

Introduction

- **Agricultural Statistics division is a part of the Socio-economic and Policy program area. It is one of the major research division of BRRI.**
- **This division conducted both basic and applied research and enhance research capacity through application of ICT and GIS.**



History of Establishment



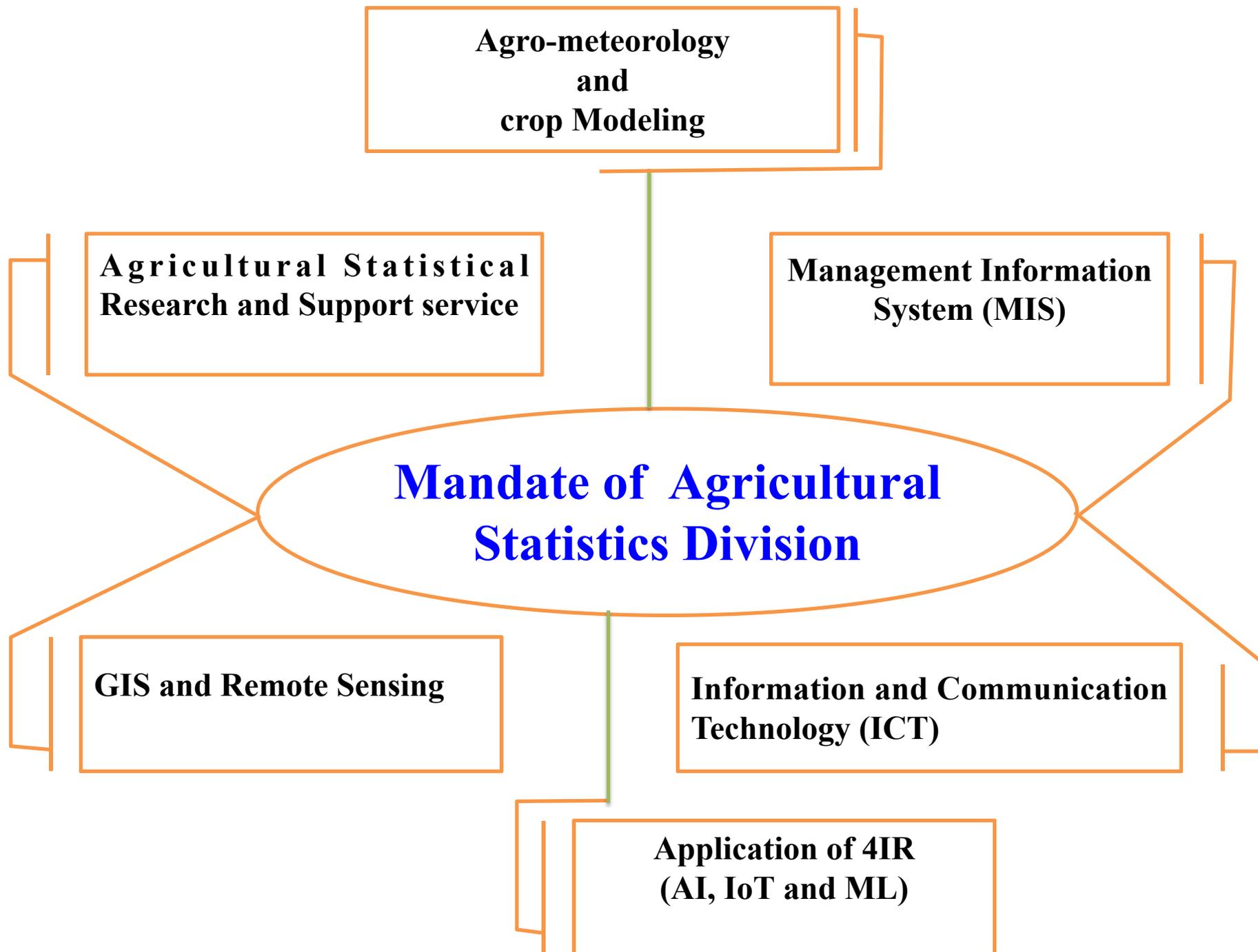
- **After the independence in 1971, this Division was named as “Agricultural Economics and Statistics” in the year of 1973-74.**
- **In 1980-81, the division was named as Agricultural Statistics Division.**

Vision and Mission



Innovation and development of sustainable and standard statistical methods and e-Agriculture service in agricultural research

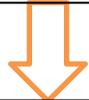
- Provide high quality research programs through comprehensive statistical programs in line with the researchers requirements.**
- Dissemination of statistical method and application of ICT in almost all corners of agricultural research.**



Transformation of Agricultural Statistics

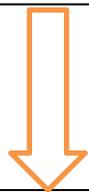
Phase 1 (1970-1980):

- Conducting Field Research Experiment
- Conducting Sample Survey Research
- Conducting Research using Secondary Data



Phase 2 (1981-1990):

- Crop-cut Method
- Sampling Technique



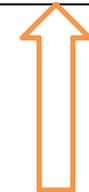
Phase 3 (1991-2000):

- Computer programming
- Establish MIS



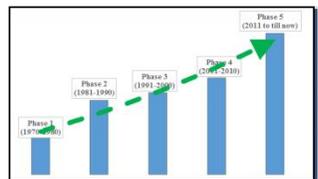
Phase 4 (2001-2010):

- GIS Technique in Rice Research
- Multivariate statistical technique
- Development of stability model
- Implementation of ICT

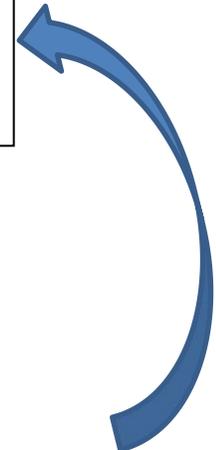


Phase 5 (2011- present):

- Agro-meteorology and crop Modeling
- Remote sensing with GIS
- ICT and Innovation for 4IR
- Analog to Digital system
- Bioinformatics
- Implementation of 4IR through AI (Sensor & IoT)



Transformation Phases



At a Glance of this Division

Major Achievements (From 1980 to 2024)

**Development of stability model
for BIRRI release rice varieties
[Using single trait (yield)-2001-02]**

Stability model:

$$G_i = (F_i^t + P_i^t + S_i^t)$$

Value of G_i	Nature of stability
≤ 0	Unstable
$0 < G_i \leq 1$	Below average stable
$1 < G_i \leq 2$	Average stable
$2 < G_i \leq 3$	Stable

Table. Stability characterization of a variety



Fig. Stability experiment of released rice varieties (ত্রি উদ্ভাবিত ধানের জাতের স্ট্যাবিলিটি পরীক্ষণ)

This stability model is helpful in selecting distinguishing stable varieties from the unstable ones.

Major Achievements (From 1980 to 2024)

Development of micro-plot technique for field experiments of rice



Fig. Field experiments on the micro-plot technique (ছোট-প্লট প্রযুক্তির পরীক্ষণ মাঠ)

- For field experiments on plant characters, the plot size may be as small as 1m².
- However, if yield is of primary importance, the plot size should not be smaller than 4m² .

Major Achievements (From 1980 to 2024)

Estimating the effect of missing hills on the yield of rice



- No marked error if the number of missing hills remains within up to 20% of the total number of hills in the plot.
- Yield loss was not appreciable even if the missing hill number equalled 40%.

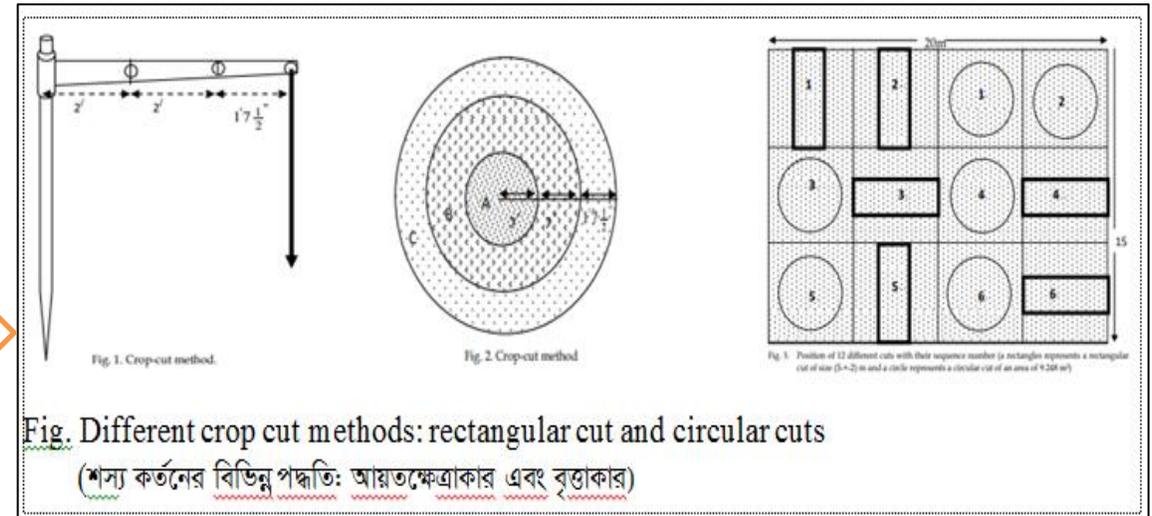
Sampling techniques for data collection regarding yield components of rice



The number of filled grains per panicle, number of unfilled grains per panicle, grain weight per panicle and number of panicles per hill should be from at least 10% of the total number of hills of the plot

Major Achievements (From 1980 to 2024)

Estimating area and production of rice in Bangladesh by the crop-cut method



- In estimating yield, at least three crop-cuts are taken from a circular sampling area with a radius of 178.5 in each plot.
- In this procedure, the sampled area in a plot (crop-cut area) becomes 10m².
- In some cases, two instead of three crop-cuts suffice.

Major Achievements (From 1980 to 2024)

Development of producer, consumer and producer cum consumer preference model to rice varieties



BIRRI variety contributes about 90% of total production, it does not reflect in field label because BIRRI varieties are sold in different brand names. As for example, BIRRI dhan28 sales as Nizersail and BIRRI dhan29 as Jhingasail and Miniket etc

Consumer model

$$CP_i = f(PR_j, CI_k, CRV_m, ARV, V_n)$$

where, CP_i = Preference of i^{th} consumers; $PR_{j(1,2,3...)}$ = Price of rice; here $PR_j = \sum_{j=1}^p X_{R_j} R_{C_j} + U$; where,

Producer model

$$PP_i = f(CP_i, PRV, RGEAEZ, TFSR_s, LFP, LD, RSS, T_c)$$

where, PP_i = Preference of i^{th} producers;
 CP_i = Preference of i^{th} consumers;

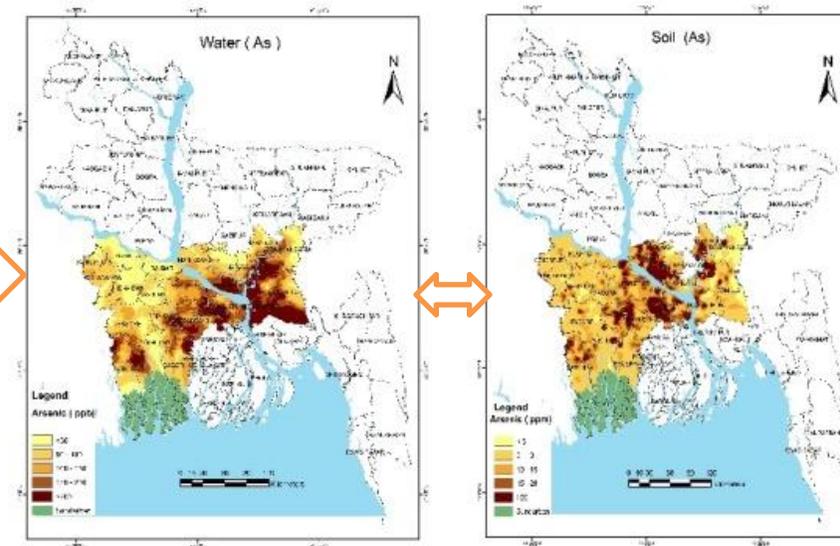
Producer-consumer model

$$PC_i = PP_i + CP_i$$

where, PP_i = Preference of i^{th} producers;
 CP_i = Preference of i^{th} consumers

Major Achievements (From 1980 to 2022)

Spatial distribution of Arsenic (As) for water and soil of irrigated rice field in South-West and Central-East of Bangladesh



Distribution of the toxic element, arsenic, in irrigation water and soils of Bangladesh

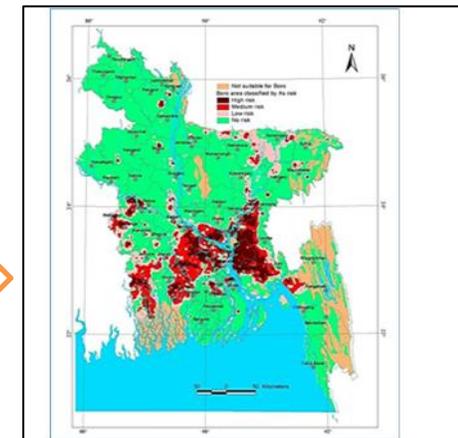
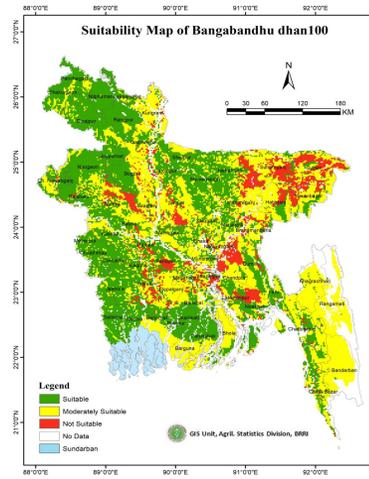
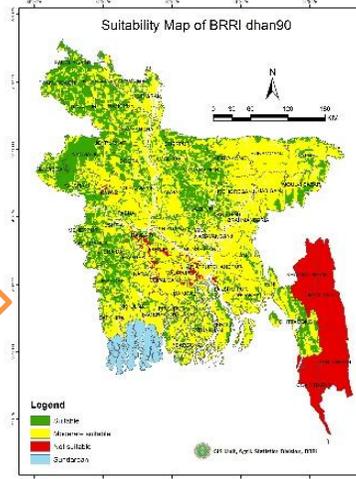


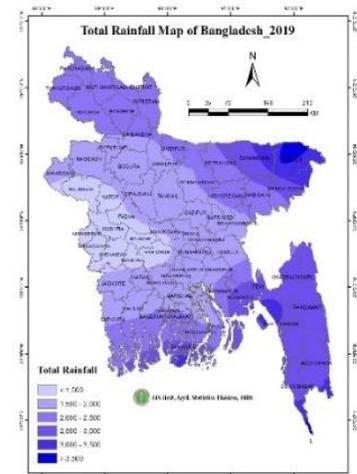
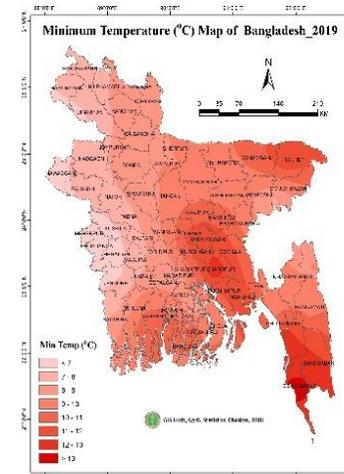
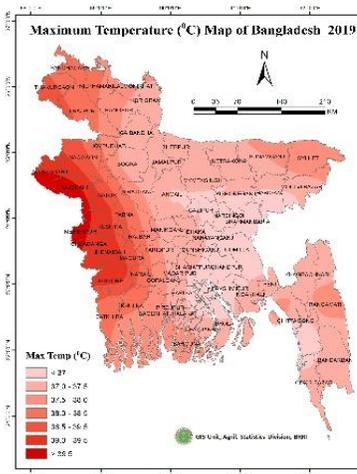
Fig. Arsenic pollution risks in irrigation water and soils in Boro rice areas of Bangladesh
(বাংলাদেশে বোরো ধান চাষে আর্সেনিক ঝুঁকিপূর্ণ অঞ্চল)

Major Achievements (From 1980 to 2024)

Suitability and Zoning Map of BRRI Varieties

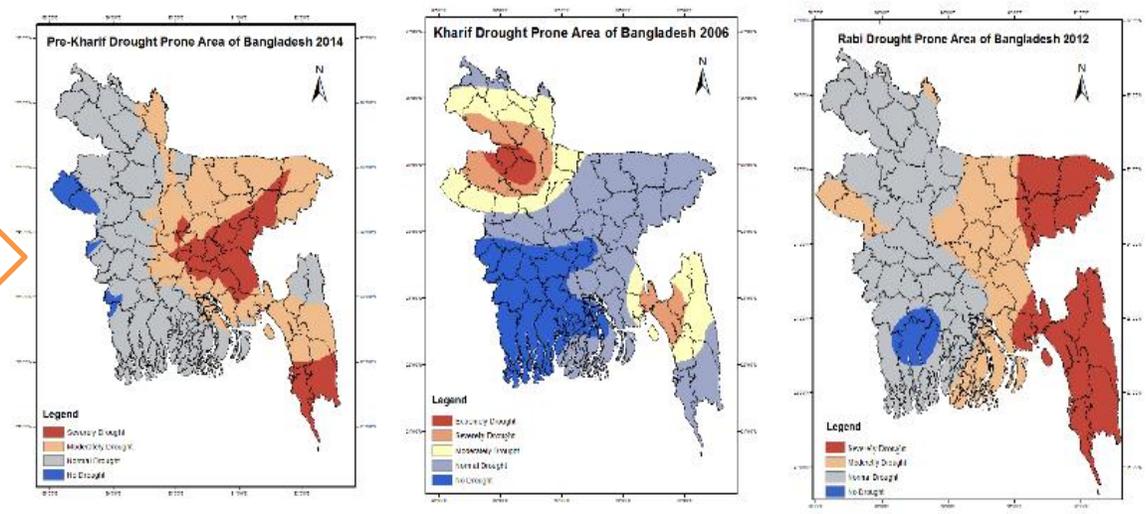


Climatic Map of Bangladesh



Major Achievements (From 1980 to 2024)

Identification of Meteorological Drought Prone Area in Bangladesh

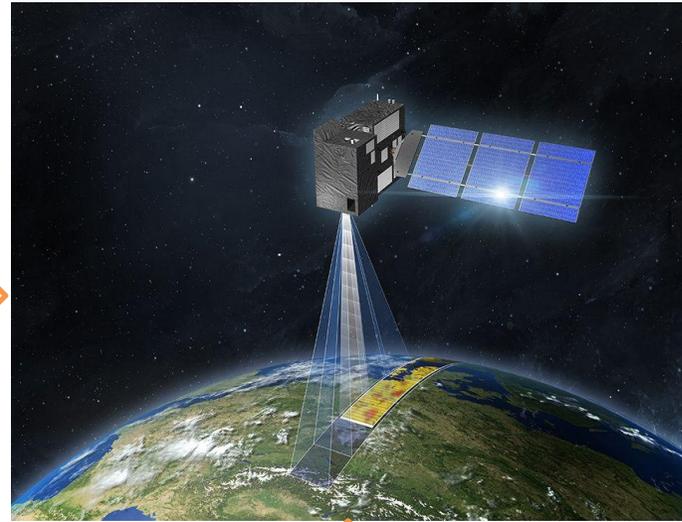


Growth and trend analysis of area, production and yield of rice: A scenario of rice security in Bangladesh

Study area	Data collection, processing and analysis	Outcomes
	Data source Yearbook of Agricultural Statistics, Bangladesh Bureau of Statistics	Figure Table GIS map
	Data types Secondary time series data Area, Yield and Production	
	Data range Aggregated level 1969-70 to 2019-20 Disaggregated level 1984-85 to 2019-20 (Whole Period) 1984-85 to 1995-96 (Period I) 1996-97 to 2007-08 (Period II) 2008-09 to 2019-20 (Period III)	Results Production contribution Regional growth rate and trend Modern variety adoption rate Cluster of regions
Statistical Methods Durbin-Watson test Exponential Growth Model Cochran-Orcutt iteration method Cluster analysis (k-means cluster)	Statistical Tools MS Excel ArcGIS 10.3 R Programming	Implications Discussion Conclusion Recommendation

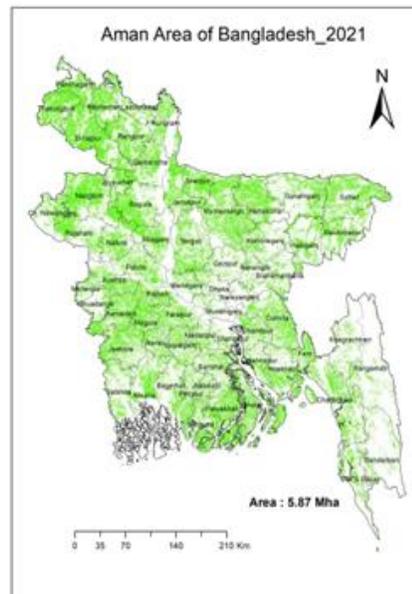
Major Achievements (From 1980 to 2024)

Season wise Rice Area Map
using Satellite Image



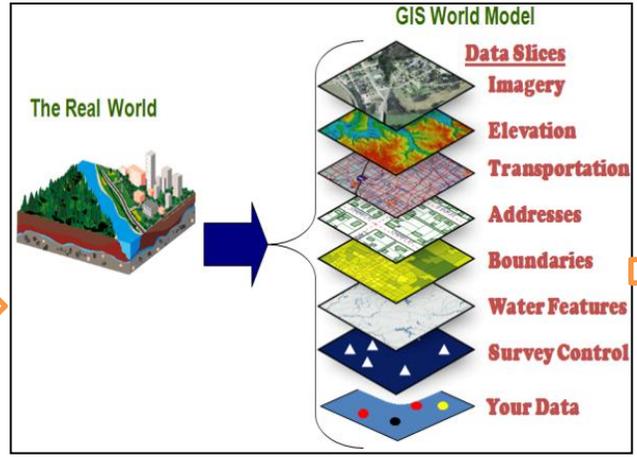
Calculated rice area in BD:

- Boro_2020-21 about 4.95 Mha
- Aman_2021=5.87 Mha

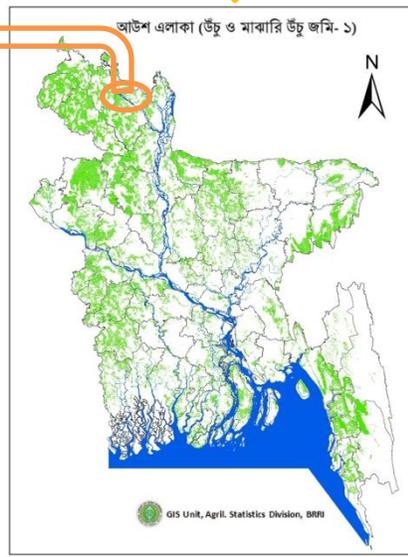
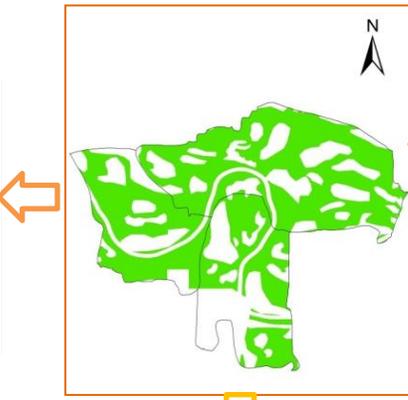


Major Achievements (From 1980 to 2024)

A book of Prospect of Aus rice Area in Bangladesh



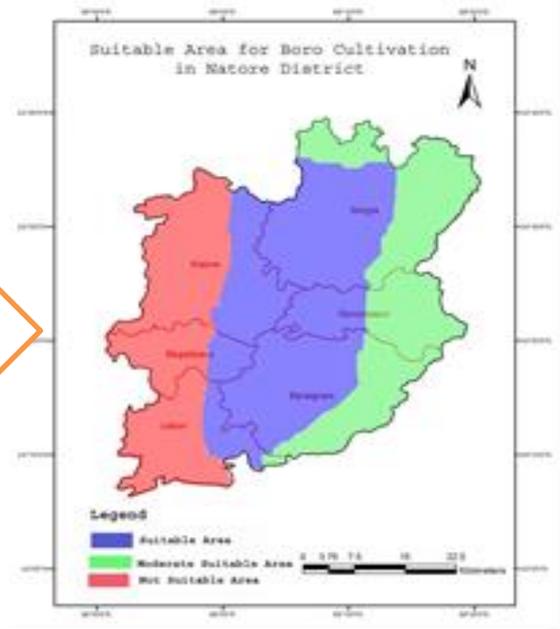
- Total Potential Cultivable Aus area=2.49 Mha
- Current Aus area about 1.34 Mha
- Possible to expand Aus area about 1.15 Mha
- Production can be increased 1.5 Mton



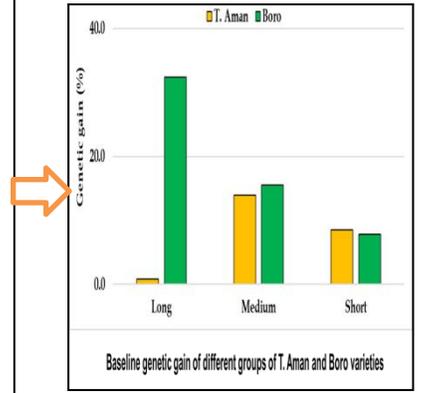
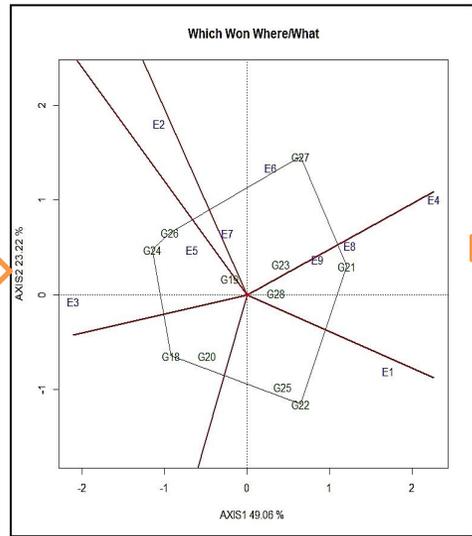
DISTRICTS	UPAZILAS	UNIONS	MOUZA	LAND TYPE	AREA_ha
Lalmonirhat	Kaliganj	Chandrapur	Satirpar	HL	127.89
				MHL1	10.43
	Hatibandha	Bhalaguri	Bhalaguri	HL	145.05
				MHL1	15.69
				Dakshin Jaorani	HL

Major Achievements (From 1980 to 2024)

Identifying suitable area of irrigated rice (Boro) cultivation based on ground water level in Natore District



Study on G X E interaction of BRRRI varieties



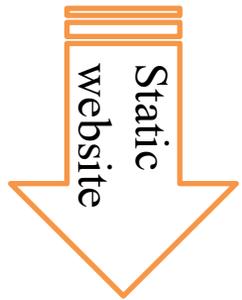
Data provide system at BRRI

Data/information provide system



Analog

Period (1970-2000)



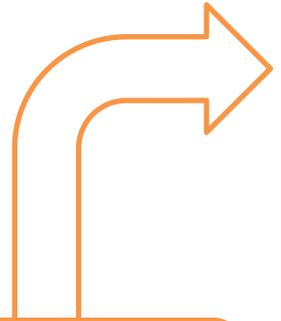
Static website

Period (2001-2010)



Dynamic Website

Period (2010-2021)



BRRI Website (www.brri.gov.bd)





Rice and related information system at BRRI

Rice and related information provide system(BRKB)



Period (1970-2000)

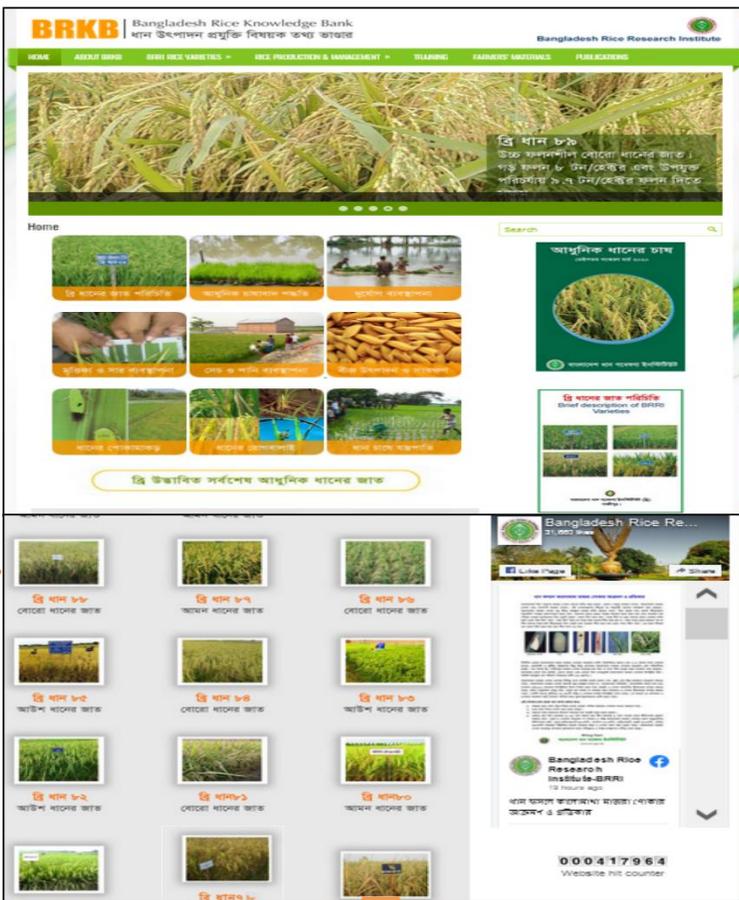


Period (2001-2010)



Period (2010-2021)

BRKB Website (<http://knowledgebank-brii.org>)



Total User/ beneficiaries 418685

Rice and related information provide system (BRKB)



Period (1970-2000)



Period (2001-2010)

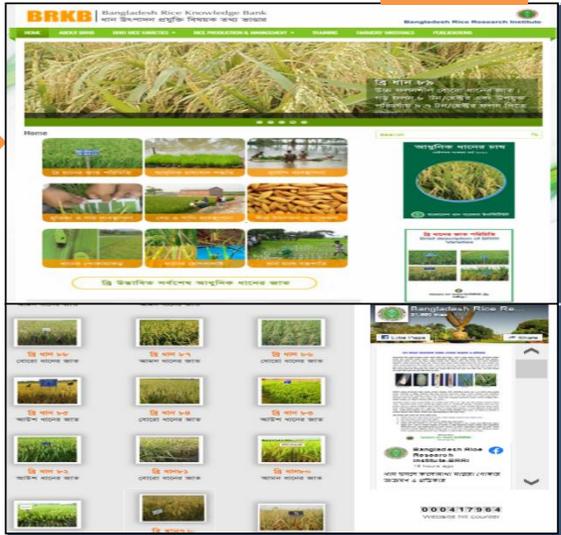
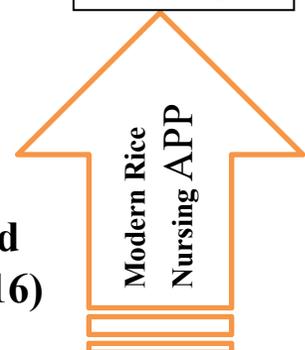
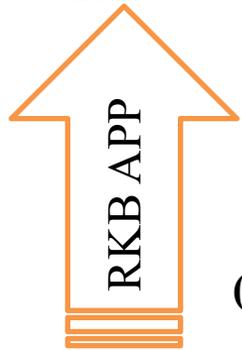


Period (2010-2021)

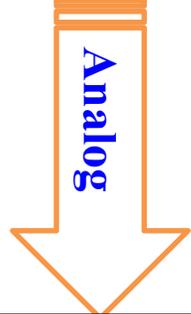


Total User/ beneficiaries 17358

Total User/ beneficiaries 2500



Rice and related information provide system (BRKB)



Analog

Period (1970-2000)



Static website

Period (2001-2010)



Dynamic Website

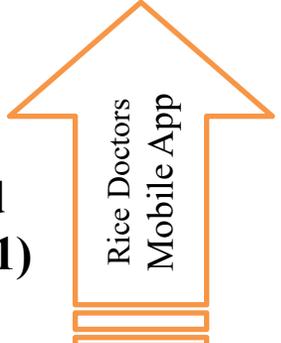
Period (2010-2021)

Total User/ beneficiaries 1750



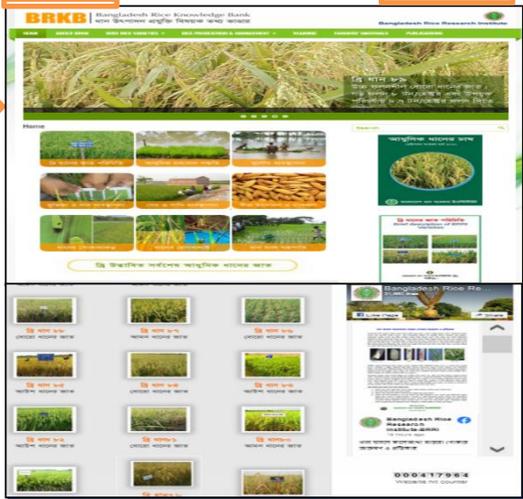
Rice Doctor Web App

Total User/ Beneficiaries 1950



Rice Doctors Mobile App

Period (2011-21)





Rice and related information provide system (BRKB)



Period (1970-2000)



Period (2001-2010)



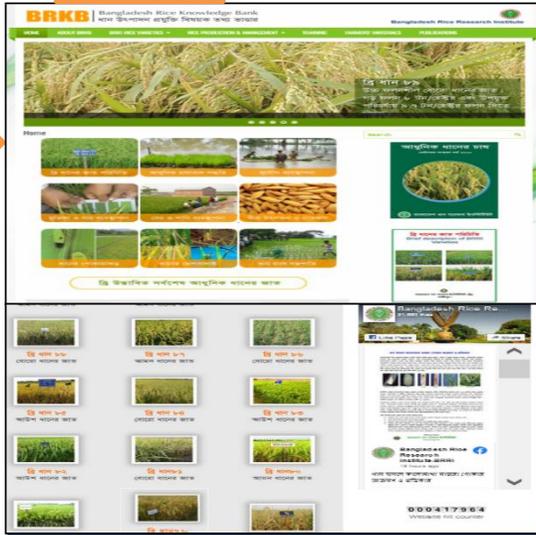
Period (2010-2021)



Total User/ Beneficiaries 1750



Period (2021-22)



<http://knowledgebank-brri.org>



Rice and related information provide system (BRKB)



Period (1970-2000)



Period (2001-2010)

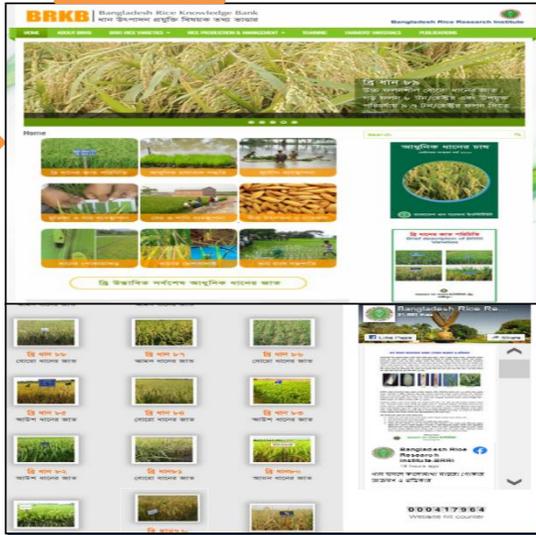


Period (2010-2021)



Period (2023-24)

Total User/ Beneficiaries 1050



Nothi/File System of BRRI

- Nothi System at BRRI
- Tendering System

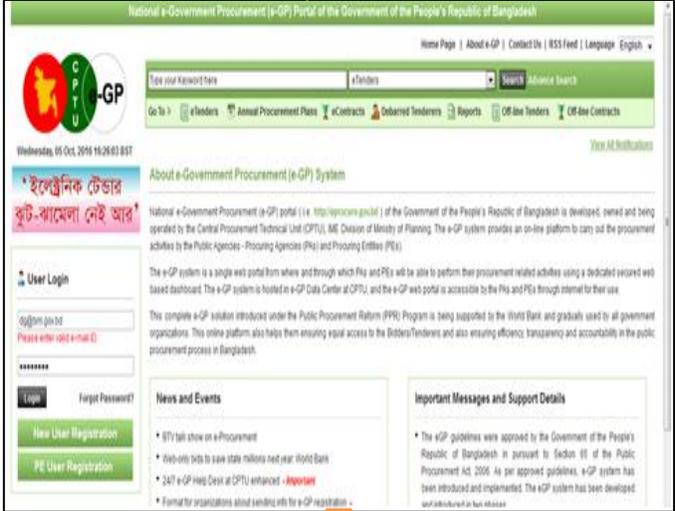
Analog

Period (1970-2010)

e-Nothi

Period (2011-21)
Digital

e-GP



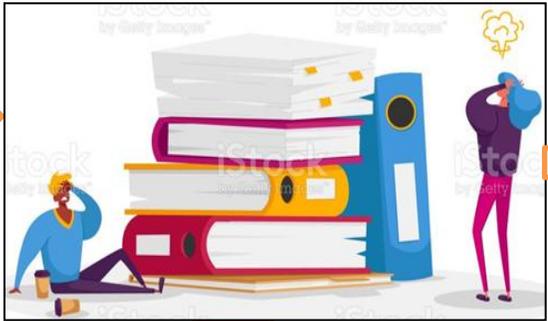
• 100% activities in e-Nothi
• Hard file activities almost zero

• 100% activities in e-GP
• Hard file activities almost zero

MIS at BRRI

Labour Management System (LMS)

Analog



Period (1970-2010)

Digitalize (2017-18)

↓
Digitalize

Online base (2019 to ..)

← **Period (2011-21)** →

https://172.16.101.17/lms/

Labour Management System
BRRI, GARIPUR, TTL, BANGLADESH

HOME LABOUR ATTENDANCE REPORT SERVICE

স্বাগতম: এখন থেকে প্রতি মাসের প্রথম কার্ড দিনের সফিকভাবে জমা দিতে প্রায়স কায়ে করে (কর্তৃপক্ষের নির্দেশ)। এ ব্যতীত অন্য কার্ড

BRRI Labour Information: At a Glance

Sl.	Division-Section	Regular	Irregular	Total
1	Administration	12	3	15
2	Administration B2	0	1	1
3	Administration B3	0	1	1
4	Administration B4	1	0	1
5	Administration B5	0	1	1
6	ABD	0	4	4
7	Academy	1	0	1
8	Research	0	14	14
9	Research B1	10	31	41
10	Research B2	0	14	14
11	Research B3	0	0	0
12	Research B4	0	0	0
13	Research B5	0	2	2
14	Research B6	0	24	24
15	Research B7	0	14	14
16	Research B8	0	0	0
17	Research B9	0	0	0
18	Research B10	0	0	0
19	Research B11	0	0	0
20	Research B12	0	0	0
21	Research B13	0	0	0
22	Research B14	0	0	0
23	Research B15	0	0	0
24	Research B16	0	0	0
25	Research B17	0	0	0
26	Research B18	0	0	0
27	Research B19	0	0	0
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147	Research B139	0	0	0
148	Research B140	0	0	0
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159	Research B151	0	0	0
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162	Research B154	0	0	0
163	Research B155	0	0	0
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166	Research B158	0	0	0
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169	Research B161	0	0	0
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288	Research B280	0	0	0
289	Research B281	0	0	0
290	Research B282	0	0	0

MIS at BRRRI

Salary Management System (SMS)

Analog



Period (1970-2000)

Payroll

Employee Management Software | Payroll System | Source Code

Main Features : *High Resolution *Responsive *User Friendly *Latest Design

- Employee Profile
- Attendance
- Payment
- Advance Payment
- Deduction
- Salary Management
- Over time
- Salary Slips
- All Reports

Visual Studio 2015 Full Project with database attached | Visual Basic .NET Framework 4+



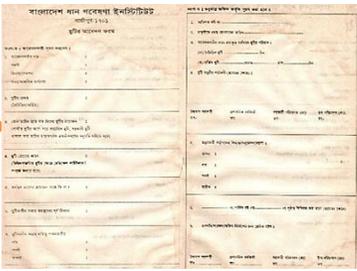
Period (1991-2010)

Online base

Period (2019 to

MIS at BRRI

CL Application System (CLS)



Period (1970-2010)



Digitalized CL Application System of Agricultural Statistics Division (2020-21)

Statistical Research at BRRI

New approach of stability model for BRRI release rice varieties

[Using multi-traits-2020-2021]

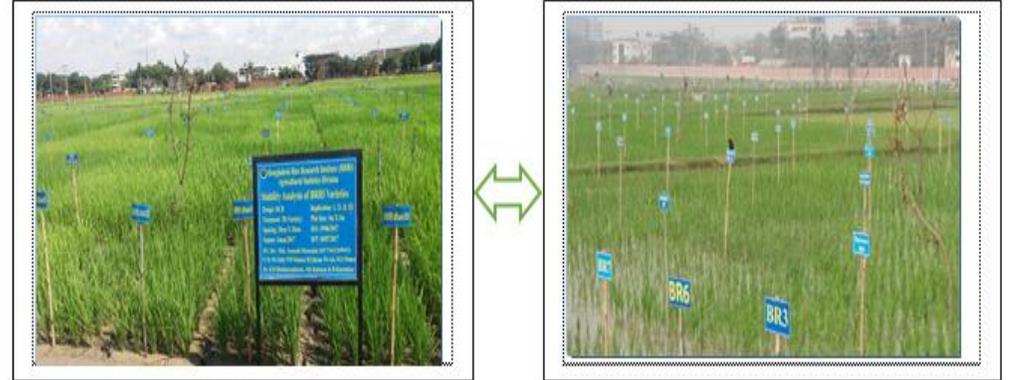


Fig. Stability experiment of released rice varieties (ব্রি উদ্ভাবিত ধানের জাতের স্ট্যাবিলিটি পরীক্ষণ)

- Evaluate the stability of rice genotypes and Multi-trait stability index (MTSI) by applying popularly recommended multi-trait (GY and GP, PN TN, GD and PH) stability analysis under diverse environmental conditions in Bangladesh.



Statistical research at BRRI

Weather Forecast

SPARRSO & BMD

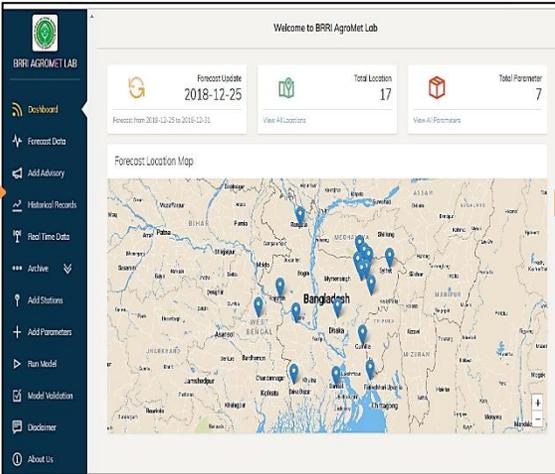
Period (1970-2000)

Period (2016-2017)

5 days interval Weather Forecast & Rice Advisory Services

Online based (2020-2021)

Every 7 days continuously Weather Forecast & Rice Advisory Services



জমি তৈরি ও চারা রোপন পর্যায়ের জন্য কৃষি-পরামর্শ

কৃষিই সমৃদ্ধি

বাংলাদেশ ধান গবেষণা ইনস্টিটিউট, গাজীপুর
Bangladesh Rice Research Institute, Gazipur
Phone: PABX-880-2-49272065-9, 49272010-38, 49272056, Fax: 880-2-49272060
E-mail: brri@brri.gov.bd, hr@brri.gov.bd, www.knowledge@brri.gov.bd

ধান গাছের সুস্থির পূর্বদিক জমি তৈরি ও চারা রোপন

০৭ দিনের আবহাওয়ার পূর্বাভাসের উপর ভিত্তি করে বোরো ফসলের সন্মত সফলতা ও কর্মসূচী-

কৃষিভিত্তিক ব্যবস্থাপনা
যেহেতু জনগণ সর্বোচ্চ সুস্থিতির জন্যে সন্মত সফলতা সেরা সফলতা জমি তৈরি ও চারা রোপন করা যাবে বলে। দেশ চাষের সময় অনুষ্ঠিত জমি তৈরি ও চারা রোপন এক বাকী সার (ডিএসপি, এমওপি, ফিশাম, ফিড) জমি তৈরির সময় প্রয়োগ করতে হবে। জমি উঁচর বা মাঝারি উঁচর হলে সেলুল ইউরিয়া সারের সন্মত নাই। চারা রোপন কালে শেতর প্রবাহ শুষ্ক হলে কয়েক দিন দেরি করে শেতর প্রবাহ চালু হলে চারা রোপন করতে হবে।

পানি ব্যবস্থাপনা
এ পর্বতে ২টি অম্বর ৩টি সচা সচা দিয়ে জমি তৈরি করতে হবে এবং রোপনের পর জমিতে ২-৩ সেমিটার পানি ধরে রাখতে হবে।

সেচা-সম্পর্কিত ব্যবস্থাপনা
ধানের চারা উৎসেপনের আগে যদি বীজবন্ধ্যা গ্রীষ্ম, কনক মাছ পান্ডাফিল্ড, সুরত শামাফিল্ড, সাদা পিঠি বাছফিল্ড এবং বাসামি বাছফিল্ড এর আক্রমণ হলে এক পাতলা ২৫ জাগ পাতা কুড়িয়ে হলে মাসাফিল্ড ৫৭ ইলি প্রতি সীতার পানিতে ২ মি.লি মিশিয়ে স্প্রে করতে হবে। বীজতলার আশেপাশের জমিতে হলে রোপনের ৩টি দিনে সেরা সুরত পান্ডাফিল্ড হাতজাল বা বীজনাশক প্রয়োগের মাধ্যমে নষ্ট করতে হবে। বীজতলার বাসামি বাছফিল্ড এক গ্রীন বিরিকি রোগের সংক্রমণ থাকলে মিলিত বাগ, বাসামি বাছফিল্ড এর ডিম প্রস্তুতকরণে নষ্ট করে ফেলবে। তবে বিরিকি হলে বা বাছফিল্ড বাসামি বাছফিল্ড সোনা মাছই বীজনাশক (এগিটিকট) প্রয়োগের মাধ্যমে সন্মত বাছফিল্ড দিতে হবে।

রোপন-সম্পর্কিত ব্যবস্থাপনা
বীজতলার থেকে চারা উৎসেপন সময় বেঙ্গল রাখতে হবে সেসে রাখার শিকড় কেত কম হয়। কালা শিকড়ের কেত ছাড়া দিয়ে কুসক রোপের সীবাণু (ব্যাকটেরিয়া) যাবে রোগে করে। ফলে চারা রোপনের পরপরই চারার গোড়া পঁচিয়ে ফেলে দুর্ভাগ্য তৈরি করে এবং পাতা হ্রাস হয়ে খাট মারা যায়। সেজন্য চারা উৎসেপনের আগের দিন জমি পানি দিয়ে ভিজিয়ে রাখতে হবে। কুসক রোগ রূপ ক্রমিক জমিতে বিধি ভিত্তিক ও ভেজি পটাল সার প্রয়োগ করতে হবে এবং রোপ সোনা সিলে জমি পানি শুষ্ক দিতে হবে।

আবেগের ভিত্তিক ধান উৎসেপন ব্যবস্থাপনা সন্মত পরামর্শ প্রদান-
এগ্রোমেটিকোলজি এর ড্রাম মনোনিং শাশ, ডি, গাজীপুর

Statistical data analysis System

Statistical Data Analysis System (LMS)

Analog
Form Fill-up and data provide (Hard Copy), Data analysis manually (calculator)

Period (1970-1990)



Digitalize
Online form collection and data provide by mail (Soft copy/pen drive), Data analysis by MSTAT, IRRISat, GenStat, SPSS etc. (Computer)

Period (2001-2010)



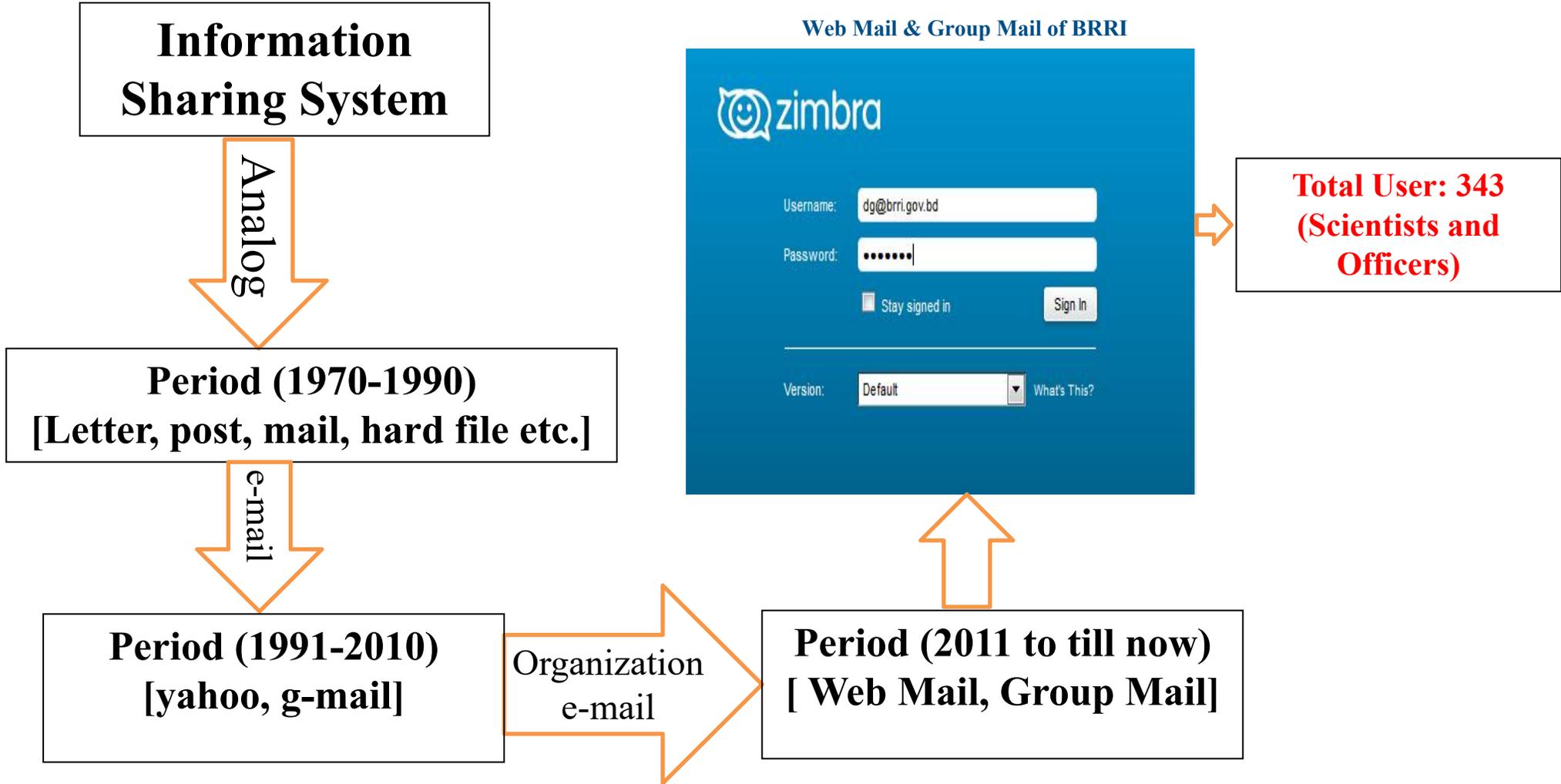
Period (2010 to ...)

Digitalize

Online form collection and data provide by mail (Soft copy/pen drive), Data analysis using R (Hi-speed Computer/Lap top)



Information Sharing System at BRRI



**Information
Sharing System**

Analog

**Period (1970-1990)
[Letter, post, mail, hard file etc.]**

e-mail

**Period (1991-2010)
[yahoo, g-mail]**

Organization
e-mail

**Period (2011 to till now)
[Web Mail, Group Mail]**



**Total User: 343
(Scientists and
Officers)**

Information Sharing System at BRRI



Total Member: 4500 (BRRI Scientists/Officers and others people)

BRRI Facebook Group and Facebook Page

BRRI Facebook Page



- 31,856 people like this page
- 32,635 people follow this page

Statistical Training

**Training on Data
collection and Statistical
analysis**



**Total Participants:
160 (Scientists)**



**Total Participants:
40 (SA & FM)**

Training/workshop on Innovation & ICT



Total Participants:

- For Innovation: 145
- For SPS: 55



Total Participants:

- For e-Learning: 30
- For Mentoring: 15
- For Digital Signature: 160

**Awarded National ICT
Award-2016 at Digital World
2016 for ICT Excellence
through Innovative Service
Delivery.**



Published Leaflets

“বাংলাদেশ রাইস নলেজ ব্যাংক” (বিআরকেবি)

BRKB | Bangladesh Rice Knowledge Bank

রচনায়

- ড. মো: ইসমাইল হোসেন
- এস.এম. মোস্তাফিজুর রহমান
- ড. মো: ইসলাম উদ্দিন মোল্লা

বাংলাদেশ খান গবেষণা ইনস্টিটিউট
গাজীপুর-১৭০১

ব্রি মোবাইল অ্যাপস “রাইস নলেজ ব্যাংক”

রচনা ও সম্পাদনায়

- এস.এম. মোস্তাফিজুর রহমান
- ড. মো: ইসমাইল হোসেন

বাংলাদেশ খান গবেষণা ইনস্টিটিউট
গাজীপুর-১৭০১

মোবাইল অ্যাপস “আধুনিক খানের পরিচর্যা” [Modern Rice Nursing]

রচনা ও সম্পাদনায়

- ড. মোঃ ইসমাইল হোসেন
- মোঃ মাহফুজ বিন ওয়াহাব

বাংলাদেশ খান গবেষণা ইনস্টিটিউট

মাঠের সমস্যা মাঠেই সমাধান Rice Solution অ্যাপস এ

ICT Division, NCC, Grameen ICT, Grameen ICT, Grameen ICT

বাংলাদেশ খান গবেষণা ইনস্টিটিউট

Rice Solution (Sensor-based Rice Pest Management)

GET IT ON Google Play | Download on the App Store

ডাউনলোড করতে স্ক্যান করুন

www.brri.gov.bd

Assessing Arsenic Status in Central-East and South-West Part of Bangladesh (A Sampling Protocol for Soil and Water Sampling)

Prepared by

- Dr. Md. Shahjahan Kabir (Director General, CC)
- Dr. Md. Ismail Hossain (Director General, CC)
- Dr. Aminul Islam (PSO)
- Md. Abdullah Ariz (SSO)
- Md. Zakaria (GIS Analyst, FFP Project)

Coordinator: Dr. G M Panaullah

Published by: Agricultural Statistics Division, Bangladesh Rice Research Institute, Gazipur-1701

Distribution of Soil and Water Arsenic in Gangetic Flood Plain

Prepared by

- Dr. Md. Shahjahan Kabir (Director General, CC)
- Dr. Md. Ismail Hossain (Director General, CC)
- Dr. Aminul Islam (PSO)
- Md. Abdullah Ariz (SSO)
- Md. Zakaria (GIS Analyst, FFP Project)

Coordinator: Dr. G M Panaullah

Published by: Agricultural Statistics Division, Bangladesh Rice Research Institute, Gazipur-1701

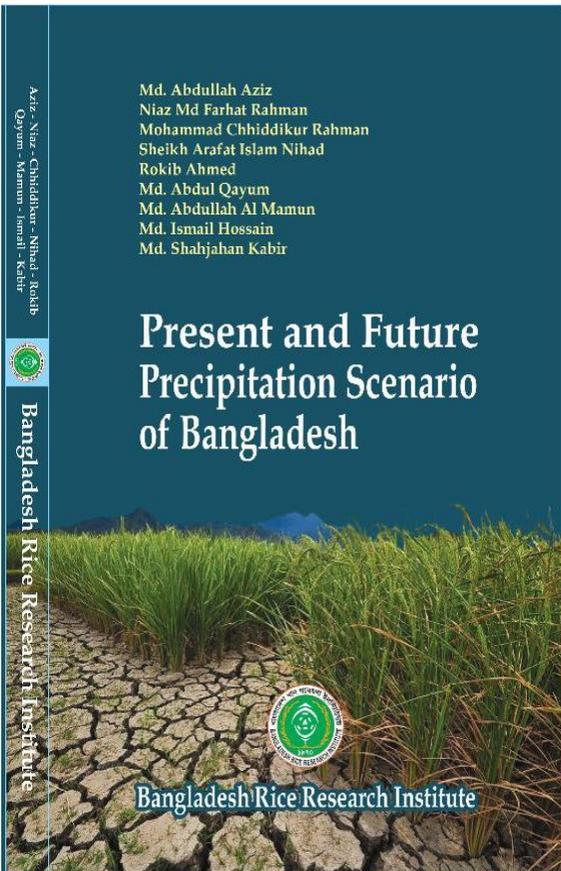
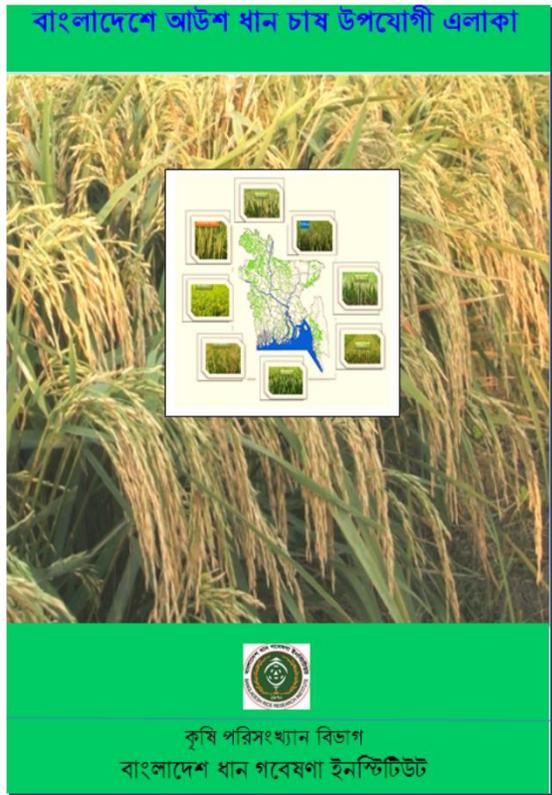
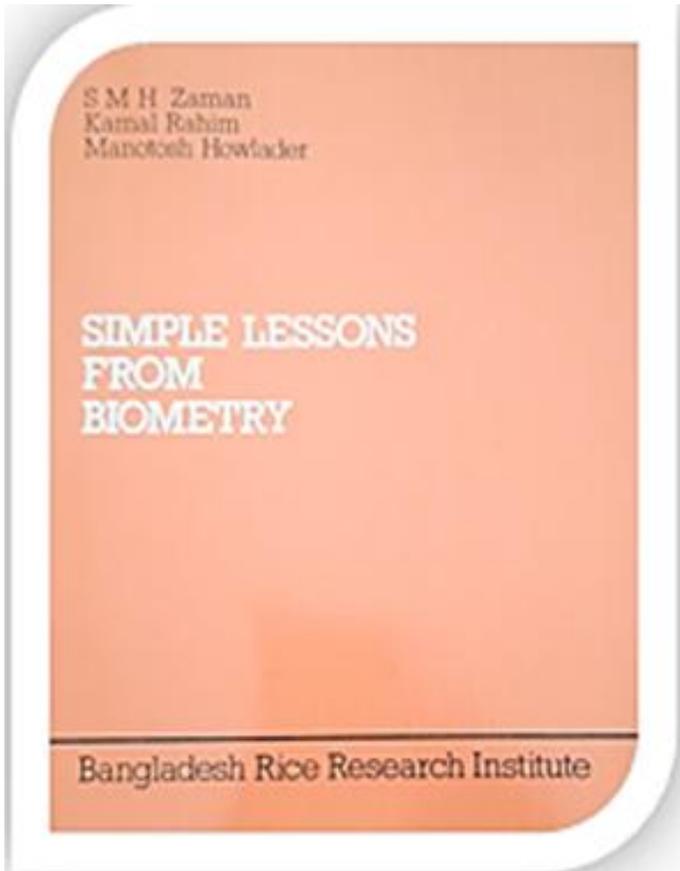
Workshop on Integrated Rice Advisory System (IRAS) for Sustainable Productivity in Bangladesh

Outcomes:

- Yield Maximization
- Enable Food Security through Reduction of Crop Losses
- Reducing Costs of Production
- Secure Farmer Income
- Secure Environment from Pollution

USAID, BRRI, Grameen ICT, Grameen ICT, Grameen ICT

Published Book/ Booklet



In Research

- Estimating genetic, agronomic and environmental gains by developing statistical models to accurately analyze data from breeding, agronomic and adaptive.
- Development moisture adjustment factor for rice yield estimation.
- Development of yield loss prediction model.
- Identification of CV (%) thresholds for getting experimental precision.
- Development of rice database and web platform for analysis using statistical programming.
- Bringing 5% of the country's farmer under weather forecast based rice production management.
- Implementation of precision agriculture theory in production using IoT, ML approach and AI.
- Big data management, data mining and crop modeling.
- Analysis and prediction of rice crops at different stages, genome sequencing and genome editing analysis using Bio-informatics.
- Innovate smart technology in research to build smart Bangladesh.

Way Forward of Agricultural Statistics Division

Using GIS and RS

- Crop monitoring using both satellite and Unmanned Aerial Vehicle (UAV) data.
- Crop damage loss assessment by natural disaster using satellite image.
- Rice yield forecasting using Satellite Images, Artificial Intelligence (AI), Machine Learning Method (MLM).

Using MIS

- BRRI's internal services digitization.
- Digitization of data collection system of rice research.
- Rice research and rice related information-based "Data Bank" for BRRI.
- An Online based automated and dynamic (Real-time) software development for all information related to rice production in Bangladesh.

Using ICT and 4IR

- To establish dashboard-base crop monitoring system analyzing several steps of rice through real-time data feeding system.
- To monitor rice crop health and estimate yield through AI and drone technology.
- Provide diversified information through this dashboard with identifying affected insect and disease including real time location specific detail map.
- To establish Smart AI Research & Development lab and transform existing data center into Big Data center through modernization.
- To collect smart device-base rice related real data and provide internet-enabled device to scientists.
- To establish 'Smart Agriculture' through Big Data, cloud computing and dashboard management in rice research.
- Adopt precision agriculture and 4IR related technology for making digital ecosystem and digital technology extension.



Team of Agricultural Statistics Division

