Gourd, and Mustard in Fallow-Fallow-T. Aman cropping systems. Additional efforts target the improvement of saline, non-saline gher and waterlogged production systems through integrated rice-fish-vegetable-fruit models ensuring year-round income and resilience.
- In the hill ecosystem, ongoing studies evaluate the feasibility of Boro rice cultivation in fringe lands of Rangamati and aim to enhance traditional Jhum systems through the inclusion of modern high-yielding Aus varieties.
- Validation of improved cropping patterns across different ecosystems focuses on integrating Rabi crops (mustard, potato, canola) and Aus rice in Boro-Fallow-T. Aman and Fallow-Fallow-T. Aman cropping systems. Field days and farmer training programmes are being conducted to promote adoption and dissemination of these improved systems.
- Integrated Farming Systems activities emphasize demonstration and promotion of improved cropping patterns such as Mustard-Boro-T. Aman and Sunflower-Boro-T. Aman to boost productivity and support eco-tourism. Additionally, farmers are actively engaged in participatory evaluation and quality seed production of newly released BRRI rice varieties, while monitoring whole-farm activities to ensure effective technology adoption and system integration.



*Rice farming systems activities.*

## **Farm Machinery and Post-Harvest Technology Division**

### **Achievement of the Farm Machinery and Post-Harvest Technology Division**

Farm Machinery and Post-Harvest Technology (FMPHT) Division of BRRI has made significant contributions to the design, development, validation, and commercialization of more than 50 types of rice-based agricultural machinery. These machines are customized to the needs of small and medium-scale farmers in Bangladesh, enhancing productivity, reducing labour dependency, and improving the timeliness and precision of field operations.

*1. Development and Commercialization of Rice-Based Farm Machinery are as follows:*

#### **A. Seed Sower Machine for Mat-Type Rice Seedling Preparation**



*BRRI Seed Sower Machine.*



*BRRI Auto Seed Sower.*

BRRRI developed seed sowing devices to support mechanized transplanting:

- Manual Seed Sower
  - Hand-operated device to evenly distribute seeds over seedling trays or mat-type seedbeds.
- Auto Seed Sower
  - Electrically or engine-powered, designed for large scale farmers.
  - Ensures more uniform seed distribution and significantly reduces labour time.

## B. Rice Transplanters

BRRRI has developed a series of rice transplanters suited to different levels of mechanization and farm sizes:

- Manually operated Rice Transplanter
  - Simple, low-cost device designed for smallholder farmers.
- Semi-Automatic Type Rice Transplanter
  - Manually operated seedling feeding with semi-automated planting mechanisms.
  - Offers better precision and higher field capacity than manual methods.



*BRRRI Rice Transplanter.*

- Walking-Type Rice Transplanter (4-row)
  - Self-propelled, mechanically driven, and operator-guided machine.
  - Requires mat-type seedlings; ensures uniform depth and spacing.
- Riding-Type Rice Transplanter (6-row)
  - Operator rides on the machine, reducing operator fatigue and enhancing efficiency.
  - Provides better control and larger coverage in less time.
- Rice Transplanter-Cum-Mixed Fertilizer Applicator (4-row)

- Innovative integration of transplanting and fertilizer application in a single operation.
- Applies basal fertilizer while transplanting, ensuring input efficiency and time savings.

### C. Fertilizer Applicators

BRRRI developed precision fertilizer application tools include:

- Urea Super Granule (USG) Applicator
  - Precisely places USG deep into the soil near plant roots and reduces nitrogen loss through volatilization and runoff.
- Prilled Urea Applicator
  - Uniformly and continuously deep placement of the prilled urea in the row transplanted rice field.

### D. Power Weeders

To address labour shortages in weeding, the division developed:

- Manual Weeder
  - Light, maneuverable, and easy to operate.
- Multi-Row Power Weeder
  - Designed for higher field capacity and improves weed control efficiency and promotes better aeration and tillering.



*BRRRI Solar Light Trap.*



*BRRRI Power Weeder.*

### E. Combine Harvesters

To mechanize harvesting and reduce postharvest losses, BRRRI has contributed to develop two types of combine harvesters:

- Head-Feed Combine Harvester
  - Feeds only the panicle portion of the crop into the machine, leaving straw in the field.

- Ideal for harvesting of standing crops in both wet and dry season crop; reduces grain shattering and loss.
- Whole-Feed Combine Harvester
  - Feeds the entire crop plant into the machine, which threshes and separates grain and straw.



*BRRR Head Feed Combined Harvester. BRRR Whole Feed Combine Harvester.*

## **2. Development of Post-Harvest and Integrated Management Technologies**

The FMPHT Division has developed and promoted a suite of post-harvest and pest management technologies to reduce losses, enhance quality, and promote environmentally sustainable practices.

- **Drying and Storage Technologies**
  - Designed and promoted seed dryers, re-circulating mechanical dryers, and low-cost grain storage options including hermetic systems.
  - Developed Grain Collector from drying floors to minimize wastage and improve efficiency in sun-drying practices.
- **Milling and Value-Addition Equipment**
  - **BRRR Mini Rice Mill:** Developed for household and small enterprise use, this compact unit performs milling, de-husking, and polishing, ensuring better recovery and rice quality.
  - **BRRR Air-Flow Type Rice Mill:** Offers enhanced separation and polishing performance using airflow technology, suitable for cleaner and higher-quality output.
  - **BRRR Rice Flour-Spice Mill:** Enables the processing of rice into flour and grinding of spices, promoting diversified uses of rice.
  - **BRRR Solar Light Trap:** Developed a solar-powered light trap to control rice field insects in an eco-friendly way without using chemical pesticides.

### 3. Fabrication and localization of spare parts

- Identified and supported local fabrication of fast-moving spare parts for combine harvesters, rice transplanter and other imported machines.
- Collaborated with local workshops to strengthen repair and maintenance capacity within Bangladesh.

### 4. Capacity Building and Training

- Conducted over 500 training programmes for:
- Farmers, machine operators, mechanics and extension personnel
- Developed user manuals and instructional manual and videos on safe and effective use of machinery.

## Workshop machinery and maintenance Division

Workshop Machinery and Maintenance (WMM) Division has been playing a leading role in the innovation, development and maintenance of modern agricultural machinery and technologies. The primary goal of this division is to design, develop and evaluate various agricultural equipment for rice cultivation to make them economically accessible to farmers.

### Achievement

- WMM Division is implementing several significant innovation and development initiatives, including solar-powered sprayers, thresher, winnower etc.

### Ongoing research

- Automated mouse traps, mobile dryers and hydroponic technique for soil-less seedling production.



*Different Maintenance Works at the WMM Division.*



*Different Maintenance Works at the WMM Division.*

## **Agricultural Economics Division**

BRRRI is fundamentally committed to developing innovative rice technologies aimed at enhancing the socio-economic conditions of rice farm households throughout Bangladesh. Recognizing that farmers may reject even significantly improved technologies if they are incompatible with their socio-economic realities, BRRRI ensures that its research is grounded in these critical factors.

To bridge this gap and provide essential feedback to biological scientists, policymakers, and extension agents, scientists within BRRRI's Agricultural Economics Division conduct comprehensive research. This includes:

1. Conducting socio-economic surveys of rice farmers to understand their needs, resources, and constraints.
2. Analyzing rice variety adoption patterns across different regions of Bangladesh.
3. Performing economic evaluations of new rice production technologies, both before their release (ex-ante) and after (ex-post).
4. Identifying barriers and constraints hindering the widespread adoption of modern variety (MV) rice technologies.

5. Assessing the impact of MV rice technology on national and household-level rice production, farm income, and employment generation.
6. Studying rice marketing systems to understand value chains, pricing, and market efficiency.
7. Analyzing the socio-economic aspects of diverse stakeholders involved in the rice value chain and conducting supply chain analyses.
8. Undertaking policy research related to the broader rice economy.
9. Investigating food and nutrition security outcomes specifically within rice farm households.
10. Evaluating the impact of climate change on farm households through the lens of rice research and adaptation strategies.
11. Examining the role of rice research in poverty alleviation and addressing income inequality.
12. Assessing demand for BRRI rice seed technologies across different market segments, utilizing a bottom-up approach.
13. Calculating costs of rice cultivation and identifying pathways for efficient input allocation across varying seasons and regions.
14. Conducting targeted socio-economic research in stress-prone areas (e.g., salinity, drought, flood-affected regions) of Bangladesh.

Through this multifaceted research programme, the Agricultural Economics Division provides crucial insights that guide the development, dissemination, and policy support for rice technologies, ensuring they are not only agronomically sound but also socio-economically viable and beneficial for Bangladesh's farming communities.



*Data collection from farmers through Focused group discussion (FGD) and face-to-face interviews.*



*Data collection from rice traders and millers.*

## **Agricultural Statistics Division**

Agricultural Statistics Division conducts research and provides statistical consulting for BIRRI Scientists. The vision of the division is to enhance and advance statistical standards, designs, methodologies, and applications in agricultural research, with a focus on rice production and sustainable food security. And the mission to:

- Provide proactive support by designing and implementing innovative programmes that help the institute to attract, retain, and develop world-class scientists;
- Deliver high-quality research initiatives through diverse training approaches and tailored statistical support aligned with researchers' needs;
- Improve statistical standards and their application in agricultural research; and
- Promote as well as disseminate advanced statistical methods across all areas of agricultural research.

## Achievement

- A new statistical model for stability analysis has been developed.
- Developed producers, consumers and producer-cum-consumer preference model for rice varieties.
- Prepared soil and water's arsenic (As) level map of 23 districts of Bangladesh.
- Constructed contour map of rainfall and temperature of Bangladesh.
- Identified meteorological drought prone areas in Bangladesh.
- Constructed major domain of BRRI varieties in Bangladesh.
- Identified suitable areas for Aus cultivation in Bangladesh using GIS technology.

## Activities

- Finding out long term yield trend and G x E interaction of BRRI varieties across different ecosystems of Bangladesh.
- Developing rice and climate related database and analysis system as well as visualizations of demonstration data for BRRI.
- Enhancing rice yield prediction in Bangladesh using ML and DL Models.
- Suitability mapping of BRRI varieties and various cropping patterns.
- Season wise rice area and climate (Temperature and Rainfall) mapping of Bangladesh.

- Delineation of rice area changes in coastal areas of Bangladesh using RS and ML approaches.
- Rice growth monitoring through remote sensing and GIS for smart management.

## ICT cell

### Achievement

- Developed ‘Rice Solution’ and ‘Smart Rice Profile’ mobile app through AI and ML technology.
- Developed RKB, Rice Doctor and Modern Rice Nursing mobile applications for disseminating the several rice related technologies;
- Introduced e-Learning platform ‘Muktopaath’ ([www.muktopaath.gov.bd](http://www.muktopaath.gov.bd)) at BRRI.
- “BRRI Networks” facebook group has created for quick dissemination of innovative technology.
- Developed a website focusing Glory and Success of 50 years of BRRI.
- Developed BRKB web application, A total of 4,95,252 users have visited the website so far.

### Activities

- Design and develop the innovative commencing to strengthen research management through ICT and 4IR technology;
- Provide e-Learning platform ‘Muktopaath’ ([www.muktopaath.gov.bd](http://www.muktopaath.gov.bd)) platform related support at BRRI;

### On-going project

- Rice yield and LAI estimation using UAV and satellite image.
- Development of rice identification and monitoring model for precision agriculture using RS and 4IR technologies.
- Strengthening research management and development of precision agriculture through 4IR technologies;
- Modernization of RKB Mobile apps to disseminate information of modern rice technology and its management at the door step of farmers.

## Major Achievement

- Developed three mobile application such as Rice Solution, Smart Rice Profile and RKB, for quick dissemination of BRRI released technology;
- Developed real time monitoring system for smart detection of disease and insect of rice;
- Developed stability model for BRRI varieties;
- Developed optimum plot size and sampling plan for field experiments with rice;
- Identified the probability of low temperature stress at different growth stages of Boro rice;
- Enriching about 500 digital maps including suitable areas for BRRI varieties and other agriculture related data.

## The Socio-economic Impact

- Studying genetic coefficients and performing stability analyses of BRRI-released rice varieties;
- Estimating sampling technique for rice yield components;
- Providing training programmes for manpower development of BRRI scientists on advanced statistical analysis and computer programming;
- Delivering high-quality, data-driven research support through customized training in statistics, machine learning, and data science.
- Preparing digital maps, spatial interpolation maps, contouring, raster creation and data management. Additionally, analysing the effect of climatic factors, ground-water and topographic conditions on rice production in Bangladesh.

## Farm Management Division

The Farm Management Division is a research division that has also the responsibilities to manage the BRRRI farm. This division conducts research related to the management aspects of agricultural farm, especially for rice production. It extends support services to other BRRRI divisions for research management and coordinates policies regarding labour and farm management. It also maintains irrigation drainage system, soil health improvement, tree plantation, graveyard, mosquito control, playground, sale proceeds, flower garden and beautification of BRRRI etc. The duties and responsibilities of this division are mainly divided into research, rice seed production and support services. Table 1 presents the land and labour strength of BRRRI.

**Table 1. Land and labour strength of BRRRI 2023-24.**

Station	Total land (ha)	Research purposes land (ha)	General cultivable land (ha)	Office and residential land (ha)	Labour (no.)									
					Regular			Irregular			Seasonal			Total
					M	F	T	M	F	T	M	F	T	
BRRRI HQ, Gazipur	76.83	55.00	9.83	12.00	326	74	400	12	3	15	3	-	3	418
Cumilla	24.68	18.95	3.00	2.73	17	2	19	3	0	3	-	-	-	22
Habiganj	35.03	20.03	9.00	6.00	24	2	26	6	0	6	-	-	-	32
Sonagazi	45.77	31.22	10.50	4.05	29	2	31	0	0	0	-	-	-	31
Barishal	39.17	27.59	8.60	2.98	21	2	23	0	0	0	-	-	-	23
Rajshahi	13.24	6.00	2.00	5.24	22	4	26	3	0	3	-	-	-	29
Bhanga	11.46	8.04	2.00	1.42	18	2	20	0	0	0	-	-	-	20
Rangpur	6.07	3.34	0.50	2.23	32	1	33	0	0	0	-	-	-	33
Satkhira	20.00	12.86	4.51	2.63	21	1	22	0	0	0	-	-	-	22
Kushtia	4.05	2.55	0.50	1.00	11	0	11	0	0	0	-	-	-	11
Sirajganj	4.05	2.55	0.50	1.00	4	1	5	5	0	5	-	-	-	10
Gopalganj	4.05	2.55	0.50	1.00	1	0	1	4	0	4				5
Total	284.4	190.68	51.44	42.28	526	91	617	33	3	36	3	0	3	656

M = Male, F = Female, T = Total

## **Adaptive Research Division (ARD)**

BRRRI effectively uses several tools for the technology transfer. Adaptive Research Division (ARD) of BRRRI is mainly involved to transfer Rice technology through public private partnership (PPP) especially in collaboration with the Department of Agricultural Extension (DAE), NGOs and farmers.

### **Role of ARD**

Adaptive Research Division (ARD) of BRRRI is formed since the establishment of BRRRI in 1970. ARD is playing a significant role to validate and transfer rice varieties and rice based technologies through the following options.

## **Technology Validation**

### **1. Advanced Line Adaptive Research Trial (ALART)**

ARD validates and evaluates the advanced rice genotypes developed by Plant Breeding, Biotechnology, Hybrid Rice Divisions and regional station(s) of BRRRI through ALART at different agro-ecological zones (AEZ) of Bangladesh. Based on experimental results and feedback from farmers and extension personnel, ARD recommend the better rice genotype(s) for proposed variety trial (PVT) and technologies to the concerned division for further necessary action.

### **2. Adaptive Trial (AT)**

ARD conducts adaptive trials (AT) of newly released modern rice varieties along with existing varieties at farmers' field in different AEZs of Bangladesh. The main objectives are to validate the adaptability and performances of modern rice varieties and to select suitable variety(s) for target environments. Adaptive trials also play a significant role to replace old rice varieties with the latest better ones and it also has vital contribution for rapid dissemination of new rice varieties to the end users.

## **Technology Dissemination**

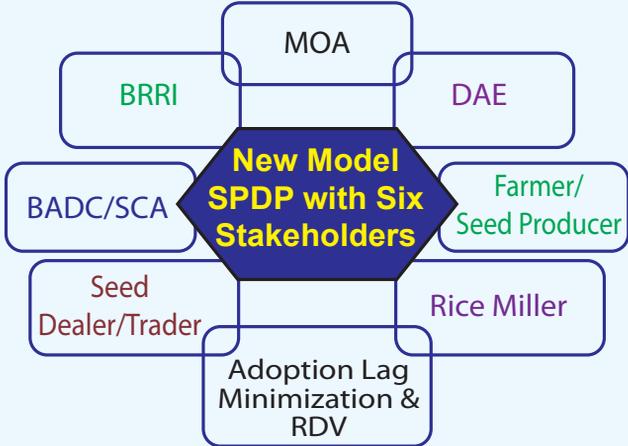
### **3. Seed Production and Dissemination Programme (SPDP)**

ARD executes SPDP of modern rice varieties and technologies at farmers' field in collaboration with DAE and farmers to disseminate the rice varieties and technologies. Thus, the rice varieties are disseminated to the end users through results demonstration and motivation.

### **4. New Model SPDP with Six Stakeholders**

ARD also conducts new model SPDP with six stakeholders of

modern rice varieties at farmers’ field as a block demonstration in collaboration with six stakeholders to enhance dissemination of modern rice varieties and to enrich seed stock. The six stakeholders like BRRI, DAE, Farmers, SCA/BADC, Seed Dealers/Traders, Rice Millers are involved in the programme as public private partnership (PPP), as shown in the diagram below-



*Conceptual framework of New Model SPDP with six stakeholders.*

**5. Field Day**

ARD organizes ‘Field Day’ at the demonstration sites on the performance of rice varieties and technologies as one of the most rapid and vital techniques of technology diffusion. Local farmers, extension personnel, seed producer, miller, dealer, retailer, local leaders, NGO, Company, etc. participate in the programme.

**6. Farmers’ training**

ARD is used to conduct day-long training on rice technologies for the farmers and extension personnel throughout the country to improve the knowledge and skills of farmers and extension personnel.

**7. Seed Production**

ARD produces truthfully labelled seeds of modern rice varieties at BRRI farm to be used in executing the technology validation and dissemination programmes.

**8. Clinical Services**

Scientists of ARD frequently meet farmers and extension personnel at field level during the execution of programmes like ALART, SPDP, Field Day, Farmers’ Training, etc. throughout the country. Then ARD scientists have the opportunity to find out the field problems on-spot and able to prescribe instant solution to the field problems.



*Pictorial view of ARD activities.*

## Training Division

Training of varying duration plays another key role in the transfer of rice production technology. BIRRI since its inception of training programme a total of 1, 80,000 personnel underwent BIRRI training programme and the trainees were agricultural scientists, extension experts, NGO workers, farmers and others. The massiveness of BIRRI training efforts reflected below:

- Scientists- 3,845
- DAE officers- 8,312
- BS/ SAAO- 24,127
- NGO workers-1,593
- Farmers- 1,39,323
- Others- 2,800



*Training classroom.*

## **Publications and Public Relations Division**

Publications and Public Relations Division (PPRD) serves as the facilitator of all the activities related to distribution of BRRI information. It presents the good image of BRRI to the internal and external publics using various ways and means.

Publications of research findings are used as very effective tools in the dissemination of information. PPRD publishes BRRI annual report in English on the advances in rice research. It regularly publishes reports, workshop proceedings, technical bulletins and newsletters based on experimental findings. Besides, BRRI scientists publish a large number of research articles in journals, workshop proceedings and popular articles in newspapers annually. Bengali language booklets Adhunik Dhaner Chash, Dhan Chasher Somoshya and Dhan Gobeshana Samachar, a rice reporter, are published to instruct agricultural extension agents reminding them of their duties and responsibilities so that farmers can grow a good rice crop. Copies of these publications are supplied to rice scientists, libraries and extension personnel throughout the country. Other publications in both English and Bengali also report new events, advances and achievements of rice research. The national language publications are meant for transferring rice technology to the farmers and extension agents. BRRI has so far issued 436 volumes of different publications.

PPRD cooperates with the national television and radio in their farm broadcasting programmes and invites farmers to participate in farmers rallies and farmers' trainings held in farmers' own plots and nearby venues to acquaint them with, and encourage them to use MV rice technology. PPRD also facilitates BRRI activities related to preparing documentary short films, videos and an online hub of

information called BRKB ([www.knowledgebank-brrri.org](http://www.knowledgebank-brrri.org)) to disseminate rice production technologies. It provides information on rice culture, replies to queries, maintains regular book exchange programmes and entertains visitors.

## Library

The BRRRI library assists scientists with a collection of updated information on rice research and production technology. At present, its monographic collection stands at 20,166. The library receives about 400 titles of foreign and local journals and periodicals. Realizing the needs of the researchers, library provides the following databases:

- Commonwealth Agricultural Bureau (CAB) Abstract;
- Crop Science Database;
- Agricultural Economics Database;
- Nutrition Database;
- Soil Science Database;
- Pests Database;
- Plant Genetics and Breeding Database.

BRRRI library is a registered member of AGORA (Access to the Global Online Research in Agriculture) since 2004. The library performs the following activities:

- Ordering and procurement of books and journals to meet the researchers' needs.
- Keeping an updated accession list to provide current awareness service.
- Providing catalogue cards of all available documents.
- Processing and filling reading materials in a systematic classified way.
- Enhancing reading facilities for the scientists and the researchers by keeping the environment neat and clean, noise free and favourable.
- Providing 14 daily newspapers for the readers and sending news clippings through e-mail.
- Rendering photocopy service.
- Collecting monthly magazines: Reader's Digest and Krishi Kotha, One Fortnightly: Amar Bari Amar Khamar, Encyclopedia and other reference materials for providing reference services.



*Inside BRRRI library*

## Rice Analytical Laboratory: Ensuring Safer Rice in Bangladesh

### Introduction

The Rice Analytical Laboratory (RAL) at BRRRI HQ, Gazipur, was established on 30 June 2022 under the Ministry of Agriculture. It aims to meet ISO/IEC 17025:2017 standards to ensure food safety by detecting pesticide residues, toxins, heavy metals, and other contaminants in rice and related products.

### Research Scope

RAL analyses rice grain, straw, bran, bran oil, irrigation water, and soil to assess rice production environments.

### Technology Platforms

RAL is equipped with advanced tools like ICP-OES, UPLC, LCMS/MS, GCMS/MS, Real-Time PCR, and others for accurate analysis.

### Analytical Capabilities

- **Heavy metals and minerals:** Arsenic, Lead, Mercury, Cadmium, Zinc, Iron, Calcium, Magnesium
- **Nutrition:** Proteins, Vitamins, Amino acids
- **Pesticides:** Multi-residue detection
- **Toxins:** Aflatoxins
- **Bioactive and Hormones:** C3G, IAA, GA<sub>3</sub>
- **Gases and Aroma:** CO<sub>2</sub>, CH<sub>4</sub>, 2-acetyl-1-pyrroline

## Collaborations

From 2023–2024, RAL analysed over 1,300 samples with partners like Dhaka University, BARC, BARI, SAU, IRRI, USAID, and CIMMYT.

## Future Plans

RAL plans to build a Chemical Waste Plant and launch a Bioinformatics Dry Lab for deeper data analysis.

**Rice is life – RAL ensures its safety.**



*Rice Analytical Laboratory (RAL), BRRI.*

## Agromet Lab

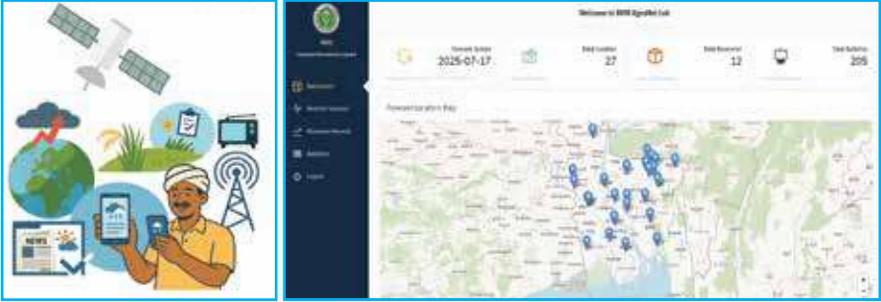
Established in 2016, the BRRI Agromet Lab addresses climate change and weather variability challenges in rice production. With contributions from 14 scientists across nine divisions, the lab serves as a national center for agrometeorological innovation, integrating AI (Artificial Intelligence), IoT (Internet of Thing), GIS (Geographic Information System), and remote sensing to develop forecast-based rice advisories and climate-smart solutions. It aligns with key national strategies, including the Bangladesh Delta Plan 2100, NAP (National Adaptation Plan) 2023, SDGs (Sustainable Development Goal), and National Agricultural Policies.

The lab's objectives include developing crop-weather models, automated advisory tools, and sustainable management technologies for stress-prone environments. It delivers localized, real-time agro-advisories via digital platforms like IRAS (Integrated Rice Advisory System) and SAADS (Smart Agro Advisory Dissemination System) and supports precision agriculture and

climate adaptation. BRRRI Agromet Lab has the following key achievements.

- Developed a weather-integrated rice production framework and WFBAS (Weather Forecast-Based Advisory Service), published in a Q1 journal.
- Launched IRAS, a digital platform providing location-specific advisories to farmers.
- IRAS won the Digital Bangladesh Award 2022 for its impact on digital agriculture.
- Published over 500 advisory bulletins for Boro and T. Aman seasons.
- Built weather prediction models with BMD (Bangladesh Meteorological Department) using NWP (Numerical Weather Prediction), AI and machine learning.
- Created a digital farmer database with over 35,000 profiles for targeted support.
- Haor Rice Monitoring, SAADS, Flood Impact Platform, IINMS (Integrated Irrigation and Nutrient Management System), CAT (Climateology Analytical Tool), DCRS (Data Collection and Repository System), and PFMS (Project Financial Management System).
- Installed Automatic Weather Stations at all BRRRI regional stations and Headquarters.
- Established a call center, SMS (push notification)/voice alert system for direct farmer outreach.
- Published 12 papers, four books, and offered ongoing training in digital agromet tools.

The BRRRI Agromet Lab is currently working on several important research areas, including weather forecasting, flood risk assessment, using AI to detect pests and diseases, monitoring greenhouse gas (GHG) emissions, and managing irrigation and fertilizer more precisely. In the future, the lab aims to improve forecasting with AI, expand its digital advisory systems, develop early warning tools for farmers, and ensure that services reach everyone including smallholders and vulnerable groups. By using advanced technologies and supporting national policies, the lab is working to make rice farming in Bangladesh more climate-resilient and food-secure.



*Agrometeorology, Crop Modeling and Climate Change Research Laboratory (Agromet Lab)*

## Technical Cooperation

**International level.** BRRI, through a memorandum of understanding with International Rice Research Institute (IRRI), receives technical assistance on rice research. BRRI exchanges breeding materials and research information with 73 rice growing countries in the world, including Africa Rice Center (AfricaRice). BRRI offers technical assistance as a member of many national and international committees.

BRRI scientists have established direct contact with Chinese counterparts and cooperated with each other under a technical assistance programme. Several BRRI scientists have already visited China to study its breeding objectives and water as well as azolla management systems. Several Chinese delegations have also visited BRRI.

BRRI has had same level of relationship with some other countries including Philippines, Japan, Korea, Australia, Malaysia, India and USA.

Our scientists participate in seminars, workshops, training programmes and monitoring tours to establish effective links with many countries around the world. BRRI benefits from different programmes by receiving a large number of elite breeding lines from rice breeders of all participating countries for testing under Bangladesh environments and to use some as parents in BRRI's breeding programmes. BRRI also benefits by having its elite lines tested by rice breeders in many countries, which help it more accurately and quickly judge their performances, speeding up the process of variety development for the future.

**National level.** BRRI cooperates in appropriate programmes with agencies such as the on-farm research of the Bangladesh Agriculture Research Institute (BARI), Bangladesh Agricultural Research Council (BARC), Bangladesh Jute Research Institute (BJRI), Bangladesh Water Development Board (BWDB), Bangladesh Institute of Nuclear Agriculture (BINA), Bangladesh Agricultural University (BAU), Dhaka University (DU) and Gazipur Agricultural University (GAU) etc. In this work, particular emphasis is placed on adaptive and cropping pattern research and development in farmers' fields. BRRI scientists are members of national committees such as the intensive crop programmes for increased production and the National Seed Board for releasing varieties of all crops.

BRRI scientists visit farmers' fields and give on-the-spot advice. Our scientists also analyse soil and examine disease and insect samples sent to them and prescribe immediate or long-term remedial measures. BRRI produces breeder seed for recommended rice varieties and supplies those to the Bangladesh Agricultural Development Corporation (BADC), private seed entrepreneurs and NGOs for seed multiplication and distribution to the farm level.

## Funding Sources

Local needs and salaries of officers and staff are met from our annual revenue budget. BRRI has a budget provision of about Tk 139 crore (revenue budget) and Tk 146 crore (development budget) for 2024-25 financial year.

However, for the purchase of laboratory equipments, construction facilities, arranging training for the scientists and to meet costs of expatriate scientists, BRRI receives grants-in-aid from several organizations and sources. Some of them are as follows:

- Asian Development Bank (ADB);
- Canadian Government through the Canadian International Development Agency (CIDA);
- International Development Research Council (IDRC);
- Ministry of Overseas Development Administration, UK;
- JICA (Japan International Cooperation Agency), Japan;
- Agency for International Development (AID), USA;
- International Fund for Agricultural Development (IFAD);
- Korea International Cooperation Agency (KOICA);

- Bill and Melinda Gates Foundation;
- IRRI;
- Embassy of Norway;
- United States Agency for International Development (USAID);
- Japan International Research Center for Agricultural Sciences (JIRCAS);
- Global Institute for Food Security (GIFS).

## REGIONAL STATIONS

Besides the headquarters at Joydebpur, 36 km north of Dhaka, where the main research programmes originate, BRRI has set up 17 regional stations (RS) to conduct location-specific research.

**Cumilla:** The BRRI Regional Station, Cumilla established in 1970 is located at Champaknagar, about one kilometre west of the Cumilla railway station. This regional station has an area of 23.75 ha of which about 18.56 ha is used as experimental fields. The station is situated in the Old Meghna Estuarine Floodplain agro-ecological zone (AEZ-22). The soil is silty clay loam to clay, acidic (pH 5.8) with an organic matter content of 1.6%. The land is typically suitable for irrigated transplanted rice. The average annual rainfall (from 2010 to 2024) recorded at the weather center of the station is around 2045 mm. The research focus of BRRI RS, Cumilla is to develop and test modern high yielding rice varieties and production technologies for favourable ecosystems, photosensitive rice, water stagnant rice, blast, tungro, bacterial blight and insect resistant rice varieties.

The major achievements of BRRI RS, Cumilla are: In 1994, BRRI dhan32 was developed for medium low land T. Aman rice variety. In 2017, water stagnation tolerant rice BRRI dhan85 was developed for Aus season in Cumilla region. A short duration green super rice (GSR) BRRI dhan75 is also developed for Aman season. A rice tungro disease management technology and the causing factors are recently developed by the scientist of BRRI RS, Cumilla, which is one of the devastating rice diseases in Cumilla region. In every rice season, new high yielding rice varieties are distributed for free seed and demonstration services due to quick dissemination of the new

varieties to the farmer's level. A total of 120 experiments, 90 crosses made through hybridization and 3000 advanced lines selection are conducted every year from plant breeding, plant pathology, soil science, agronomy and rice farming systems divisions. According to the farmers demand, about 35 metric tons of truthfully labelled seeds are produced and distributed to the farmers. Besides, more than 30 metric tons breeder seeds of different rice varieties are produced and distributed to the government, private, NGOs, stakeholders, seed growers. Every year about 300 farmers, 75 Agriculture Extension Officers are trained up and one workshop are organized and about 10 to 20 thousands leaflets about devastating rice diseases like rice blast and tungro disease management technology are distributed among the farmers and extension personnel for technology dissemination.

**Barishal:** The BRRI Regional Station, Barishal, established in 1970, is the oldest among all BRRI regional stations. It is located at 22°40'50" N latitude and 90°21'15" E longitude, at an elevation of approximately 3.3 meters above sea level.

The station operates across two research farms i.e Char Badna (30 ha) and Sagardi (8.8 ha) covering a total of 38.8 hectares of research land. Its primary mandate is to develop improved rice varieties and associated production technologies specifically for the non-saline tidal water ecosystems of southern Bangladesh. This work addresses the unique challenges of the region, including periodic tidal inundation and seasonal waterlogging, with a focus on resilient, ecosystem-specific solutions to ensure stable and high-yielding rice production.

Situated in a humid tidal environment, the station receives an average annual rainfall of about 2,100 mm. The soil is predominantly sandy loam, with a pH of 7.3 and about 2.6% organic matter, providing a moderately fertile base for rice cultivation.

In the Barishal region, T. Aman is the principal rice-growing season, accounting for the largest share of annual rice production compared to Aus and Boro. Commonly cultivated varieties during the T. Aman season include BR23, BRRI dhan52, and BRRI dhan76, along with several traditional local varieties like Sadamota, Kachamota, Nakuchimota, Dudmona, Moulota etc. that are well adapted to the tidal ecosystem.

**Rajshahi:** BRRI RS, Rajshahi (13 ha) was established in 1978 to develop high-yielding rice varieties suitable for two extreme conditions: drought and cold, particularly for the northern districts. The station conducts on-farm research trials on cropping patterns and adaptive research trials in farmer fields to address the specific problems of farmers of the Barind tract of northern Bangladesh. The soil pH is 7-8 and contains 0.7 percent organic matter. The average annual rainfall of 1400 mm is the lowest among the BRRI regional stations.

**Habiganj:** Established on 36 ha in 1934. After independence BRRI RS, Habiganj has been conducting research on deepwater and Boro rice. The soil is highly acidic with 4.5 pH and contains 3.9 percent organic matter.

The soil is also extremely heavy containing 80 percent clay. The average annual rainfall is 2,330 mm.

**Sonagazi:** BRRI RS, Sonagazi (45.77 ha) was established in 1976 on the bank of Baro Feni river. Cultivable land is 35.71 ha, office and residential area occupied about 2.04 ha and others (farm buildings, farm road, drain, canal, embankment, levee, etc.) 8.02 ha. This station is located at Char Chandia union under Sonagazi upazila, about 30 km to the south of Feni district, 7 km from Sonagazi upazila and 15 km away from the shore of the Bay of Bengal. This regional station covers two agricultural regions, eight districts, 70 upazilas including many charlands like Subarnachar, Urirchar, Vasanchar, Hatia, Sandwip, Kutubdia etc. Jurisdiction of this station is very much heterogeneous regarding land type, topography, soil type, cropping pattern, agro-ecology and socio-economic condition.

Adaptability trial for MV rice development including salinity tolerant in different rice growing seasons are conducting in this farm. The soil is sandy clay loam with about pH 7.0 and 1.4% organic matter. The average annual rainfall is 3,058 mm.

Once upon a time Aman was the only rice growing crop in these regions due to many abiotic stresses like salinity, waterlogged condition, lack of irrigation in the dry season, light textured char land soils etc. Now-a-days, farmers are growing at least two even three rice crops in a year with the intervention of BRRI as well as this regional station. However, still there is a huge scope to increase the cropping intensity in this area and BRRI RS, Sonagazi is trying the best to achieve this target.

**Satkhira:** The BRRI RS in Satkhira began its activities on 1 August 1999. The station covers a total land area of approximately 54.69 acres, of which about 40 acres are under cultivation. It represents agro-ecological zones (AEZ) 11 and 13, and its research jurisdiction extends across 24 upazilas in three districts: Jashore, Satkhira, and Khulna. The core mission of the station is to conduct research and promote innovations that enhance farm productivity in coastal areas. Since its establishment, the station has played a key role in developing 13 salinity-tolerant rice varieties through extensive field trials. In addition to addressing salinity challenges during the dry winter Boro season, the station has also focused on water stagnation issues, as these areas face severe waterlogging during the monsoon T. Aman season. Furthermore, the station has introduced a range of region-specific technologies aimed at increasing yields. The adoption of these innovations has contributed significantly to improving rice production in the coastal saline belt of the Khulna-Satkhira region.

**Rangpur:** BRRI RS, Rangpur was established in 1991. The station is located about 7 km west of the divisional city of Rangpur in the Teasta Meander Floodplain (AEZ-3) agro-ecological region. Of the 6.07 ha of land belonging to this regional station of BRRI, about 4.05 ha is used for research purposes. The soil is silty loam, slightly acidic (pH 6.4) with a low organic matter content (1.2-1.3%). The annual rainfall at this station is around 2192, mm. Research is focused mainly to: (a) develop HYV Boro rice varieties for tolerant of low temperatures at the seedling stage, (b) develop flash flood and drought tolerant HYV T. Aman rice varieties, (c) develop short-duration, aromatic T. Aman rice varieties with a high yield potential, (d) trials and evaluation of HYV MVs and improved production practices suitable for the greater Rangpur-Dinajpur region (AEZ-1, 2, 3, 7, 25 and 27), (e) technology dissemination through training and technical information services to public and private extension agencies and farmers. At present, the station is run by one Principal Scientific Officer, two Senior Scientific Officers, one Scientific Officers and nine support service personnel.

**Bhanga:** BRRI RS, Bhanga, Faridpur was established in 1985 with the mandate to develop deepwater rice (DWR) and DWR-based farming systems that are suitable for the Low Ganges Floodplain (AEZ-12) agro-ecological zone. A total of 24 upazilas under four districts of Faridpur region are under the jurisdiction of the BRRI RS Bhanga. The total area of this regional station is 10.28 ha of

which 8.19 ha is used for research and seed production. The annual rainfall at this station is around 1100 mm. The maximum ambient temperature (35°C) is recorded in May and the minimum (17°C) in January. The research farm is situated in a low-lying basin, which is inundated to a depth of around 2.0 meters during the monsoon season. The farm has fertile, silty clay-loam soil with a relatively high organic matter content. The station has its own research programme and also conducts research under the various BIRRI programme areas. In general, the yield levels of MV rice in this farm are markedly higher than the national averages for them.

**Kushtia:** BIRRI RS, Kushtia was established in 1996. Research area of this station is upland ecosystem of Gangetic flood plain and moderate drought prone situation. Mandate of this station is developing rice variety in drought prone situation. It represents agro-ecological zone (AEZ) 11a, which is the low rainfall area of the country. The soil of Kushtia is light and sandy loam to loam in high and medium high lands and silty loam to clay loam in medium low to low lands. Rice based double and triple cropped lands dominate the area. Boro-Fallow-T.Aman is the dominant cropping pattern in this area. The station has recently acquired its own farm area of 10 acre. However, the experiments are conducted in its own farm area as well as at the farmers' field. Several experiments are conducted under different programme areas in this station. Its research area includes five districts (Kushtia, Jhenaidah, Meherpur, Chuadanga & Magura).

**Sirajganj:** BIRRI RS, Sirajganj was established in 2017. Located at Konabari Mouja of Kamarkhand upazila of the Sirajganj district, 12 km away from the city of Sirajganj. The Station is mandated to conduct research on rice production technologies suitable for the Korotoya-Bangali Floodplain (AEZ-4) and Level Barind Tract (AEZ-25) of the Jamuna Basin in the districts of Pabna, Sirajganj, Bogura and Joypurhat where mainly rice based single/double cropping is practiced. The soils in this region are sandy loam to loam on the medium high lands and silty loam to clay loam on the medium low and low lands. The major objectives of the station are to strengthen problem-oriented research activities for sustainable rice production in the Chalan bil and char land areas, especially the management strategies of the rice pest nomadic rice plant hoppers. In addition, the Station conducts research under various BIRRI programme areas such as, Varietal Development, Crop-Soil-Water Management, Pest Management, Enrichment of Seed Stock, Socio-Economics and Policy and Technology Transfer.

**Gopalganj:** BRRI RS, Gopalganj was established in 2018 and situated at 22°56'48" N latitude and 89°49'24" E longitude and 4.0 m above the sea level. It has been established to address research on deep-water and saline ecosystems. In 2018, four hectares of land were acquired in Bhethdar mouza of Gobra union under Sadar upazila of Gopalganj district. The station is situated at Ghonapara on the way to Gopalganj-Tungipara road and is seven km away from Gopalganj town. The station represents the agro-ecological zone-14 in the Gopalganj-Khulna Beel area. The soil is silty loam to clay loam, peat soil with 6.6-7.0 pH. The organic matter content of the Gopalganj soil is 1.7-2.0 percent. The main cropping pattern of this district is Boro-Fallow-Fallow.

## Facts and Figures

The rice-growing environments in Bangladesh are very diverse, varying from the drought-prone high lands in the north-west through the flood-affected central region to the coastal saline zone in the south. The diversity is indicated by the thirty major agro-ecological zones (AEZ) into which the country has been divided on the basis of land and soil types, hydrology and climate. This diversity in the rice-growing environments makes the task of BRRI scientists more challenging.

The institute is well equipped with research facilities including laboratories, greenhouses and experimental fields. BRRI has a modern germplasm bank, eight major laboratories with sophisticated equipments, two greenhouses, a transgenic greenhouse and a 45 ha test fields in and around its headquarters in Gazipur. Moreover, it has a number of sites in different agro-ecological zones throughout the country. The test sites include advanced line adaptive research trial (ALART), proposed variety trial (PVT), regional yield trial (RYT) and seed production and dissemination programme (SPDP) etc.

## LOOKING AHEAD

BRRI scientists are very much aware that the demand for food in Bangladesh will continue to increase as the population increases by nearly 2.10 million every year. Bangladesh must, therefore, maintain a steady yearly increase in rice production. By the year 2030, rice productivity in the country must be doubled from the present level just to maintain self-sufficiency in food. To enable the country in achieving this target, BRRI has initiated research and development programmes with the following major objectives:

- Harnessing frontier technologies like genome editing, genetic transformation, haplotype-based breeding, speed breeding coupled with genomic prediction, bioinformatics, high through-put phenomics, artificial intelligence, digitization, techniques etc in variety development;
- Accelerating genetic gain of BRRI breeding programmes @ 2.0% per year for both the favourable and unfavourable areas;
- Breaking yield ceiling through the development of MVs capable of yielding more than 12.0 t/ha;
- Development and scaling up of super hybrid rice technology;
- Development of nutraceutical healthier rice like low GI, anti-oxidant rice;
- Improvement of nutritional quality of rice with high zinc, iron and vitamin A;
- Development of premium quality rice varieties with national and international standards for meeting up local and export markets;
- Development of sticky rice varieties for the Jhum areas and for the export perspectives;
- Development of multiple stress-tolerant varieties;
- Pyramiding of disease and insect tolerances leading to pest resistant varieties;
- Development of mitigation and adaptation technologies in relation to climate change;
- Development of location and genotype specific technologies with low-cost perspectives;
- Development of climate change model for agricultural mitigation and adaptation;
- Development of biorational pesticide, organic fertilizers and nano technologies;
- Validation and scaling up of the region-specific technologies including varieties and management practices;
- Soil health improvement to address soil degradation for higher productivity;
- Development of appropriate farm machinery with local

environment suitability, reasonable price and their up scaling through PPP;

- Impact assessment of climatic change on crop production practices;
- Enhancing dissemination of Bangladesh Rice Knowledge Bank (BRKB) based rice production technology and strengthening training programmes;
- Maximizing rice production of different unfavourable environments namely deep water, rainfed, coastal saline and non-saline, haor, water logging, drought-prone, flood-prone, hilly areas, etc;
- Accelerating technology transfer to end users;
- Determination of genetic trends of BRRI breeding programmes and stability parameters;
- Weather forecast-based agro-advisory services to the grass root levels;
- Forecasting of rice area, production and yield in Bangladesh
- Assisting government in policy formulation and socio-economic issues;
- Estimating genetic, agronomic and environmental gains by developing statistical models to accurately analyze data from breeding, agronomic and adaptive research divisions;
- Development of yield loss prediction model;
- Identification of CV (%) thresholds for getting experimental precision;
- Implementation of precision agriculture theory in production using IoT, ML approach and AI;
- Big data management, data mining and crop modelling;
- Development of innovative technology in research;
- Production and distribution of more than 200 tons of breeder seed per year to support sustainable rice seed supply of the country.

**Table 2. Characteristics of BRRI developed varieties, 1970-2025.**

Designation	Season	Height (cm)	Life cycle (day) <sup>1</sup>	Size and shape (milled rice)	Varietal speciality	Average yield (t/ha)	Year of recommendation
<b>Inbred rice varieties</b>							
BR1 (Chandina)	Boro	88	150	Short bold	Early maturing	5.5	1970
	Aus	88	120			4.0	
BR2 (Mala)	Boro	120	160	Medium slender	Suitable for puffed rice	5.0	1971
	Aus	120	125			4.0	
BR3 (Biplab)	Boro	95	170	Medium bold	Late maturing	6.5	1973
	Aus	100	130			4.0	
	Aman	100	145			4.0	
BR4 (Brrisail)	Aman	125	145	Medium bold	Strongly photoperiod sensitive	5.0	1975
BR5 (Dulabhog)	Aman	120	150	Short bold	Aromatic; Antioxidant enriched	3.0	1976
BR6 (IR28)	Boro	100	140	Long slender	Short duration	4.5	1977
	Aus	113	110			3.5	
BR7 (Brribalam)	Boro	125	155	Long slender	Good eating quality	4.5	1977
	Aus	125	130			3.5	
BR8 (Asha)	Boro	125	160	Medium bold	Suitable for hail-storm prone areas	6.0	1978
	Aus	125	125			5.0	
BR9 (Sufala)	Boro	125	155	Medium bold	Suitable for hail-storm prone areas	6.0	1978
	Aus	125	120			5.0	
BR10 (Progoti)	Aman	115	150	Medium slender	Weakly photoperiod sensitive	6.0	1980
BR11 (Mukta)	Aman	115	145	Medium bold	Weakly photoperiod sensitive, high yield potential	6.0	1980
BR12 (Moyna)	Boro	105	170	Medium bold	Leaf sheath purple colour	5.5	1983
	Aus	105	130			4.5	
BR14 (Gazi)	Boro	120	160	Medium bold	Awned	6.0	1983
	Aus	120	120			5.0	
BR15 (Mohini)	Boro	90	165	Medium slender	Long panicle	5.5	1983
	Aus	100	125			5.0	
BR16 (Shahibalam)	Boro	90	165	Long slender	Low glycemic index	6.0	1983
	Aus	110	130			5.0	
BR17 (Hashi)	Boro	125	155	Medium bold	Suitable for haor (depressed) areas	6.0	1985
BR18 (Shahjalal)	Boro	115	170	Medium bold	Suitable for haor (depressed) areas, cold tolerant	6.0	1985
BR19 (Mangol)	Boro	110	170	Medium bold	Suitable for haor (depressed) areas	6.0	1985
BR20 (Nizami)	Aus	120	115	Medium bold	Suitable for direct seeding and rainfed areas	3.5	1986
BR21 (Niamat)	Aus	100	110	Medium bold	Suitable for direct seeding and rainfed areas	3.0	1986
BR22 (Kiron)	Aman	125	150	Short bold	Late maturing; Photoperiod sensitive	5.0	1988
BR23 (Dishari)	Aman	120	150	Long slender	Late maturing; Photoperiod sensitive	5.5	1988
BR24 (Rahmat)	Aus	105	105	Long slender	Suitable for direct seeding and rainfed areas	3.5	1992
BR25 (Nayapajam)	Aman	138	135	Short bold	Suitable for direct seeding, low glycemic index	4.5	1992

Table 2. Continued.

BR26 (Sraboni)	Aus	115	115	Long slender	Intermediate amylose	4.0	1993
BRR1 dhan27	Aus	140	115	Medium bold	Suitable for Barisal tidal areas	4.0	1994
BRR1 dhan28	Boro	90	140	Medium slender	Early maturing, suitable for low laying areas, less water requiring	6.0	1994
BRR1 dhan29	Boro	95	160	Medium slender	Very high yield potential and requiring available water	7.5	1994
BRR1 dhan30	Aman	120	145	Medium slender	Weakly photoperiod sensitive	5.0	1994
BRR1 dhan31	Aman	115	140	Medium bold	Suitable for southern region	5.0	1994
BRR1 dhan32	Aman	120	130	Medium bold	Medium duration, low input variety	4.5	1994
BRR1 dhan33	Aman	100	118	Short bold	Blackish spotted paddy; early maturing	4.5	1997
BRR1 dhan34	Aman	117	135	Short bold	Aromatic; Antioxidant enriched	3.5	1997
BRR1 dhan35	Boro	105	155	Medium bold	Resistant to brown planthopper	5.0	1998
BRR1 dhan36	Boro	90	140	Long slender	Cold tolerant	5.0	1998
BRR1 dhan37	Aman	125	140	Medium slender	Aromatic	3.5	1998
BRR1 dhan38	Aman	125	140	Long slender	Aromatic	3.5	1998
BRR1 dhan39	Aman	106	122	Long slender	Early maturing	4.5	1999
BRR1 dhan40	Aman	110	145	Medium bold	Salt tolerant	4.5	2003
BRR1 dhan41	Aman	115	148	Long bold	Salt tolerant	5.0	2003
BRR1 dhan42	Aus	100	100	Medium bold	Drought tolerant, suitable for rainfed areas	3.5	2004
BRR1 dhan43	Aus	100	100	Medium bold	Drought tolerant, suitable for rainfed areas	3.5	2004
BRR1 dhan44	Aman	130	145	Medium bold	Suitable for coastal non-saline tidal-prone areas	6.5	2005
BRR1 dhan45	Boro	100	137	Medium bold	Early maturing	6.5	2005
BRR1 dhan46	Aman	105	124	Medium bold	Late maturing, can be transplanted up to 15 September; Photoperiod sensitive, suitable for flood prone areas	4.7	2007
BRR1 dhan47	Boro	105	145	Medium bold	Tolerates 12-14 dS/m salinity in seedling stage and 6 dS/m in rest of the life	6.1	2007
BRR1 dhan48	Aus	105	110	Medium bold	Early maturing	5.5	2008
BRR1 dhan49	Aman	100	135	Medium slender	Seven-day earlier than BR11, Nizersail type grain	5.5	2008
BRR1 dhan50 (Banglamati)	Boro	82	155	Long slender	Premium quality rice, slightly aromatic	6.0	2008
BRR1 dhan51	T.Aman	90	142	Medium slender	Submergence tolerant	4.5	2010
BRR1 dhan52	T.Aman	116	145	Medium bold	Submergence tolerant	5.5	2010
BRR1 dhan53	T.Aman	105	125	Medium bold	Tolerates 8 dS/m salinity in seedling and reproductive stages	4.5	2010
BRR1 dhan54	T.Aman	115	135	Medium bold	Tolerates 8 dS/m salinity in seedling and reproductive stages	5.0	2010
BRR1 dhan55	T.Aman	100	145	Long slender	Moderately tolerant to salt, drought and cold	7.0-7.5	2011

Table 2. Continued.

BRRi dhan56	T.Aman	114	110	Long bold	Drought tolerant; tolerates rainless condition for 14-21 days at the reproductive stage without losing much yield	4.0-4.5	2011
BRRi dhan57	T.Aman	113	105	Long slender	Drought escaping, tolerates rainless condition for 10-14 days at the reproductive stage without losing much yield	4.0	2011
BRRi dhan58	Boro	100	155	Medium slender	Five-day earlier than BRRi dhan29	7.2	2012
BRRi dhan59	Boro	83	147	Medium bold	Flag leaf erected and deep green, non-lodging	7.1	2013
BRRi dhan60	Boro	98	151	Long slender	Early maturing, yield potential equivalent to BRRi dhan29, extra long grain	7.3	2013
BRRi dhan61	Boro	96	150	Medium slender	Salt tolerant	6.3	2013
BRRi dhan62	T.Aman	102	100	Long slender	Moderately zinc enriched (19 mg/kg), high protein (9%) and early maturing	4.5	2013
BRRi dhan63	Boro	85	150	Long slender	Basmati type	6.5	2014
BRRi dhan64	Boro	110	152	Medium bold	Zinc enriched	6.5	2014
BRRi dhan65	B.Aus	88	99	Medium slender	Drought tolerant	3.5-4.0	2014
BRRi dhan66	T.Aman	119	113	Medium long bold	Drought tolerant	4.5	2014
BRRi dhan67	Boro	103	145	Medium slender	Salt tolerant	6.0	2014
BRRi dhan68	Boro	95	149	Medium bold	Green leaf at maturity	7.3	2014
BRRi dhan69	Boro	98	153	Medium bold	Flag leaf erected	7.5	2014
BRRi dhan70	T.Aman	125	130	Long slender	Aromatic	5.0	2015
BRRi dhan71	T.Aman	107	114	Long bold	Drought tolerant	3.5-5.5	2015
BRRi dhan72	T.Aman	116	125	Medium bold	Zinc enriched	6.00	2015
BRRi dhan73	T.Aman	120	125	Medium slender	Salt tolerant	3.5-6.0	2015
BRRi dhan74	Boro	92	147	Long bold	Zinc enriched	7.1	2015
BRRi dhan75	T.Aman	107	112	Medium slender	Early maturing	5.5	2016
BRRi dhan76	T.Aman	134	163	Medium bold	Suitable for non-tidal low land	5.0	2016
BRRi dhan77	T.Aman	133	154	Bold & white	Suitable for non-saline	5.0	2016
BRRi dhan78	T.Aman	118	135	Medium bold	Suitable for slender saline tidal prone zone/Area	4.5	2016
BRRi dhan79	T.Aman	112	135	Medium slender	Flag leaf erected	5.0-5.5	2017
BRRi dhan80	T.Aman	120	130	Long slender	Aromatic like jasmine type	5.0	2017
BRRi dhan81	Boro	96	140	Long slender	Antioxidant	6.5	2017
BRRi dhan82	T. Aus	110	102	Medium bold	Short duration	4.7	2017
BRRi dhan83	B. Aus	104	105	Medium bold	Short duration	3.8	2017
BRRi dhan84	Boro	96	142	Medium slender	Zinc enriched (27.6 mg/kg)	6.5	2017
BRRi dhan85	T. Aus	110	107	Medium long slender	Short duration Water logging tolerant	4.3	2017

Table 2. Continued.

BRR1 dhan86	Boro	95	142	Long slender	Long slender and white	6.5	2017
BRR1 dhan87	Aman	122	127	Long slender	Long slender and white	6.5	2018
BRR1 dhan88	Boro	96	142	Medium slender	Suitable for haor areas	7.0	2018
BRR1 dhan89	Boro	105	156	Medium bold	Medium bold and white	8.0	2018
BRR1 dhan90	Aman	110	122	Short bold	Protein enriched	5.0	2019
BRR1 dhan91	B.Aman	180	156	Medium bold	Semi-deep water rice	3.5	2019
BRR1 dhan92	Boro	107	156-160	Long slender	Suitable for barind areas	8.4	2019
BRR1 dhan93	Aman	117	134	Medium bold	Leaf deep green, reddish colour grain	5.8	2019
BRR1 dhan94	Aman	118	134	Medium bold	Leaf colour is deep green reddish colour grain	5.9	2019
BRR1 dhan95	Aman	120	125	Medium bold	Leaf colour deep green, grain deep red	5.7	2019
BRR1 dhan96	Boro	120	140-145	Medium bold	leaf deep green, stem is strong	7.0	2020
BRR1 dhan97	Boro	100	152	Medium bold	Salt tolerant	7.0	2020
BRR1 dhan98	T.Aus	104	112	Long slender	long aromatic and	5.0-6.0	2020
BRR1 dhan99	Boro	94	155	Long slender	Salt tolerant	7.0	2020
BRR1 dhan100	Boro	101	148	Medium Slender	Zinc enriched	8.0-9.6	2021
BRR1 dhan101	Boro	110	142	Long slender	Bacterial blight resistant	7.72	2022
BRR1 dhan102	Boro	103	150	Long slender	Zinc enriched, 25.7 mg/kg Zn	8.0-9.6	2022
BRR1 dhan103	T.Aman	125	128-133	Long slender	Yield potential 8.0 t/ha	6-8	2022
BRR1 dhan104	Boro	92	147	Extra-long slender	Basmati-type with aroma and non-sticky cooked rice	7.3	2022
BRR1 dhan105	Boro	100	151	Medium slender	Low GI diabetic rice	7.6	2023
BRR1 dhan106	T.Aus	123	117	Medium bold	Suitable for Non-saline tidal area	5.0	2023
BRR1 dhan107	Boro	103	143	Extra-long slender and white	High protein enriched	8.2	2024
BRR1 dhan108	Boro	102	150	Medium-slender as like Jira rice	A greater number grains (250-270) per panicle	8.52	2024
BRR1 dhan109	T.Aman	128	147	Medium bold	Suitable for coastal tidal areas, High protein enriched	6.0	2025
BRR1 dhan110	T.Aman	120	123-133	Medium slender	Suitable for flash flood prone areas	6.65	2025
BRR1 dhan111	T.Aman	162	146-160	Medium bold	Suitable for low-laying flood prone areas like haors and beel region	5.2-5.7	2025
BRR1 dhan112	T.Aman	103-105	120-125	Medium slender	salt tolerant	4.4 -6.1	2025
BRR1 dhan113	Boro	102-105	143	Medium slender and white	the flag leaf is erect, wide and long	10.1	2025
BRR1 dhan114	Boro	101-108	149	Medium bold	blast disease resistant	10.2	2025
<b>Hybrid rice varieties</b>							
BRR1 hybrid dhan1	Boro	110	155	Slender	Late maturing	8.5	2001
BRR1 hybrid dhan2	Boro	105	145	Medium bold	Early maturing	8.0	2008
BRR1 hybrid dhan3	Boro	110	145	Medium bold	Early maturing	9.0	2009
BRR1 hybrid dhan4	T.Aman	112	118	Medium slender	Early maturing	6.5	2010
BRR1 hybrid dhan5	Boro	107	144	Long slender	Slender and long	9.0	2016
BRR1 hybrid dhan6	T.Aman	111	114	Long slender	Slender and long	6.5	2017
BRR1 hybrid dhan7	T.Aus	103	104	Slender	Suitable for Chattogram, Khulna and Rangpur, Slender and long	6.5-7.0	2020
BRR1 hybrid dhan8	Boro	112	148	Slender	High yield potential	10	2022

<sup>1</sup>Life cycles vary with seeding date.

## Recognition

BRRRI as well as a number of its scientists have been honoured with 32 prestigious national and international awards for outstanding contributions to the science and technology. the following list presents the details.

Year	Award	Area
1974	Bangabandhu Award	Development of modern rice varieties
1977	President's Gold Medal	Development of BR3 and BR4 varieties
1978	Independence Day Award	Contributions to science and technology
1980	FAO Bronze Award	Development of BR10 and BR11 varieties
1980	President's Gold Medal	Development of Low Cost Diagram Pump
1984	President's Gold Medal	Contributions to rice research and development
1986	Begum Zebunnesa and Kazi Mahbubullah Trust Gold Medal	Development of rice variety and research
1991	Dr Maniruzzaman Foundation Gold Medal	Contributions to agricultural development
1992	Independence Day Award	Contributions to science and technology
1997	Independence Day Award	Contributions to science and technology
2004	Agriculturist forum of Bangladesh Gold Medal	Development of high yielding varieties specially BRRRI dhan28 and BRRRI dhan29
2005	IRRI Plaque of Honour	Achievements of three decades in ensuring food security and health of people
2006	Senadhira Rice Research Award	Special contribution to rice research in Asia
2008	Mathematics Olympiad Award	Contributions to food security
2009	National Environment Award	Development of salt tolerant varieties
2013	Mercantile Bank Award	Contributions to food security and overall achievement of rice research
2016	Metropolitan Chamber of Commerce and Industries (MCCI) Award	Recognition of the being the best institute in the Bangladesh
2016	Bangabandhu National Agriculture Award	Contributions to climate-smart and high yielding rice varieties, highlighting its role in agricultural research and development
2016	Digital Word Award 2016	Performance in providing innovative service through ICT activities
2017	Standard Chartered Bank Agro Award	Outstanding performance as the best agricultural organization in research and innovation
2017	Bangabandhu Agriculture Award	Contributions to climate-smart and high yielding rice varieties as well as its progress in golden rice research
2017	Natinal ICT Award	Contribution to the rice research through ICT
2018	World Summit Awards Bangladesh	Government and Citizen Engagement
2018	Bangladesh Academy of Science Award	Contributions to rice research and food security in Bangladesh
2021	RTV Agriculture Award	Contributions to national agricultural development, especially in the area of rice research and variety development.
2021	Senadhira Rice Research Award	Contributions to the rice genetics in Bangladesh
2021	Ekushe Padak	Contributions to research, particularly rice varieties
2021	BAS-National Professor Dr. M Innas Ali Memorial Gold Medal Award	Contributions to the field of biological sciences
2022	Digital Bangladesh Award	Contributions towards building digital Bangladesh
2022	Jatio Paribesh Padak	Contributions to environmental research and technological innovation.
2023	Smart Bangladesh Award	Unique contribution to detect disease and insect in rice using 4 IR technology
2024	National Agricultural Award (Gold)	Contributions to the field of biological sciences

**List of Projects**

**On-going Annual Development Programme (ADP) Project 2024-2025**

Title	Implementing agency	Duration	Estimated cost (In lakh taka)	Cumulative Progress up to June 2025		2024-25 ADP Allocation (In lakh taka)	Progress up to June 2025		Source of fund
				Financial (%) (In lakh taka)	Physical (%)		Financial (%) (In lakh taka)	Physical (%)	
				1. Strengthening Farm Machinery Research Activity for Mechanized Rice Cultivation (2nd Revised)	BARRI		01-07-2019 to 30-06-2027	5059.00	
2. High Yielding Hybrid Rice Variety Development through Modernization of Research	BARRI	01-07-2021 to 30-06-2026	4780.66	3714.00 (77.68%)	81.80%	900.00	900.00 (100.00%)	100.00%	GoB
3. Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship and Resilience in Bangladesh (PARTNER-BARRI-Part)	BARRI (Lead agency-DAE)	01-07-2023 to 30-06-2028	58370.46	16327.00 (27.97%)	29.00%	9793.00	9786.76 (99.94%)	100.00%	GoB, WB & IFAD
4. Innovation of Location-Specific Rice Varieties and Technologies by Setting up 06 New Regional Stations and Development of Existing Research Laboratories.	BARRI	01-07-2023 to 30-06-2028	36930.20	2149.00 (5.82%)	7.19%	3401.00	1427.00 (41.96%)	50.00%	GoB
<b>Total No. of Projects-4</b>			<b>105140.32</b>	<b>2611.00 (24.83%)</b>		<b>14594.00</b>	<b>12613.76 (86.43%)</b>		

## List of Projects

### Ongoing Non-ADP Project 2024-2025

Title	Implementing agency/ Collaborative Org.	Duration	Estimated cost (In lakh taka)	Cumulative Progress up to June 2025		Source of fund
				Financial (%) (In lakh taka)	Physical (%)	
1. Transforming Rice Breeding in Bangladesh: Institutional Capacity Building (Second Phase) (BRR1-Part)	BRR1/ International Rice Research Institute (IRRI)	01-12-2019 to 30-06-2025	3364.00	3364.00 (100.00%)	100.00%	Bill and Melinda Gates Foundation (BMGF)
2. Feed the Future Innovation Lab for Climate Resilient Cereals (CRCIL)	BRR1/ Kansas State University (KSU), USA	20-9-2023 to 29-8-2028	604.99	156.33 (25.84%)	25.84%	USAID
3. IRRI NARES Breeding Networks Project	BRR1/ International Rice Research Institute (IRRI)	01-01-2024 to 31-12-2024	97.58	97.58 (100.00%)	100.00%	Bill and Melinda Gates Foundation (BMGF)
4. AFACI – Stress Tolerant High Yielding Rice (SHR+) Project- BRR1 Part	BRR1/ BRR1 R/S, Satkhira (Salinity) BRR1 R/S Rangpur (Submergence)	01-07-2022 to 30-06-2025	48.00	47.95 (99.90%)	100.00%	AFACI, RDA, South Korea
5. Development of Short Duration Cold Tolerant Rice (SDCTR) for Haor Areas of Bangladesh (SDCTR-Physiology)	BRR1/ Plant Physiology, BRR1 R/S Habiganj	01-07-2020 to 30-06-2025	481.00	481.00 (100.00%)	100.00%	IRRI- KGF
6. BRR1 Support to Successfully Implement Rapid Cycle Genomic Selection (RCGS) BMGF Project Code: INV-069664	BRR1/ International Rice Research Institute (IRRI)	01-11-2024 to 31-10-2028	2300.57	147.56 (6.41%)	6.41%	Bill and Melinda Gates Foundation (BMGF)
7. Productivity Enhancement through Improved Agricultural Water Management Technologies in the Haor Areas (PIW/MH Project)	BRR1	01-07-2023 to 30-06-2025	49.00	49.00 (100.00%)	100.00%	Dutch-Bangla Bank Limited
8. Upscaling of Improved Water Management Practices for Sustainable Productivity in the Haor areas.	BRR1	18-11-2021 to 17-06-2025	53.25	53.20 (99.91%)	100.00%	KGF

9. Mitigating risk and scaling-out profitable cropping system intensification practices in the salt-affected coastal zones of the Ganges Delta (March 2021 to June 2025)	BRR/ BARI and Shushilan, Bangladesh; & CSSRI, BCKV and TSRD, India; CSIRO and IMU, Australia	01-03-2021 to 30-06-2025	200.00	170.00 (85.00%)	85.00%	ACIAR, Australia & KGF, Bangladesh (KGF part only for BRR/ BARI)
10. Asia Regional FAW and BPH Diagnostics and Monitoring and Surveillance Program	BRR/ BWMRI; and BARI	01-11-2023 to 30-09-2026	12.50	0.24 (1.92%)	1.92%	AFACI, RDA, Korea
11. Insecticide Resistance and Resurgence Management of Tungro Disseminating Green Leafhopper Project	BRR/ BARI	24-06-2023 to 30-06-2026	35.00	23.26 (66.46%)	66.46%	KGF
12. Dissemination of Prilled Urea Applicator to Boost-up Rice Production	BRR/ BARI	30-06-2024 to 30-04-2025	90.00	87.30 (97.00%)	97.00%	NCC bank
13. Productivity enhancement of Boro rice – Fallow-T. Aman rice - Rapeseed mustard cropping system in Bangladesh under the project titled Productivity enhancement of priority crops through piloting and upscaling of tailored, innovative, climate resilient and sustainable agricultural practices in South Asian countries (FVC/RAP/209/MUL)	BRR/ BARI	01-03-2024 to 31-12-2025	78.04	38.02 (48.78%)	48.78%	FAO
14. Socio-economic Assessing of AWD on rice cultivation in Bangladesh	BRR/ BARI	01-01-2024 to 31-03-2026	21.32	21.32 (100.00%)	100.00%	JIRCAS
15 Accelerating rice-based agri-food systems transformation for better sustainability, profitability and inclusiveness through promoting the adoption and up scaling of mechanized ratooning rice systems (TCP/RAS/3906)	BRR/ BARI	14-03-2024 to 31-08-2025	56.55	23.19 (41.00%)	41.00%	FAO
16. Smart detection of rice disease and insects through 4IR (fourth Industrial Revolution) technologies	BRR/ A2i (Aspire to Innovate)	24-06-2023 to 23-06-2026	35.00	26.62 (76.05%)	76.05%	KGF

**List of Projects**

**Proposed ADP Project for the Financial Year 2024 – 2025**

<b>Title</b>	<b>Estimated cost (In lakh taka)</b>	<b>Duration</b>	<b>Priority</b>	<b>Source of Fund</b>	<b>Status/Comment</b>
1. Improvement of Rice and Rice-based Farming Systems through the Efficient Management of Local resources in the Hill Tract	1960.00	01-07-2024 to 30-06-2029	High	GOB	Reconstructive DPP Submitted to MOA by PPS Software after Project Scrutiny Committee Meeting
2. Strengthening Research Capacity of BRRI Harnessing Quality Breeder Seed Production and Delivery and Effective Genetic Resources Management System)	14432.75	01-07-2025 to 30-06-2030	High	GOB	DPP under Preparation
3. Increasing the Productivity of Rice in the Barind Region	2611.671	01-07-2025 to 30-06-2028	High	GOB	DPP under Preparation
4. Strengthening Biotechnological Research in BRRI	3834.95	01-07-2025 to 30-06-2030	High	GOB	DPP under Preparation
5. Climate Resilient Agriculture Development Project (CRADP)	30000.00	01-07-2025 to 30-06-2030	High	GOB, Project Loan	Preliminary Project Proposal Submitted to MOA

**Proposed Non-ADP Project for the Financial Year 2024 - 2025**

<b>Title</b>	<b>Estimated cost (In lakh taka)</b>	<b>Duration</b>	<b>Priority</b>	<b>Source of Fund</b>	<b>Status/Comment</b>
1. Assessing the Impact of Climate Change on Rice Cultivation and Developing Sustainable Adaptation Strategies	740.00	01-07-2025 to 30-06-2028	High	Bangladesh Climate Change Trust Fund (BCCTF)	Project Proposal Submitted to MOA
2. Increasing the production of Rice and Rice-Based Cropping Patterns in the Waterlogged Bhabadah Beel area in the context of climate change	210.564	01-07-2025 to 30-06-2028	High	Bangladesh Climate Change Trust Fund (BCCTF)	Project Proposal Submitted to MOA
3. Expedite National Hybrid Rice Research, Training, Seed Production and Distribution Systems through Public-Private Sector Partnerships to Ensure Food Security in Bangladesh	600.00	01.04.2026 to 01.03.2029	High	Japan's Technical Cooperation	Project Proposal Submitted to MOA
4. The project for DX in Molecular Breeding for Global Climate Change: Genomics x Field Sensing Paves the Way for a "New Green Revolution"	350.00	01-01-2026 to 01-03-2032	High	Japan's Technical Cooperation (SATREPS Project)	Project Proposal Submitted to MOA











**Blast-resistant variety BRR1 dhan114**



**Rice**



**Non-Parboiled Rice**