

SOIL RESEARCH AT BRRI



M A Saleque and Jatish C Biswas



SOIL SCIENCE DIVISION



BANGLADESH RICE RESEARCH INSTITUTE
GAZIPUR-1701

SOIL RESEARCH AT BRRI

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PREFACE

Scientific knowledge is expanding faster than expectation. While information to solve a particular problem has been generated, a new problem appears to be addressed. Currently, one of the challenges is to break yield ceiling in rice, although many new improved rice varieties have been released. Soil and fertilizer management including other cultural practices are important to realize actual yield of an improved variety.

Soil research was initiated at the inception of BRRI in 1970s. In this booklet the authors have made chronological events of soil related research at BRRI, which would be a ready reference to the researchers of the present generation. I believe this compilation would help in planning future soil research programs at BRRI and elsewhere in Bangladesh.



Jiban Krishna Biswas PhD
Director General

Establishment of Soil Science Division

Soil Science Division is one of the 19 research divisions at the Bangladesh Rice Research Institute (BIRRI). The divisional activity was started since the inception of BIRRI in 1970 under the name of Soil Chemistry. In 1992, the Soil Chemistry Division was renamed as Soil Science Division. Starting out with only four scientists at the beginning, the division gradually flourished over the last three decades into a major research unit of BIRRI. Presently, with fourteen scientists and nine support service employees, the Soil Science Division became a principal research unit of BIRRI's Crop-Soil-Water Management Research Program Area.

Mandate of Soil Science Division

- Study soil-plant relationship influencing the growth, mineral nutrition and yield of rice under various agro-ecological conditions.
- Identify the causes and evaluate the magnitude of soil related constraints on sustainable rice-based cropping systems, and develop appropriate soil and fertilizer management interventions to overcome these constraints.

Addressing to the mandates, the research activities of the division were grouped under the following broad fields:

- I. Soil fertility and plant nutrition
- II. Physical aspects of soil management
- III. Problem soil management
- IV. Microbiological studies
- V. Soil and environment

The research activity of the Soil Science Division is concentrated to the target oriented and demand led to

answer farmers' recent problems. The scientists of this division enthusiastically love to undertake research programs targeting the potential problems coming in the near future.

Research Program

During 1970–2016, the following research programs were successfully carried out in the Soil Science Division:

Research program during 1970-1977

Soil Fertility and Plant Nutrition

Nitrogen response study

- T. Aus, T. Aman and Boro rice varieties and promising T. Aman lines
- Influence of N rates and planting patterns
- Timing effect of N on Boro rice
- Time of N application and water management for Boro
- Use of basic slag on N response for T. Aman and Boro rice
- N response for late planted T. Aman promising lines
- N sources and application methods for T. Aman and Boro rice
- Split application for direct seeded upland Aus
- Liquid band placement vs N splits for T. Aman

NPK response study

- Upland Aus, T. Aman and Boro
- Varietal response in T. Aman season
- Fertilizer management for late planted T. Aman rice

Phosphorus response study

- Use of TSP and ground phosphate rock for Boro rice
- Residual effect of P in Aus rice

Potassium response study

- Split application K in Boro and T. Aman seasons
- Timing effects of K application on Boro rice

Long term trials

- Continuous cropping
- Long-term NPK study

Micronutrient response study

- Aus, T. Aman and Boro season

Soil amendment

- Use of Agromax
- Rice straw incorporation in Boro season

Research program during 1978–1984

Soil Fertility and Plant Nutrition

Nitrogen response study

- Transplant Aus rice
- Plant population densities
- Sources and methods of N application
- Promising Boro lines
- Newly released varieties
- Efficiency of different N fertilizers
- Efficiency of prilled urea and USG with and without rice straw incorporation
- Seedling root enrichment with ammonium nitrogen

- Methods, sources and time of N application

Sulfur response study

- Sulfur response studies in transplant rice
- Evaluation of different sulfur sources for rice
- Soil-drying and sulfur response in transplanted rice
- Study on the kinetics of available sulfur due to soil submergence
- Residual effect of S on rice under two pre-trial hydrological conditions
- Soil test-crop response correlation study for sulfur
- Sulfur status of Bangladesh soils

Phosphorus response study

- Long-term study on phosphorus sources for rice

Potassium response study

- Potassium supplying capacities of BRRI farm soils

Zinc response study

- Zinc response in transplant rice
- Zinc status of Bangladesh soils

Long-term trials

- Long-term sub-optimal fertilization trials in transplant rice
- Long-term NPK fertility trial for rice
- Studies on continuous wetland rice cropping
- Long-term missing element trial and rice nutritional problems

Organic and inorganic nutrient sources

- Decomposition studies of organic residues and their contribution to plant nutrient availability
- Contribution of blue-green algae to wetland rice
- Study on the potential use of organic residues to supply plant nutrient relative to chemical fertilizers
- Integrated use of organic and inorganic fertilizers for rice
- Organic residues as bio-fertilizers for rice
- Biomass and N content of green manure
- Residual effect of PK in transplant rice
- Carry-over effects of organic residues to supply plant nutrients for rice

Nutrient uptake

- Nutrient status of modern rice varieties
- Effect of planting treatments on nutrient uptake

Problem Soil Management

- Management of Zn deficiency
- Management of acid upland soils
- Screening of breeding materials in acid upland soils

Research program during 1985–1990

Soil Fertility and Plant Nutrition

Nitrogen response study

- Efficiency of prilled urea and urea super granule with and without rice straw incorporation in wetland rice

- Comparison of hand and machine (injector) application of prilled urea and USG
- Interaction of N fertilizer and water management in rice
- Nitrogen response of upland rice
- Nitrogen response of rice in soils with variable level of initial N
- Efficiencies of prilled urea, large grain urea and USG
- Nitrogen response under different N application method and incorporation schedule
- Residual effect of prilled urea and USG
- Native N content of soil and N balance after rice cropping
- Nitrogen response of promising varieties/lines
- Nitrogen response of rice with different seedling age
- Nitrogen fertilization schedule for rice under rainfed upland environment
- Nitrogen-sulfur interaction in rice

Phosphorus response study

- Phosphorus management for upland rice
- Long-term P fertilizer management for rice at BIRRI head quarter and regional station farms
- Frequency of phosphorus application in rice
- Determination of critical level of soil available phosphorus for rice

Potassium response study

- Potassium-supplying capacities and K fertilizer requirements of rice soils
- Effect of split application of potassium for rice

- Q/I relationship of potassium for wetland rice soils
- Potassium response studies on rice in BIRRI farms and in farmers' fields
- Frequency of potassium application in rice
- Determination of critical level of soil exchangeable potassium for rice

Sulfur response study

- Management of S deficiency under different water regimes
- Effect of rate, sources and split application of S on rice
- Immediate and residual effect of sulfur fertilization in continuous wetland rice cropping

Long-term trials

- Long-term missing element trial and rice nutritional problems
- Long-term potassium response studies of rice

Organic and inorganic nutrient sources

- Organic residues as fertilizers for rice
- Evaluation of thomaskali, vegimax and thiovit as fertilizer sources for rice
- Evaluation of azollon as N fertilizer for rice compared to prilled urea, urea large granule and USG
- Culture and use of azolla as supplemental source of N for rice
- Integrated use of inorganic fertilizers, cow dung and ash

Problem Soil Management

- Determination of the relationship between EC_e and EC₅ for coastal soils with variable clay contents
- Plough pan management by power tiller and dhaincha rooting for increasing rice yield
- Performance of upland MV rice in saline soils

Microbiological Study

- Inoculation and phosphorus management effect on *Sesbania* green manure crop
- Effect of some common insecticides on soil microorganisms
- Effect of effective micro-organism technology on wetland rice

Soil Physical Management

- Effect of different tillage practices on rice and soil physical properties at BIRRI regional station Rajshahi and Comilla

Research program during 1991–1995

Soil Fertility and Plant Nutrition

Nitrogen response study

- Nitrogen response of rice varieties and promising lines
- Comparison of prilled urea broadcasting and injection with deep placement of USG in rice
- Nitrogen fertilization on the performance of rainfed lowland rice at different toposequences

- Planting methods and nitrogen fertilization on the performance of upland rice under drought-prone environment

Phosphorus response study

- Frequency of P fertilizer application in rice
- Phosphorus response of MV rice
- Response of added P fertilizer in soils with different levels of available P
- Varietal differences in yield of rice at different level of P deficient soils

Potassium response study

- Potassium response studies for rice

Sulfur response study

- Immediate and residual effect of sulfur under intensive wetland rice culture

Zinc response study

- Root dipping, seed soaking and other methods of zinc application for rice

Long-term trials

- Long-term integrated nutrient management for rice through inorganic fertilizers, cow dung and ash
- Long-term integrated use of organic and chemical N fertilizer for wetland rice
- Long-term missing element trial and rice nutritional problems

Organic and inorganic nutrient sources

- Intercropping of *Sesbania* in T. Aus – T. Aman cropping pattern
- Effect of green manure management for rainfed lowland rice
- Integrated nutrient management for rice based cropping patterns
- Evaluation of mixed fertilizer for rice production
- Evaluation of SLAN and BCSR concepts of soil fertility interpretation and fertilizer recommendation

Soil Physical Management

- Plough pan management through deep tillage and *Sesbania* rooting for increasing rice yield in farmers' fields

Microbiological Study

- Evaluation of microbial fertilizer “Tian Li Bao” for wetland rice

Soil and Environment

- Effect of temperature and moisture regimes on phosphorus availability in soils

Research program during 1996–2000

Soil Fertility and Plant Nutrition

Nitrogen response study

- Chlorophyll meter based nitrogen fertilizer management for modern rice varieties
- Ordinary prilled urea and urea super-granule as N source for hybrid rice
- Performance of coated urea

Phosphorus response study

- Phosphorus and N interaction in calcareous soils
- Phosphorus deficiency problems in wetland rice soils
- Variety-phosphorus interaction in mineral nutrition of rice

Long-term trials

- Long-term missing element trial and rice nutritional problems
- Effect of continuous rice cropping on rice yield and soil quality
- Long-term integrated use of organic and chemical N fertilizer for wetland rice
- Long-term integrated nutrient management for rice through inorganic fertilizers, cow dung and ash

Organic and inorganic nutrient sources

- Poultry manure as a source of organic matter and plant nutrients
- Evaluation of integrated fertilizer management packages for various cropping pattern
- Soil health card preparation for farmers
- Soil nutrient status and nutrient management for the rice-wheat systems

Microbiological Study

- Studies on soil microbial biomass carbon and nitrogen in rice soils

Soil physical management

- Contribution of silt on soil fertility and rice yield improvement

Research program during 2001–2005

Soil Fertility and Plant Nutrition

Nitrogen response study

- Nitrogen response of BRRI dhan29 in a rice-fallow-fallow cropping pattern, BRRI R/S Habiganj and Bhanga
- Adaptation and adoption of USG technology for tidal submergence prone area
- Nitrogen response of fine grain and MV rice varieties
- Comparative efficiency of different N management techniques on hybrid and inbred irrigated rice
- Contribution of mungbean in nitrogen supply to soil in a wheat-mungbean-rice cropping pattern (BARI ARS, Pabna site)

Phosphorus response study

- Performance of BRRI released varieties/lines on P-deficient soil
- Effect of phosphorus and micronutrient interactions on the yield and nutrient uptake by rice
- Phosphorus response of BRRI rice varieties and advanced lines
- Performance of fused magnesium phosphate fertilizer on the growth and yield of wetland rice
- Evaluation of low dose organic manures for phosphorus nutrition of wetland rice

Potassium response study

- Potassium supplying capacity of soils of Bangladesh and contribution of crop residue to K supply in some rice based cropping patterns

Fertilizer rate model and micronutrients

- Comparison of fertilizer recommendation models for low land rice
- Effect of micronutrient application on growth, yield and nutrition of rice
- Application of GIS and Geostatistics for interpretation of soil properties for site specific fertilizer management- A case study of BRRI farm, Gazipur

Organic and inorganic nutrient sources

- Integrated nutrient management on the performance of MV rice in a Bush bean-T. Aus-T. Aman cropping pattern (Gazipur site) and Boro-Green manure (GM)-T. Aman cropping pattern (Comilla site)
- Evaluation of cow dung, poultry manure, rice straw and farmyard manure as supplemental nutrient source for rice
- Evaluation of Chook-Chook-III, Moni Mukta, Sunray and Shusama as organic fertilizer for rice cultivation
- Effect of decomposition period of poultry litter ages on wetland rice cultivation
- Contribution of different nutrients from organic and inorganic sources on rice yield
- Determination of biomass-C under different organic and inorganic fertilizer management in wetland rice culture

- Carbon and nitrogen mineralization and carbon dioxide evolution from cow dung and poultry manure amended soil under anaerobic condition

Nutrient uptake

- Genotypic variation in T. Aman and Boro rice for nutrient absorption from soil and fertilizers and their use efficiency

Long-term trial

- Long-term missing element trial and rice nutritional problems
- Effect of continuous rice cropping on rice yield and soil quality

Soil Physical Management

- Spatial variability of wheat yield in relation to soil properties

Problem Soil Management

- Evaluation of salt tolerance of sesame, Boro and T. Aman lines in coastal saline soils in south-western region of Bangladesh.
- Study on effects of using Arsenic contaminated irrigation water on rice production and its carry-over effects in food chain.
- Arsenic in the food chain: Assessment of the water-soil-crop systems in target areas of Bangladesh.
- Impact of arsenic contamination on agricultural sustainability and food quality
- Application of different fertilizer, chemical amendment and organic matter to increase the

productivity of coastal salt affected soil in Satkhira

- Alternative rice cultivation methods for arsenic mitigation in the soil-plant system
- Effect of arsenic levels on vegetable growth
- Spatial variability of arsenic in soil irrigated by shallow tube well water with high arsenic content
- Status of arsenic concentrations of water, soil and crop in south-western Bangladesh
- Study of heavy metal contents in poultry manure

Microbiological Study

- Isolation and identification of indigenous potential organic decomposer (filamentous fungi) and determination rate of composting

Research Program during 2006-2010

Soil Fertility and Plant Nutrition

Nitrogen response study

- Nitrogen response of MV and hybrid entries in a rice-fallow-rice cropping pattern
- Performance of USG on the growth and yield of drum seeded wetland rice
- Comparative study of some promising lines and BRRI varieties to N doses
- Study of N release pattern from USG and PU under field condition and its effect on grain yield and N nutrition of rice
- Nitrogen response behavior of ALART materials for T. Aman rice
- Comparison of different application methods of USG for wetland rice
- Nitrogen response of MVs and hybrid entries in a rice-rice cropping pattern

Phosphorus response study

- Phosphorus response of MV and hybrid rice in a rice-fallow-rice cropping pattern
- Performance of BRRRI released varieties/lines on P deficient soil
- Screening for P efficient germplasms in P deficient soil
- Phosphorus response of MVs and hybrid entries in a rice-rice cropping pattern

Potassium response study

- Potassium response of MV and hybrid rice in a rice-fallow-rice cropping pattern
- Adaptation and adoption of K fertilizer technology in Bangladesh
- Effect of K as organic and inorganic sources on growth, yield and mineral nutrition of rice in a rice-fallow-rice cropping pattern
- Integrated use of organic and inorganic K fertilizer on sustainable soil K fertility and productivity
- Potassium response of MVs and hybrid entries in a rice-rice cropping pattern

Organic and inorganic nutrient sources

- Evaluation of cow dung, poultry manure (PM), rice straw and farmyard manure as supplemental nutrient source for rice
- Effect of PM incorporation of different ages on wetland rice cultivation
- Performance of Moni Mukta, Agro-Sar, Jaibo-Sar, Super Greenfield, Chook-Chook 111, Flora, Biostar, Waste Concern organic fertilizer on growth and yield of wetland rice

- Integrated use of PM and chemical fertilizers for rice

Long-term trials

- Long-term missing element trial and rice nutritional problems
- Effect of continuous wetland intensive rice cropping on performance of HYV rice

Soil fertility and yield maximization

- Evaluation of soil test based fertilizer doses for maximum rice yield
- Fertility assessment of BRRRI farm soils (Rangpur, Rajshahi)
- Validation of soil test based fertilizer doses for sustainable soil fertility and productivity of rice
- Impact of maize-rice-potato cropping sequence on soil fertility and crop productivity
- Effect of double/triple rice cropping pattern for maximizing yield and sustaining soil fertility

Problem Soil Management

- Study of heavy metals content in poultry feed and poultry litter
- Zinc and N interaction in Boro rice grown in calcareous soil
- Heavy metal contamination in soil water and plant systems
- Screening rice varieties for less Arsenic uptake
- Removal of Arsenic by water hyacinth

Microbiological Study

- Isolation and biochemical characterization of diazotrophs from wetland rice

- Isolation of Arsenic oxidizing-reducing bacteria and reclamation of As (III) in *invitro* condition
- Effect of soil nutrients on microbial population in wetland rice cultivation

Research program during 2011-2015

Soil Fertility and Plant Nutrition

Nitrogen response study

- Effect of N rates on yield of BRR1 varieties/lines
- Nitrogen losses and rice yield with N and water management options in a triple rice cropping system
- Determination of N fertilizer dose through SSNM for ALART materials

Potassium response study

- Evaluation of K rates with BRR1 varieties
- Effect of K rates on soil available K
- Determination of K fertilizer dose through SSNM for ALART materials

Phosphorus response study

- Evaluation of BRR1 dhan29 in P deficient soil
- Evaluation of N P compound (N P C) fertilizer on Boro rice
- Determination of P fertilizer dose through SSNM for ALART materials

Zinc response study

- Performance of zinc enriched rice varieties under zinc deficient condition

Long-term trials

- Long-term missing element trial and rice nutritional problems
- Long-term missing element trial at BRRI Regional Stations
- Effect of continuous wetland intensive rice cropping

Soil fertility and yield maximization

- Effect of double or triple rice cropping on yield maximization and soil fertility
- Validation of BRRI developed fertilizer management technology at farmers field (Barisal and Rangpur regions)
- Nutrient management for growing four crops in a year
- Identify appropriate nutrient dose for satisfactory yield under AWD situation including optimization of N, P, K and other nutrients

Soil Physical Management

- Soil profile study of selected areas/experiments

Soil and Environment

- Assessment of existing carbon stock in some AEZ soils in Bangladesh
- Carbon accumulation and its mineralization in soils under AWD and continuous flooding conditions with rice in net house
- Carbon sequestration in soils under different tillage method and rice straw management
- Effect of different organic materials and fertilizer management on carbon

sequestration under rice-fallow-rice cropping pattern

- Greenhouse gas emission from rice field
- Fertilizer Management for cold and submergence prone ecosystem (AEZ-3), drought prone and cold ecosystem (AEZ-26), non-saline tidal flood ecosystem (AEZ-13) and haor areas (AEZ-21)
- Varietal adaptation and adoption in Rajshahi and Barisal regions
- Cropping patterns for drought prone Rajshahi and saline prone Barisal regions
- Climate smart agricultural practices in three villages of Kapasia and Kishoreganj

Problem Soil-Water Management

- Survey of Arsenic status in soil and irrigation water
- Effect of different levels of Arsenic containing water management techniques on rice yield and its Arsenic content
- Effect of Arsenic contaminated irrigation water to some BRRI varieties
- Fertilizer management for saline and char land ecosystem (AEZ-18)
- Fertilizer Management for rice and rice based cropping patterns in unfavorable ecosystems of Bangladesh
- Screening of salt tolerant rice germplasms

Microbiological Study

- Effect of soil nutrients on microbial population in wetland rice cultivation
- Influence of fertilizer management on microbes and soil health

- Effect of long term nutrient management on microbial growth at variable soil depth
- Isolation and characterization of plant growth promoting bacteria from saline, acidic and peat soils
- Bioremediation of Arsenic contaminated paddy soils

Research program during 2016-17

Soil Fertility and Plant Nutrition

- N P K fertilizer doses through SSNM for ALART materials
- Nutrient management for growing four crops in a year

N response study

- Effect of N on modern rice cultivation
- Alternate wetting and drying and N management

K response study

- Effect of K on modern rice cultivation
- Alternate wetting and drying and K management

Zinc response study

- Performance of zinc enriched rice varieties under zinc deficient condition

Long-term trials

- Long-term missing element trial at BIRRI regional station
- Long-term effect of organic and inorganic nutrients on yield and yield trend of lowland rice (missing element trial)
- Consequences of continuous wetland rice cropping on rice yield and soil health

Integrated nutrient management

- Integrated nutrient management for double and triple rice cropping for maximizing productivity
- Performance of vermicompost and poultry manure on rice yield and soil health
- Effects of organic and chemical fertilizer on rice production
- Evaluation of city waste in rice cultivation

Soil Physical Study

- Organic and inorganic fertilizer management effect on physical properties of a soil under rice-rice system

Problem Soil Management

- Effect of gypsum on soil salinity and rice yield in coastal areas
- Evaluation of salt tolerant rice varieties in salt affected soil

Soil and Environment

- Greenhouse gas (GHG) emissions, measurement and mitigation

Microbiological Study

- Influence of fertilizer management on microbes and soil health
- Effect of long term nutrient management on microbial growth at variable soil depth
- Formulation and evaluation of multistrain biofertilizer for rice production
- Isolation and characterization of plant growth promoting bacteria from saline and acidic soils
- Bioremediation of Arsenic contaminated paddy soils

Major Achievements

- Developed suitable N doses and application schedule for the different BRRi MVs and hybrid rice.
- Established critical level of soil available S (12.0 ppm), Zn (1.0 ppm), P (6.0 ppm) and exchangeable K (0.06 cmol kg⁻¹ soil) for wetland rice in Bangladesh.
- Developed integrated nutrient management practices combining chemical fertilizers and crop residues/animal dung/green manures for rice-rice and rice-wheat cropping systems.
- Identified poultry manure as a good source of organic matter and plant nutrients for rice production.
- Identified rice straw as a source of potassium fertilizer.
- Determined round-the-year soil and ground water salinity trends, and assessment of the fertility status of coastal saline belt of Bangladesh.
- Selected salt tolerant rice genotypes.
- Assessed arsenic problem in the irrigated water-soil-plant systems.
- Assessed rice yield trends under various fertilizer management practices through long-term experimentation on intensive rice cropping.
- Developed participatory plant nutrient management practice.
- Discovered technology for quality compost.
- Recommended site-specific soil and plant test based fertilizer doses for high yield goals in rice-rice and rice-wheat cropping systems.
- Broadcast and incorporation of USG in Tidal Submergence Prone Area.

- Phosphorus management technology in acid soils.
- Cowdung (2.0 t ha^{-1} oven dry) and poultry manure (1.0 t ha^{-1} oven dry) as alternatives to chemical phosphorus fertilizer.
- Potassium management technology in wheat growing soils.
- Soil salinity management technology through organic and inorganic amendments.
- GIS based village level soil fertility mapping with minimum soil analysis.
- Contribution of silt accumulation for the improvement of the fertility of rice soils.
- Techniques to minimize GHG emission from rice field.
- Fertilizer package for low-input rice variety (BRRI dhan69).

Future Research Thrust

- Understanding and arresting the declining/plateau trend in yield levels and unstable production growth; improving factor productivity, increasing fertilizer use efficiency.
- Minimizing soil fatigue and enhancing soil quality through balance fertilization and integrated nutrient management practices for increasing the nutrient use efficiency and cost effectiveness in input use.
- Impact of arsenic buildup in soil and on crop yield and its mitigation. Speciation of arsenic and tolerant variety selection.
- Improvement of physical, chemical and biological properties of soil for sustaining higher productivity of rice and rice based cropping system and reduce chemical fertilizer use.

- Understanding soil ecosystem services.
- Monitoring soil C stocks associated with land use patterns, management practices and land use changes for C sequestration.
- Nutrient deposition, soil acidification and salinization patterns and their management.
- Soil quality improvement. Soil biology and biodiversity targets for a soil type under different use patterns, climate change scenarios and ecosystem services.
- Prediction of fertilizer requirement for a crop and cropping system based on target yield and nutrient supplying capacity.
- Development of practical tools for the farmers to conserve soil for all agricultural production systems.
- Understanding the response of microbial communities to soil management and to assess the relationship between microbial diversity and function.
- Development of environmentally safe and economically viable biofertilizers.
- Initiate and maintain long-term field experiments in different ecosystems to investigate critical soil P and K concentrations required to optimize crop yields.
- Improvement of soil physical conditions to facilitate speedy and effective salt leaching from soil.
- Delineation of sodic and saline sodic soils and their management. Amendment of problem soils.
- Understanding recovery rates of soil C and interactions between SOM, biodiversity, transformations of nutrients and soil structure.

- Establish functional relationship of soil management with soil quality.
- Fertilizer management packages for abiotic stress ecosystems (salinity, drought, submergence) including selection of suitable varieties.
- Determination of soil yield potential based on soil quality. Char land and upland crop management.
- Soil processes as influenced by climate change impacts.
- Greenhouse gas emission from paddy soil, adaptation and mitigation. Minimization of reactive nitrogen loss.
- Carbon foot print in rice based cropping systems.
- Soil management to maximize yield in single and double rice cropping systems.

Soil Science Laboratory

The Soil Science Division runs three laboratories—soil chemistry and fertility laboratory, microbiology laboratory, and extension and upgrading laboratory. Many of the modern analytical services are available in the laboratories. The division acquired three atomic absorption spectrophotometers for K, Ca, Mg, Na, Fe, Mn, Zn, Cu, and heavy metals analyses and arsenic analysis. It has the facilities for analysis using HPLC and ICP.

Manpower

Name and designation	Specialization/interest
Dr. Jatish Chandra Biswas, CSO & Head	Plant nutrition, Soil microbiology
Dr. M. Rafiqul Islam, PSO	Soil pollution
Dr. Aminul Islam, PSO	Potassium nutrition
Dr. U. A. Naher, PSO	Soil microbiology
Md. Sajidur Rahman, PSO	Pedology
Dr. A.T.M.S. Hossain, MS, SSO	Phosphorus nutrition
Dr. F. Rahman, MS, SSO	Soil C management
Dr. Mozammel Haque, SSO	Greenhouse gas
Ms. M Akhter, MS, SSO	Nitrogen dynamics
S. M. Mofijul Islam, MS, SSO	Greenhouse gas
Dr. Mosud Iqbal, SSO	Arsenic problems
Md. N. Ahmed, MS, SO	Soil fertility
Md. Nazrul Islam, MS, SO	Soil salinity
Md. I. U. Sarker, MS, SO	Soil microbiology
Ms. Farzana Alam, MS, SO	Soil fertility
Faruk Hossain Khan, MS, SO	Soil physics
Ms. Mahmuda Akhter, MS, SO	Soil pollution
Ms. Afsana Jahan, MS, SO	Soil microbiology
Ms. N Akhter, Dip-in Ag, SA	
Mr. A Taleb, Dip-in Ag, SA	
Ms. Shahin Sultana, LDA	
Mr. M. Abu Javed, LA	
Mr. Rafiqul Islam, GA	
Ms. Nazma Akhter, LA	

Selected Publications List

- Haque, M. M., J. C. Biswas., S. Y. Kim., P. J. Kim. 2016. Suppressing methane emission and global warming potential from rice fields through intermittent drainage and green biomass amendment. *Soil Use Mgt.* 32:72–79.
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People Left the Division

Dr. Animesh Chandra Roy, founder Head of the division, left BIRRI in 1980.

Mr. Enayet, left BIRRI and joined SRTI.

Dr. N. I. Bhuiyan, former head of Soil Science Division from 1981 to 1996. He was promoted to Director (Res.) and DG, BIRRI, retired in 2004.

Dr. G. M. Panauallah, former head of Soil Science Division from 1997 to 2001. He was promoted to Director (Res.), BIRRI, and resigned from the institute.

Dr. M.S. Rahman, PSO, retired in 2003.

Dr. M. Ishaque, PSO, resigned in 2008

Dr. M.A.M. Miah, CSO & Head, retired in 2008

Dr. S.K. Zaman, CSO & Head, retired in 2011

Dr. A. Latif Shah, CSO & Head, retired in 2014

Dr. M.A. Saleque, PSO, promoted to CASR in 2013

Dr. P.K. Saha, CSO & Head, retired in 2014

Dr. Mustaque Ahmed, PSO, left BIRRI for Australia.

Dr. Md. Mujibul Islam, SSO, left BIRRI for Australia.

Mr. Murshidul Kabir, SSO, left BIRRI and joined Bangladesh Sugar Industries.

Mr. M Shahjahan Mia, SSO, left BIRRI for Australia.

Mr. A. B. M. Saiful Islam, SSO, resigned.

Mr. Md. Abdul Awal, SO, left BIRRI and joined DAE.

Dr. Md. Nuruzzaman, SO, left BIRRI for Australia.

Dr. Md. Joinal Abedin, SO, left BIRRI for Canada.

Dr. A. T. M. Mohammad Ali, SO, left BIRRI for Australia

Ms. Shamsun Nahar, SO, left BIRRI.

Mr. M. Jashim Uddin, SO, left BIRRI in 2004.

Mr. Z. U. Ahmed, SSO, left BIRRI in 2008

Mr. A. B. M. B. U. Pathan, SSO, left BIRRI in 2008

Kazi Manna Akhter, SO

Md. Abdul Aziz, SO, left BIRRI in 2008

Mr. M. Hossain, B. Sc., EM, retired in 2015

Mr. M. Tofazzal Hossain Khan, SA, retired in 2015
Mr. Subol C. Dhar, Laboratory Assistant, retired in 2015
Mr. M. A. Awal, Dip-in Ag, SSA, Retired
Mr. M. Habibur Rahman Sarkar, SA, Expired
Mr. M. Tayub Ali, Office Assistant, moved to DG's office.
Ms Mahmuda Khatun, Office Assistant, moved to the Director (Res) office.
Mr. Anwar Hossain, Laboratory Attendant, retired in 2008.
Selim Ahmed
Golam Kibria
Mizanur Rahman Khan

