Welcome to

Transformation of Research of GRS Division since 1971





Genetic Resources and Seed (GRS) Division
Bangladesh Rice Research Institute, Gazipur

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1. INTRODUCTION

A. Genetic Resources and Seed Division

- Genetic Resources and Seed (GRS) Division is an important component of Variety Development Program (VDP) of BRRI.

- Genetic Resources and Seed Division was established in 1991 with its manpower by separating from previous Plant Breeding Division of BRRI.

B. Conservation of rice germplasm

- Since the establishment of BRRI in 1971, the rice germplasm conservation was carried out under the supervision of previous Plant Breeding Division of BRRI.
- Systematic conservation of germplasm (by collecting and obtaining rice from various domestic and foreign sources) was started after the establishment of walk-in-type air cooled genebank in 1974 with the help of USAID .
- A modern short- and medium-term genebank was established as Hasanuzzaman Hall along with germplasm processing facilities in 1985 with the assistance of JICA .
- A full-fledged long-term BRRI Genebank was established as GRSD Office building in 2007 with the GoB funding.

C. Production and distribution of breeder seed

- Since the establishment of BRRI in 1971, the variety maintenance and seed production of BRRI developed rice varieties were carried out under the supervision of previous Plant Breeding Division of BRRI.
- After the National Seed Rules in 1998, the distribution of breeder seed to NGOs and the Private Sector (PS) began.
- In 1998, the Breeder Seed Unit (BSU) was also established by the support of ASSP (Agricultural Support Service Project).
- From the first phase of PETRRA sub-project in 1999, the amount of distributing breeder seed to license based seed dealers started to increase.

2. VISION AND MISSION

Genetic Resources and Seed Division

VISSION	Innovating sustainable, safe and profitable rice technology to ensure food for a growing population by addressing the challenges of climate change and dwindling resources
MISSION	Assistance in achieving sustainable food security through management of rice genetic resources and variety maintenance, production and distribution of breeder seed

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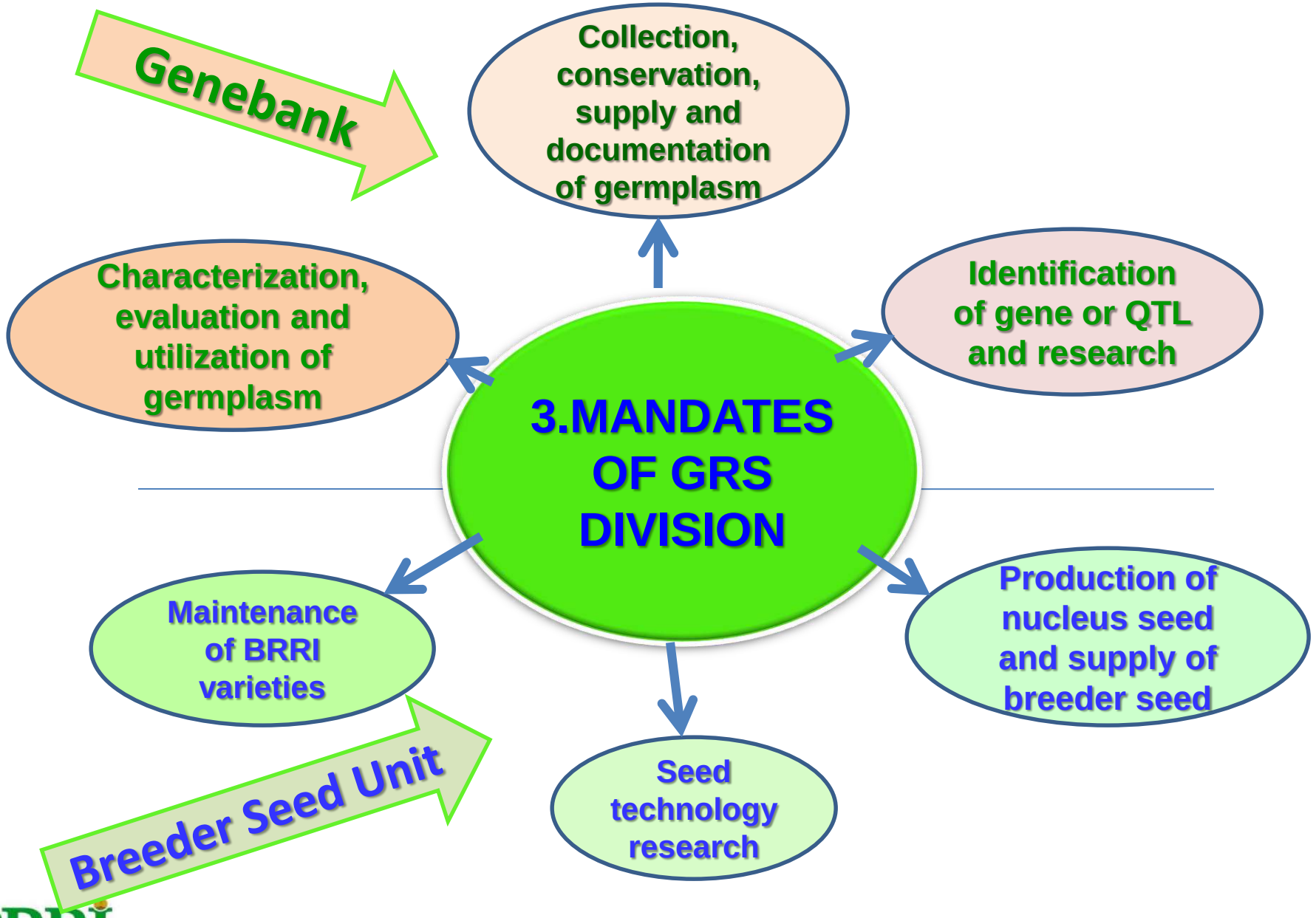
Genebank
Collection, conservation, supply and documentation of germplasm
Characterization, evaluation and utilization of germplasm
Identification of gene or QTL and research
3.MANDATES OF GRS DIVISION
Maintenance of BRRI varieties
Production of nucleus seed and supply of breeder seed
Seed technology research
Breeder Seed Unit

4. Head of the Division of GRS Division since 1991

Dr. Md. Nasir Uddin (Aug 1991 to Nov 1995),
Dr. Md. Anwarul Kabir (Nov 1995 to Dec 1995),
Dr. Md. Khairul Bashar (Jan 1997 to March 1997),
Haran Chandra Sarkar (March 1997 to May 1997),
Dr. Md. Khairul Bashar (May 1997 to Jan 1998),
Haran Chandra Sarkar (Jan 19978 to Oct 1998),
Dr. Md. Anwarul Islam (Oct 1998 to Jan 2002),
Dr. Md. Khairul Bashar (Jan 2002 to Dec 2010),
Dr. Mohammad Khalequzzaman (Dec 2010 to April 2013),
Dr. Md. Shamser Ali (April 2013 to Jul 2013),
Dr. Mohammad Khalequzzaman (Jul 2013 to Sep 2021),
Dr. Mir Sharf Uddin Ahmed (Sep 2021 to Dec 2022),
Dr. Md. Alamgir Hossain (Dec 2022 to Jan 2023),
Dr. Partha Sarathi Biswas (Jan 2023 to May 2025),
Dr. Mir Sharf Uddin Ahmed (May 2025-)

5. ACHIEVEMENTS OF GRS DIVISION

- BRRI dhan34 released from Khaskani
- 9,052 rice germplasm registered in genebank
- 90 wild rice samples conserved as *ex-situ* in Net house
- More than 1200 varieties evaluated against different biotic and abiotic factors and >350 varieties used in hybridization
- 1844 rice germplasm characterized at molecular level by SSR Marker
- 383 rice germplasm purified using GBS profilling along with trait profilling of 376 germplasm and 83 wild rice
- All information of conserved germplasms reported to the Global Plan of Action of FAO since 2019
- According to the Article no. 17 of FAO's ITPGRFA, 113 germplasm registered with DOI numbers in the Global Information System
- 131 BRRI invented and recommended rice varieties are maintained along with their nucleus seeds every year
- More than 200 tons of breeder seeds of BRRI invented varieties are supplied to around 1000 SeedNet partners including BADC every year.

GI Products of Bangladesh

GEOGRAPHICAL INDICATION RICE: DINAJPUR KATARIBHOG

Dinajpur Kataribhog rice

Polished Kataribhog rice

GEOGRAPHICAL INDICATION RICE: BANGLADESH KALIJIRA

Bangladesh Kalijira rice

Polished Bangladesh Kalijira rice

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6. TRANSFORMATION OF RESEARCH PROGRAM OF GRS DIVISION FOR LAST 50 YEARS

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

Part 1 — **Rice Gene bank**

Project 01: Rice Germplasm Conservation and Management

	Experiments/ Activities	Year of Initiation
1	Collection of rice (*Oryza sativa* L.) germplasm	1974
2	Rejuvenation and conservation of rice germplasm	1974
3	Rice germplasm supply and exchange	1974
4	Morphological characterization of rice germplasm	1990
5	Documentation of rice germplasm	1990
6	Molecular characterization of rice germplasm	2009

Studies of Germplasm of GRS Division before 2009

	Studies	Year	Out put
1	**Screening of >2000 rice germplasm against biotic and abiotic stress *viz* submergence, anaerobic, low input , allelopathic, BPH, WBPH, GLH, gallmidge, ufra, BB, ShB, bakanae, Blast etc**	**1991-2023**	Tolerant germplasm were identified and documented: 638 MR-R for BB, 108 MR-R for Blast,76 MR for ShB, 9 MR-R Stem rot, 1 (Hasikolmi) MR for BLE, 2 (Panati & Nizershail) R for Bakani, 13 MR-R for Tungro, 52 R for UFRA, 16 MR-R for BPH, 14 for GLH, 33 for WPH, 5 MR-R for Galmidge, 7 MR for SB, 20 MT-T for Sub, 2 MT – T for Tidal Sub, 54 MT – T for Salinity, 2 MT-T for Water logged, 11 MT – T for drought, > 50 T for Cold, 15 MT-T for Heat
2	**Evaluation of aromatic rice varieties**	**1992-96**	•Proposed Khaskani released as **BRRI dhan34**. •Basmati (D) was selected as promising.
3	**Evaluation of Tribal rice (glutinous)**	**1994-23**	Selected Kuichcha Binni (acc. 4474), Chandan Binni (4481), Dudhmethi (4482) and Maraka Binni (4903) sent to PBD for hybridization.
4	**Evaluation of quality rice germplasm**	**1995-98**	•**2 PYT and 2 SYT** conducted. •But no further progress.

Project 02: Exploratory and Genetic Studies		2009
Few Experiments/ Activities		Year of Initiation
1	Studies on selection criteria and genetic divergence of rice germplasm	2009
2	Regional Yield Trial (RYT) of Balam and Jesso-Balam rice germplasm of southern region	2017
3	Selection of superior genotypes from T. Aman/ Boro rice germplasm based on agro-morphological traits	2017
4	Secondary Yield Trial (SYT) of aromatic rice germplasm	2018
5	Evaluation of photosensitive rice germplasm collected from Northern districts of Bangladesh	2020
6	Secondary Yield Trial (SYT) of Jirasail genotype	2018
7	Molecular characterization of pigmented rice germplasm	2018
8	Secondary Yield Trial (SYT) of Jhum rice landraces	2019
9	Identification and selection of Sticky rice from Jhum rice germplasm	2019

Project 02: Exploratory and Genetic Studies		2009
Few Experiments/ Activities		Year of Initiation
10	Study of Biruin rice germplasm for amylose and antioxidant content	2021
11	Assessment of agronomic and physico- chemical properties of long slender rice germplasm	2022
12	Development of a duplicate free core set of rice germplasm through QC genotyping ang GBS profiling	2024
13	Whole Genome Sequencing of GBS purified germplasm	2024
14	Trait Discovery and validation of landrace varieties for specific adaptability	2024
15	Development of BRRI aromatic rice panel (BARP)	2024
16	Assessment of agronomic performance and trait-based phenotyping of Aus Germplasm	2024

Part 2

Breeder Seed Unit (BSU)		
Project 03: Seed Production & Variety Maintenance		**1990**
Experiments/ Activities		**Year of Initiation**
1	Nucleus seed production	1990
2	Maintenance of BRRI recommended HYVs and LIVs	1990
3	Breeder seed production and distribution	1990
4	Monitoring of breeder seed production farms	1990
5	Monitoring of foundation seed production farms	1993
6	Sending *khudebarta* (SMS) for Breeder seed distribution	2019

Studies of Seed Technology Research of GRS Division before 2015

Studies		Year	Out put
1	**Hybrid rice seed production technology**	**1992-97**	• **Maintainer: CMS=2B: 6A** for highest seed yield (1.02 t/ha) of the CMS line IR62829A. • Highest seed yield (CMS line IR58025A) was obtained from **flag leaf clipping**, pollination through **rope pulling** and **GA3** application.
2	**Impact of varietal mixtures on yield and seed quality**	**1995-99**	•Admixture of identical varieties have no effect but **dissimilar varieties have negative** effect. •Admixture should not exceed 10%.
3	**Comparison of BS, FS, CS and farmers seed.**	**1995-99**	•Yield declined from BS to FS. •FS up to 5 yrs gave good yield, then declined.

Project 04: Seed Technology Packages		2015
Experiments/ Activities		Year of Initiation
1	Storage potential of BRRI developed HYV, hybrid seeds and their parental lines	2015
2	Publication on seed production technology package	2018
3	Digital rice herbarium	2020
4	Effect of regional variation of weather parameters, cultural management, post-harvest processing and seed storage on seed quality of BRRI dhan89	2021

7. Transformation of Storage Facilities of Germplasm

Hasanuzzaman Hall

Former modern short- and medium-term genebank

New GRS Office Building

BRRI new long-term genebank

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8. Transforming events of Breeder seed production and distribution system

- After the notification of the Seed Rules 1998 of Bangladesh, with the provision to produce foundation seed (FS), the distribution of breeder seed (BS) to NGOs and the Private Sector (PS) began.
- ASSP (Agricultural Support Service Project) from 1994-98.
- The Breeder Seed Unit (BSU) established in 1998 by the support of ASSP.
- Then, TCTTI (Thana Cereal Technology Transfer and Identification) project during 1999-2000.

- Next, 'the increased amount of distributing breeder seed' to license holding seed dealers started by the support of the first phase of PETRRA sub-project (1999-2004) and
- The 'BRRI Rice Seed Network' established in 2004.
- Then, the 2nd and 3rd phase of PETRRA sub-project and 'Breeder seed production and maintenance of nucleus stock' projects and then 'Strengthening of breeder seed production and maintenance of nucleus stock of BRRI released varieties' project from 2006-2011.
- Finally, 'Performance and web based allotment system' for distributing breeder seed in 2017, 'Region wise distribution of breeder seed' in 2018 and 'Sending SMS to clients' in 2019 began.

9. Transformation of Breeder seed distribution system

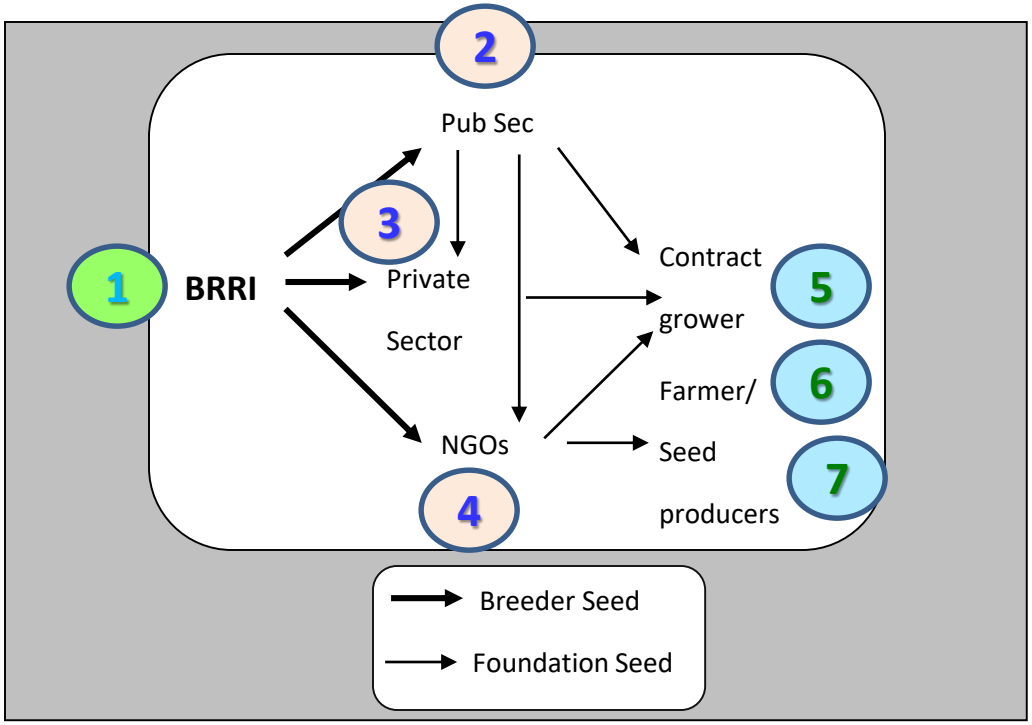


Fig. Current rice seed systems in Bangladesh

10. Transforming practices of Breeder seed production and distribution

- 'Single seedling per hill'.
- 'Panicle to row' methods.
- 'Single rice variety in a single threshing floor' at a time.
- 'Intact panicles of Nucleus seed' for producing all BS.
- 'Improved Nucleus and Breeder seed processing' system.
- Maintaining 'Isolation distance of 3 m' through 'at least 21 days gap between the flowering times within 3 meters' of two adjacent different rice varieties.
- 'Roguing of entire row', if contains any Off-type plant in NS.
- Distributing Breeder seed in 'High Quality Polythin-Cotted Bag'.
- GRSD, BRRI is mainly for Nucleus seed production.
- 'Storing no carry-over seed' in Breeder seed storage.
- Practicing 'Good Agricultural Practice (GAP)' in Breeder seed production.

11. TRANSFORMATION OF RESEARCH ACTIVITIES OF

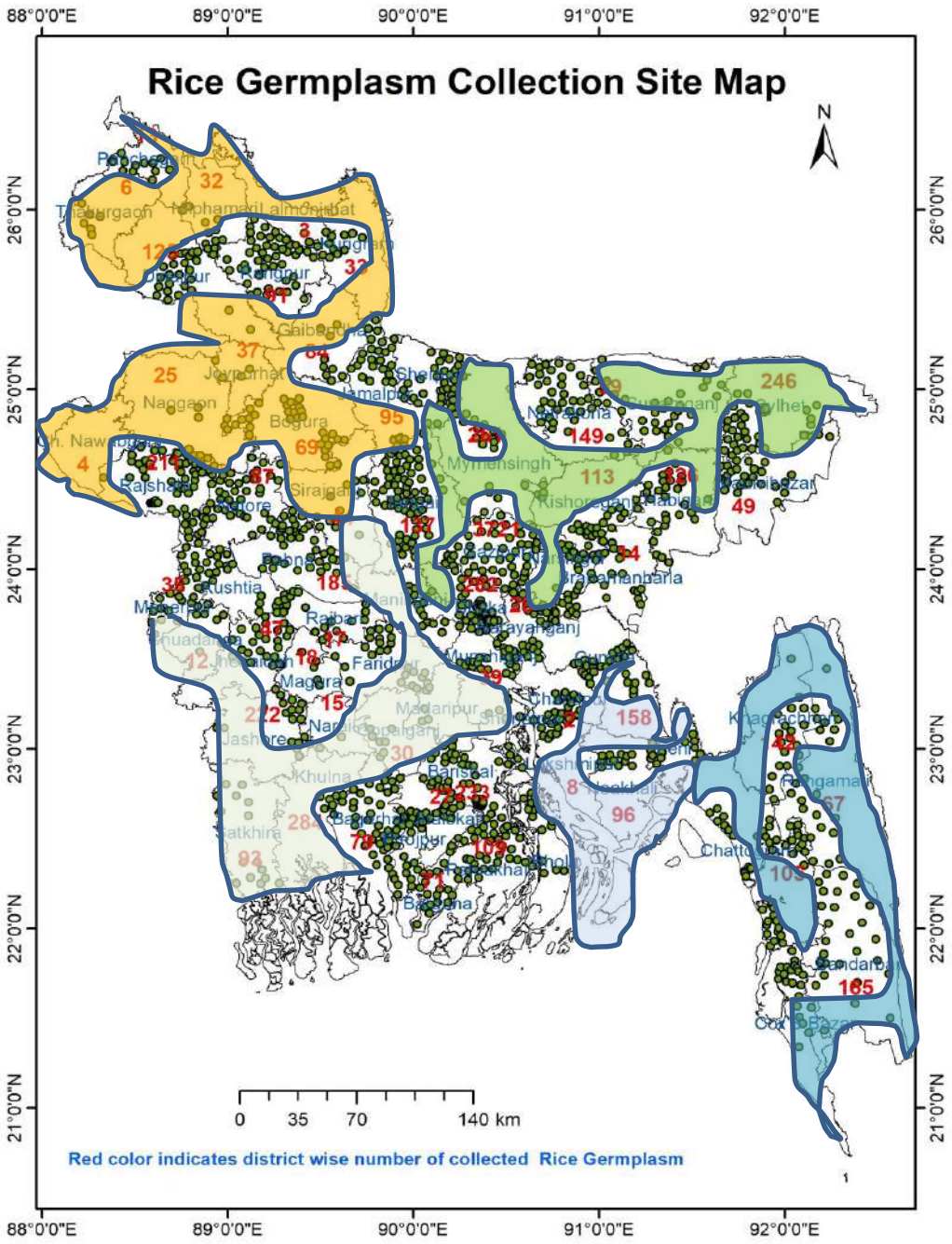
GENE BANK

a. Collection of rice germplasm

Season wise available number of rice germplasm in Bangladesh (BD) and as well as in BRRI Gene bank:

Season	Aus/ Jhum	T. Aman	B. Aman	Boro	Total	Source
Listed number of Germplasm in BD (with duplication)	3,449	3,900	3,741	1,188	12,278	Deshi Dhaner Jat*
BRRI Genebank Status	1,585	4,757	744	1,966	Acc. 1-9052	GRS Div.
Per cent	46	+100	19.9	+100	73.7	

*Source: Hamid, A.; M. Nasiruddin; M. Hoque and E. Hoque (1982). Deshi Dhaner Jat (In Bengali). (Edited) M.H.R. Talukder. Bangladesh Rice Research Institute, Dhaka (Gazipur), Bangladesh.



A grid map (dotted) of the conserved germplasm in the BRRI Genebank, based on GPS co-ordinates of the collection sites.

The super imposed areas (5) are the hot spots of new collection.

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Progress of germplasm registration

BRRI Acc. No.	Name of Germplasm	Date of Collection
63	Hasha Kumira	21 Jan., 1974
1000	Dudh Kolom	10 Dec., 1973
2000	Lal-malsi	27 Dec., 1977
3000	Cylindrical TAPL -613	10 Dec., 1982
4000	Bachi Boro	24 Dec., 1986
5000	Hiday	June, 2001
6000	Sotam	5 Sep., 2005
7063	Sugandi Dhan	7 Jan., 2009
7999	Unknown	15 Sep., 2013
8659	Nerica 1	10 Nov., 2021
8998	Babu Katari	14 Nov., 2022

Summary

Acc. 1 to 4978 were collected by the first 27 years from 1974 to 2000

Acc. 4979 to 8998 are collected by the next 22 years from 2001 to 2022

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Germplasm Collection

1

2

3

4

5

6

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Germplasm Collection

7

8

9

10

11

12

13

14

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b. Storage facilities of BRRI Genebank

Short-term storage

Type: Walking (90 m^2)
Temperature: 20 to 22°C
Capacity: 15,000 accessions
Seed moisture: around 10%
Packing: Brown paper bags
Amount: 150 g seeds per acc.
Stored: Glass jars, silica gel
Seed viability: more than 80%
Seed longevity: 3 to 5 years.

Medium-term storage

Type: Walking type
Temperature: 0 to 5°C
Capacity: 10,000 accessions
Seed moisture: 8-10%
Packing: Laminated aluminum foils
Amount: 50 g seeds per acc.
Stored: Air tight glass jars, silica gel
Seed longevity: 15 to 20 years.

long-term storage

Type: Walking (225 sqf)
Temperature: -20 ± 1°C
Capacity: 22,000 packets
Seed moisture: less than 8%
Packing: Laminated aluminum foils
Amount: Same as medium-term
Stored: Air tight glass jars, silica gel
Seed longevity: 50 to 100 years.

c. Ex-situ net-house conservation of wild rice

Type: *Ex-situ* field conservation
Species: Wild rice
Number of species: 11
Number of samples: more than 90
Stored: One sample per pot.

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d. Present status of BRRI Genebank

	Category of germplasm (variety/line)	Number of accession stored
1	Indigenous *indica* (local)	5,498
2	Indigenous *indica* (pure line)	861
3	Local *indica* varieties and breeding lines	834
4	Exotic *indica* (IRRI, China, USA, Turkey etc.)	1,675
5	*Japonica* (Korea, Japan, Taiwan, N. China)	111
6	Wild rice (4 species)	47
7	Unknown	26
	Total	9,052

e. Step by step progress of registration of germplasm in genebank

Acc. No.	Germplasm Name	Upazila	District/ Division	Season	Date of collection
01	Atlai (Da-10 Gs517)	-	Dhaka	Aus	-
63	Hasha Kumira	Shivalaya	Dhaka	Aus	21/01/1974
1000	Dudh Kolom	Dunuria	Khulna	T. Aman	10/12/1973
2000	Lal-Malsi	Modhupur	Mymansingh	T. Aman	27/12/1977
3000	Cylindrical TAPL-613	PB Div., BRRI	Gazipur	T. Aman	10/12/1982
4000	Bachi Boro	Baniachang	Habigonj	Boro	24/12/1986
5000	Hiday	Pabna	Pabna	B. Aman	June, 2001
6000	Sotam	Rajior	Madaripur	B. Aman	05/09/2005
7063	Sugandi Dhan	Gomostapur	Chapainowabgong	T.Aman	07/01/2009
7999	Unknown	Mirjagonj	Patuakhali	T. Aman	15/09/2013
8998	Babu Katari	Joypurhat	Rangpur	Boro	14/11/2022
9052	BR11727-4R-6	PBD, BRRI	Gazipur	Boro	14/11/2023

Step by Step Summary

BRRI acc. no. 0063 was registered in 1974
BRRI acc. no. 2000 was registered in 1977
BRRI acc. no. 3000 was registered in 1982
BRRI acc. no. 4000 was registered in 1986
BRRI acc. no. 5000 was registered in 2001

BRRI acc. no. 6000 was registered in 2005
BRRI acc. no. 7000 was registered in 2009
BRRI acc. no. 8000 was registered in 2013
BRRI acc. no. 9000 was registered in 2023

BRRI Genebank Management Activities

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Sun drying of rice germplasm in net bags in dry season

In-house Air drying of rice germplasm in net bags in the rainy season

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Rice Germplasm Drying Rack

RGA Tray for Purification of Rice Germplasm

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f. Characterization and evaluation of conserved germplasm

Experiment	Started	Status
Screening of rice germplasm against biotic and abiotic stress *viz* submergence, anaerobic, low input , allelopathic, BPH, WBPH, GLH, gallmidge, ufra, BB, ShB, bakanae, Blast etc.	1991	• Tolerant germplasm were identified and documented. • After 2013, conducted division wise.
Morphological characterization based on descriptor	1991	Acc. 1 to acc. 7500 completed during 1991 to 2008*
Morphological characterization based on unified descriptor	2018	Acc. 7501 to acc. 8759* completed during 2009 to 2020
Molecular characterization	2009	1200 germplasm completed by SSR markers

***Few still uncompleted**

Progress of Morphological characterization of conserved germplasm in BRRI Genebank

Acc. Number	Number of characterized* germplasm	Number of germplasm not yet characterized	Per cent germplasm not yet characterized
1-1000	844	156	15.6
1001-2000	600	400	40
2001-3000	971	29	2.9
3001-4000	887	113	11.3
4001-5000	911	89	8.9
5001-6000	969	31	3.1
6001-7000	749	251	25.1
7001-8000	333	667	66.7
8001-9000	109	891	89.1
9001-9052	0	51	0.51
Total	6373	2678	29.5

*with filled up 'Germplasm Descriptor Form (2018)' of GRS Division having a total of 53 morpho-agronomic characters (20 quantitative + 33 qualitative traits).

Morphological characterization of germplasm

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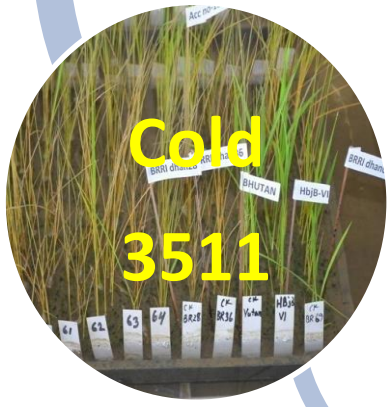
Morphological characterization of germplasm

Identification of climate resilient donor parents



Summary of screened 9052 Genebank accessions against different abiotic stresses

Molecular laboratory of GRS Division

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g. Molecular characterization of germplasm

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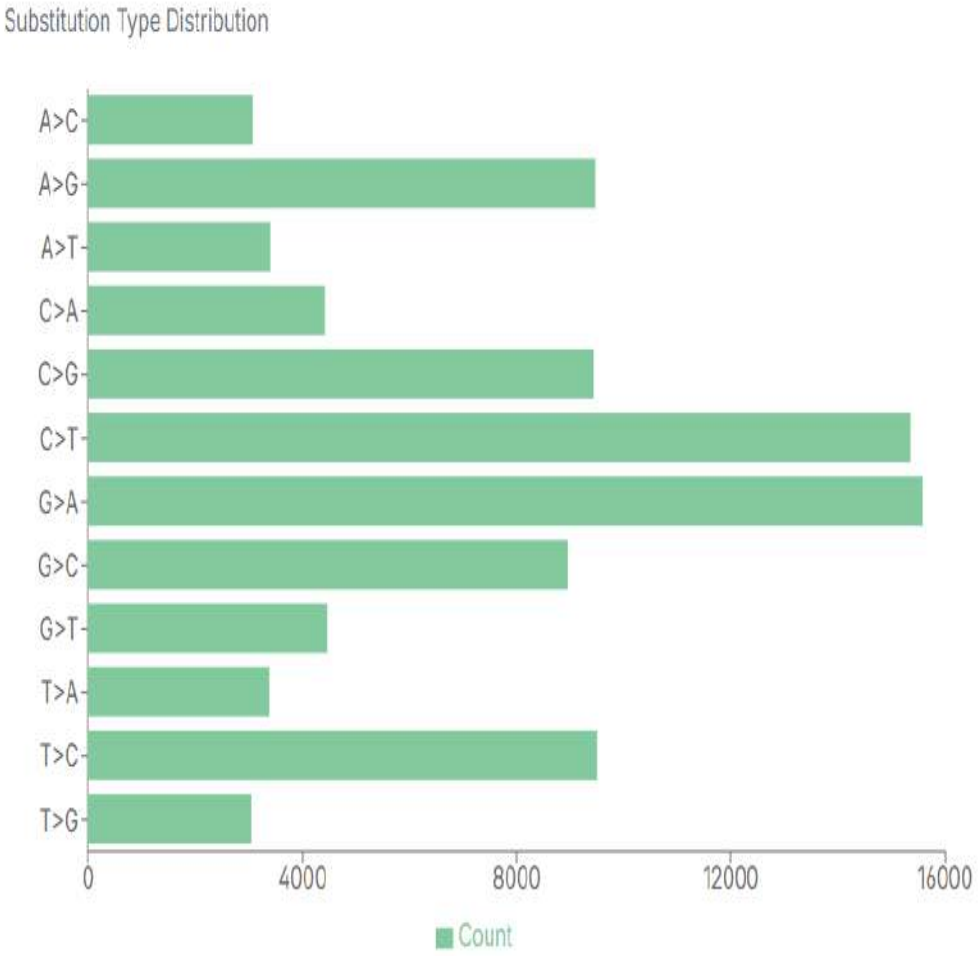
Purification and duplicate sorting of BRRI Genebank accessions through GBS profiling

Genotyping Results Summary

Number of Samples	1705
Number of Records	96228
Number of No-ALTs	0
Number of SNPs	86044
Number of MNPs	0
Number of Indels	10184
Number of Others	0
Number of Multiallelic Sites	7385
Number of Multiallelic SNP Sites	4036



Sequencing summary (approx 20X depth)

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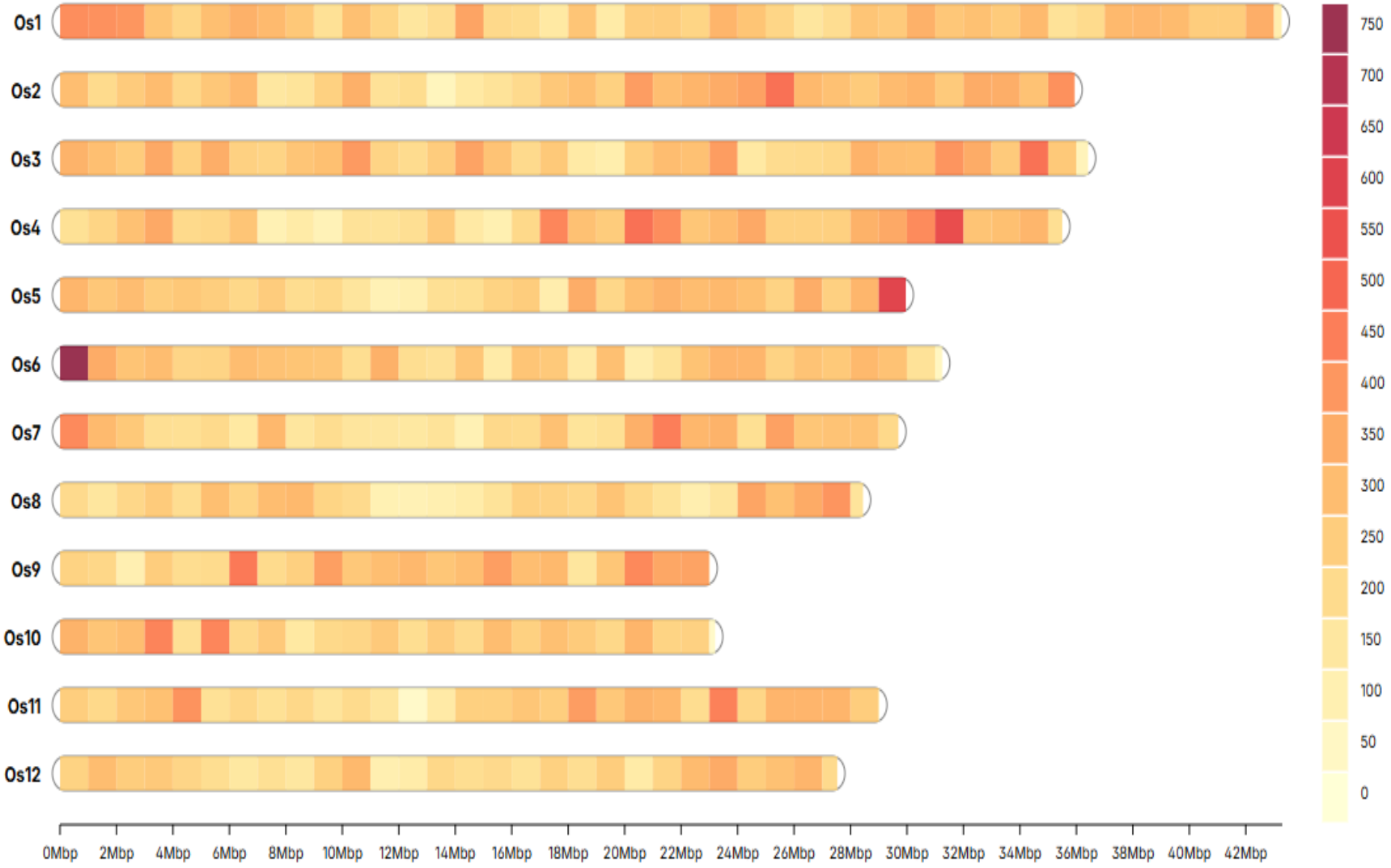
SNP coverage across the genome



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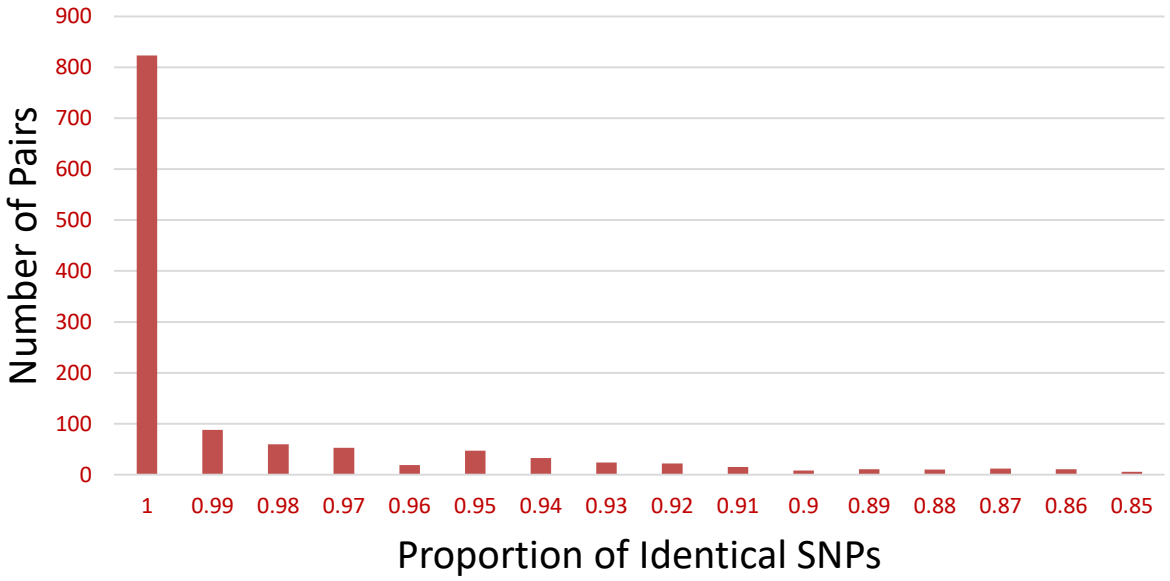
Identification of homogenous germplasm using the correlations among the four samples GBS Data of each accession (2nd batch)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	SampleName	R1	R2	R3	R4		Sample Name	Homo-Ref SNPs	Homo-NonRef SNPs	Het SNPs	Transitions	Transversions	InDels	verage Depth		
808	GB23-202_3	NaN	NaN	1.00	1.00		GB23-202_3	43,344	29,641	13,573	22,831	20,383	5,350	31.5		GB23-2
809	GB23-202_4	NaN	NaN	NaN	1.00		GB23-202_4	45,021	29,568	13,018	22,991	19,595	5,326	45.8		GB23-2
810	GB23-203_1	1.00	1.00	1.00	1.00		GB23-203_1	44,113	29,482	13,527	22,339	20,670	5,084	44		GB23-2
811	GB23-203_2	NaN	1.00	1.00	1.00		GB23-203_2	44,826	29,381	13,343	22,380	20,344	5,060	52.9		GB23-2
812	GB23-203_3	NaN	NaN	1.00	1.00		GB23-203_3	44,173	29,711	13,084	22,330	20,465	5,101	40		GB23-2
813	GB23-203_4	NaN	NaN	NaN	1.00		GB23-203_4	44,717	29,363	13,335	22,358	20,340	5,087	47.2		GB23-2
814	GB23-204_1	1.00	0.99	0.99	0.99		GB23-204_1	43,326	29,262	15,175	23,231	21,206	5,321	35.7		GB23-2
815	GB23-204_2	NaN	1.00	0.99	0.99		GB23-204_2	43,848	30,464	13,071	22,646	20,889	5,253	41.8		GB23-2
816	GB23-204_3	NaN	NaN	1.00	1.00		GB23-204_3	44,221	29,860	13,174	22,472	20,562	5,208	44.1		GB23-2
817	GB23-204_4	NaN	NaN	NaN	1.00		GB23-204_4	43,468	30,264	13,352	22,587	21,029	5,227	33.9		GB23-2
818	GB23-205_1	1.00	0.90	1.00	1.00		GB23-205_1	43,692	30,224	13,251	22,838	20,637	5,258	24.2		GB23-2
819	GB23-205_2	NaN	1.00	0.90	0.90		GB23-205_2	38,741	23,236	26,099	27,272	22,063	6,133	42.1		GB23-2
820	GB23-205_3	NaN	NaN	1.00	1.00		GB23-205_3	44,633	29,721	12,073	22,663	19,131	5,301	17.1		GB23-2
821	GB23-205_4	NaN	NaN	NaN	1.00		GB23-205_4	44,755	29,946	13,630	23,112	20,464	5,249	42.9		GB23-2
822	GB23-206_1	1.00	1.00	1.00			GB23-206_1	43,711	30,395	13,739	23,270	20,864	5,254	43.1		GB23-2
823	GB23-206_3	NaN	1.00	1.00			GB23-206_3	45,305	31,306	11,633	23,351	19,588	5,246	83.5		GB23-2
824	GB23-206_4	NaN	NaN	1.00			GB23-206_4	43,296	30,613	13,881	23,252	21,242	5,258	41.1		GB23-2
825																

SNPs | Sequencing | +

206 acc*4=804 plant samples

(2nd batch)



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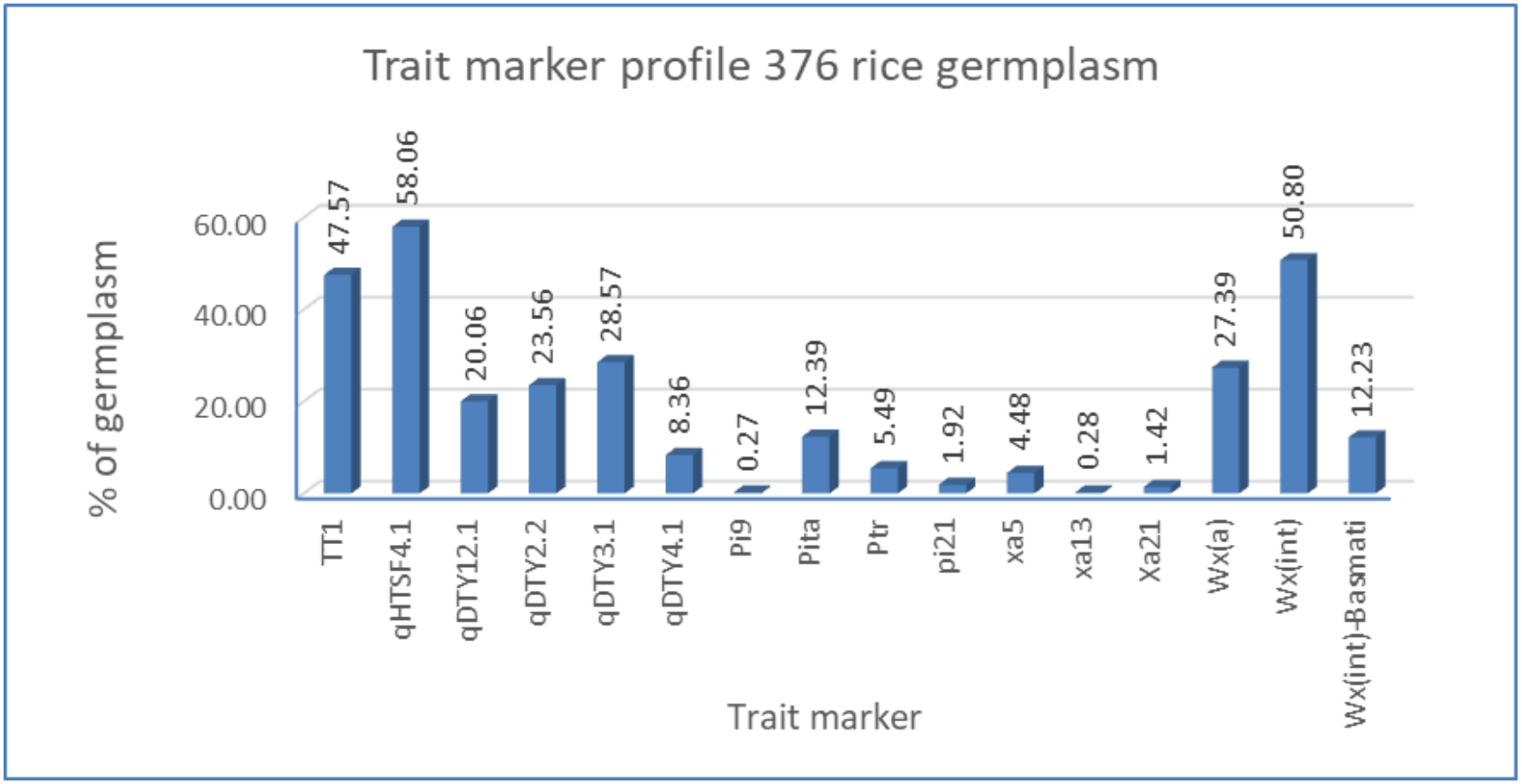
Trait profiling of rice genebank accessions using trait-based SNP markers



Trait profiling of rice BRRI Genebank accessions using trait-based SNP markers

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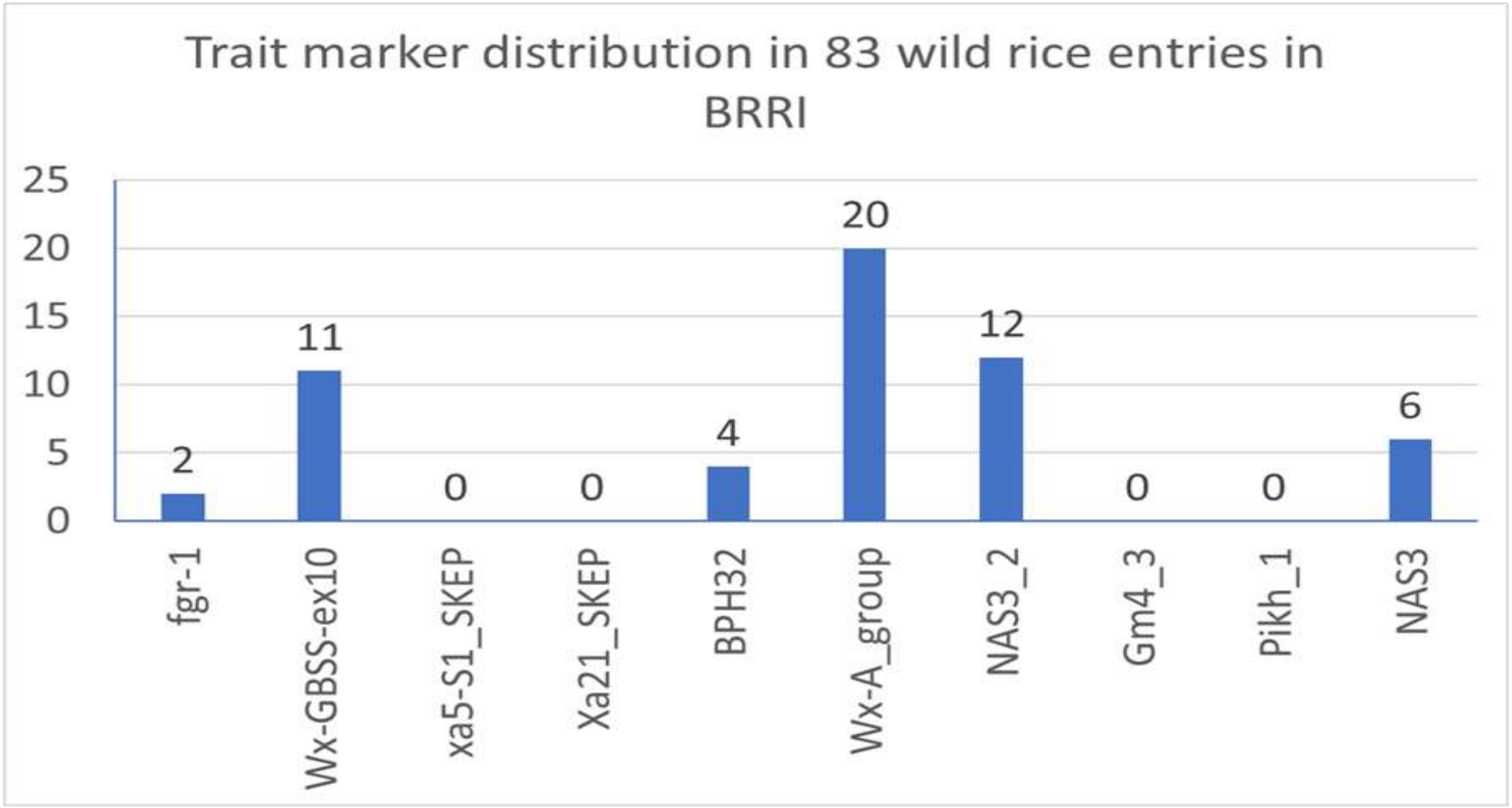
Morphological and molecular characterization of wild rice accessions



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Growing science for food security

Morphological and molecular characterization of wild rice accessions

WR_Sl Haplotype SNP Loci

17 Hap1 G:GG:AC:CT:C C:C C:CG:GG:GUncallableC:T T:T G:GG:A? A:AA:GG:CG:GA:AT:T C:C T:T G:AG:G

29 Hap2 G:GG:AC:CT:C C:C C:CG:GG:GUncallableC:T T:T G:GG:AG:GA:AA:GG:CG:GA:AT:T C:C T:T G:AG:G

17 *Oryza nivara* | 29 *Oryza rufipogon*

WR_Sl Haplotype SNP Loci

83 Hap1 A:AA:AC:CT:TT:TA:A? G:GA:AC:CT:TA:AA:AG:GA:AA:A G:GA:A G:GC:CC:CT:TG:GT:T

85 Hap2 A:AA:AC:CT:TT:TA:AA:AG:GA:AC:CT:TA:AA:AG:GA:AUncallableG:GUncallableG:GC:CC:CT:TG:GT:T

83 *Oryza rufipogon* | 85 *Oryza rufipogon*

Growing science for food security

h. Monitoring viability of stored germplasm

Short-term storage

Medium-term storage

Medium term storage

Short term storge

Mid and Long Term Storage

i. Supply of germplasm

List of distributed number of germplasm from BRRI Gene bank

Year	No. of varieties/ samples supplied	Year	No. of varieties/ samples supplied
2010-11	1050	2018-19	2268
2011-12	6495	2019-20	1910
2012-13	0617	2020-21	1545
2013-14	0790	2021-22	2399
2014-15	1192	2022-23	2778
2015-16	1523	2023-24	3872
2016-17	2315	2024-25	2748
2017-18	1137		
Grand total of last 15 years			32,639

BRRI web based application Form for BRRI Genebank germplasm

Bangladesh Rice Research Institute
Gazipur-1701
Tel. No. PABX: +88-02-49272005-14 Fax No. +88-02-49272000
E-Mail: brrihq@yahoo.com, dg@brri.gov.bd

REQUEST FORM FOR RICE GERMPLASM

The following germplasm are needed for research purposes

Name of varieties
Season
Number of germplasm needed
Specific character of the variety

I intend to utilize the germplasm: in breeding program, characterization, detailed evaluation for biotic or abiotic stresses or any other study (please specify)

_____
_____
_____
_____

Title of Research

Place where the research will be conducted _____

I shall provide the research result and genetic information of the supplied germplasm with electronic and printed material. I shall abide by the terms and conditions as specified by BRRI.

Name_____
Designation/Status/Post_____
Department (Institute/Organization)_____
Address_____
_____
Cell_____ Email_____

Signature _____
Date_____

Submit to the Office of the Director General, BRRI, Gazipur 1701

Use separate sheet if needed

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j. Milestones of utilization of germplasm

Variety	Parentage	Season	Year
BR3	IR508-133-1/Latisail	Aus, T. Aman & Boro	1973
BR5	Badshabhog/Hbj. B. II (natural cross)	T. Aman	1976
BR22	BR51-46-5/Nizersail	T. Aman	1988
BR23	BR4/DA-29	T.Aman	1988
BR25	IR26/Pajam II	T.Aman	1992
BRRI dhan28	BR6 (IR28)/Purbachi	Boro	1994
BRRI dhan31	BR11/ARC 10550	T.Aman	1994
BRRI dhan34	A local germplasm selection (Khaskani)	T.Aman	1997
BRRI dhan37	Bashmati (D)/ BR5	T.Aman	1998
BRRI dhan38	Bashmati (D)/ BR5	T.Aman	1998
BRRI dhan46	BR11/Shawrnalota/ARC14766	T. Aman	2007
BRRI dhan51	Swarna/IR49830-7-1-2-3	T.Aman	2010
BRRI dhan55	IR64/ *Oryza rufipogon*	Boro, Aus	2011
BRRI dhan62	Zirakatari/BRRI dhan39	T. Aman	2013
BRRI dhan81	Amol-3/ BRRI dhan28	T. Aman	2017
BRRI dhan82	Nerica-10 pure line	T. Aus	2017
BRRI dhan87	BRRI dhan29/ *Oryza rufipogon*	T. Aman	2018
BRRI dhan89	BRRI dhan29/ *Oryza rufipogon*	Boro	2018
BRRI dhan96	BRRI dhan28/ *Oryza rufipogon*	Boro	2020
BRRI dhan103	BRRI dhan29/ FL378	T. Aman	2022
BRRI dhan111	Tilockkachari/ BRRI dhan41	T. Aman	2025
BRRI dhan113	BRRI dhan29/ Hbj.B.VI (Poshurshail)	Boro	2025

k. BRRI Genebank visit


RICE GENETIC
RESOURCES OF
BANGLADESH
PLEASE SAVE US !!


RICE GENEBANK AND
SEED LABORATORY


RICE GENEBANK AND
SEED LABORATORY


RICE GENEBANK AND
SEED LABORATORY

BRRI web based application Form for BRRI Genebank Visit

কৃষিই সমৃদ্ধি

বাংলাদেশ ধান গবেষণা ইনস্টিটিউট, গাজীপুর

Bangladesh Rice Research Institute, Gazipur

Phone: PABX-880-2-9294117-21, 9264118, 9264127, 9264154, 9264165, **Fax:** 880-2-9261110
E-mail: dg@brri.gov.bd; brrihq@yahoo.com, **Website:** www.brri.gov.bd

বাংলা-
তারিখঃ ________
খ্রিস্টাব্দ-

বাংলাদেশ ধান গবেষণা ইনস্টিটিউট (ব্রি)
পরিদর্শনের জন্য আবেদন ফরম ঃ

বরাবর
মহাপরিচালক
বাংলাদেশ ধান গবেষণা ইনস্টিটিউট (ব্রি)
গাজীপুর-১৭০১।

বিষয় ঃ ব্রি পরিদর্শনের অনুমতি প্রদানের আবেদন।

১। দল/প্রতিষ্ঠানের নাম ও ঠিকানা ঃ ....
....
....

২। পরিদর্শনকারীর ধরণ (সরকারি কর্মকর্তা/শিক্ষার্থী/শিক্ষক/গবেষক/অধ্যাপক/বিশেষজ্ঞ/কৃষিকর্মকর্তা/উপ-সহকারী কৃষি কর্মকর্তা/এনজিও প্রতিনিধি/ কৃষক প্রতিনিধি/অন্যান্য) ঃ ....

৩। পরিদর্শনকারীর সংখ্যা ঃ .... (জন)

৪। পরিদর্শনের তারিখ ও সময় ঃ সকাল/বিকাল ....তারিখ ....

৫। প্রতিষ্ঠান প্রধান/দলনেতার নাম ঃ ....

৬। পদবী ঃ ....

৭। যোগাযোগের ঠিকানা ঃ ....

৮। ফোন (ল্যান্ড ও মোবাইল) নম্বর ঃ ....

৯। ই-মেইল ঃ ....

....
(আবেদনকারীর নাম, স্বাক্ষর ও তারিখ)

বি.দ্র: পূর্ব অনুমতির জন্য আবেদনটি অবশ্যই পরিদর্শনের তারিখের ০৫ (পাঁচ) কার্যদিবস পূর্বে ডাকযোগে এবং ফ্যাক্স/নিম্নের ই-মেইল ঠিকানাসমূহে প্রেরণের মাধ্যমে জমা দিতে হবে (আবেদন ফরম ব্রির ওয়েবসাইট www.brri.gov.bd হতে ডাউনলোড করা যাবে। ই-মেইল: dg@brri.gov.bd; da@brri.gov.bd; dr@brri.gov.bd; head.stat@brri.gov.bd; system.analyst@brri.gov.bd; seniorliaisonofficer@brri.gov.bd;

Growing science for food security

12. Important transforming Projects for Germplasm Conservation of GRSD since 1971

Sl. no.	Project name
1	A modern short- and medium-term Gene bank along with two-storey 'Hananujaman hall' with germplasm processing facilities with the help of the Japanese International Cooperation Agency (JICA) in 1985
2	Rice diversity and production in the Southwest of Bangladesh: Using Diversity and Local Knowledge to create sustainable livelihoods in the coastal Area of Bangladesh (SP 2202)
3	Identification of rice varieties for water logged situation in south west of Bangladesh
4	A full-fledged long-term Gene bank with GoB funding in 2007

Diversity of Landraces in Bangladesh

13. TRANSFORMATION OF ACTIVITIES OF

BREEDER SEED UNIT (BSU)

a. Nucleus seed production and variety maintenance

Panicle

row

‘Panicle to row’ method is used for producing nucleus seed

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Nucleus seed production and variety maintenance

Season	Type	Number	Variety
T. Aman	MV	60	BR4, BR5, BR10, BR11, BR21, BR22, BR23, BR24, BR25, BRRI dhan27, BRRI dhan30, BRRI dhan31, BRRI dhan32, BRRI dhan33, BRRI dhan34, BRRI dhan37, BRRI dhan38, BRRI dhan39, BRRI dhan40, BRRI dhan41, BRRI dhan42, BRRI dhan43, BRRI dhan44, BRRI dhan46, BRRI dhan48, BRRI dhan49, BRRI dhan51, BRRI dhan52, BRRI dhan53, BRRI dhan54, BRRI dhan56, BRRI dhan57, BRRI dhan62, BRRI dhan66, BRRI dhan70, BRRI dhan71, BRRI dhan72, BRRI dhan73, BRRI dhan75, BRRI dhan76, BRRI dhan77, BRRI dhan78, BRRI dhan79, BRRI dhan80, BRRI dhan82, BRRI dhan83, BRRI dhan85, BRRI dhan87, BRRI dhan90, BRRI dhan91, BRRI dhan93, BRRI dhan94, BRRI dhan95, BRRI dhan98, BRRI dhan103, BRRI dhan106, BRRI dhan109, BRRI dhan110, BRRI dhan111, **BRRI dhan112**.
	LIV	10	Nizersail, Latisail, Rajasail, Kalijira, Kataribhog, Basmati-D, Patnai23, Tilockkachari, DA29, DA31
Boro	MV	53	BR1, BR2, BR3, BR6, BR7, BR8, BR9, BR12, BR14, BR15, BR16, BR17, BR18, BR19, BR26, BRRI dhan28, BRRI dhan29, BRRI dhan35, BRRI dhan36, BRRI dhan45, BRRI dhan47, BRRI dhan50, BRRI dhan55, BRRI dhan58, BRRI dhan59, BRRI dhan60, BRRI dhan61, BRRI dhan63, BRRI dhan64, BRRI dhan65, BRRI dhan67, BRRI dhan68, BRRI dhan69, BRRI dhan74, BRRI dhan81, BRRI dhan84, BRRI dhan86, BRRI dhan88, BRRI dhan89, BRRI dhan92, BRRI dhan96, BRRI dhan97, BRRI dhan98, BRRI dhan99, BRRI dhan100, BRRI dhan101, BRRI dhan102, BRRI dhan104, BRRI dhan105, BRRI dhan107, BRRI dhan108, BRRI dhan113, **BRRI dhan114**.
	LIV	8	Hbj Boro II, Hbj Boro IV, Hbj Boro VI, Hbj Boro VIII, Purbachi, IR8, IR20, IR64
Total		131	

Head to row for Nucleus seed production and variety maintenance

Nucleus Seed production plot

Roguing of 'Nucleus Seed Stock' plot

Intact panicle of Nucleus Seed Stock

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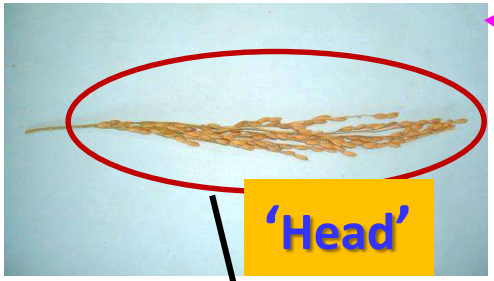
b. Breeder seed production

'Head to row' method is used for producing nucleus stock

'seed'



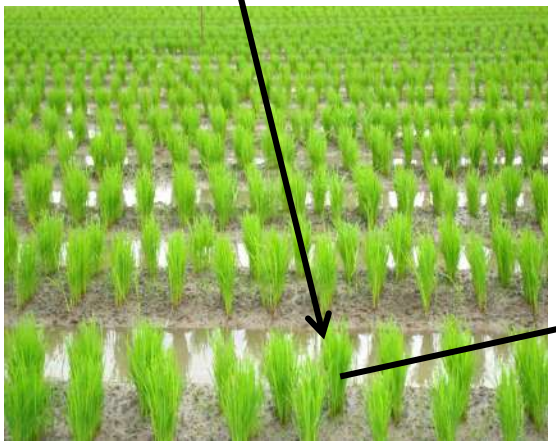
'Head'

2 Selection of panicles

Selection of 'true to type' plants

3

Rest of the plot harvested as BS



'Row'

1 Rouging of full row, if with off type plant(s)

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Important practices for Breeder seed production by GRS

- 'Single seedling per hill'.
- 'Panicle to row' methods.
- 'Single rice variety in a single threshing floor' at a time.
- 'Intact panicles of Nucleus seed' for producing all BS.
- 'Improved Nucleus and Breeder seed processing' system.
- Maintaining 'Isolation distance of 3 m' through 'at least 21 days gap between the flowering times within 3 meters' of two adjacent different rice varieties.
- 'Roguing of entire row', if contains any Off-type plant in NS.
- Distributing Breeder seed in 'High Quality Polythin-Cotted Bag'.
- GRSD, BRRI is mainly for Nucleus seed production.
- 'Storing no carry-over seed' in Breeder seed storage.
- Practicing 'Good Agricultural Practice (GAP)' in BS production.

Drying of Nucleus seed panicles for Breeder seed production

More than **80 thousand panicles** of 45 T. Aman varieties and more than **3.4 lakh panicles** of 26 Boro varieties were distributed to **11 RS** to produce BS during 2022-23

Sowing of Nucleus seed panicles for Breeder seed production

c. Head to row method

Sowing of intact panicles

Transplanting of a complete row from seedlings of a single panicle

Current breeder seed production technology of GRSD

Off-type free Breeder seed plot

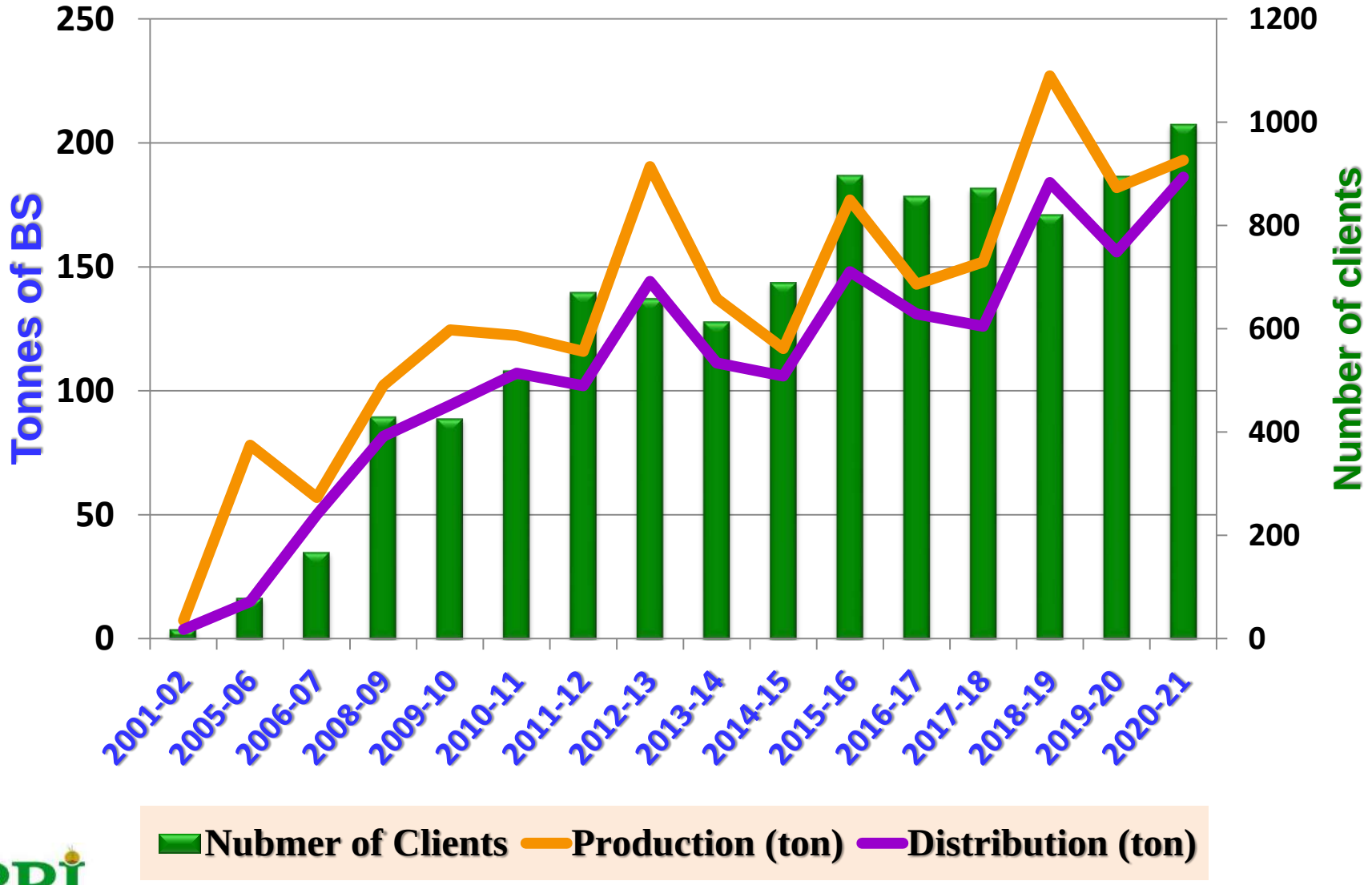
d. Step-by-Step progress of Breeder seed production since 1971

Year	Number of variety	Production (Ton)	Distribution (Ton)	Number of client
1971	0	0	0	0
1980-81	31	2	0	0
1990-91	30	5.4	5	1
1997-98	33	4.22	0.697	2
1998-99	33	3.69	2	2
1999-00	24	2.80	1.19	4
2005-06	30	77.93	15.46	82
2010-11	34	124.27	107.14	752
2015-16	55	177.71	149.94	1172
2020-21	53	193.03	186.212	996
2021-22	65	218.72	198.994	718
2022-23	71	273.86	183.572	691
2023-24	66	294.07	249.08	645
2024-25	**71**	**232.47**	**196.33**	**662**

Milestones of Breeder seed production since 1971

Year	Breeder Seed Production	Time
1973-74	Few kg	start
1980-81	2 tons	after 7 years
1994-95	exceed 10 tons	after 21 years
2004-05	exceed 50 tons	after 31 years
2007-08	exceed 100 tons	after 34 years
2013-14	exceed 150 tons	after 40 years
2020-21	exceed 190 tons	after 47 years
2021-22	exceed 218 tons	after 48 years
2022-23	exceed 273 tons	after 49 years
2023-24	exceed 294 tons	after 50 years
2024-25	exceed 232 tons	after 51 years

Scenario of Breeder seed production, distribution and number of clients during the last 20 years



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Breeder seed production and distribution activities

Production Planning meeting

1

Intact panicle sowing

2

Head to row transplanting

3

Vigorous weeding

4

BRRI
Growing science for food security

Breeder seed production and distribution activities

Weed free BS plot

5

After Roguing

6

Clean Threshing floor

7

BS lot after processing

8

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Breeder seed production and distribution activities

Sampling of BS lot

9

Sampling of BS lot

10

Sampling of BS lot

11

Truck loading of BS lot

12

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Breeder seed production and distribution activities

BS plot monitoring at Rangpur

13

BS plot monitoring at RS

14

BS plot monitoring at Rajshahi

15

BS plot monitoring at Sirajganj

16

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Breeder seed production and distribution activities

FS plot monitoring

17

FS plot monitoring at BRAC

18

FS field monitoring at BADC

19

FS monitoring meeting

20

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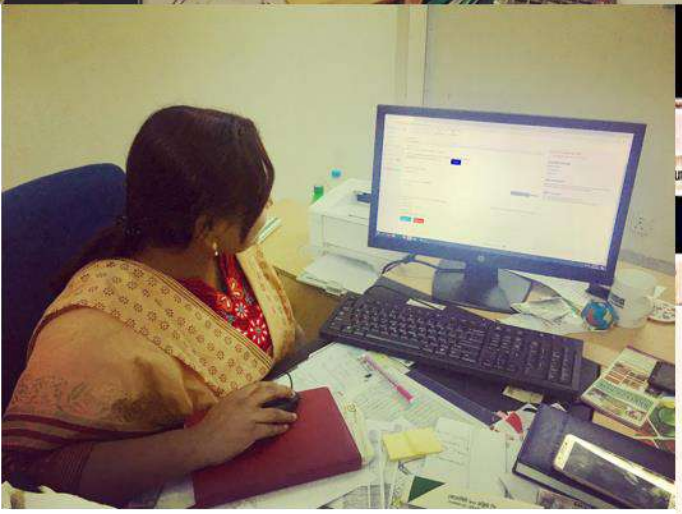
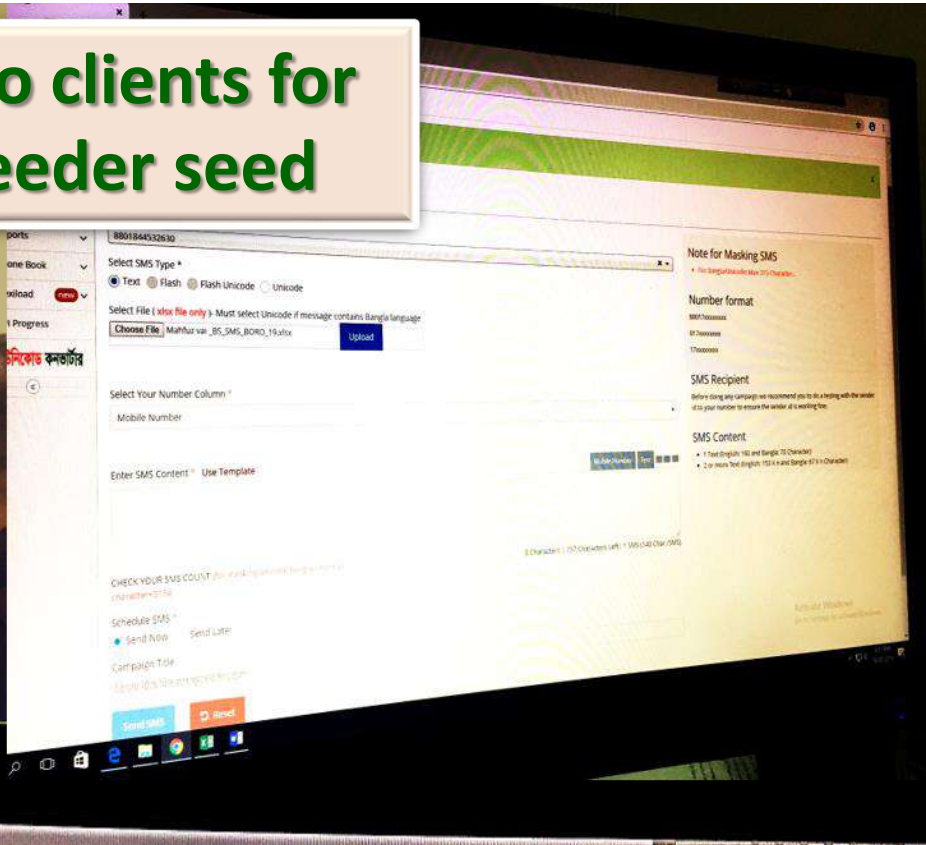
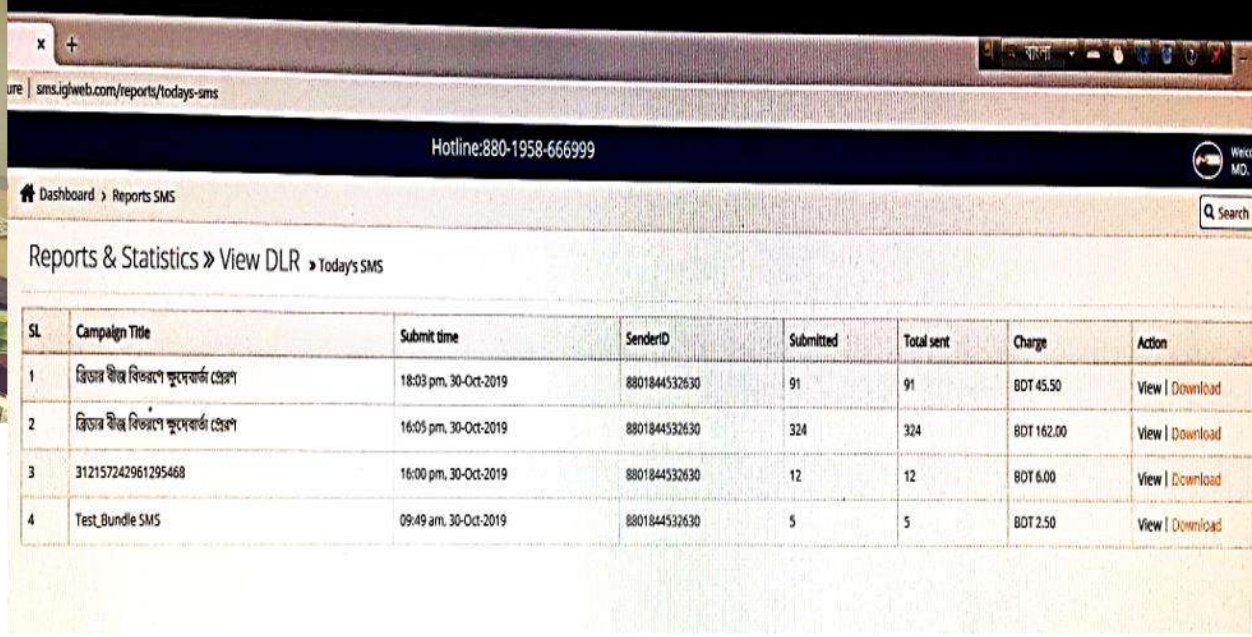
f. Sending SMS to clients for distributing Breeder seed







SL	Campaign Title	Submit time	SenderID	Submitted	Total sent	Charge	Action
1	ব্রিডার বীজ বিতরণে শুভেচ্ছা প্রেরণ	18:03 pm, 30-Oct-2019	8801844532630	91	91	BDT 45.50	View | Download
2	ব্রিডার বীজ বিতরণে শুভেচ্ছা প্রেরণ	16:05 pm, 30-Oct-2019	8801844532630	324	324	BDT 162.00	View | Download
3	312157242961295468	16:00 pm, 30-Oct-2019	8801844532630	12	12	BDT 6.00	View | Download
4	Test_Bundle SMS	09:49 am, 30-Oct-2019	8801844532630	5	5	BDT 2.50	View | Download

BRRI
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BRRI web based application Form for Breeder seed

ব্রিডার বীজ প্রাপ্তির জন্য আবেদন ফরম

প্রতিষ্ঠানের নামঃ .....
স্বত্বাধিকারীর নাম ও মোবাইল নম্বরঃ.....
বীজ ডিলারশীপ লাইসেন্স নম্বর (কৃষি মন্ত্রণালয়) .....

বরাবর,
মহাপরিচালক
বাংলাদেশ ধান গবেষণা ইনস্টিটিউট (ব্রি)
গাজীপুর-১৭০১।

বিষয়ঃ আউশ/আমন/বোরো ধানের জাতের ..... সালের ব্রিডার বীজ প্রাপ্তির জন্য আবেদন।

বিনীত নিবেদন এই যে, আপনার প্রতিষ্ঠান (BRRI) ধানের বিভিন্ন জাতের ব্রিডার বীজ উৎপাদন করে ভিত্তি বীজ উৎপাদনকারী প্রতিষ্ঠান সমূহে সরবারহ করে আসছে যা পরবর্তীতে বীজ বর্ধণের মাধ্যমে কৃষকদের মাঝে সাশ্রয়ী মূল্যে বাজারজাতকরণ ও উৎপাদনের জন্য ব্যবহৃত হয়ে আসছে। আমাদের প্রতিষ্ঠান ..... সালে প্রতিষ্ঠিত হয়েছে এবং অদ্যবধি আপনার প্রতিষ্ঠান হতে ব্রিডার বীজ সংগ্রহপূর্বক নিজস্ব নিয়ন্ত্রাধীনে মানসম্মত বীজ উৎপাদনের মাধ্যমে কৃষকদের মাঝে বাজারজাত করে আসছে। এমতাবস্থায় নিম্নলিখিত পরিমাণ ব্রিডার সীড সরবরাহ করার জন্য বিনীত অনুরোধ করছি।

ক্রমিক নং	ধানের জাতের নাম	পরিমাণ (কেজি)
মোট		

আপনার বিশ্বস্ত

.....
(নাম, স্বাক্ষর ও সীল)

সংযুক্তিঃ সীড ডিলারশীপ লাইসেন্স ও ট্রেড লাইসেন্স এর সত্যায়িত অনুলিপি।

আবেদনপত্র গ্রহণের সময়সীমাঃ বোরো আবেদনের শেষ তারিখঃ প্রতি বছরের ১৫ অক্টোবর; আমনঃ প্রতি বছরের ১৫ মে ও আউশঃ প্রতি বছরের ২৮ ফেব্রুয়ারি।

BRRI
Growing science for food security

Production and distribution (1-6) of Breeder seed for Foundation seed producing seed dealers, 2024-25

Season	Production		Distribution		
	Quantity (Ton)	Variety	Quantity (Ton)	Variety	Number of Clients
Boro 2024-25	154.54	27	120.67	27	649
Aus 2024-25	14.84	09	14.19	07	39
T. Aman 2024-25	63.09	35	61.18	35	400

1. Copy of Trading license
2. Copy of Seed dealers license
3. Copy of Field and Seed certificates from SCA
4. Application with mobile number in BRRI web based Form
5. Bank payment receipt.
6. BRRI payment receipt.

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14. Important transforming Projects of Breeder seed Production and distribution of GRSD since 1971

ASSP (Agricultural Support Service Project) during 1994-98
TCTTI (Thana Cereal Technology Transfer and Identification) during 1999-00
sub-project of PETRRA (Breeder seed production and distribution-an improved uptake pathway sub-project of PETRRA) during 1999-2004
Sustainable Rice Seed Network in 2004
Breeder seed production and maintenance of nucleus stock.
Strengthening of Breeder seed production and maintenance of nucleus stock of BRRI released varieties.

Farmer's Training on Seed Production

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15. Man Power status of GRSD since 1991

Scientist

Post	Number of post				
	1991-92	2000-01	2009-10	2022-23	2024-25
CSO (Chief Scientific Officer)	1	1	1	1+1	1
PSO (Principal Scientific Officer)	1	1	1	1	0
SSO (Senior Scientific Officer)	2	2	2	4	8
SO (Scientific Officer)	2	2	5	5	2
Total	**6**	**6**	**9**	**11 +1**	11
Degree	**Number**				
PhD	1	1	2	7	7
MS	3	3	7	3	3
B. Sc. Ag (Hons)	2	2	0	1	1
Total	**6**	**6**	**9**	**11**	**11**

Manager/ Scientific Assistant / Staff

Post	Number of post					
	1991-92	2000-01	2009-10	2020-21	2022-23	2024-25
FM (Farm Manager)				1		1
SSA/SA (Scientific Assistant)	4	4	3	4	4	4
SA (Seed Analyst)		1				
SO (Store Officer)					1	1
Stenotypist	1					
UDA				1		
Gene Bank Technician (GT)			1	1	1	1
Laboratory Assistant (LA)	1	1		1	1	1
Total	**6**	**6**	**4**	**8**	**7**	**8**

16. Few Important Books/Reports

1.Utilization of rice diversity through participatory variety selection in Southwest Bangladesh in *Proceedings of the workshop on Coastal Water Management and Uptake Technologies*.

2. Rice diversity Evaluation and Utilization in Southwest of Bangladesh in Proceeding of the workshop on Technology Development.

3.Responding to demand with a rice seed network in Bangladesh in Proceedings of the workshop on Technology uptake pathway under PETRRA.

4.Completion report of the project on "Rice diversity and production in the Southwest of Bangladesh: Using Diversity and Local Knowledge to create sustainable livelihoods in the coastal Area of Bangladesh".

5.Final Evaluation report on Rice diversity and production in the Southwest of Bangladesh: Using Diversity and Local Knowledge to create sustainable livelihoods in the coastal Area of Bangladesh.

6.Completion report of the project on "Sustainable Rice Seed Network."
7.Passport data and physico-chemical properties of rice varieties in the Southwest of Bangladesh.
8.Completion report of the project on "Identification of rice varieties for water logged situation in south west of Bangladesh" etc.

17. Few Important Bulletins/Leaflets

1.Khalequzzaman, M, MS Ahmed, ESMH Rashid and SH Habib. 2004. Booklet on Quality seed production and preservation techniques of BRRI developed Rice varieties. (*In: Bengali*). Edited by Bashar, M.K. Published by Genetic Resources and Seed Division, Bangladesh Rice Research Institute in July 2004. 32p.

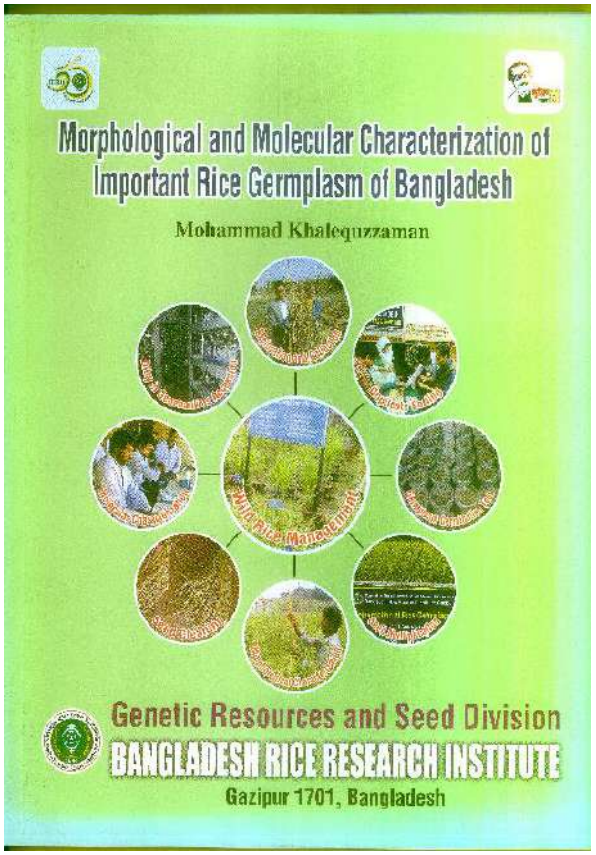
2.Khalequzzaman, M, MS Ahmed, ESMH Rashid and SH Habib. 2004. Booklet on Suitable rice seed production and preservation techniques in Southwest of Bangladesh. (*In: Bengali*). Edited by Bashar, M.K. Published by Genetic Resources a nd Seed Division, Bangladesh Rice Research Institute in July 2004. 18p.

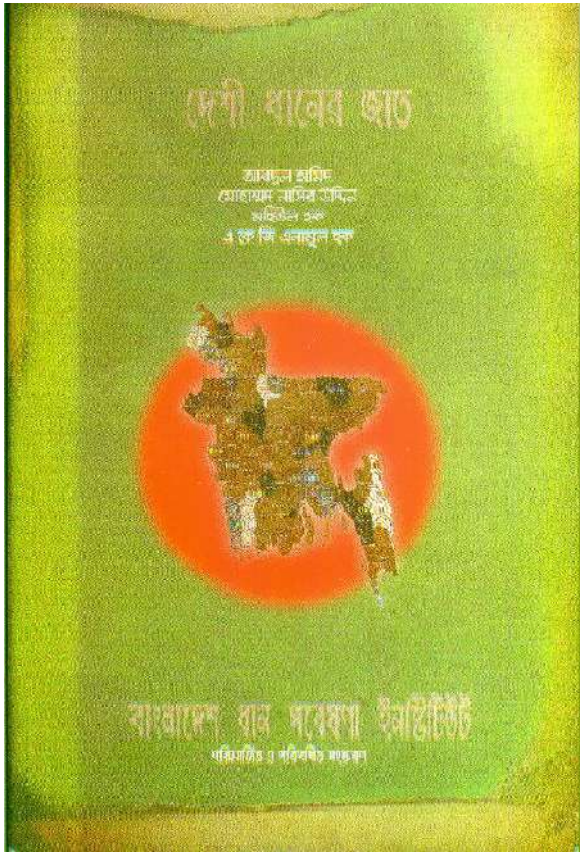
3.Ahmed, MS, ESMH Rashid, M Khalequzzaman, and MK Bashar. 2008. Bulletin on quality seed production and preservation techniques of BRRI developed rice variety. (*In: Bengali*). Published by Genetic Resources and Seed Division, Bangladesh Rice Research Institute in June 2008.

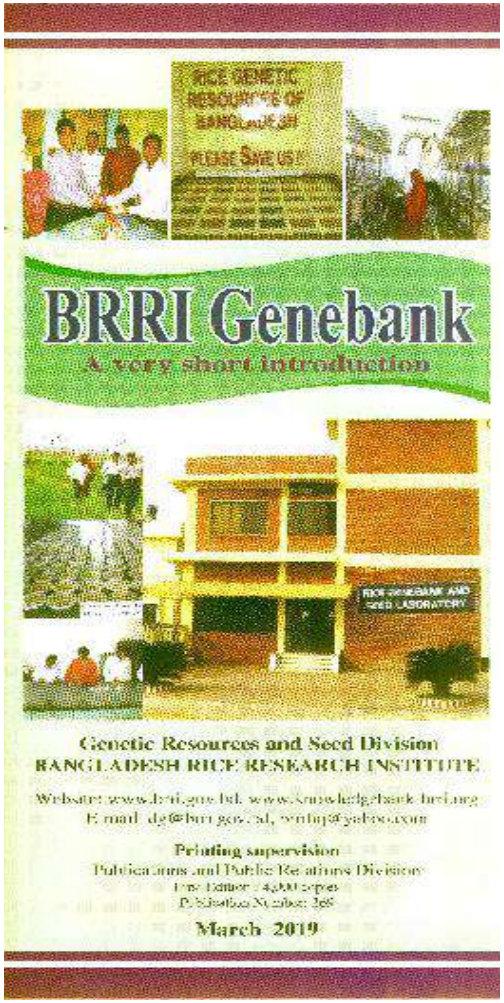
4. MS Ahmed, M Khalequzzaman, ESMH Rashid and others. 2019. BRRI Genebank- A very short introduction. BRRI publication number 269, Printing supervision by Publication and Public Relation Division. Genetic Resources and Seed Division. Bangladesh Rice Research Institute. Gazipur 1701.

5. MS Ahmed, ESMH Rashid, A Bhuiya, MZ Islam, T Chakrabarti, N Akter. 2019. Identification of Off-type and roguing. Editors: M Khalequzzaman and MA Kashem. BRRI publication number 270, Printing supervision by Publication and Public Relation Division. Genetic Resources and Seed Division. Bangladesh Rice Research Institute. Gazipur 1701. etc.

Publications







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Constraints of GRS division: BRRI perspective

- Lack of trained manpower are the major constraints to collection, evaluation and conservation of genetic resources.
- Storage capacity is demising sharply (9000+ conserved already in the storage capacity of 10,000 accessions
- Lack of appropriate software for documentation of PGR.
- No facility to handle big data/sequenced data storage.

Way Forward

- Digitized data recording in the field and laboratories
- Automation in germplasm management system
- Completion of both morphological and molecular characterization (QC and genotyping and GBS profiling) of all purified conserved local rice germplasm
- Genome sequencing of valuable genebank accessions
- Development of a core collection of the conserved working germplasm
- Identification of unidentified samples of conserved wild rice
- Evaluation of all wild germplasm against stressful environment
- Allele mining from wild rice germplasm
- Conservation of BRRI Genebank acc. at the Global Seed Vault in Norway.

Specific program/ activities/ projects	Functions	Present status
Strengthening of Research Facility of GRS Division, BRRI	1. Modernization of seed processing and storage facility of GRSD by establishing dehumidified modern cold storage. 2. Vertical extension of existing seed storage building of GRS division for the establishment of seed processing and storage facilities. 3. Renovation of germplasm characterization block with RCC levees. 4. Creation of hybridization facility at GRS Division. 5. Vertical extension of Main building of GRS Division to accommodate seating arrangement and seed laboratory facilities. 6. Extension of threshing floor of GRS Division.	Modernization of seed processing and storage facility will be done with the help of PARTNER project. **New project needs to formulate.**

- We need to make progress in identifying the genes present in our collections, move to “smart phenotyping” (designed for a high return on investment)
- Application of artificial intelligence (AI) in genebank management system (like seed authentication, ML-based panicle phenotyping, preliminary screening, application of ML-model for seed sorting & cleaning, viability monitoring)
- Better understand how to maintain the health, viability and genetic integrity of genebank materials
- We must fully engage in international policy forums to ensure that benefits are shared fairly and equitably.

Time-bound Action Plan of GRS Division

Initiative	Short-term (Jan 2025 to Dec 2025)	Mid-term (Jan 2026 to Dec 2030)	Long-term (Jan 2031 to Dec 2041)	Target Pillar
Development of a smart rice germplasm management system	▪ Use of barcoded plot label for minimizing human error ▪ Duplicate sorting of BRRI genebank accessions through QC SNP genotyping ▪ Trait genotyping of germplasm accessions ▪ Development of a smart rice germplasm management software-based system at BRRI for efficient utilization by the users ▪ Training on germplasm management system (GMS) and familiarity with the globally accessible databases (e.g., Genesys, WIEWS) ▪ Ensuring restricted area for germplasm rejuvenation and characterization	▪ Validation, upgradation and implementation of smart germplasm management system ▪ Implementing elements of a quality management system (QMS) which includes the development of standard operating procedures (SOP) and the management of staff, risks, equipment and data ▪ Adopting or improving the genebank information management system ▪ Development of germplasm exchange protocol that will improve documentation as well as dissemination of information	▪ Dissemination of smart germplasm management system to the users and use of it as routine management for BRRI genebank ▪ Exchanging rice germplasm and associated information in 'two-way flows' between partners and genebank ▪ Strengthening systems for distributing germplasm, including testing germplasm health and ensuring compliance with Plant Treaty, Nagoya Protocol and IPPC	Smart Citizen & Smart Government
Development of smart BRRI seed management system	▪ Development of smart BRRI seed management system for efficient service delivery to rice seed net partners of Bangladesh ▪ Validation and upgradation of smart BRRI seed management system based on feedback from the users	▪ Dissemination of smart BRRI seed management system across the country for smart delivery to the seed receiving clients	▪ Dissemination and adaptation of smart BRRI seed management system nationwide for sustainable utilization of the software	Smart Citizen, Smart Economy & Smart Government
Modernization and Automation of Breeder seed production and processing system at BRRI	▪ Use of barcoded label for minimizing human error ▪ Modernization of Breeder seed production and processing system though increasing the use of digital devices/machineries at BRRI	▪ Modernization and Automation of Breeder seed production and processing system through installation of appropriate devices/machineries at BRRI	▪ Automation of Breeder seed processing system; and application of Robotics for processing and distribution of breeder seed	Smart Citizen, Smart Economy & Smart Government

18. FUTURE PLAN

Short and medium term Plan:

Genebank:

- Completion of morphological characterization of all conserved rice germplasm.
- Evaluation and Molecular Characterization of all germplasm against stressful environment.
- Development of 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).

Breeder Seed Unit (BSU):

- Maintenance of present seed flow of minimum 150 tons per year along with up hold the highest standard of the seed quality.

Long term Plan:

Genebank:

- Development of purified duplicate free core set of conserved working rice germplasm accessions in the BRRI Genebank through quality control (QC) genotyping and genotyping-by-sequencing (GBS) profiling.
- Utilization of identified different stress tolerant QTL through High Throughput Genotyping of all purified conserved germplasm.
- On farm conservation of wild and primitive rice germplasm.

Breeder Seed Unit (BSU):

- Maintenance of future seed flow of minimum 200 tons per year along with full Automation of Breeder seed production and distribution system.

Thank you