

ANNUAL REPORT

2022-2023

Towards building advanced
intelligent system for agriculture



BANGLADESH AGRICULTURAL RESEARCH COUNCIL

Farmgate, Dhaka-1215, Bangladesh

www.barc.gov.bd



National Agricultural Research System (NARS)

Institute	Ministry	Areas of Research
Bangladesh Agricultural Research Council (BARC), Dhaka www.barc.gov.bd	Agriculture	Strengthen the national agricultural research capability through research planning, coordination, integration and resource allocation
Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur www.bari.gov.bd	Agriculture	Basic, applied and adaptive research on cereals (other than rice), pulses, oilseeds, vegetables, horticultural crops etc.
Bangladesh Rice Research Institute (BRRI), Joydebpur, Gazipur www.brri.gov.bd	Agriculture	Basic, applied and adaptive research on rice
Bangladesh Jute Research Institute (BJRI), Sher-e-Bangla Nagar, Dhaka www.bjri.gov.bd	Agriculture	Basic, applied and adaptive research on jute production and utilization
Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh www.bina.gov.bd	Agriculture	Application on nuclear technology in agriculture
Bangladesh Sugarcrop Research Institute (BSRI), Ishurdi, Pabna www.bsri.gov.bd	Agriculture	Applied and adaptive research on sugarcrops
Soil Resource Development Institute (SRDI), Farmgate, Dhaka www.srdi.gov.bd	Agriculture	Soil survey, soil classification and soil characterization
Cotton Development Board (CDB), Khamarbari, Farmgate, Dhaka www.cdb.gov.bd	Agriculture	Cotton production and research
Bangladesh Wheat and Maize Research Institute (BWMRI), www.bwmri.gov.bd	Agriculture	Basic, applied and adaptive research on wheat and Maize
Bangladesh Fisheries Research Institute (BFRI), Mymensingh www.fri.gov.bd	Fisheries and Livestock	Marine and freshwater fisheries research
Bangladesh Livestock Research Institute (BLRI), Savar, Dhaka www.blri.gov.bd	Fisheries and Livestock	Basic and applied research on cattle, buffalo, sheep, goats, poultry, duck, etc.
Bangladesh Forest Research Institute (BFRI), Sholashahar, Chittagong www.bfri.gov.bd	Environment Forest and Climate Change	Forestry and agroforestry research
Bangladesh Tea Research Institute (BTRI), Srimangal, Moulvibazar www.btri.gov.bd	Commerce	Applied and adaptive research on tea
Bangladesh Sericulture Research and Training Institute (BSRTI), Baliapukur, Rajshahi www.bsrti.gov.bd	Textiles and Jute	Research and training on sericulture

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Bangladesh Agricultural Research Council

New Airport Road, Farmgate, Dhaka-1215

www.barc.gov.bd



Published By

Bangladesh Agricultural Research Council

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October 2023

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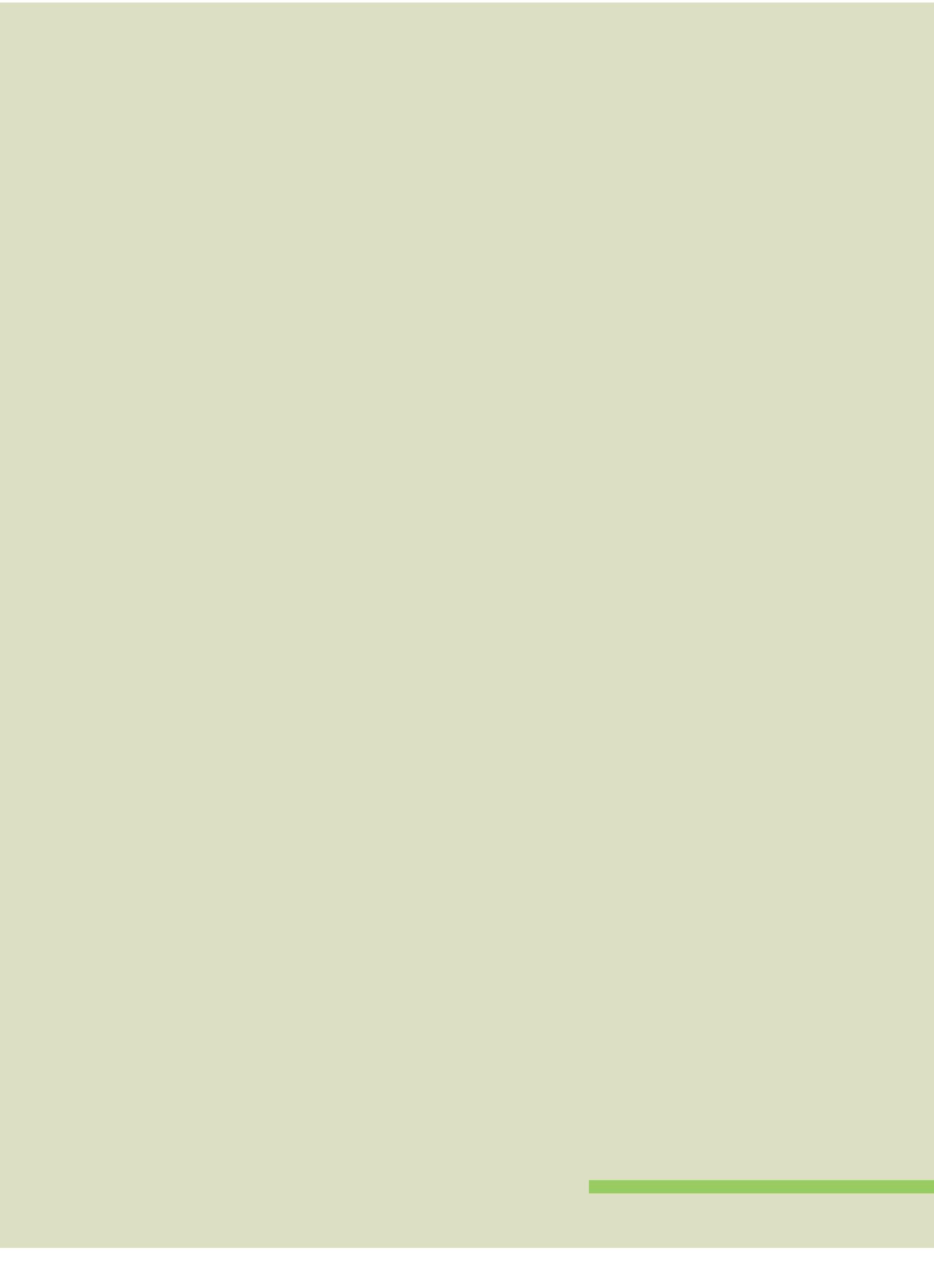
Illustration & Printed by:

Generation PPA, Motijheel, Dhaka. 01819 230291



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Foreword

I am delighted to know that BARC Annual Report 2022-2023 is peeping through window. This report reflects as usual the annual activities accomplished during the reporting period. Bangladesh Agricultural Research Council plans and implements the annual activities through seven divisions, seven units, and one centre.

The annual report reveals that each of the divisions, units, and the centre has done quite a lot of scheduled work within the time frame. A few of the striking paradigm is that Hon'ble Prime Minister of the Government of the People's Republic of Bangladesh, Sheikh Hasina unveiled A Development Trajectory of Bangladesh Agriculture: From Food Deficit to Surplus, Agricultural Development for Fragile Ecosystem in Bangladesh and Bangladesh Agricultural Research Vision 2041. Livestock Division, BARC implemented a project titled *Qualitative and Quantitative Study of Hazardous Chemicals in Broiler* from January to June 2022 financed by the Ministry of Agriculture. Ten antibiotics and three heavy metals were tested from broiler meat, bones, and composite samples (liver, kidney, and gizzard) by ISO-certified and accredited laboratories. To announce the results of the project, a press briefing was organized by the Press Information Department (PID) of the Ministry of Agriculture (MoA), Bangladesh Secretariat.

During the reporting period the 26th CORRA annual meeting on enhancing regional cooperation in rice production among the staple food-producing countries in Asia was held during 29-30 November 2022 at Bangladesh Rice Research Institute (BRRI), Gazipur, jointly organized by IRRI, the Ministry of Agriculture, and the Bangladesh Agricultural Research Council (BARC).

A multi stakeholders agricultural development program titled 'Program for Agricultural and Rural Transformation through Nutrition, Entrepreneurship and Resilience' (PARTNER) has been prepared during the reporting period. This is a project under IDA credit ID7299-BD amounting US\$500 million and IFAD amounting US\$ 43 million as project cost. BARC has been implementing some multipurpose project such as 'Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh' implemented by the coordination of the Crops Division, BARC with the Soil Resource Development Institute (SRDI) and Institute of Water Modeling (IWM). Nutrient Management for Diversified Cropping in Bangladesh (NUMAN). There is an international project collaborated with NARS institutes and public universities of Bangladesh and Murdoch University of Australia, is jointly funded by Krishi Gobeshona Foundation



(KGF) and Australian Council for International Agricultural Research (ACIAR). Improving crops through conventional methods and fitting the developed varieties under different agro-ecological zones have been a challenge and will remain so in future.

Maximization and intensification of land utilization is another focused area with improving cropping patterns whereas soil health management efforts have got increased importance. However, frontiers sciences like biotechnology and genome editing technology are though relatively new but sensitizing scientists for adopting to address research issues not being settled through conventional techniques. Nevertheless, various programs on adaptive trials of different products and crops varieties are under implementation and experimentation at a regular basis. Another challenge of malnutrition is crucial, we keep focusing on the nutritional improvement of consumers through food of plant and animal sources as well. Cost-effective livestock production for an increased supply of animal-origin food and productivity improvement are conducive in this regard.

The scientists, officers, and staff of BARC have worked hard in an innovative, collaborative, and inclusive way to make the annual report a comprehensive and impressive. I congratulate and thank them for their whole-hearted cooperation and activities during the reporting period. As this Annual Report reflects the spirit of continuous innovation, I believe, this will pave more ways for new strategies in the upcoming years. Finally, I thank those associated with compiling, editing, and printing the annual report 2022-2023.



(Dr. Shaikh Mohammad Bokhtiar)
Executive Chairman

Executive Summary

The Annual Report 2022-2023 is presenting the activities of Bangladesh Agricultural Research Council (BARC) associated with coordination, management and development of research programmes of the National Agricultural Research System (NARS) institutes. The highlights of the progress activities during the period have been highlighted in this report.

Hon'ble Prime Minister of the Government of the People's Republic of Bangladesh, Sheikh Hasina unveiled the cover of the three BARC publications on the occasion of inaugural ceremony of BRRI Golden Jubilee on 22nd February 2023. The three books are *A Development Trajectory of Bangladesh Agriculture From Food Deficit to Surplus*, *Agricultural Development for Fragile Ecosystem in Bangladesh* and *Bangladesh Agricultural Research Vision 2041*. BARC's Executive Chairman Dr. S M Bokhtiar is the first author of the first two books.

Research study on Qualitative and Quantitative Study of Hazardous Chemicals in Broiler was implemented by Livestock Division, BARC from January to June 2022. Ten antibiotics and three heavy metals were tested from broiler meat, bones, and composite samples (liver, kidney, and gizzard) by ISO-certified and accredited laboratories. To announce the project results, a press briefing was organized by the Press Information Department (PID) of the Ministry of Agriculture (MoA). In the press briefing, on the basis of results of this project, Hon'ble Agriculture Minister assured that broiler meat is safe for human consumption.

The 26th CORRA annual meeting was held during 29-30 November 2022 at Bangladesh Rice Research Institute (BRRI) in Gazipur. The meeting jointly organized by IRRI, the Ministry of



Executive Summary

Agriculture, and Bangladesh Agricultural Research Council (BARC) discussed for enhancing regional cooperation in rice production among the staple food-producing countries in Asia. The Government of Bangladesh launched a new mega Program titled Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience in Bangladesh (PARTNER) to promote diversification, food safety, entrepreneurship, and resilience in the agri-food value chains of Bangladesh. The Program implementation commenced in July 2023 and will continue until December 2028 under the Ministry of Agriculture (MoA) through Department of Agricultural Extension (DAE) as lead agency the along with Department of Agricultural Marketing (DAM), Bangladesh Agricultural Research Council (BARC), Bangladesh Agricultural Development Corporation (BADC), Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), and Barind Multipurpose Development Authority (BMDA).

A National Workshop on Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050 was held at BARC by Agricultural Economics and Rural Sociology (AERS) Division, BARC. In this workshop, Dr. Muhammad Abdur Razzaque, MP, Hon'ble Minister, Ministry of Agriculture (MoA) was present as the chief guest.

The 8th CGIAR Advisory Committee (CAC) Meeting discussed the progress of the ongoing projects/programs being implemented by the CG Centres in Bangladesh in collaboration with the public, private, and development partners held on 21 June 2023 at the BARC. The meeting was chaired by Dr. SM Bokhtiar, Executive Chairman, BARC who also is the chair of the CAC. Ms Wahida Akter, Secretary, MoA attended the program as chief guest. The CAC members from the concerned ministries, research-extension institutes, universities and representatives of all

CG Centers (IRRI, CIMMYT, WorldFish, IFPRI, and CIP) were the attendees. Dr. Temina Lalani-Shariff, Regional Director for South Asia, CGIAR was also present in the meeting.

The AFACI projects funded by the government of Korea are implemented by BARC in collaboration with the NARS institutes. In financial 2022-2023 year under the supervision of the MoA and BARC coordination, five AFACI projects were implemented. The projects were Rural Agricultural Technology Extension System in Asia (RATES), (implementing organization: DAE & BARI); Development of Vegetable Breeding Technology in Asia (implementing organization: BARI); Soil Atlas in Asia and National Soil Information Systems (SRDI); Salt-Tolerant Rice (STR) Selection and dissemination of elite salinity tolerant rice varieties in AFACI member countries (BRRI & BINA); Asian Food Composition Database (AFCD) (Dhaka University & BRRI)

A 17-member committee was formed with Executive Chairman, BARC as Convener and General Manager (Seed), BADC as Member-Secretary for formulation of 'National Seed Vision 2030. According to the decision of the 99th meeting of the National Seed Board BARC is coordinating the project titled "Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh" (in short crop zoning) with financial support of Krishi Gobeshona Foundation (KGF) since June 2017. The main purpose of this project is to develop an online crop zoning application system using geospatial technology (GIS, RS, GPS) to deliver necessary information to ensure a sustainable agricultural production system for a long-term food security. The 'Khamari' mobile app is developed for the dissemination of land parcel level information on suitable crops, crop varieties with their yield and duration, soil nutrient-based fertilizer recommendations, land and soil

Executive Summary

characteristics, etc. to the farmers, extension workers, and other stakeholders of agriculture sector.

Bangladesh GAP Standards have been approved by the Technical and Steering Committee, being notified by the MoA on 4 June 2023. The scheme certification mark is the protected mark of Bangladesh, also commonly known as 'Logo'. GAP owned by the Scheme Owner (BARC). After a long process, the Certification Mark (Logo) of Bangladesh Good Agricultural Practices has been approved by the MoA on 28 May 2023. A day-long workshop on "Standard Operating Procedure for Genome Edited Plants in Bangladesh" was held on 25 May 2023 at BARC, organized by Crops Division, with Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC as chief guest. The main objective of this program was to ensure the safe and appropriate use of these plants while keeping environmental, health, and ethical considerations in mind.

A training course for two days on *Contemporary issues and Technologies in Forestry and Agroforestry for Professionals* was organized at BARC during 1-2 March 2023. Forty participants from different 18 organizations like NARS institutions (BARC, BARI, BRRI, BJRI, BSRI, BFRI, BWMRI, SRDI, BTRI, etc.), DAE, SPARRSO, BMWA, RDA, WARPO, and NGOs (CNRS and CEGIS) participated the training.

A review workshop on 'National Budget 2023-24 Analysis: Agriculture and Agricultural Development Perspective' was organized at BARC on 21 June 2023. The Resource Speaker was Dr. Md. Abdus Salam, PSO (AERS), BARC. All scientists and officers of BARC participated the workshop.

The technology Transfer and Monitoring Unit (TTMU) is working to facilitate the prompt transfer of technologies generated by the NARS institutes to Extension agencies viz. Department of

Agriculture Extension (DAE), Department of Fisheries (DoF), Department of livestock (DLS), private and public organizations. The unit is also coordinating to strengthen the linkages among research, extension, and farmers through organizing workshops, trainings, meetings, seminars, etc. Under the context during the reporting period (July 2022-June 2023) TTMU organized three ToT training programs and three Agricultural Technology Extension Coordination Committee (ATECC) meetings.

In the financial year, 2022-2023, one DPC-2 meeting was held. Five Principal Scientific Officers, one of each Programmer, Protocol Officer, and Data Entry officer were directly recruited after the meeting. Three DPC-3 meetings were held in the financial year, 2022-2023. Thirteen staffs were appointed following the meetings. Among the appointees there were one Transport Inspector, two of each Word Processing Assistant and Stenographer cum Computer Operator, one of each Auditor, Cataloguer, Audio Visual Assistant, and five Office Assistant cum Computer Operator.

As per approved annual budget allocation, BARC sent proposal for fund release to the government on quarterly basis. During the financial year BARC received Tk. 3897.97 lakh for salary and allowances, supply and services, research, pension and retirement benefit, repair and maintenance, manpower development and capital fund.

Planning and evaluation (P&E) division timely and effectively monitored special funded projects of NARS institutes, CRG and PBRG sub-projects under PIU NATP-2, BARC project. The division coordinated Omics Food and Nutritional Security-Platform Technologies to Enhance Crop Genetic Resources and Food Value Chains in Bangladesh (OFANS), funded by KGF (ID: TF-92-FNS/21). Likewise, Capacity Building for Conducting Adaptive Trials on Seaweed Cultivation in Coastal

Executive Summary

Areas and Improving Research Qualities of ARI's Through Review and Evaluation by an External Panel of Experts were implemented with financial support, from KGF (ID: CEP VI-BARC/2021). Planning and Evaluation Division organized 'Preparation of Agricultural Workplan workshop in Accordance with 4IR', at BARC on April 3, 2023, to review the progress of the implementation status of the Agriculture Ministry's specific targets related to the Sustainable Development Goals (SDGs). During the workshop, a threadbare discussion was held regarding the practical implementation of the specific targets set by MoA.

Key activities performed by the Unit are project development, supervision, execution, technology development, monitoring and evaluation of the research projects, coordinating research programs with the NARS institutes, universities, BCSIR, BFSA, BIRTAN, and the agencies engaged in nutritional research and development like FAO, WHO, World Vision, World-Fish, IFRI, Hellen Killer, etc. The unit performed some activities like evaluating contamination and adulteration of food and food products, process, chain and mollification; value addition and standardization of nutritional level in selected food items to mitigate malnutrition; food-based initiative for improving household food security, income generation and minimize malnutrition; value addition and standardization of nutritional level in selected food items from poultry origin; fortification and standardization of nutritional level in selected food items and efficacy test of polyphenolic compounds as quality livestock feed production.

The Livestock Division is working to improve nutritional status of the general mass through cost-effective livestock production for increased supply of animal origin food, supporting increased crop production through providing healthy draft animals and biological manure, and helping the rural poor in employment generation,

income and fuel supply through profitable livestock raising. The division is also engaged to support national avian influenza/bird flu prevention and control programs, recruit scientists/officers in NARS institutes, support different research activities of NARS institutes, and support various activities of National Agricultural Technology Project (NATP), BARC and DLS Units.

Agricultural Engineering Unit (AEU) organized a three-day long training course on IoT Based Precision Agriculture for Sustainable Production. Thirty participants from NARS institutes (BARC, BARI, BRRI, BINA, BSRI, BJRI, SRDI, and CDB), BARTAN, BADC, and DAE attended the training. Fifteen lectures on different topics focused on IoT, artificial intelligence, machine learning, and deep learning in precision agriculture, infrastructure design for precision agriculture and application, adoption, profitability, opportunities, challenges, plan, and policies of IoT-based precision agriculture were delivered by renowned scientists, teachers, and experts from different government and private organizations and universities. Likewise Agricultural Information Centre (AIC) organized a training on 'Technical Report Writing and Editing' where 25 scientists from NARS institutes were attended.

Special Achievements

Bangabandhu-Pierre Trudeau Agricultural Technology Centre Inaugurated by Prime Minister Sheikh Hasina at BRRRI



Hon'ble Prime Minister Sheikh Hasina inaugurating Bangabandhu Pierre Elliot Trudeau Agricultural Technology Centre at BRRRI

Bangladesh Rice Research Institute (BRRRI) celebrated its Golden Jubilee on 22nd February 2023. Hon'ble Prime (HPM) Minister Sheikh Hasina graced the occasion as the chief guest.

After arrival at the BRRRI, The Prime Minister paid homage to the portrait of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman. Later, HPM inaugurated the program by releasing balloons and pigeons to mark the 50th founding anniversary of BRRRI. Prime Minister reiterated her call to scientists to put extra effort into research to attain excellence in agricultural research. 'I always think that without research it's not possible to attain excellence. As we are an agriculture-base country, we have paid an extra emphasis to agriculture,' she added. However a documentary titled '50 years of BRRRI's Pride and Success' was demonstrated at the function.

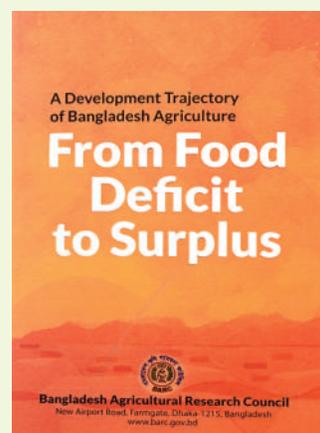
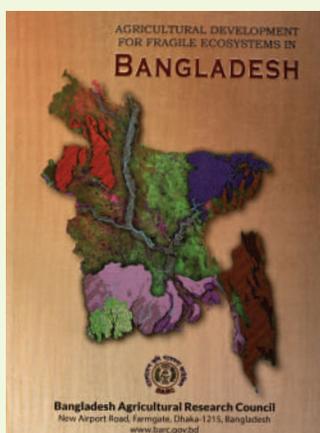
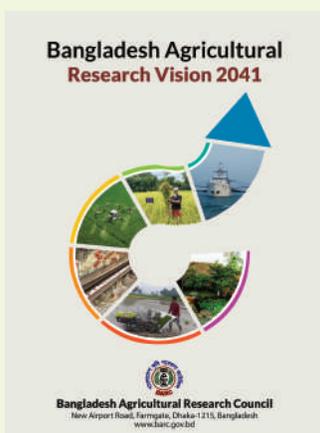
HPM inaugurated the *Bangabandhu Pierre Trudeau Agricultural Research Centre* and visited BRRRI's Innovations stalls. The centre is expected to increase the existing commercial, research activities, technology exchange, and development assistance between Bangladesh and Canada. This is the first such a research centre was set up with the direct support and funding

from the government of Canada. The technology centre has been set up at BRRi following a Memorandum of Understanding (MoU) signed between the Global Institute for Food Security (GIFS), University of Saskatchewan, Canada and the Bangladesh Agricultural Research Council (BARC) aiming to cooperate on multidisciplinary research, training, and development partnership toward sustainable food security.



Hon'ble Prime Minister Sheikh Hasina took part in Unveiling the Cover of Five Books

HPM also unveiled the cover of the publications published by BARC and BRRi. The three books published by the Bangladesh Agricultural Research Council are *A Development Trajectory of Bangladesh Agriculture: From Food Deficit to Surplus*, *Agricultural Development for Fragile Ecosystems in Bangladesh* and *Bangladesh Agricultural Research Vision 2041*. Dr. SM Bokhtiar Executive Chairman, BARC pioneered authorship of the first two books. Hon'ble Dr. Muhammad Abdur Razzaque, Minister for Agriculture, AKM Mozammel Haque, Minister for Liberation War Affairs, and Md. Zahid Ahsan Russel, State Minister for Youth and Sports, Ms. Wahida Akter, Secretary for Agriculture, Dr. SM Bokhtiar, Executive Chairman, BARC, Mr. Jean Balié, Director General, International Rice Research Institute (IRRI), Mr. Steven Webb, Executive Director and Chief Executive Officer, GIFS and Dr. M Shahjahan Kabir Director General, BRRi spoke on the occasion.



Glimpse of Recent Publications of BARC

Press Briefing on the Safety of Broiler Meat by MoA



Press Briefing on Safety of Broiler Meat by the Ministry of Agriculture

Livestock Division, BARC implemented a project *Qualitative and Quantitative Study of Hazardous Chemicals in Broiler* from January to June 2022 financed by MoA. Ten antibiotics and three heavy metals were tested from broiler meat, bones, and composite samples (liver, kidney, and gizzard) by ISO-certified and accredited laboratories. To announce the project results a press briefing was organized by the Press Information Department (PID) of MoA, on 12 January 2023. Minister Dr. Muhammad Abdur Razaque, MP, Ministry of Agriculture delivered his speech on the safety of broiler meat. On that occasion, Mr. S. M. Rezaul Karim, MP, Minister, Ministry of Fisheries and Livestock, Ms Wahida Akter, Secretary, MoA, Dr. Nahid Rashid, Secretary, Ministry of Fisheries and Livestock, Dr. SM Bokhtiar, EC, BARC were present. Approximately one hundred journalists from print and electronic media attended the press briefing. In the briefing, based on the project results the hon'able Minister for Agriculture declared and confirmed that broiler meat is safe for human consumption

National Workshop on Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050



Dr. Muhammad Abdur Razzaque, MP, Hon'ble Minister, MoA delivering speech as Chief Guest

The National Workshop on Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050 was held at BARC on 23 August 2022, being organized by Agricultural Economics and Rural Sociology (AERS) Division, BARC. Dr. Muhammad Abdur Razzaque, MP, Hon'ble Minister, MoA graced the workshop as the chief guest. Mr. Md. Sayedul Islam, Hon'ble Secretary, MoA was the special guest. It was presided over by Dr. S M Bokhtiar, EC, BARC. At first, the session chair welcomed all and started the workshop with a briefing on study result, which could be potentially useful for policy support.

The Inaugural and welcome speech was offered by Dr. Md. Mosharraf Uddin Molla, Member Director (AERS), BARC and coordinator of the research team. The keynote paper was presented by Dr. S M Fakhru Islam, Professor (Retired), BSMRAU, Gazipur and Leader, Research Team. More than a hundred participants including team members and members of the advisory committee, additional secretaries of the Ministry of Agriculture, renowned university professors, agriculture experts and delegates from different research organizations and the private sectors attended the workshop. Print and electronic media persons were invited for press coverage.

Finally chief guest and special guest appreciated the presentation of the research report highlighting the importance of this research report in the support of national policy implementation.

OFFICE OF THE EXECUTIVE CHAIRMAN

The office of the Executive Chairman works as nerve and brain of the organization coupled liaisons with national and international bodies of both home and abroad. However, the central entity is accomplishing its function with the following personnel.

Name of the Professionals

Name	Designation
Dr. Shaikh Mohammad Bokhtiar	Executive Chairman
Md. Mustafizur Rahman	Principal Technical Officer
S.M. Mustafizur Rahman	Personal Secretary
Md. Mustafa Kamal	Data Entry Officer (CC)

2. Annual Performance Agreement (APA) Activities Accomplished Under Right to Information (RTI)

In line with the APA (2022-2023) under RTI seven following activities were successfully carried out.

- I. Disposal of applications received for information delivery within the stipulated time;
- II. All information publishable under the RTI, were updated and disclosed through website twice a year;
- III. The Annual Report of BARC was published on time both in electronic format and hard copy.
- IV. Under Clause 5, Right to Information Act 2009 Category and Catalog of all information was prepared and updated;
- V. Two seminars, one each for officers and staff and one meeting for officers were organized under the activity of awareness building on the RTI act and regulations;
- VI. Three training programs on the RTI Act and regulations were organized. One of those was for the officers while rest two were for the staff members.
- VII. Quarterly progress reports were uploaded to the BARC website under RTI Services Box.



Training on Right to Information Act 2009

2. International Collaboration

Following international events (Seminar/workshop/meeting) were organized by Principal Training Officer (PTO), BARC in collaboration with other divisions during the fiscal year 2022-2023.

2.1 Council for Partnership on Rice Research in Asia (CORRA) meeting held in Bangladesh

A two-day meeting of the Council for Partnership on Rice Research in Asia (CORRA), an international agency of Asia's sixteen rice-producing country, was held during 29-30 November 2022 at Bangladesh Rice Research Institute (BRRI), Gazipur being jointly organized by IRRI, the MoA and BARC. The 26th CORRA annual meeting discussed for enhancing regional cooperation in rice production among the staple food-producing countries in Asia. The meeting aimed help to enhance more cooperation among member countries', as added by M Sayedul Islam, Secretary, MoA who graced the meeting as the chief guest.



Council for Partnership on Rice Research in Asia (CORRA) meeting

The main objectives of the meeting were to assess, discuss, and come to a consensus on collaborative actions and initiatives regarding principal issues and challenges facing the Asian and global rice industry. The meeting also discussed the problems and possibilities in rice production, climate change and rice-based food system. The first day of the meeting was structured with an opening session followed by five technical sessions on topics like CORRA member country updates on rice research initiatives, increasing resilience and enhancing adaptation of rice-based food systems to climate change, IRRI's research and development activities in rice research and partnership and collaboration in rice research strategies in South Asia, etc.

On the second day (Nov 30) the representatives of CORRA member states visited research facilities and experimental fields of BRRI and BARI and exchanged views on the field of possible co-operations. Among the sixteenth rice-producing countries, 11 countries representative including Bangladesh, India, Nepal, Thailand, Indonesia, Myanmar, Sri Lanka, Philippines, Laos, Pakistan, and Cambodia directly participated the meeting and the other countries like China, South Korea, Malaysia, Vietnam, and Japan took part through virtual platform.

The opening session was chaired by Shaikh Mohamamd Bokhtiar, Executive Chairman, BARC and attended by the heads and senior representatives of the National Agricultural Research and Extension Systems (NARES) of Bangladesh and the representatives of the CORRA member countries and senior IRRI officials.

2.2 8th CGIAR Advisory Committee (CAC) Meeting



Hon'ble Chief Guest, Ms Wahida Akter, Secretary, MoA, Chair Dr. SM Bokhtiar, EC, BARC and the Other Guests of the Eighth CAC Meeting

The 8th CGIAR Advisory Committee (CAC) Meeting was held on 21 June 2023 at BARC Conference Room, Farmgate, Dhaka. The meeting was chaired by Dr. S.M Bokhtiar, Executive Chairman, BARC who is also chairing the CAC. Ms. Wahida Akter, Secretary, Ministry of Agriculture attended the program as chief guest. The CAC members from the concerned ministries, research-extension institutes, and universities, and representatives of all CG Centers (IRRI, CIMMYT, WorldFish, IFPRI, and CIP) were present. Dr. Temina Lalani-Shariff, Regional Director for South Asia, CGIAR was also present in the meeting.

The Meeting discussed the progress of the ongoing projects/programs being implemented by the CG Centers in Bangladesh in collaboration with the public, private, and development partners. The meeting also discussed how the collaboration between government agencies and CG centers could be strengthened further.

2.3 Implementation of AFACI Projects

The AFACI projects funded by the government of Korea are being implemented by BARC and the NARS institutes. Under the supervision of the MoA and BARC coordination during the financial year 2022-2023 following AFACI projects were implemented.

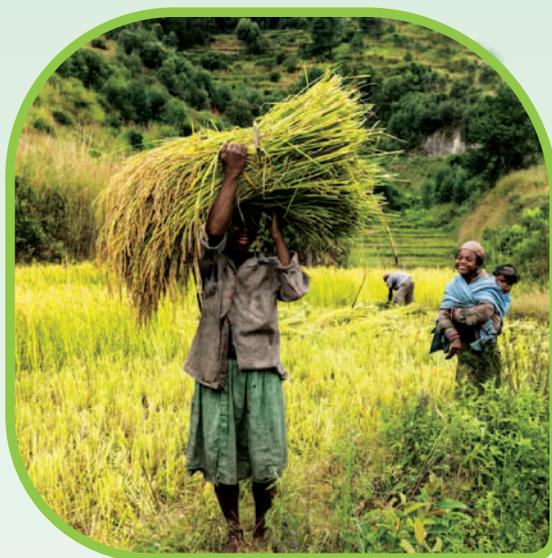
1. Rural Agricultural Technology Extension System in Asia (RATES), (implementing organization-BARC, DAE & BARI)
2. Development of Vegetable Breeding Technology in Asia ((implementing organization-BARI)
3. Soil Atlas in Asia and National Soil Information Systems (implementing organization-BARC, SRDI)
4. Salt-Tolerant Rice (STR) Selection and dissemination of elite salinity tolerant rice varieties in AFACI member countries (implementing organization-BARC, BRRI & BINA)
5. Asian Food Composition Database (AFCD) (implementing organization-Dhaka University and BRRI)

2.4 International Meeting, Events and Programs

During the financial year 2022-2023 the Executive Chairman of BARC Dr. Shaikh Mohammad Bokhtiar attended the following important international meeting, events, and programs. It is participation has facilitated strengthened collaboration after a well and wider understanding.

Sl. No.	Program Title	Venue	Date
1.	Bangladesh Day of the 7 th International Horticultural Exhibition Expo 2022 'Floriade Almere'	1-6 July 2022	Netherlands
2.	17th GIAR System Council Meeting and related events	31 Oct. to 04 Nov. 2022	Brisbane, Australia
3.	Annual Meeting & Pause, Reflect and Plan Workshop	13-16 March 2023	Cambodia
4.	South-South High-Level Meeting at BISA, New Delhi, India during	1-2 Sept. 2023	India
5.	Convening on Agronomy R&D Priorities for Climate Change Adaptation	01-02 Feb. 2023	Nairobi, Kenya
6.	18th CGIAR System Council Meeting and related events in,	10-12 May 2023	Washington, D.C., USA
7.	Impact of Sub-seasonal and Seasonal Forecast for Agriculture Project	28th May-3rd June 2023	Netherlands

CROPS DIVISION



CROPS DIVISION

The Crops Division is a vital body of the organization carrying out multifarious functions and responsibilities towards food security, livelihood improvement, employment generation and equitable natural resources management. In addition, the division oversees the NARS institutes' research progress and programs on routine basis. Furthermore, it also pays its utmost and sincere efforts in formulating various national policies and providing inputs and comments on similar documents compiled by other organizations. It is exerting its duties with the following professionals.

Name of Professionals	
Name	Designation
Dr. Md. Abdus Salam	Member Director (Routine Charge)
Dr. Md. Harunur Rashid	Chief Scientific Officer
Dr. Shah Md. Monir Hossain	Chief Scientific Officer (CC)
Dr. Md. Mahfuz Alam	Principal Scientific Officer
Dr. Md. Rezwan Molla	Principal Scientific Officer
Dr. Md. Jamal Uddin	Principal Scientific Officer
Dr. Md. Jahirul Islam	Principal Scientific Officer

Also, the activities performed during the reporting period is listed down.

1. Regional and International Collaboration and Cooperation

Linkage with International Organizations and Development Partners

- The First Virtual meeting of the Joint Agricultural Working Group (JAWG) between Bangladesh and Cambodia was held on November 2022
- Attended CORA inaugural meeting held on November 2022
- Attended BSAFE Workshop held on December 2022
- Attended the AFACI meeting held on December 2022
- Attended the SAARC Charter Day held on December 2022
- Inputs for Hon'ble Minister for Agriculture, Government of the People's Republic of Bangladesh to attend the 15th Global Forum for Food and Agriculture (GFFA)' held on December 2022
- Organized 1st Joint Follow-up Committee meeting between Bangladesh and Sri Lanka held on February 2023
- Attended meeting with FAO Investment Expert held on April 2023, FAO FAW Action Plan meeting held on May 2023 and FAO Investment for Transforming Agriculture meeting held on May 2023
- Inputs sent on G20 Agriculture Working Group in June 2023

Inputs for Bilateral Meetings and Foreign Office Consultation (FOC)

- Joint Agricultural Working Group meeting between Bangladesh and Thailand
- Joint Agricultural Working Group meeting between Bangladesh and Cambodia
- Talking points on trade collaboration with US trade delegates
- Inputs for meeting with Agriculture Ministers' Meeting of Italy
- Talking points on trade collaboration with US trade delegates
- Foreign Ministers meeting between Bangladesh and Saudi Arabia
- A high-level meeting between Bangladesh and United Kingdom
- A high-level meeting between Bangladesh and Japan
- A high-level meeting between Bangladesh and French
- Inputs for talking points of Islamic Organization for Food Security (IOFS)
- A high-level meeting between Bangladesh-Russia
- A high-level meeting between Bangladesh and Algeria
- A high-level meeting between Bangladesh and Kenya
- A high-level meeting between Bangladesh and Cambodia
- A high-level meeting between Bangladesh and Indonesia
- FOC (4th) between Bangladesh, Russia, Vietnam, Thailand, and Oman
- Joint Agricultural Working Group meeting between Bangladesh and Singapore
- Joint Agricultural Working Group meeting between Bangladesh and Brunei
- Bilateral visit of the Honorable Prime Minister to Bangladesh and Algeria
- Comments on Global Forum for Food and Agriculture 2023 'Zero Draft Communique'
- Work plan for Joint Follow-up Committee between Bangladesh and Sri Lanka
- Opportunities in Contract Farming in Kenya, Rwanda, Tanzania, and Uganda

2. Research Program/Project Development and Evaluation

a) Annual Research Progress and Programs

As a regular activity the division has provided technical support through arranging research progress review, 2021-22 and program planning, 2022-23 workshop on (i) Crop Improvement, (ii) Crop Production, (iii) Disease Management, (iv) Insect Management, and (v) Biotechnological research program based on National Agriculture Policy 2018, 7th FYP and SDGs towards climate resilient technology development. Member Director (Crops), Chief Scientific Officer, and Principal Scientific Officers participated in different programs as Expert Member in the Central Review of BARI and Annual Review of BRRI and opined their technical suggestion.

b) Formulation of National Seed Vision 2041

According to the decision of the 99th meeting of the National Seed Board, a 17-member committee was formed with Executive Chairman, BARC as Convener and General Manager (Seed), BADC as Member-Secretary for formulating National Seed Vision 2030. In the 4th meeting of the committee, it was decided to formulate 'National Seed Vision 2041 through an expert consultation considering the national importance. The former Executive Chairman of BARC, Dr. Mohammad Jalal Uddin was assigned for the duty and all information collected from various organizations was sent to him. He prepared an initial draft and sent it to BARC. In a follow up meeting he urged that the summary table provided by BADC should be sent as a

model to other institutions so that all institutions could submit projection of their seed vision. In formulating a worthy document, the literature of other countries' seed vision was reviewed by the coordinator, PI, and expert. Accordingly, secondary information from all of the participating institutions were gathered, including NARS, BADC, DAE, agricultural universities, and private seed companies. In presence of all relevant parties a number of meetings were organized at BARC. A draft of the National Seed Vision 2041 presented in the conference before the stakeholders. After integrating the suggestions from the workshop's participants the National Seed Vision 2041 was finalized. It is expected that implementation of the National Seed Vision 2041's would help increasing seed security, crop productivity and production, farmers' income, minimum seed import, promote export, employment generation, biodiversity conservation, climate change adaptation, and contribute to gender equality.

b) 'Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh' Project

The crops division is coordinating the project titled 'Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh' (in short Crop Zoning) with the financial support of Krishi Gobeshona Foundation (KGF) since June 2017. The first phase of the project ended in January 2022 and the second phase started in February 2022. The main purpose of this project is to develop an online crop zoning application system using geospatial technology (GIS, RS, GPS) to deliver necessary information for maintaining a sustainable agricultural production system to ensure long-term food security for the people. The crop zoning application system consists of a Crop Zoning Information System (CZIS), a Crop zoning dashboard, 'Khamari' mobile app, and an agri-advisory portal (www.cropzoning.gov.bd).

The CZIS software is developed for maintaining and processing agro-edaphic and agro-climatic information related to crop suitability assessment and zoning. The 'Khamari' mobile app is developed for the dissemination of land parcel level information on suitable crop, crop varieties with their yield and duration, soil nutrient-based fertilizer recommendations, land, and soil characteristics, etc. to the farmers, extension workers, and other stakeholders in agriculture. It is developed in Bangla and can be downloaded from Google Play Store. On the other hand, the crop zoning dashboard is specifically developed for the planners, and policymakers for drawing up agricultural land use and production planning.

During 202-2023, crop suitability assessment and zoning have been completed for 83 upazilas. In altogether such activities have been completed for 365 out of 495 upazilas. The major activities performed during the period are as follows:

- i) The agro-edaphic data i.e., landform, soil association, land type, land relief, soil texture, soil consistency, soil drainage, soil moisture, water recession, soil salinity, and soil pH required for suitability assessment of crop(s) have been completed for 88 upazilas.
- ii) The soil nutrient status data i.e., Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S), Zinc (Zn), Boron (B), Calcium (Ca), Magnesium (Mg), Ferus (Fe), Copper (Cu), Manganese (Mn), soil reaction (pH), Organic matter (OM) have been compiled and edited for 88 upazilas. This data is required for formulating fertilizer recommendations for crops and cropping patterns.

- iii) The agro-climatic map layers required for the suitability assessment of crop(s) have been prepared for 83 upazilas. The thermal regime map layers are duration (number of days) of cool temperature $\leq 15^{\circ}\text{C}$ and duration of extreme temperature $\geq 40^{\circ}\text{C}$ and moisture regime map layers i.e., length (number of days) of the pre-kharif transition period, kharif growing period, and rabi growing period
- iv) The updating of the upazila soil and landform map has been completed for 84 upazilas. The updated upazila soil and landform map and relevant data are used for preparing individual map layers of land and soil factors i.e., land type, land relief, soil texture, soil consistency, soil drainage, soil moisture, water recession, soil salinity and soil pH required for edaphic suitability assessment of crops. The upazila soil sample location map has also been created for providing fertilizer recommendations for crops. During the reporting period, these activities have been completed for 83 upazilas.
- v) Socio-economic data from 133 upazilas have been collected through Focus Group Discussion (FGD) at the upazila level during the reporting period. Socioeconomic data is used for computing socio-economic indicators to measure crop profitability.
- vi) During the reporting period, demonstration trials were carried out at 16 locations for 7 (seven) rabi crops (Boro rice, Wheat, Maize, Potato, Mustard, Lentil, and Onion) for validation of fertilizer recommendations provided through 'Khamari' mobile app. Three field days were organized, of which wheat demonstration trials in Gomostapur upazila of Chapainawabganj district and Boro rice in Tungipara upazila of Gopalganj district. The Honourable Secretary, Ministry of Agriculture was present as chief guest on those field days. The onion demonstration trial organized in Faridpur Sadar upazila was attended by Member Director (Crops). It was observed from the demonstration trials that fertilizer use is higher but the yield is low in the case of farmers' practice compared to the 'Khamari' app-provided fertilizer recommendations.
- vii) Field testing and result validation training on 'Khamari' mobile app and crop zoning was conducted at 53 upazilas for agriculture extension officers, farmers, and input providers. In total 1900 persons were trained. Many important improvements to the 'Khamari' app have taken place based on the user feedback gathered from the training.
- viii) The updated land use map of 36 upazilas has been prepared using satellite imagery during the reporting period. The information is very crucial for land use planning as it provides the actual extent of cultivable land and miscellaneous land area by upazila.
- ix) The updating of pourashava (ward), union, and mauza boundary has been carried out for 48 upazilas using small area atlas maps of BBS, BBS Geocodes, National Window Portal, and LGED Digital Maps.
- x) The boundary of 113 upazilas lying within the international borders of Bangladesh was adjusted with the SoB international boundary as it is authentic and recognized internationally. The difference was from 10m to around 900m (Boda upazila and Matiranga upazila).
- xi) The preparation of 1185 soil fertility status maps for fifteen soil chemical properties (soil salinity, soil pH, OM, N, Po, Pb, K, S, Zn, B, Ca, Mg, Fe, Cu, Mn) of 79 upazilas has been completed.

- xii) The information related to crop varieties, crop management, and production technology, etc. required for the crop zoning study has been gathered, compiled, edited, and documented both in Bangla and English. The information has been uploaded into the agri-advisory portal.
- xiii) Economic profitability indicators in terms of gross margin and BCR were calculated for 76 crops in 29 upazilas at present the economic profitability indicator of 76 crops for 358 hundred upazilas has been completed. The economic profitability indicators are used for evaluating the best crop/ cropping pattern.
- xiv) During this period, some features like (1) A calculator for determining location and union wise fertilizer quantity according to cropland area; (2) Save searched outputs to facilitate offline availability of information; (3) 'Soil properties' for displaying important soil characteristics and nutrient status information of a land parcel; (4) Links to websites, videos, call centre, infographics related to different useful agricultural services, were added.
- xv) During the reporting period, the crop zoning dashboard has been overhauled. The dashboard of the crop zoning system has been developed for quick and easy access to information. The users will be able to access information on crop suitability, land use, cropping pattern with profitability, crop zone, etc. in the form of a map, table, and chart instantly by upazila, district, division, country.
- xvi) The development of CZIS software, crop zoning dashboard, 'Khamari' mobile app, and agri-advisory portal in terms of adding new features, enhancement of existing features, improvement of the user interface, fixing bugs, etc. is continuing.
- xvii) Prepared Annual Report for the period from February 2022 to January 2023 and submitted to KGF

C) Progress Activities of GAP Scheme Owner

Approval of Bangladesh GAP Standards and Certification Mark/Logo

- Bangladesh GAP Standards having a total of 246 compliance criteria with three control points is categorized into five modules viz. Food Safety Module, Environmental Management Module, Workers Health, Safety and Welfare Module, Produce Quality Module, and General Requirements Module. These standards specify the requirement of Bangladesh GAP with respect to all types of fruits, vegetables, and other crops. Bangladesh GAP Standards have been approved through the Technical and Steering Committee. Bangladesh GAP Standards have notified by the Ministry of Agriculture on 4 June 2023.
- After a long process, BARC has been able that the Certification Mark/Logo of Bangladesh Good Agricultural Practices has been approved by the Ministry of Agriculture on 28 May 2023.
- A separate section of the homepage on BARC's website for 'Bangladesh GAP' has been created to upload all document of the Scheme Owner to make it available. Afterward approval of the Standards and Certification Mark/Logo of Bangladesh Good Agricultural Practices, Bangladesh GAP is almost ready for field application.



ToT Training Programme on BJRI Generated Technologies

3. Preparation of Policy Documents and providing inputs

Policy Documents

During this reporting year, the following policy documents either have been prepared or reviewed or provided comments/inputs:

- Formulation of National Seed Policy 2022
- Opinions on finalization of Pesticide Rules 2022
- Drafting National Seed Vision 2030.
- Drafted ToR in favor of conducting research activities at the proposed Genome Centre (BJRI) prepared by the NARS Institutes
Inputs/Talking points/Opinions
- Inputs on the occasion of Bangladesh's participation in the 77th session of the United Nation General Assembly (UNGA)
- Courtesy call between the Honorable Minister of Agriculture and the Honorable Swiss Ambassador posted in Dhaka on 20 July 2022.
- Opinion on presence of excess level of chemicals in sugar powder rice and puffed rice exported from Bangladesh to Sweden
- Opinion regarding the report on implementation progress of OIC-2025 Program of Action (PoA) for Agriculture & Food Security
- Information for FAO Global Plant of Action on 'International Treaty on Plant Genetic Resources for Food and Agriculture' sent to MoA.
- Progress report of the time-bound action plan for the implementation of the Bangladesh Good Agricultural Practices (GAP) Policy 2020
- Research Purposes on Transgenic rice tested for its ability to withstand salinity and drought with the NCB approval under net house condition.
- Information on Plant Genetic Resources Collection, Conservation and Sustainable Utilization was sent to MoA.
- Comments on 'BD eggplant contains cancer causing lead' was sent to MoA.
- Monitoring report on National Integrity Workplan 2022-23.
- Talking point on '15th Global Forum for Food and Agriculture (GFFA)'
- Talking points on 'Australian high commissioner and ACIAR'.
- Meeting held at BARC on 68 Potato Variety (It needs reising, as it does not correctly).
- Talking points on 'Bangladesh Business Summit 2023 between Bangladesh and Saudi Arabia'
- Comments on establishment of Betel leaf and Mango research Centre at Rajshahi and Shatkhira.
- Comments on 'SAARC Agriculture Vision 2030' in January 2023.

4. Workshop/Meeting/Seminar

(a) Annual Research Review Workshop on Crop Improvement Program of NARS Institutes: Research Progress, 2021-2022 and Research Program, 2022-2023

A review workshop on the Crop Improvement Program of NARS Institutes was held at BARC auditorium during 21-22 August 2022. The objectives of the workshop were to review the research progress, 2021-22 and research programs, 2022-23 of NARS institutes to avoid duplication of research through appraisal of proposed programs aligning with different national vision documents and research priority. Scientists and academia of the relevant fields of research institutes and Universities attended the workshop as expert members and provided a good number of recommendations/suggestions for incorporation while planning future research programs. In the inaugural session Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC graced the session as chief guest, while the session was chaired by Dr. Mian Sayeed Hassan, Member Director (Crops), BARC. Dr. Shah Md. Monir Hossain, CSO (Crops), BARC briefed last year's recommendations provided to the NARS institutes before the audience.

Six expert members namely Dr. Shah-e-Alam, Ex. Vice Chancellor, Sher-e-Bangla Agricultural University; Prof. Dr. Rakha Hari Sarkar, University of Dhaka; Dr. Md. Amjad Hossain, Former Director General, BINA; Prof. Dr. Md. Sarowar Hossain, Sher-e-Bangla Agricultural University, Dhaka; Prof. Dr. A.K.M. Aminul Islam; Director (Res.), Bangabandhu Sheikh Muzibur Rahman Agricultural University; Prof. Dr. Gazi Md. Mohsin, Noakhali Science, and Technology University attended the technical sessions for overviewing and providing appropriate suggestions for further improvement of the programs. There were four technical sessions chaired by Dr. Shah-e-Alam, Ex. Vice Chancellor, Sher-e-Bangla Agricultural University; Dr. Md. Aziz Zilani Chowdhury, Member Director, Crops (PRL), BARC; Dr. Bhagya Rani Banik, Former Executive Chairman, BARC; Dr. Mian Sayeed Hassan, Member Director, Crops (R.C.), BARC, respectively. Following presentations, valued experts and participants provided a good number of recommendations for integration in improving future research programs. The respected six expert members of the workshop critically reviewed the presentations and passed comments/suggestions which are being forwarded to the concerned institutes in formulating future research programs towards achieving SDGs as well as food and nutritional security of the country.

(b) Annual Review Workshop on Crop Production Program of NARS Institutes: Research Progress 2021-22 and Research Program 2022-23

Annual review workshop on the Crop Production Program of NARS Institutes held at BARC during 24-25 August 2022. The objectives of the workshop were to review the research progress, 2021-22, and research program, 2022-23 of nine NARS institutes viz. BARI, BRRI, BINA, BJRI, BSRI, BWMRI, BTRI, BSRTI, and CDB to discuss the achievement and to avoid duplication of research after appraising proposed programs aligning various national vision documents and research priorities. Scientists and academia of the relevant fields of research institutes and agri-varsities attended the workshop as expert members and provided remarks/suggestions for incorporation while planning future research programs. Dr. Mian Sayeed Hasan, Member Director, Crops (R.C.), BARC welcomed the participants and requested lively participation in improving crop production program.

Six expert members viz., Dr. Rafiqul Islam Modal, former DG, BARI; Dr. Md. Abdul Quayum, former CSO, OFRD, BARI; Prof. Dr. Parimal Kanti Biswas, Department of Agronomy, Sher-e-Bangla Agricultural University (SAU); Prof. Dr. Md. Moynul Hoque, Department of Agronomy, Bangabandhu Sheikh Muzibur Rahman Agricultural University; Dr. Md. Hazrat Ali, former CSO, RFSD, BARI; Prof. Dr. A.F.M. Jamal Uddin and Prof. Dr. Md. Nazrul Islam, Department of Horticulture, SAU attended the technical sessions for overviewing and providing appropriate suggestions/comments for the annual research progress and further improvement of the future programs of the NARS Institute. There were four technical sessions chaired by Dr. Rafiqul Islam Modal, former DG, BARI; Dr. Mian Sayeed Hasan, Member Director, Crops (R.C.), BARC and Dr. Md. Aziz Zilani Chowdhury, Member Director, Crops (PRL), BARC respectively. However, valued experts and participants delivered several opinions and recommendations which were being forwarded to the concerned institutes with the hope of integration in their upcoming research programs.

(c) Annual Review Workshop on Insect Management Program: Progress 2021-22 and Research Program 2022-23

The annual review workshop on the Insect Pest Management Program of NARS Institutes viz., BARI, BARI, BINA, BJRI, BSRI, BSRTI, BWMRI, CDB, BTRI and BSRTI, was held at BARC on 28 August 2022. The objective of the workshop was to review the research progress 2021-22 and the research program 2022-23 of NARS institutes to avoid duplication of research, to develop need-based research due to climate change issues, and to take initiatives for future research programs in alliance with various vision documents and research priority. Scientists and academicians from the relevant fields of research institutes and Agricultural Universities were present as expert members in the workshop who provided their valuable remarks and suggestions to follow in formulating future research programs. The inaugural session was graced by Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC as chief guest while, Dr. Mian Sayeed Hassan, Member Director, Crops (R.C.), BARC chaired the session. Dr. Md. Mahfuz Alam, Principal Scientific Officer, Crops Division, BARC welcomed the participants and briefed last year's recommendation.

Six expert members namely Prof. Dr. Md. Mahbubur Rahman, Former Vice Chancellor, BSMRAU; Prof. Dr. Sirazul Islam, Department of Entomology, Sher-e- Bangla Agricultural University; Prof. Dr. Khandaker Shariful Islam, Department of Entomology, Bangladesh Agricultural University; Dr. Syed Nurul Alam, Former Director, BARI; Prof. Dr. Mohammad Ali, Department of Entomology, SAU and Prof. Dr. Md. Ruhul Amin, Department of Entomology, Bangabandhu Sheikh Muzibur Rahman Agricultural University(BSMRAU) were present in the workshop. Two technical sessions were chaired by Prof. Dr. Md. Mahbubur Rahman, Former Vice Chancellor, BSMRAU, and Dr. Mian Sayeed Hassan, Member Director, Crops (R.C.), BARC respectively, while the recommendation session was chaired by Dr. S. M. Bokhtiar, EC, BARC. Expert Members and valued participants placed their valuable suggestions/recommendations which were forwarded to the concerned institutes for integration in developing future research programs towards sustainable food and nutrition security.

(d) Annual Review Workshop on Disease Management Program of NARS Institutes: Research Progress 2021-22 and Research Program 2022-23

The annual review workshop on the Disease Management Program of NARS Institutes viz., BARI, BARI, BINA, BJRI, BSRI, BSRTI, BWMRI, CDB, and BTRI was held at BARC on 23 August 2022. The

objective of the workshop was to review the research progress 2021-22 and the research program 2022-23 of NARS institutes to avoid duplication of research, formulate need-based research due to climate change issues and to take initiatives for future research programs aligning with various vision documents and research priority. Scientists and academia of the relevant fields of research institutes and Agricultural Universities were present as expert members who provided their valuable remarks and suggestions to follow in formulating future research programs. Dr. Mian Sayeed Hasan, Member Director, Crops (R.C.), BARC welcomed the participants and requested a vibrant participation for improving the disease management program.

Three expert members, namely, Dr. Biresh Kumar Ghoswami, former DG, BINA, Dr. Tapan Kumer Dey, former Director, BARI; Dr. Md. Ansar Ali, former Director and Prof. Dr. Abu Ashraf Khan, Dept. of Plant Pathology, Bangabandhu Sheikh Muzibur Rahman Agricultural University (BSMRAU) were present in the day-long workshop. There were two technical sessions chaired by Dr. Mian Sayeed Hasan, Member Director, Crops (R.C.), BARC, and Dr. Md. Aziz Zilani Chowdhury, Member Director, Crops (PRL), BARC. Expert Members and valued participants placed their valuable suggestions/recommendations which were forwarded to the concerned institutes to integrate in developing future research programs towards food and nutrition security.

(e) Annual Review Workshop on Biotechnological Program: Progress 2021-22 and Research Program 2022-23

The annual review workshop on Biotechnology Program of NARS Institutes was held at BARC auditorium on 29 August 2022. The objectives of the workshop were to review the research progress 2021-22 and research programs 2022-23 of NARS institutes viz., BARI, BRRI, BINA, BJRI, BSRI, BWMRI, CDB & Agricultural Universities viz., BAU, BSMRAU and SAU; National Institute of Biotechnology (NIB) and private sectors viz., BRAC and ACI to avoid duplication of research through appraisal of proposed programs aligning various national vision documents and research priority. The inaugural session was graced by Dr. Shaikh Mohammad Bokhtiar, EC, BARC as chief guest while, Dr. Mian Sayeed Hassan, Member Director, Crops, BARC chaired the session. Scientists and academia of the relevant fields of the participating research institutes and agri-universities attended the workshop as expert members. Dr. Md. Amzad Hossain, Director General, BSRI; Prof. Dr. Rakha Hari Sarker, Department of Botany, Dhaka University; Dr. Md. Aziz Zilani Chowdhury, Member Director, Crops, BARC; Dr. Md. Shamsheer Ali, former DG, BINA and Prof. Dr. Shahidul Haque, Dept. of Biotechnology, Bangladesh Agricultural University attended the workshop as expert members. Dr. Shah Md. Monir Hossain, Chief Scientific Officer, Crops Division, BARC welcomed the participants and briefed last year's recommendation.

There were two technical sessions which were chaired by Dr. Mirza Mofazzal Islam, Director General, BINA, and Dr. Mian Sayeed Hassan, Member Director, Crops (R.C.), BARC, respectively. However, a good number of recommendations and opinion was given by the expert members and audience for integration into the future research programs of respective institutes.

(f) Workshop on Biotechnology Research based on Biotechnology Policy 2012

The 11th Progress Review Workshop on Biotechnology Research based on the Biotechnology Policy 2012 was held at BARC on 22 May 2023. Under the guidance of the Plant Biotechnology Technical Committee, the crop-related NARS institutes, agricultural universities, and private sector have prepared a mid- (2017-22) and long-term (2017-2027) biotechnology research plan based on Biotechnology Policy 2012.

The research areas of the time-bound plan are i) Developing standard of tissue culture/micropropagation method for the prompt production of high quality and disease-free seed/ sapling of important plants crops, bamboo, and timber, ii) Selection/reproduction of very important crops (paddy, wheat, pulse, oilseed, etc.) by the marker for a specific use, iii) Developing nutritional value of crops; producing transgenic plants which are resistant to insects and diseases, abiotic stress-tolerant and harmonious to climate change, iv) Identification and characterization of important genes to develop plant variety by transferring genes, v) Determination and conservation of molecular characteristics of the plant (including medicinal plants) genetic resources and necessary microorganisms in agriculture sector, vi) Revealing genome of important crops and forest plants for specific use, vii) Introduction, evaluation and testing of transgenic crops and viii) Identification of plant diseases at the molecular level. The progress of mid- and long-term activities was presented in the workshop. The compiled report was sent to the Ministry of Agriculture for necessary actions.

(g) Workshop on Standard Operating Procedure (SOP) for Genome Edited Plants in Bangladesh

Genome editing is a cutting-edge technology that employs targeted and fixed genetic traits rapidly to develop desired characteristic crops through addition and deletion. A day-long workshop on Standard Operating Procedure for Genome Edited Plants in Bangladesh was held on 25 May 2023 at BARC organized by Crops Division, BARC, Dhaka. The main objective of this program was to ensure the safe and appropriate use of these plants while keeping environment, health, and ethical considerations in mind. Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC was present as chief guest, Major General (Rtd.) Prof. Dr. A S M Matiur Rahman, Fellow, BAS, and Rehana Yasmin, Joint Secretary (Research), Ministry of Agriculture attend as special guests, respectively, Dr. Md. Abdus Salam, Member Director (Crops), BARC welcomed the participants and highlighted the importance of the program in his welcome speech and also presided over the workshop. Prof. Dr. Rakha Hari Sarker, Department of Botany, Dhaka University presented the draft SOP for Genome Edited Plants in Bangladesh; briefly outlined the current situation of agriculture and how biotechnology may be employed in agriculture. In his presentation, he also emphasizes the relevance of genome editing technology in crop development, as well as how many industrialized countries around the world are exploiting the technology in their research efforts. The Executive Chairman of BARC told that several developed and developing countries are utilizing this technology. He also suggests that the SOP applies to all researchers, institutions, and stakeholders in Bangladesh who are involved in the development, testing, and marketing of genome-edited plants. It includes everything from laboratory studies to field trials and commercialization. He also emphasized the rapid advancement of technology and advised that the Bangladesh Academy of Science (BAS) established SOP be submitted to the agricultural ministry for approval sooner. The participants opined that it was a time-demanding program that meets global and country-level expectations. However, valued experts and participants provided a few opinions and recommendations. A technical committee or relevant subject-oriented committee is required in the SoP of the process for identifying SDN1 and SDN2. A standard lab must be identified for the process of identifying SDN1 and SDN2. The workshop ended up with the recommendation to facilitate the development and release of genome-edited crops that will fulfill the demands of local farmers and consumers.

h) Pesticide Technical Advisory Committee (PTAC) and Sub PTAC Meeting

Dr. Md. Abdus Salam, MD (Crops), and Dr. Shah Md. Monir Hossain, CSO (Crops), Bangladesh Agricultural Research Council participated the PTAC Committee Meetings.

i) National Technical Committee on Crop Biotechnology (NTCCB) Core Committee meeting

- 02 hybrid varieties of Bt cotton (JKCH 1947 Bt and JKCH 1050 Bt) received from JK Agri Genetics Limited (JKAL) of India have been sent to the Ministry of Agriculture with evaluation and recommendations for field release.
- National Technical Committee on Crop Biotechnology (NTCCB) core committee opinion/recommendation on conduct of confined field trial of two transgenic 3R -gene resistant potato lines DIA-MSU-UB015 and DIA-MSU-UV0255 resistant to late blight disease.

(j) Other Activities

- In light of the annual performance agreement of the Bangladesh Agricultural Research Council for the financial year 2021-22, 02 meetings were organized to coordinate the breeding, foundation, certified and certified seed production and distribution activities of BADC, DAE, BARI, BRRI, BINA, BJRI, BSRI and CDB.
- Organized 02 meetings of the national task force formed for monitoring and appropriate management of fall armyworm in Bangladesh. Besides, organized a workshop on Knowledge Sharing Workshop on Fighting Back Fall Armyworm as a joint venture of Bangladesh Agricultural Research Council and CIMMYT.

k) Activities MD (Crops)

- Attended the following meetings/events
- Sensitization Workshop at BSRI and RARS Ishordhi;
- Steering Committee Meeting- Phytosanitary Trade Compliance in Bangladesh Project in September 2022;
- NATP-2 PAC meeting to recruit Livestock Consultant in September 2022;
- FAO Digital Village Workshop in October 2022; BAU Research Advisory meeting at Mymensingh in November 2022;
- CIMMYT Workshop on Maize Oil Production in November 2022;
- ISTA Workshop at BARC in November 2022.
- the NCB meeting at MoEFCC in November 2022.
- graced as guest of Honor for the inaugural ceremony of the EWG workshop on Harmonization of Food Safety Regulation & Standards of BFSA in December 2022.
- Project Development and Management Training in December 2022.
- Crop Zoning Workshop on Field Testing and Result Validation of Khamari Mobile App in December 2022.
- Inter-Ministerial Meeting on BD and UAE MoU at MoFA in December 2022.
- International Conference on Climate Change at the University of Dhaka in December 2022.
- GAP Technical meeting at BARC in December 2022.

- Seed Act-2018 revision meeting at BARC in December 2022.
- BINA Scientific Officer recruitment meeting in December 2022.
- 108th NSB meeting at MoA in December 2022.
- AGM of Hortex Foundation in December 2022.
- workshop on Climate-Resilient Agricultural Growth (CRAGG) for Sustainable Food Security and Poverty Alleviation in Bangladesh Organized by IFDC in January 2023.
- Biotechnological Technical Committee Meeting at BARC in January 2023.
- Crop Zoning Meeting at BARC in January 2023.
- Discussion meeting on the proposed project on South Asia Climate Adaptation Atlas in January 2023.
- Evaluation meeting of 68 potato variety in January 2023.
- BJRI Technology Transfer Workshop in January 2023.
- Workshop on Agriculture Research Vision 2041 in January 2023.
- Organized Biotechnology Workplan Progress Review Workshop in January 2023 and NTTCB meeting in January 2023.
- Expert Panel meeting in January 2023.
- Global GAP Workshop organized by Feed the Future, USAID in January 2023.
- Workshop on Exportable Mango Production in January 2023.
- Workshop at BARI on Spices Research and Development in February 2023
- Chaired in the LiDAR Technology inception Workshop in February 2023.
- Arranged Field Day on Khamari APPs at Chapainawabganj with Hon'ble Secretary in March 2023 and field Day on Khamari APPs at Rajshahi with Hon'ble Secretary in March 2023
- NATP Ph.D. Progress Review Workshop Attend Crop zoning Project Khamari Apps Field Day at Faridpur in March 2023
- ESF meeting at Finance Ministry in March 2023
- Crop zoning Khamari Apps trial field monitored at Gopalganj on April 2023
- Ph.D. student comprehensive test Examination at SAU as an Expert in April 2023.
- Meeting on Khamari Apps with Director Field Service at DAE in April 2023.
- Khamari Apps Field Day at Tungipara in April 2023.
- NCB meeting in May 2023.
- Arranged Review Workshop on the long-term Action Plan of Biotechnology in May 2023.
- Arranged Seed Vision Workshop in May 2023.

5. Regular/Routine Activities

Scientist of the Crops division were actively involved in the following committees:

- Member Secretary of NTCCB
- Member Secretary of Seed Regulatory Reform Committee
- Convener and Member Secretary, Plant Variety Protection Rules Committee-2019
- Member, National Seed Vision Committee-2030
- Member of BINA recruitment committee -2
- Member, Pesticide Technical Advisory Committee Meeting (PTAC)
- Member, National Seed Board (NSB) Technical Committee
- Member, GAP unit, BARC

- Member, National Taskforce on Fall Armyworm Management
- Member, Technical Committee, Sher-e-Bangla Agricultural University Research System
- Member, Technical Advisory Committee (TAC), Agricultural Research Foundation
- Member, General Council, Hortex Foundation

Following Regular/Routine Activities are performed by the Crops Division scientists:

- Preparation of technical reports, comments, inputs, and talking points for the Ministry of Agriculture and others.
- Commenting on MoUs and bilateral agreements with different countries, national, regional, and international organizations.
- Speech drafting for different national and international events in favor of high officials.
- Acted as a member/member secretary in different committees formed for observing national and international days.
- Prepared proceedings of different meetings and seminars.

Preparation of Annual Report and Newsletter

Prepared annual report (2022-23) and newsletter (2022-23) and submitted to AIC, BARC.

6. Publication

a) Scientific article

1. **Molla, M.R.**, Ahmed, I., Rohman, M.M., Hossain, M.A., Hassan, L. 2022. Genetic diversity assessment by microsatellite markers in summer chilli (*Capsicum annuum* L.) genotypes of Bangladesh. *SAARC Journal of Agriculture*, 20(2): 69-82. DOI: <https://doi.org/10.3329/sja.v20i2.63451>
2. **Molla, M.R.**, Ahmed, I., Rohman, M.M., Haque, M.A., Hossain, S.M.M., Hassan, L. 2022. Genetic diversity in chilli (*Capsicum annuum* L.) based on microsatellite markers: An evaluation of Bangladeshi germplasm. *Acta agriculturae Slovenica*, 118 (4): 1-20. DOI:10.14720/aas.2022.118.4.2511
3. **Molla, M.R.**, Rohman, M.M., Islam, M.R., Hasanuzzaman, M., Hassan, L. 2022. Screening and evaluation of chilli (*Capsicum annuum* L.) genotypes for waterlogging tolerance at seedling stage. *BIOCELL*, 1-15. DOI: 10.32604/biocell.2022.019243
4. Momota, z, R., Alam, K.M., Arifunnahar, M., Islam, M.N., Alam. M.M., Hossain, M.M. and Siddique, S.S. 2022. *Colletotrichum siamense* leaf blight/spot: Characterization of a newly identified disease on *Cinnamomum tamala*. *Journal of Basic Microbiology*. <https://doi.org/10.1002/jobm.202300053> (Impact factor: 2.65)
5. Ahmed, I., Rohman, M.M., Hossain, M.A., Molla, M.R., Azam, M.G., Hasan, M.M., Gaber, A., Albogami, B., Hossain, A.A. 2022. Study on the phenotypic variation of 103 cucumbers (*Cucumis sativus* L.) landraces for the development of desirable cultivars suitable for the changing climate. *Life (MDPI)*, 12, 1235.
6. Rahman KAMM, Juraimi AS, Molla MR, Hatta MAM, Sulaiman ZB, Sultana S, Gaber A, Biswas B, Hossain M. 2022. Molecular characterization of sweet potato (*Ipomoea batatas* [L.] Lam) germplasms for desirable traits by using simple sequence repeat markers. *BIOCELL*, 1-11. Doi: 10.32604/biocell.2023.025135

7. **Islam, M.J.,** Ryu, B.R., Rana, M.S., Cheong, E.J., Wang, M.H., Lim, J.D., Hossain, M.A. and Lim, Y.S., 2022. Cannabinoid accumulation in hemp depends on ROS generation and is interlinked with morpho-physiological acclimation and plasticity under an indoor LED environment. *Frontiers in plant science*, 13, p.984410. (Impact factor: 6.627)
8. Ryu, B.-R.; Kim, C.-H.; Kwon, T.-H.; Han, J.-H.; Gim, G.-J.; Islam, M.J.; Azad, M.O.K.; Rahman, M.H.; Rana, M.S.; Lim, J.-D. Industrial Hemp Clone Selection Method under LED Smart Farm Condition Based on CBD Production per Cubic Meter. *Agronomy* 2022, 12, 1809. (Impact factor: 3.7)

b) Book

Islam, M.J.; Mou, M.A.; Razzak, M.A. and Lim, Y.S., 2022. Exogenous Putrescine-Mediated Modulation of Drought Stress Tolerance in Sugar Beet: Possible Mechanisms. In: Misra, V., Srivastava, S., Mall, A.K. (eds) *Sugar Beet Cultivation, Management and Processing*. pp: 441-457, Springer, Singapore.

c) Popular Article

১. ড. মো. মাহফুজ আলম। আলুর লেট বাইট বা নাবী ধ্বসা বা মড়ক রোগ ও তার প্রতিকার। *দৈনিক সমকাল* ২৬শে ডিসেম্বর ২০২২।
২. ড. মোহাম্মদ রেজওয়ান মোল্লা ও ইফতেখার আহমেদ। বৈচিত্র্যময় আমের দেশ বাংলাদেশ, স্বত্বাধিকার প্রতিষ্ঠায় দরকার সঠিক পদক্ষেপ। *কৃষি বিষয়ক মাসিক ম্যাগাজিন কৃষিকথা*, জ্যৈষ্ঠ ১৪২৯।



Technology Transfer and Monitoring Unit (TTMU)

The Technology Transfer and Monitoring Unit (TTMU) is working to facilitate prompt transfer of technologies generated by the National Agricultural Research System (NARS) institutes to extension agencies viz. Department of Agriculture Extension (DAE), Department of Fisheries (DoF), Department of livestock (DLS), private and public organizations. TTMU is also coordinating to strengthen the linkages among research, extension, and farmers through different workshops, training, meeting, seminar, etc. In this context during the reporting period (July 2022-June 2023) TTMU organized three ToT training programmes and three Agricultural Technology Extension Coordination Committee (ATECC) meetings. However, the professionals involved in carrying out TTMU activities are mentioned in table below.

Name of Professionals

Name	Designation
Dr. Fauzia Yasmin	Director (up to 24 January/2023)
Dr. Suraya Parvin	Principal Scientific Officer

A brief description of those activities is furnished below:

1. Training, Workshop, Meeting, Seminar, etc.

i. Training (TOT): Three of such training were organized with a short sketch outlined below

A) ToT Training on Cotton Development Board Developed Technologies

A day-long Training of Trainers (ToT) program was conducted on 09 November 2022 to transfer technologies generated by Cotton Development Board (CDB). Thirty Upazila Agriculture Officers/Upazila Extension Officers from different regions participated the training program. Dr. Fauzia Yasmin, Director, TTMU was the course coordinator of this training programme. Md. Akhteruzzaman, Former Executive Director, CDB was present as chief guest, Dr. Md Fakhra Alam Ibne Tabib, Executive Director, CDB presided over the inaugural session of the training programme. The resource speakers of this training programme were the scientists of CDB. There were five technical sessions on varieties/information technologies, pests, diseases, agronomical practices, etc.)

B) ToT Training on BJRI Development Recent Technologies

A day-long Training of Trainers (ToT) program was conducted by Bangladesh Jute Research Institute (BJRI) on recent technologies) at Conference Room, BJRI, Dhaka on 27 February 2023. This training was jointly organized by TTMU, BARC and BJRI. Thirty Upazila Agriculture Officers/Upazila Extension Officers from different regions participated in this training program. Dr. Suraya Parvin, PSO (TTMU) was the course coordinator of this training programme. Dr. Md. Abdul Awal, Director General, BJRI was present as chief guest, and Dr. Moslem Uddin, Director, Technical Wing, BJRI presided over the inaugural session. The resource speakers of this training programme were the scientists of BJRI. There were five sessions on transferable Jute technologies (varieties/information technologies, pests, diseases, agronomical practices, etc.).



ToT Training Programme on BJRI Generated Technologies

C) ToT Training on BLRI Generated Technologies

To escalate technology transfer, a day-long Training of Trainers (ToT) program was conducted on 15 May 2023 at BLRI training room, Savar, Dhaka. The event was organized by TTMU, BARC and BLRI. Thirty Upazila Livestock Officers from different districts participated in this programme. Dr. Suraya Parvin, PSO (TTMU) was the Course Coordinator of this training programme. Dr. SM Jahangir Hossain, Director General, BLRI was present as Chief guest. Dr. Kamrunnahar Monira, PSO (Training, Planning and Technology Testing Division), BLRI presided over the inaugural session. The resource speakers were the scientists of BLRI. Important livestock technologies on varieties, and management practices were transferred to 30 Upazila Livestock Officers. Following the training a fruitful discussion was hold among participants and researchers. The participants reported various bottlenecks in livestock rearing and management and suggested that BLRI technologies should be disseminated accross the country. It is also a two-way communication process to transfer technologies for dissemination through this training program. The participants also suggested that such training programme could be conducted by BARC in other region for strengthening the linkage between research and extension agencies.



ToT Training Programme on BLRI Generated Technologies

ii. Agriculture Technology Extension Coordination Committee (ATECC) Meeting

A) Kharif-2 and Rabi Season /2022

A day-long meeting of the Agriculture Technology Extension Coordination Committee (ATECC) was held on 23 November 2022 at BARC for Kharif-2 and Rabi Season/2022. The meeting was presided by Dr. Shaikh Mohammad Bokhtiar, EC, BARC. He welcomed all the members and acknowledged the relentless work of agriculturists as well as extension workers in ensuring food security for the growing population and achieving the SDG and agricultural development. Stress tolerant, high yielding, climate resilient variety could be disseminated rapidly, he also added. Mr. Badal Chandra Biswas, Director General, DAE presented at the meeting Mr. Tajul Islam Patwary, Director, Field Service wing, DAE coordinated this meeting as the member secretary. All the participants of ATECC from NARS institutes, DAE, DAM, BADC, AIS, BIRTAN, SCA, Hortex Foundation, BARC, and private organizations joined the meeting. Dr. AHM Moniruzzaman, Deputy Director (Extension), DAE presented all activities of this meeting. Dr. Fauzia Yasmin, Director (TTMU), BARC as a member of the committee attended the meeting.



ATECC Meeting on 23/11/2022 at BARC for Rabi Season/2022

B) ATECC Meeting Kharif-1 Season/2023

A meeting of ATECC (Agriculture Technology Extension Coordination Committee) was held at BARC on 02 April 2023 for Kharif-1 Season/2023. The meeting was presided by Dr. Shaikh Mohammad Bokhtiar, EC, BARC. Mr. Md. Tajul Islam Patwary, Director, Field Service wing, DAE attended the meeting. All the participants of ATECC from NARS institutes (BARI, BRRI, BINA, BSRI, BJRI, CDB, SRDI), DAE, DAM, BADC, AIS, BIRTAN, SCA, Hortex Foundation, and BARC attended the meeting. Through power point presentation, Dr. AHM Moniruzzaman, Deputy Director (Extension) explained the work plan of crop demo, technology demo, field day, training, follow-up activities of seed distribution of aus, aman, boro rice, wheat, mustard, ground nut and jute for 2022-23.



ATECC Meeting for Kharif-1/2023, 02 April/23

C) ATECC Meeting Kharif-2 Season/2023

One Agriculture Technology Extension Coordination Committee meeting was held at BARC on 07 June 2023 for Kharif-2 Season/2023. The meeting was presided by Dr. Shaikh Mohammad Bokhtiar, EC, BARC. Mr. Md. Tajul Islam Patwary, Director, Field Service wing, DAE attended the meeting. All the participants of ATECC from NARS institutes (BARI, BRRI, BINA, BSRI, BJRI, CDB, SRDI), DAE, DAM, BADC, AIS, BIRTAN, SCA, Hortex Foundation, and BARC) was present in the meeting. Through power point presentation, Dr. AHM Moniruzzama, Deputy Director, DAE presented the work plan of crop demo, technology demo, field day, training, follow-up activities of seed distribution of aus, aman, boro rice, wheat, mustard, ground nut and jute for 2023-24.



ATECC Meeting for Kharif-2/2023, 07 June 23

After a threadbare discussion, a decision was taken that in the upcoming Boro season, farmers will be encouraged to use the AWD (Alternative Drying and Wetting) technology for irrigation and Khamari App for rice production. DAE will take due measures for implementation the decision.

2. Annual Performance Agreement (APA)

- Bangladesh Agricultural Research Council stood 3rd (Score: 97.64) among the 17 institutes of MoA for 2021-22 of APA.
- Evaluation Report (2021-22), 4th Quarter Reports of 2021-22, and all proofs for 2021-22 submitted to MoA and loaded in APAMS software.
- All reports for 2022-23 were submitted in APAMS software, uploaded in BARC website, and hardcopies were sent to MoA.
- The final APA for 2023-24 was prepared and submitted to APAMS software.

3. Project Implementation

During the fiscal year two projects were implemented:

i) Improving Research Qualities of ARIs through Review and Evaluation by an External Panel of Experts

Dr. Suraya Parvin, PSO, TTMU and Coordinator cum PI of the project organized several meetings of the External Panel of Experts. Under the project, BARC arranged the following workshop:

Sl. No.	Workshop/Seminar	Venue	Date	No. of Participants			Fund Source
				Male	Female	Total	
1.	Sensitization Workshop	BRRI, Gazipur	01 day 20/07/2022	10	81	91	Improving Research Qualities of ARI Project, BARC Funded by KGF
2.	Technical Workshop	BRRI, Gazipur	01 day 21/07/2022	40	07	47	
3.	Sensitization Workshop	BINA, Mymensingh	01 day 10/08/2022	52	07	59	
4.	Technical Workshop	BINA, Mymensingh	01 day 11/08/2022	43	06	49	
5.	Sensitization Workshop	BWMRI, Dinajpur	01 day 21/08/2022	43	05	48	
6.	Technical Workshop	BWMRI, Dinajpur	01 day 22/08/2022	35	06	41	
7.	Sensitization Workshop	BSRI, Ishurdi	01 day 04/09/2022	48	09	57	
8.	Technical Workshop	BSRI, Ishurdi	01 day 05/09/2022	41	02	43	
9.	Seed Production and Distribution' with Senior Scientist/Officer of BJRI, DAE, BADC, and EPE Members	Conference Room-1, BARC, Farmgate, Dhaka-1215.	01 day 20/10/2022				
10.	1st Annual Review Workshop,	Conference Room-1, BARC, Farmgate, Dhaka-1215.	01 day 07/02/2023	51	06	57	
11.	Agricultural Technology Uptake Assessment Workshop	ARS, OFRD, Rangpur	01 day 26/02/2023	50	06	56	
12.	Agricultural Technology Uptake Assessment Workshop,	Regional Station, BRRI, Barishal	01 day 20/03/2023	44	10	54	
13.	Agricultural Technology Uptake Assessment Workshop,	Training Hall, Office of the DD, DAE, Cumilla.	08/05/2023	41	3	44	

- Improving Rural Agricultural Technology Extension System in Asia (RATES) Project: With AFACI funding BARC scientist attended the workshop held on 24-28 April/2023 where country report was presented alongwith submission of the revised TCP for this project for consideration.



RARES Workshop in Korea;24-28 April 2023

4. Policy Level Contribution

Speech for Chief Guest and welcome speech was prepared on account of World Food Day/2022 for oOn 08 October 2022

5. Attended Training, Workshops, Meetings, Seminars, etc.

Officers of TTMU have attended a good number of Workshops, Seminars, Training and Meetings.

6. Other activities

Several other documents such as work-plan preparation, divisional annual progress report, budgeting for future training and workshops, reports for MoA, newsletter, APA, citizen charter, etc. were prepared.

7. Publication(s) by the Division/Section in Different Journals/Media

The section also prepared a wide of variety documents and being published as listed down.

Sl. No.	Published Item	Nos
i	Training Manuals	3
ii	Country Report	1
iii	Annual Report	2
iv]]	Progress and work-plan report:	2
Total		8

PLANNING AND EVALUATION DIVISION



PLANNING AND EVALUATION DIVISION

This is one of the vital divisions of BARC bestowed with the responsibility of developing Project proposal for the organization. It also revises and reviews the proposal prepared by other NARS institutes as per direction of MoA. In addition, the division is attending regular activities together with policy formulation as when asked by MoA and EC, BARC and other institutes. Also, opinions and comments are passed on various important documents composed by organization other than NARS institutes. However, the professionals rendering duties under the division are as follows.

Name of the Professionals

Name	Designation
Dr. Md. Abdus Salam	Member Director (CC)
Dr. Kabir Uddin Ahmed	Chief Scientific Officer (AC)
Dr. Md. Ashraful Alam	Principal Scientific Officer
Dr. A B M Khaldun	Principal Scientific Officer

The areas where the division is exerting services are summarized below

1. Coordination and Monitoring

The division handled four Programme Based Research Grant (PBRG) sub-projects, under PIU, BARC, NATP-2. The project IDs # are 06, 096, 097, 098 on Plain land eco-system, Char land eco-system, Drought eco-system and Coastal eco-system. Project Completion Reports of the sub-projects were submitted in due time. In addition, three other projects. First one titled 'Omics Food and Nutritional Security- Platform Technologies to Enhance Crop Genetic Resources and Food Value Chains in Bangladesh (OFANS), funded by KGF (ID: TF-92-FNS/21). Its second year's research report has been submitted. The second one titled Improving Research Qualities of ARI's Through Review and Evaluation by an External Panel of Experts, also funded by KGF (ID: CEP VI-BARC/2021) and its second year's report has been submitted. The third one titled Capacity Building for Conducting Adaptive Trials on Seaweed Cultivation in Coastal Areas is being implemented by June 2023 and new Phase has been started from July 2023 upto June 2025.

PARTNER Project

The Government of Bangladesh designed a new Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience in Bangladesh (PARTNER) and to promote diversification, food safety, entrepreneurship, and resilience in the agri-food value chains of Bangladesh. The Program implementation commenced in July 2023 and will continue until December 2028. The Program is under implementation of the Ministry of Agriculture (MoA) through the lead implementing agency the Department of Agricultural Extension (DAE). Others are, the Department of Agricultural Marketing (DAM), the Bangladesh Agricultural Research Council (BARC), the Bangladesh Agricultural Development Corporation (BADC), the Bangladesh Agricultural Research Institute (BARI), the Bangladesh Rice Research Institute (BRRI), and the Barind

Multipurpose Development Authority (BMDA). A Program Coordination Unit (PCU) has been established under the DAE with Agency Program Coordination Units (APCUs) at each implementing agency. In addition, there will be another eight agencies (BINA, BIRTAN, BJRI, BWMRI, SRDI, BSRI, CDB, and Hortex Foundation) as strategic partners of the PCU-DAE. The Government has received a credit from the International Development Association (IDA) Credit No. IDA 7299 - BD for US\$500 million and IFAD for US\$43 million towards the cost of PARTNER. Dr. Md. Ashraful Alam, PSO (P & E), has been assigned as Agency Program Director (APD) of the APCU-BARC component.

Research Projects Monitoring and Evaluation

- Regular desk monitoring and reporting have been done.
- Integrated Farming Research and Development for Livelihood Improvement in the Plain land Eco-system (Project ID: 061) Final Project Compilation Report (PCR) has been Submitted to PIU-BARC, NATP-2.
- Improvement of Farm Productivity through Intervention with Improved Agricultural Technologies in Char Land Eco-system (Project ID: 096) Final Project Compilation Report (PCR) has been Submitted to PIU-BARC, NATP-2.
- Climate Resilient Farming Systems Research and Development for the Coastal Eco-system (Project ID: 098) Final Project Compilation Report (PCR) has been Submitted to PIU-BARC, NATP-2.
- Livelihood Improvement of the farmers through Integrated Farming System Research and Development of Drought and Rain-fed Ecosystem (Project ID: 097) Final Project Compilation Report (PCR) has been Submitted to PIU-BARC, NATP-2.
- Monitoring of OFANS Project activities done at BSMRAU on 12 March 2023.
- Monitoring of OFANS Project activities done at BIRRI and BARI on 14 April 2023

2. Field Monitoring 2022-23

Adaptive Trials on Seaweed Cultivation Project

The project was monitored during 25-28 January, 2023. Dr. Ma Salam, mo. (Planning & Evaluation), BARC lead the monitoring activities accompanied by Dr Kabir Uddin Ahmed, CSO, (P & E). The team carried out the following efforts.

- Discussions with scientists about the progress of field activities.
- Field visit of Seaweed Cultivation and Lab Research.

3. Regional and International Collaboration and Cooperation

a) Ninth Session of The Governing Body Meeting of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

Dr. Md. Abdus Salam, Member Director (Planning and Evaluation), BARC and National Focal Point (NFP) of ITPGRFA, Bangladesh attended the Ninth Session of the Governing Body meeting of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) held in New Delhi, India during 17-24 September 2022. The session was preceded by two days of regional and

inter-regional consultations, and a special event on 'Celebrating Farmers as Guardians of Crop Diversity'. The GB-9 theme of 'Celebrating the Guardians of Crop Diversity' recognizes the contributions of the world's smallholder farmers and genebanks towards safeguarding the PGRFA that nourishes the world.

b) 11th Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture

Dr. Md. Abdus Salam, Member Director (Planning and Evaluation), Bangladesh Agricultural Research Council and National Focal Point (NFP) of ITPGRFA, Bangladesh attended the 11th Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture meeting held in FAO Head Quarter, Rome, Italy during 18-20 April 2023. The Working Group elected Dr. Md. Abdus Salam (Bangladesh) as Vice-Chairperson of the Asia region and also elected Rapporteur of the 11th Session of the Intergovernmental Technical Working Group. During the session the following issues were discussed-

- i. The third report on the state of the world's plant genetic resources for food and agriculture
- ii. Status of implementation of the second global plan of action for plant genetic resources for food and agriculture,
- iii. Conservation and on-farm management;
- iv. Sustainable use of plant genetic resources for food and agriculture;
- v. Building sustainable institutions and human capacities;
- vi. Updating the second GPA;
- vii. Application of the Genebank Standards for Plant Genetic Resources for Food and Agriculture;
- viii. Effects of seed policies, laws, and regulations;
- ix. The role of plant genetic resources for food and agriculture in mitigation of and adaptation to climate change;
- x. Access and Benefit-sharing for plant genetic resources for food and agriculture;
- xi. Digital sequence information and plant genetic resources for food and agriculture;
- xii. Strategic plan for the commission on genetic resources for food and agriculture; and
- xiii. Reports from International Organizations and Instruments.



Dr. Salam Presenting the Rapporteur Reports

4. Linkage with International Organizations and Development Partners

- In accordance with the Framework Agreement for bilateral cooperation between Wageningen University & Research (WUR) of the Netherlands and the Ministry of Agriculture of Bangladesh, a Draft Agreement has been sent to the Ministry of Agriculture (MoA) for mutual collaboration on April 11, 2023
- A report on participation in the 'Tokyo AMR One-Health Conference 2023,' virtually held on 17th February 2023, has been sent to the MoA on February 27, 2023
- Necessary information regarding the discussed matters during the courtesy call with the Honorable Minister of Agriculture & His Excellency High Commissioner of India on January, 5, 2023, has been sent to the line Ministry on 20 February, 2023
- Proposed Memorandum of Agreement (MoA) between the Bangladesh Agricultural Research Council (BARC) and the International Potato Center (CIP) was sent to the MoA on February, 15, 2023
- Views on the Agricultural Cooperation Agreement regarding cultivation between Bangladesh and Algeria was sent to the Ministry of Agriculture on February 2, 2023
- Opinion regarding the proposed Memorandum of Understanding (MoU) between Bangladesh Agricultural Research Institute (BARI) and Mianz International College (MI College) of Maldives for the purpose of signing a MoU related to suggested collaboration was sent to the Ministry of Agriculture on February 5 2023
- Information/input for briefing/running notes/talking points/statements preparation, concerning the foreign office consultations between Bangladesh and India in February 2023, were sent to the Ministry of Agriculture on January 30, 2023
- Suffrage on the proposed document of the project titled Innovative Approaches for Better Plant Production under the Economic and Technical Assistance (Grant) of the Food and Agriculture Organization (FAO) of the United Nations was sent to the Ministry of Agriculture on On January, 29 2023

- A proposal for signing of an agreement between Bangladesh Agricultural Research Council (BARC) and Cornell University for research collaboration in the field of agriculture was sent to the MoA on November, 20, 2022
- Information about the extension of the tenure of the Memorandum of Understanding (MoU) between Bangladesh Agricultural Research Council and Michigan State University, USA, was sent to the MoA on November 20, 2022
- An Agreement in the form of a Memorandum of Understanding (MoU) between Bangladesh and Japan for bilateral cooperation in the field of agriculture was sent to the MoA on November 14, 2022
- Views about the signing of a Memorandum of Understanding (MoU) between Bangladesh and Greenwich University, United Kingdom, was sent to the Ministry of Agriculture on October 31, 2022
- Taking points were prepared and sent to the Ministry of Agriculture on for presentation at the First Agriculture Deputies Meeting (ADM) held in Indore, Madhya Pradesh, India, during 13-15 February 2023.
- Suffrage was sent to the MoA on June 6, 2023 concerning the joint research agreement between Bangladesh Jute Research Institute (BJRI) and Meffy's Stylewear for the development and commercialization of diversified jute products.
- Opinion was sent to the MoA on March 3, 2023 concerning the Zero Draft Communiqué of the 2nd Agricultural Deputies Meeting (ADM) held in Chandigarh, India, from 29-31 March 2023.
- Opinion was sent to the MoA on the proposed Memorandum of Understanding (MoU) between Bangladesh and Indonesia in the field of agricultural cooperation on 23 March 2023
- A Memorandum of Understanding (MoU) was signed between Bangladesh and Greenwich University, United Kingdom
- Views were sent to the MoA regarding the Memorandum of Understanding (MoU) signed between the Ministry of Agriculture of Bangladesh and the Ministry of Agriculture and Farmers' Welfare of India on 3 March 2023
- Opinion was sent to the MoA regarding the bilateral cooperation agreement between Bangladesh and Algeria in the field of agriculture on 2 February 2023
- Opinion was sent to the MoA on the revised draft of the Memorandum of Understanding (MoU) for bilateral cooperation in the field of agriculture between Bangladesh and Argentina on 7 February 2023
- Opinion was sent to the MoA on 30 January 2023 for Memorandum of Understanding (MoU) between Cotton Development Board and USDA-ARS,
- The proposed Memorandum of Agreement between the Bangladesh Agricultural Research Council (BARC) and the International Potato Center (CIP) for consideration was forward to the MoA on 23 January 2023
- Opinion was sent to the MoA regarding the 'SAARC Agriculture Vision 2030' on 9 January 2023

- Necessary Information was provided to the Ministry of Agriculture regarding the Joint Working Group's virtual meeting for the implementation of proposed work plans within the framework of the signed MoU between Bangladesh Agricultural Research Council (BARC) and Sri Lanka Council for Agricultural Research Policy (SLCARP) on 20 December 2022
- Opinion was sent to the Ministry of Agriculture regarding the subject of signing a Memorandum of Understanding (MoU) between Bangladesh Rice Research Institute (BRRI) and the International Maize and Wheat Improvement Center (CIMMYT) on 31 August 2022
- Suffrage was sent to the Ministry of Agriculture regarding the Memorandum of Understanding (MoU) between Bangladesh Agricultural Research Institute (BARI) and Michigan State University, USA on 7 July 2022
- A Memorandum of Understanding (MoU) related to food processing collaboration between Bangladesh and Rwanda was sent to the Ministry of Agriculture on 6 July 2022
- Remarks was sent to the Ministry of Agriculture regarding the finalization of the proposed Memorandum of Understanding (MoU) on food safety matters between Bangladesh and the United Arab Emirates government on 6 December 2022
- Opinion was sent to the Ministry of Agriculture regarding the proposed Memorandum of Understanding (MoU) between World Vegetable Centre (WorldVeg) and Bangladesh Agricultural Research Institute (BARI) on 20 November 2022
- Opinion was provided to the Ministry of Agriculture regarding the Memorandum of Cooperation (MoC) to enhance trade and investment between Bangladesh and Singapore on 6 November 2022
- Opinion was sent to the Ministry of Agriculture regarding the proposed MoU between National Group, LLC (Russia) and the Bangladesh Agricultural Development Corporation (BADC) for potato export to Russia on 20 October 2022
- Views was provided to the Ministry of Agriculture regarding the revised MoU proposal between SAARC Agriculture Centre and the Postgraduate Institute of Agriculture of the University of Peradeniya, Sri Lanka on 4 October 2022
- Remarks was sent to the Ministry of Agriculture regarding the signing of a Memorandum of Understanding (MoU) between Bangladesh Agricultural Research Council (BARC) and the Indian Council of Agricultural Research (ICAR) on 4 October 2022
- Opinion was provided regarding the proposed bilateral Memorandum of Understanding (MoU) for agricultural cooperation between Bangladesh and Mexico on 10 November 2022
- Opinion was provided regarding the proposed bilateral Memorandum of Understanding (MoU) on sugarcane cultivation between Bangladesh and India on 1 November 2022
- Suffrage was sent to the Ministry of Agriculture regarding the Memorandum of Understanding (MoU) between Bangladesh Agricultural Research Institute (BARI) and iDE-Bangladesh on 25 October 2022
- Opinion was provided to the Ministry of Agriculture regarding the amended MoU proposal for bilateral cooperation between Bangladesh and Indonesia in the field of agriculture on 23 October 2022

- Opinion was sent to the Ministry of Agriculture regarding the Memorandum of Understanding (MoU) between BIMSTEC and the International Food Policy Research Institute (IFPRI) on 31 August 2022
- Opinion was sent to the Ministry of Agriculture regarding the proposed collaborative MoU between Bangladesh Agricultural Research Institute (BARI) and Michigan State University, USA on 22 August 2022
- Remarks was sent to the Ministry of Agriculture regarding the proposed MoU between Bangladesh and Nigeria for bilateral cooperation in commercial agriculture development 21 august 2022
- Views was sent to the Ministry of Agriculture regarding the proposed bilateral MoU between Bangladesh and Argentina in the field of agriculture on 26 July 2022
- Opinion was sent to the Ministry of Agriculture regarding the proposed MoU between Bangladesh and Brazil for cooperation in the agriculture sector on 5 July 2022

5. Research Project Development and Evaluation

DPP/TAPP/Project Documents Preparation and Evaluation

- Establishment of Bangabandhu-Pierre Eliot Trudeau Agricultural Technology Center (BP-ATC) and enhancement of agricultural research capability in Bangladesh.
- Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience in Bangladesh (PARTNER)
- Establishment of the Institute of Agricultural Economists Bangladesh
- FAO-funded Pro Doc signed- Enabling inclusive and effective blended investment in agri-food systems in the context of the Hand-in-Hand Initiative (HIH)
- FAO-funded Pro Doc preparation- Technical Support (TS) for Bangladesh Agriculture Sector Transformation Programme (ATP).

Mid-Term Evaluation of Capacity Building for Conducting Adaptive Trials on Seaweed Cultivation in Coastal Areas (3rd Phase)

A mid-term evaluation report was submitted to KGF for informing funding authority for necessary action.

6. Preparation of Policy Documents, Agreements, Comments on MoU/MoA/LoA and Providing Inputs

- Opinion regarding the signing of MoU by Medina Tech Ltd with Bangladesh Agricultural Research Institute (BARI) Sent to the MoA on 25 June 2023
- Opinion regarding the signing of a MoU with the Bangladesh Agricultural Research Institute (BARI) and the Supreme Seed Company (SSCL) was sent to the MoA on 14 June 2023
- Provided input on the adoption of a 'Time-bound Action Plan' and a 'Monitoring Framework' for the effective implementation of the National Agriculture Extension Policy-2020 to the MoA on 11 January, 2023
- On 28/12/2022, the MoA of Bangladesh sent its feedback for signing MoU between Bangladesh Agricultural Research Institute (BARI) and Daffodil International University (DIU) following a proposal sent earlier.

- Opinion regarding the proposed Memorandum of Understanding (MoU) for research and manpower development between the Bangladesh Agricultural Research Council and the Bangladesh Seed Association was sent to MoA on 14 December 2023
- The proposed MoU between the Bangladesh Agricultural Research Institute (BARI) and the Bangladesh Institute of Grain and Pulse Research was sent to the Ministry of Agriculture on 30 November 2022
- Opinions of proposed Memorandum of Understanding (MoU) between the Bangladesh Agricultural Research Institute (BARI) and Abedin Equipment Limited were sent to MoA on 24 November 2022
- Views on the proposed MoU between the Bangladesh Agricultural Research Institute (BARI) and Sylhet Agricultural University was sent to the MoA on 20 November 2022
- On various dates, memoranda of understanding (MoUs) were sent to the Ministry of Agriculture from different organizations. Here is a summary of the information contained in those MoUs:

Comments on the MoU signed between Bangladesh Agricultural Research Institute (BARI) and Lal Teer Seed Limited; BARI and National Agricare Import & Export Ltd; BARI and Rural Development Academy (RDA), Bogura; BARI and Prottasha Foundation for a research agreement; Bangladesh Agricultural Research Institute (BARI) and Asian Food & Agriculture Cooperation Initiative (AFACI), BARI and AQUAFARM Shrimp Limited; BARI and International Potato Center (CIP); Bangladesh Agricultural Research Institute (BARI) and The Global Alliance for Improved Nutrition (GAIN), Bangladesh Agricultural Development Corporation (BADC) and International Maize and Wheat Improvement Center (CIMMYT); SRDI and Hajee Mohammad Danesh Science and Technology University (HSTU); Dinajpur; Bangladesh Jute Research Institute (BJRI) and Krishibid Samabay Society Limited; Department of Agricultural Extension (DAE) and International Rice Research Institute (IRRI); Bangladesh Seed Association and the Ministry for Research and Human Resources Development.

- Relevant briefings were sent to the Hon'ble Secretary of the Ministry of Agriculture for the Bill & Melinda Gates Foundation's Bangladesh Mission Team on 17 August 2022,
- Comments were sent to the Ministry of Agriculture about the working group's action plan for Skill Development, Youth, Migration and ICT (SDYMC & ICT) – LCG on 11 April 2023,
- Views were sent to the MoA for the 18th meeting of the Food Security and Disaster Assistance Cluster Committee on 6 March, 2023

7. Workshop/Seminar/Training/Meeting

a) Annual Review Workshop on Implementation Progress of Workplan 2021-22 and Proposed Workplan 2022-23

One day long workshop on Implementation Progress of Work plan 2021-2022 and Proposed Work Plan 2022-23 was organized on 04 August 2022 at BARC. Progress made on approved work plan 2021-22 was presented by the technical divisions/units. The work plan was revised as per suggestions received from the audience. 57 participants with 49 male and 8 female attended the workshop.



Executive Chairman, BARC delivering speech

b) Training Workshop on Project Development and Management (PDM)

A training workshop on Project Development and Management was organized during 04-08 December 2022. Thirty scientists include three participants attended the training workshop.

c) Workshop on SDG Tracker

In terms of the Plant Genetic Resources for the SDG Indicator 2.5.1, a meeting was held on May 17, 2023, at BARC, to mitigate duplication issues in uploading updated information of genetically modified resources by different departments/organizations on the SDG Tracker. The workshop was attended by 19 scientists and officials from departments/institutions under the MoA including Focal Person for SDG.



Workshop on SDG Tracker at BARC

d) Workshop on Implementation of Agriculture Ministry's Relevant Targets for SDGs

A workshop was held at the Auditorium of Bangladesh Agricultural Research Council (BARC) on April 3, 2023, to review the progress of the implementation of the Ministry of Agriculture's specific targets related to the SDGs. The workshop was chaired by Dr. S M Bokhtiar, EC, BARC. The chief guest of the workshop was Mohammad Rahul Amin Talukder, Additional Secretary (PPC), MoA. The workshop was attended by relevant scientists and officials from departments/institutions of MoA, including Focal Points for SDGs.

During the workshop, discussions were held regarding the practical implementation of the specific targets related to the SDGs set by the Ministry.



Dr. Md. Ruhul Amin Talukder, Additional Secretary, PPC MoA delivering his speech on occasion of Workshop on SDG Progress

e) Exchange Meeting with External Expert Panel for Enhancement of Research Quality in 'Category K' Affiliated Institutions of the National Agricultural Research System (NARS)

Planning and Evaluation Division of Bangladesh Agricultural Research Council (BARC) organized a meeting On April 16, 2023 at BARC. Dr. S M Bokhtiar, EC, BARC, chaired the meeting. The purpose of the meeting was to facilitate discussions and knowledge exchange with an external expert panel, focusing on the enhancement of research quality in institutions categorized as 'Category K' within the National Agricultural Research System.

The Chief Guest of the meeting was Dr. Md. Abdur Razzaque, MP, the Hon'able Minister of Agriculture. The distinguished guest Mr. Wahida Akhtar, Secretary of the MoA, and other relevant officials from the ministry, as well as the heads of departments/institutions under the ministry, attended the meeting. Dr. Md. Abdur Razzaque MP, the Honorable Minister of Agriculture, inaugurated the event with his valuable insights. Furthermore, the meeting was attended by Executive Director of the Krishi Gobeshona Foundation, the institute's esteemed external expert panel members, and 36 scientists/experts from the relevant departments/institutions affiliated with the Ministry of Agriculture.

The primary objective of this meeting was to engage in discussions and knowledge sharing with the external expert panel in order to formulate strategies for improving the research quality of institutions classified under 'Category K' within the National Agricultural Research System.



Hon'ble Agriculture Minister delivering speech

f) A knowledge exchange meeting was held regarding the production and distribution of seeds for various crops between the external expert panel of the institute, officials from BARI, BADC, and DAE.

An Expert panel's meeting was held at BARC On October 20, 2022, organized by Planning and Evaluation Division, BARC. Dr. S M Bokhtiar, EC, BARC, chaired the meeting. The purpose of the meeting was to facilitate discussions and knowledge exchange on the production and distribution of seeds for various crops, involving an external expert panel formed by the government.

During the meeting, a productive exchange of ideas took place between the government-established external expert panel and representatives from Bangladesh Agricultural Research Institute (BARI), Bangladesh Agricultural Development Corporation (BADC), and Department of Agricultural Extension (DAE). The focus was on matters related to the production and distribution of seeds of various crops. The meeting was attended by prominent figures including heads of BARI, BADC, DAE, and the Chief of BARC. In addition, dignitaries from the Bangladesh Jute Research Institute, Bangladesh Agricultural Development Corporation, and Department of Agricultural Extension, along with esteemed members of the external expert panel, actively participated in the discussions. Furthermore, around 30 officials from relevant departments/institutions under the MoA were also present.

The meeting provided an opportunity to share insights, experiences, and expertise among the participants, contributed to the development of effective strategies for improving the production and distribution of seeds for various crops. This collaborative effort is expected to yield positive outcomes in the agricultural sector, enhancing crop yields and supporting agricultural growth.



Expert panel's meeting held at BARC

g) 1st Annual Review Workshop on 'Improving Research Qualities of ARI's through Review and Evaluation by an External Panel of Experts'

1st Annual Review Workshop on 'Improving Research Qualities of ARI's through Review and Evaluation by an External Panel of Experts' Panel of Experts was held on 07 February, 2023 at BARC conference room-1 organized by Planning and Evaluation Division, BARC. It is noteworthy to mention that the activities of the program is funded by KGF. In total 30 scientists including three female from NARS institutes participated the workshop. The even discussed on the progress activities of the said program.



Annual Workshop of External Panel of Experts at BARC

h) Coordination Meeting on Research Activities and Financial Progress in the Project titled Capacity Building for Conducting Adaptive Trials on Seaweed Cultivation in Costal Areas (Phase-3)

Dr. S M Bokhtiar, Executive Chairman, BARC chaired the coordination meeting on research activities and financial progress of the project titled 'Capacity Building for Conducting Adaptive Trials on Seaweed Cultivation in Costal Areas (Phase-3)' funded by KGF. The programme was organized by Planning and Evaluation Division, BARC on April 26, 2023 at BARC. The meeting was attended by the Director General of Bangladesh Agricultural Research Institute (BARI), Executive Director, KGF along with concerned scientists/officials of BARC, BARI and KGF.



Executive Chairman Delivering Speech at the Meeting on the Sea Weed Project's Progress

i) Workshop on Formulating Agricultural Development Plans with Relevance to the Fourth Industrial Revolution (4IR)

A workshop on 4IR was organized to recommend new initiatives/projects from relevant departments/institutions, with the participation of focal points, experts, and officials. The workshop was held on July 28, 2022, BARC, Farmgate, Dhaka. The objective was to finalize new programs/projects to move the farm sector forward.

j) Training attended by the scientists of Planning and Evaluation Division

Dr.Md. Ashraful Alam, PSO (P&E), BARC

- i. Attended a training programme titled Public Financial Management: Concepts, Rules and Procedures on 21-23 May/2023 conducted by the Institute of Public Finance Bangladesh (IPF), Dhaka.
- ii. Joined a training programme titled Climate Smart Agriculture for Adaptation during 16-18 May 2023 conducted by BARC, Farmgate, Dhaka.
- iii. Attended a training programme titled Public Procurement Management during 19-20 March 2023 conducted by BARC, Farmgate, Dhaka.
- iv. He attended a training programme titled Use of Modern Farm Machinery for Ensuring Food Security during 12-14 March 2023 conducted by BARC, Farmgate, Dhaka.
- v. Joined a training programme titled Awareness Building on Act and Policies of Bangladesh Agriculture held on during 12-14 March 2023 organized by BARC.
- vi. Also attended the training programme titled The Fourth Industrial Revolution and Potential Application in Livestock Sector during 25-26 January 2023 conducted by BARC.

Dr. ABM Khaldun, PSO (P&E), BARC

- i. Attended a training programme titled Climate Change, Carbon Sequestration, and Adaptation Strategies held during 18-20 June 2023 conducted by BARC.
- ii. He participated a training programme titled Public Procurement Management during 19-20 March 2023 conducted by BARC.

- iii. Attended a training programme titled Contemporary Issues and Technologies in Forestry and Agroforestry for Professionals during 01-02 March 2023 arranged by BARC, Dhaka.
- iv. Attended a training programme titled Awareness Building on Act and Policies of Bangladesh Agriculture during 26-28 February 2023 arranged by BARC.
- v. Joined a training programme titled Crop Improvement through Plan Biotechnology during 15-19 January 2023 conducted by National Agriculture Training Academy (NATA), Gazipur.
- vi. Also attended a training programme titled Project Development and Management during 04-08 December 2023 conducted by BARC.

8. Regular/Routine Activities

Annual Report for 2020-21, ADP review meeting reports, monthly progress report of MoA projects, reports on Prime Minister's directions and report on meeting with Secretary were prepared and sent to MoA for necessary action. Besides a monthly report on National Social Security Program in Agriculture Sector was sent to Ministry of Agriculture.

9. Publications

Quite a good number of publication was prepared during the reporting as below:

- Project Development and Management (PDM) Training Manual.
- BARC Annual Work Progress (2021-2022) and Work Plan (2022-23) published.
- Prepared Annual Report 2020-21 and news on workshops/training/seminars were submitted to the AIC unit for BARC Newsletter.
- Integrated Farming Research and Development for Livelihood Improvement in the Plain land Eco-system (Project ID: 061) Final Project Compilation Report (PCR).
- Improvement of Farm Productivity through Intervention with Improved Agricultural Technologies in Char Land Eco-system (Project ID: 096) Final Project Compilation Report (PCR).
- Climate Resilient Farming Systems Research and Development for the Coastal Eco-system (Project ID: 098) Final Project Compilation Report (PCR).
- Livelihood Improvement of Farmers through Integrated Farming System Research and Development of Drought and Rain-fed Ecosystem (Project ID: 097) Final Project Compilation Report (PCR).
- Journal publication- Evaluation of Inbred Maize (*Zea mays L.*) for Tolerance to Low Phosphorus at the Seedling Stage. 2023. Md. Shalim Uddin, Farzana Akter, Md. Golam Azam, Shamim Ara Bagum, Neelima Hossain, Masum Billah, Priya Lal Biswas, Abu Sayeed Md. Hasibuzzaman, Abul Bashir Mohammad Khaldun, Amnah Mohammed Alsuhaibani, Ahmed Gaber, and Akbar Hossain. *Plants* 2023, 12, 2520. <https://doi.org/10.3390/plants12132520>

MANPOWER AND TRAINING UNIT

During July 2022 to June 2023 in total, 8,250 scientists/officers/ representatives from the National Agricultural Research System (NARS) institutes including Bangladesh Agricultural Research Council (BARC) and other associate organizations participated revenue/other sources' funded training/workshop/seminar/higher study programs at home and abroad through physical and virtual modality. However, the personeels rendering their duties under the unit are as follows:

Name of Professionals

Name	Designation
Dr. M. Baktear Hossain	Director
Mr. Md. Al Mobasher Hussen	Principal Training Officer

The major activities that Manpower and Training Unit has accomplished/assisted in implementation during the reporting period are delineated below.

1.1 Training on Citizen Charter

Manpower and Training Unit, BARC conducted a day-long training on Citizen Charter as per Annual Performance Agreement (APA) Work Plan 2022-2023. The overall objective of this training is to raise employees' awareness of the citizen charter by ensuring quality services on time for the citizen. In total 55 employees of 16-20 grades participated the training program. The five assigned topics are (i) Citizen Charter: vision, mission & importance; (ii) Rules & Regulations related to the provision of services; (iii) Service delivery systems and timeline; (iv) Types of services and (v) BARC's Citizen Charter were discussed in the training. The APA team members of BARC conducted the training sessions as resource persons. Dr. Shaikh Moham mad Bokhtiar, Executive Chairman, BARC inaugurated the training program as chief guest.



The Executive Chairman, BARC inaugurating program as chief guest.

1.2 Training on Public Procurement Management (PPM)

Manpower and Training Unit organized a two-day in-house training on Public Procurement Management for mid-level scientists and officers. The training was held during 19-20 March 2023 at BARC. The overall objective of the training is to improve the knowledge and skills of mid-level scientists/officers in the management of



PKSF Procurement Expert Conducting Two Training Sessions as a Resource

procurement functions following the Public Procurement Act, 2006 & Public Procurement Rules 2008. In total 35 mid-level scientists and officers participated the training program. The Procurement Experts from different public and private organizations (DAE, PKSF, and DoF) conducted the training sessions.

1.3 Training on Awareness and Skill Development

The unit organized a two-day in-house training on awareness and skill development for professional drivers and associated staff during 8-9 May 2023 at BARC. Twenty-two drivers and associated staff took part in the training program. The training objective is to enhance the participant's etiquette awareness and vehicle maintenance skills. The concerned officials from Bangladesh Road Transport Authority (BRTA), Dhaka conducted the training sessions.

1.4 Training on Annual Performance Agreement (APA)

The unit conducted a day-long training on Annual Performance Agreement. The training was held on 24 May 2023 at BARC. In total 57 officers of the Council attended the training program. The training is designed to enhance the participant's knowledge and skills in determining performance indicators that are result-oriented in the preparation of the Annual Performance Agreement: 2023-24. Ms.



Inaugural Session of APA training

Nazia Shirin, Joint Secretary (Budget & Monitoring), Ministry of Agriculture conducted major sessions on (i) Guidelines for APA; (ii) APA structure, process & timeline; (iii) APA Mandatory Strategic Objectives (MSO) and (iv) APA Monitoring and Evaluation as resource speaker.

2. Workshop on Citizen Charter of BARC

A day-long workshop on the BARC's Citizen Charter took place on 26 October 2022 at BARC. The unit organized the program in cooperation with the Citizen Charter Monitoring Committee of the Council. The objective of the program was to review the current BARC services and update the BARC citizen's charter by participating in all Divisions/Units. Dr. Shaikh Mohammad Bokhtiar, Executive Chairman of BARC was the chief guest at the event and Dr. Md. Baktear Hossain, Director (Manpower & Training), BARC attended as a special guest. Dr. Md. Saifullah, Member Director (Admin & Finance), BARC presided over the workshop. In total 80 employees of the council took part in the program. Mr. Md. Al Mobasher Hussen, Principal Training Officer and alternate focal point, citizen charter, BARC welcomed the participants and highlighted the importance of the program in his welcome speech. Mr. Md. Mustafizur Rahman, Principal Technical Officer and Member Secretary, Citizen Charter



Inaugural Session of Review Workshop on BARC's Citizen Charter

presented a brief on Citizen Charter update guidelines with Citizen Charter Work Plan, 2022-23 prepared by the Cabinet Division. Then, the Session Chair is invited to present existing and proposed services by Divisions/Units for inclusion in the Citizen Charter. Dr. Mian Sayeed Hassan, Member Director (NRM), and Mr. Hasan Md. Hamidur Rahman, Director (Computer & GIS) was present as discussants in the program. After threadbare discussions, it was decided that the new & updated services proposed by the Divisions and Units would be included in the BARC's citizen charter following Citizen Charter Update guidelines. The Citizen Charter Update Committee of BARC will take necessary action for updating the citizen charter. The respected chief guest emphasized timely service delivery to the citizen in ensuring transparency and accountability. He also requested everyone to work with a service mentality from their respective positions

3. Seminar on Different Agricultural Issues (Based)

Activities	Progress
i. Seminar on 'Climate Change: Actions for Food Security and Safe Food Assurance' (PIU-BARC, NATP-II Project Funding)	Held on 12 Jan. 2023 at BARC No. of Participants: 80 nos. from KGF, SAC, PIU-BARC, NATP-2, PMU-NATP-2 Moderator: Dr. Md. Saifullah, Member Director (A&F), BARC Keynote Speaker: Dr. Md. Abdus Salam, Member Director (Crops), BARC
ii. Transformation of Nutrition-Sensitive Agri-Food System (KGF Funding)	Held on 11 Jan. 2023 at BARC No. of Participants: 80 nos. from KGF, SAC, PIU-BARC, NATP-2, PMU-NATP-2 Moderator: Dr. Md. Abdus Salam, Member Director (Crops), BARC Keynote Speaker: Dr. Md. Rafiqul Islam, Director (Nutrition), BARC
iii. Seminar on Mobility in Office Work and Use of Information Technology	Held on 12 Feb. 2023 at BARC No. of Participants: 140 nos. from BARC Moderator: Dr. Md. Abdus Salam, Member Director (Crops), BARC
iv. Seminar on Smart Agriculture to build smart Bangladesh	Held on 14 June 2023 at BARC No. of Participants: 300 nos. from BARC, NARS, DAE, BADC, PIU-BARC, NATP-2, KGF, etc. Moderator: Dr. Md. Saifullah, Member Director (Admin & Finance) BARC. Keynote Speaker: Mr. Md. Hamidur Rahman, Director (Computer & GIS), BARC.

4.1: Coordination Meeting on Citizen Charter as per Citizen Charter Work Plan 2022-23

The Manpower and Training unit, in collaboration with the Citizen Charter Monitoring Committee, held four coordination meetings with all divisions, units, and sections as per the Citizen Charter Work Plan 2022-23. The purpose of the meeting is to ensure that citizens receive quality service on time following BARC's citizen charter. Dr. Md. Saifullah, Member Director (Admin & Finance), BARC chaired all the four meetings.

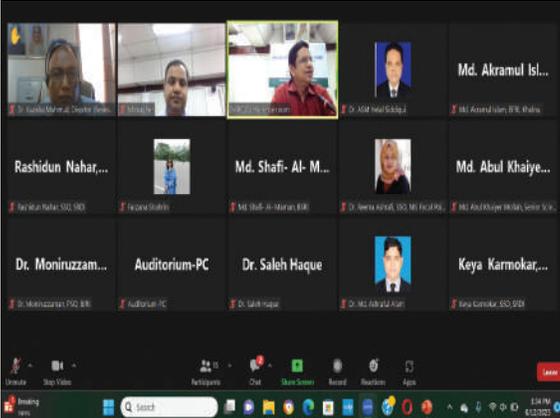
Sl.	Activities	Progress
1.	Meeting with Soil unit, Support service unit & Finance unit	Held on 06 Sept.2022, Participants: 18
2.	Meeting with P&E Division, M&T Unit, AIC, and Computer & GIS unit	Held on 24 November 2022 Participants: 28
3.	Meeting with NRM Div., Crops Div., Livestock Div., and TTMU unit	Held on 19 February 2023 Participants: 20
4.	Meeting with AERS Div., Fisheries Div., A&F Div. and Soil unit	Held on 17 May 2023 Participants: 23



Coordination Meeting on Citizen Charter

4.2. Meeting with Stakeholders of Citizen Charter

The Manpower and Training unit organized two stakeholder meetings on the citizen charter at BARC with the participation of NARS institutes and fertilizer entrepreneurs, as per the Citizen Charter Work Plan 2022-23. The meeting was organized to provide information to stakeholders about BARC's citizen charter.

SI	Activities	Progress
i.	<p>Stakeholder 1st Meeting on Citizen Charter</p>  <p><i>MD (A&F) Chaired the Meeting</i></p>	<p>Held on 19 December 2022 at BARC</p> <p>Participants: 46 (NARS, Fertilizer entrepreneur)</p> <p>Chairperson: Dr. Md. Saifullah, Member Director (Admin & Finance), BARC</p>
ii.	<p>Stakeholder 2nd Meeting on Citizen Charter</p>  <p><i>MD (A&F) Chaired the Meeting</i></p>	<p>Held on 12 June 2023 at BARC</p> <p>Participants: 44 (NARS, Fertilizer entrepreneur)</p> <p>Chairperson: Dr. Md. Saifullah, Member Director (Admin & Finance), BARC</p>

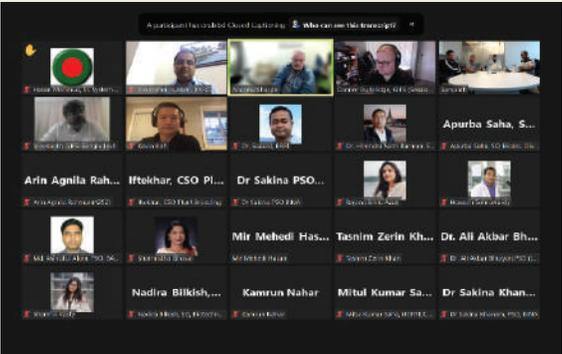
5. Project/Research Activities

Project Name: Omics Food and Nutritional Security–Platform Technologies to Enhance Crop Genetic Resources and Food Value Chains in Bangladesh (OFANS)

5.1 Theme 1: Application of Genomics and Phenomics in Plant Breeding for Crop Improvement

Specific Objective 1.4: Establishing advanced and gender-balanced training programmes at graduate, master’s, doctoral and post-doctoral levels between Bangladesh and Canada.

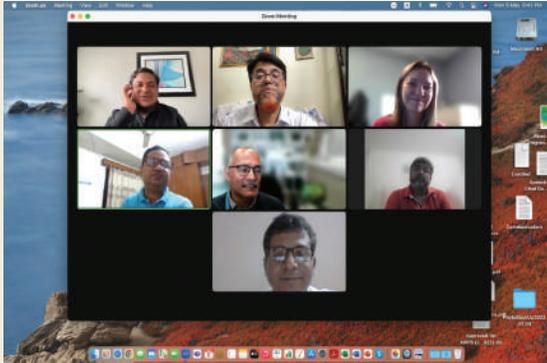
PI: Dr. Md. Baktear Hossain, Director and **Co-PI:** Md. Al Mobasher Hussen, PTO

SI	Activities	Progress
i.	<p>Stakeholder 1st Meeting on Citizen Charter</p>  <p><i>Online meeting with Bangladesh & Canadian project personnels</i></p>	<ol style="list-style-type: none"> 1. Review the activity progress of Theme 1.4 held on October 18, 2022 (Virtual) 2. Preparatory Meeting for starting bioinformatics training held on 30/1/2023 (virtual) 3. Coordination meeting for planned activities of Y2 held on 20/2/2023 (offline) 4. OFANS project coordination meeting held on 9/5/2023 (virtual)
ii.	<p>Establishment of introductory bioinformatics and statistical genomics training program by GIFS in collaboration between Bangladesh (BARC, BSMRAU, BRRI & BARI) and Canadian (GIFS/Usask/NRC) researchers</p>  <p><i>Online Training session on Bioinformatics</i></p>	<p>Conducted 03 training sessions on Introduction to Linux (2 hrs. per session)</p> <ul style="list-style-type: none"> • 1st Session held on Feb.2, 2023 • 2nd Session held on Feb. 3. 2023 • Follow-up Q&A and 3rd session held on Feb 10, 2023 <p>Conducted 03 training sessions on Introduction to R (2 hrs. per session)</p> <ul style="list-style-type: none"> • 1st session held on May 10, 2023 • 2nd session held on May 11, 2023 • 3rd session (Refreshers) held on May 18, 2023 <p>33 participants from NARS scientists, Academia, and Researchers participated in the sessions</p>

5.2 Theme 4: Postharvest Food Handling and Processing

Specific Objective 4.4: Design an online training module for postharvest food handling and processing in Bangladesh

PI: Dr. Md. Baktear Hossain, Director and Co-PI: Md. Al Mobasher Hussen, PTO

SI	Activities	Progress
i.	<p>Planning meeting for designing overall strategies for activity implementation of Specific Objective 4.4 with the participation of Bangladesh and Canadian stakeholders</p>  <p><i>Online Planning Meeting of Theme 4.4</i></p>	<p>Held on 8 May 2023 The purpose of meeting is to develop a value-adding strategy for setting learning objectives and developing a training matrix/programme outline and preparing Level 1 (Hygiene) & Level 2 (safe food handling) training modules.</p> <p>Moderator: Dr. Pankaj Bhowmik, Senior Research Officer and Scientific Support Lead, Sustainable Protein Production (SPP) Program, National Research Council of Canada</p>
ii.	<p>Meeting of training module preparation on Food Hygiene & Food Safety handling under specific objective 4.4</p>  <p><i>Online training module preparation meeting of Theme 4.4</i></p>	<p>Held on Jun 1, 2023 Phase 1: Development of Module 1 & Module 2 (Level 1-Hygiene & Level 2-safe food handling) training matrix and program outline Phase 2: Development of Train the Trainer package for Module 1 & Module 2</p> <p>Moderator: Dr. Pankaj Bhowmik, Senior Research Officer and Scientific Support Lead, Sustainable Protein Production (SPP) Program, National Research Council of Canada</p>

6. Foreign Training/Seminar/Workshop/Consultation Meeting

During the reporting period apart from in-country activities, the unit carried out nomination process for participation in virtual international seminars/workshops/meetings. In total 41 research managers/scientists/personnel of different fields of agriculture and cross-cutting issues attended 21 programs to enrich their professional skills facilitating the country's ultimate goal to ensure food and nutrition security. Details are as follows:

Sl. No.	Name, designation & organization	Program	Duration	Country	Funding Source
7.	Dr. Md. Khairul Alam, Principal Scientific Officer, Soil Unit, NRM Division, BARC	Short Training Course on Soil Management -Biogeochemical Cycles of Carbon and Nitrogen	01 January to 28 th Feb. 2023	Australia	Deakin University
8.	Dr. Nazmun Nahar Karim, Member Director (Livestock) and CSO (Agril. Engg) BARC.	International Water Management Institute's (IWMI) Regional Forum & Gujarat's grid-integrated solar irrigation sites	6 to 10 February 2023	Gujarat, India	IWMI, India.
9.	Hasan Md. Hamidur Rahman. Director (Computer & GIS Unit), BARC.	Counterpart Training in Japan	27 Feb. to 15 March 2023.	Japan	JICA
		'South Asia Climate Adaptation Atlas for Agriculture Project' Inception Workshop	25 -27 April 2023	India	BISA
10.	Dr. Suraya Parvin Principal Scientific Officer, Technology Transfer and Monitoring Unit, BARC	'Workshop on the improvement of Rural Agricultural Technology Extension System in Asia (RATES)' in Jenoju, Republic of Korea	24 to 28 April 2023.	Korea	AFACI
11.	Hasan Mahmud, Senior System Analyst, Computer & GIS Unit, BARC	'South Asia Climate Adaptation Atlas for Agriculture Project' Inception Workshop	25 -27 April 2023	India	BISA
12.	Dr. Md. Golam Mahboob, Principal Scientific Officer, Forestry Unit, BARC	'South Asia Climate Adaptation Atlas for Agriculture Project' Inception Workshop	25 -27 April 2023.	India	BISA
13.	Dr. Md. Abdus Salam, Principal Scientific Officer, AERS Division, BARC	'South Asia Climate Adaptation Atlas for Agriculture Project' Inception Workshop	25 -27 April 2023	India	BISA
14.	Dr. A B M Khaldun, Principal Scientific Officer (P&E), BARC	7th International Horticultural Exhibition 'Expo 2022 Floriade Almere'	6-15, Sept. 2022	Netherlands	MoA

7. In-country Training/ Workshop/ Seminar

During the reporting period, 35 training programs and 74 workshops/seminars were arranged. Under revenue budget 31 training programs and 35 workshops were organized. The number of participants for the training and workshop/seminar were 1,269 and 2,915, respectively. The share of male and female participants of programs implemented during 2022-2023 are furnished in the following lists.

7.1 Training programs (Revenue budget)

A. In-house-Training

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Computer & GIS Unit	Training on Online software developed by BARC	BARC	1 Oct.2022	36	4	40
	Training on e-filing for Officer (1 st batch)	BARC	20 Dec.2022	18	2	20
	Training on e-filing for Officer (2 nd batch)	BARC	21 Dec.2022	14	6	20
	Training on e-filing for Staff	BARC	22 Dec.2022	13	7	20
Manpower & Training Unit	Training on Citizen Charter for Staff	BARC	09 March 2023	46	9	55
	Training on Public Procurement Management for mid-level scientists and officers	BARC	19-20 March 2023	30	4	34
	Training on awareness and skill development for Professional Drivers	BARC	8-9 May 2023	22	0	22
	Training on Annual Performance Agreement (APA) for Officers	BARC	24 May 2023	51	6	57
RTI Focal Point	Training on Right to Information Act 2009 (Officers 1 st batch)	BARC	13 Sept.2022	50	6	56
	Training on Right to Information Act 2009 (Employees: Grade 10-20 2 nd batch)	BARC	21 Dec.2022	47	8	55
	Training on Right to Information Act 2009 (Employees: Grade 10-20 3 rd batch)	BARC	18 May 2023	42	8	50
Support Service Unit	Training on National Integrity Strategy (NIS) (two batches)	BARC	31/8/2002 & 23/3/2023	142	18	160
	Training on Grievance Redress System (GRS) & application of GRS software (two batches)	BARC	28/12/2022 & 14 June 2023	101	19	120
	Sub-total (Program 13)			612	97	709

B. Training Organized for NARS Scientists and Others (Revenue budget)

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Crops Division	Awareness Building on Act & Policies of Bangladesh Agriculture	BARC	26-28 Feb.2023	32	8	40
P&E Division	Training in Project Development & Management	BARC	4-8 Dec.2022	28	2	30
Nutrition Unit	Food Utilization, Quality Processing and preservation techniques of Agro-products at the households' level	Islamic University, Kushtia	12-13 September 2022	23	7	30
	Food Safety, Nutrition, and Public Health Concerns in Bangladesh	BARC	6-8 Dec.2022	14	16	30
Livestock Division	Advanced Training on Bioinformatics for Sustainable Development in Agriculture	BARC	27 Nov. to 01 Dec.2022	14	6	20
	The Forth Industrial Revolution and Potential Application in the livestock sector	BARC	25-26 Jan. 2023	25	5	30
NRM (Soil)	Training on Use of Fertilizer Recommendation Guide-2018	BARC	15-17 May 2023	24	16	40
	Training on the use of Fertilizer Inspection Manual	BARC	18-20 June 2023	34	6	40
NRM (Agril. Engineering)	Training on 'IoT-based Precision Agriculture for Sustainable Production'	BARC	17-19 Jan.2023	25	5	30
	Training on the Use of 'Modern Farm Machinery for Ensuring Food Security'	BARC	12-14 March 2023	19	11	30
NRM (Forest)	Training on Contemporary Issues and Technologies in Forestry and Agroforestry for Professional'	BARC	1-2 March 2023	35	5	40
	Training on 'Climate Smart Agriculture for Adaptation' for NARS scientists, Academia, Extension & NGO officials	BARC	16-18 May 2023	31	9	40
AERS Division	Application of Quantitative and Qualitative Methods for Scientific Paper Writing	BARC	12-16 Feb.2023	11	9	20
Computer & GIS Unit	Training on the use of GIS technologies	BARC June 2023	4-8	18	2	20

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
TTMU unit	Training on matured technologies developed by CDB	CDB, Dhaka	9 Nov. 2022	29	1	30
	Training on Matured Technologies developed by BJRI	BJRI, Dhaka	27 Feb. 2023	26	4	30
	Training on Matured Technologies developed by BLRI	BLRI, Dhaka	15 May 2023	20	10	30
AIC	Technical Report Writing and Editing	BARC	5-7 March 2023	24	6	30
Sub-total (Program 18)				432	128	560

C. Training Organized for NARS Scientists and Others (Funding: NATP-2 and other source)

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
PIU_BARC, NATP-2	Scientific Report Writing	BIM, Dhaka	18-23 Sept. 2022	25	5	30
	Exploratory Data Analysis in Agricultural Research with R software	BIM, Dhaka	26-30 Nov. 2022	21	8	29
	Research Methodology	BIM	1-14 March 2023	18	6	24
	Excel-Based Data Analysis for Early Career Scientists	BARC	18-22 March 2023	23	7	30
Sub-total (Program 4)				87	26	113
Total Training (Program Number 35): (A+B+C): Participant Number						1,382

7.2. Workshop/Seminar Organized for NARS Scientists and Others

A. Workshop (Revenue budget)

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Crops Division	Annual Review Workshop on Crop Improvement Program of NARS Institutes: Research Progress 2021-2022 and Research Program 2022-23	BARC	21-22 August 2022	82	18	100
	Annual Review Workshop on Disease Management Program of NARS Institutes: Research Progress 2021-22 and Research Program 2022-23	BARC	23 August 2022	66	13	79

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Crops Division	Annual Review Workshop on Crop Improvement Program of NARS Institutes: Research Progress 2021-2022 and Research Program 2022-23	BARC	21-22 August 2022	82	18	100
	Annual Review Workshop on Disease Management Program of NARS Institutes: Research Progress 2021-22 and Research Program 2022-23	BARC	23 August 2022	66	13	79
	Annual Review Workshop on Crop Production Program of NARS Institutes: Research Progress 2021-2022 and Research Program 2022-23	BARC	24-25 August 2022	91	19	110
	Annual Review Workshop on Insect Pest Management Program of NARS Institutes: Research Progress 2021-22 and Research Program 2022-23	BARC	28 August 2022	72	8	80
	Annual Review workshop on Biotechnology Program of NARS institutes: Research Progress 2021-22 and Research Program 2022-23	BARC	29 August 2022	66	15	81
	Review Workshop on Draft 'National Seed Vision-2023'	BARC	16 August 2022	49	2	51
	Progress Review Workshop on Biotechnological Research Based on Biotechnology Policy-2012 (1 st batch)	BARC	19 Jan.2023	59	14	73
	Progress Review Workshop on Biotechnological Research Based on Biotechnology Policy-2012 (2 nd batch)	BARC	23 May.2023	62	13	75
	Workshop on Standard Operating Procedure for Genome Edited Plants in Bangladesh	BARC	25 May.2023	31	7	38
AERS Division	Socio-Economic Research Progres (2022-23) and Future Research Program (2023-24) of NARS Institutes	BARC	19 June 2023	63	12	75
AERS Division	National Budget 2023-24 Analysis: Agricultural Development Perspective	BARC	21 June 2023	57	8	65
Computer & GIS unit	Workshop on '4th Industrial Revolution: Challenges & Way forward' (1 st batch)	BARC	14 Feb.2023	53	6	59
	Workshop on E-Governance & Innovation Work Plan 2022-23	BARC	18 Apr.2023	53	7	60
	Workshop on '4th Industrial Revolution: Challenges & Way forward' (2 nd batch)	BARC	31 May 2023	73	7	80

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Computer & GIS unit	Workshop on 'Standardization and Interoperability of Agro-Data Ecosystem for Smart Agriculture'	BARC	18-20 June 2023	22	8	30
Soils unit	Research Review and Program Planning Workshop of Soils Programs of NARS Institutes	BARC	27-29 Sept.2022	67	13	80
Agril. Engg. unit	Research Progress 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS institutes	BARC	15-16 Sept. 2022	69	11	80
Forestry unit	Forestry and Agroforestry programs of NARS Institutes: Research Progress 2021-22 and Research Programs 2022-23	BARC	19-20 Oct. 2022	66	14	80
P&E Division	Workshop on Annual Progress 2021-2022 & Work Plan 2022-2022	BARC	04 August 2022	50	7	57
	Workshop on SDG Action Plan: Present status, scale up & phase-out	BARC	03 April 2023	94	23	117
	Workshop on Delta plan -2100: Activity Progress & Future Plan	BARC	06 Feb.2023	95	19	114
M&T Unit	Workshop on Citizen Charter Work Plan:2022-23	BARC	26 October 2022	68	13	81
AIC centre	Workshop on Introducing BanglaJoL and Improving BJA Publishing	BARC	01 Dec. 2022	51	9	60
Livestock Division	Annual Research Review Workshop on Research Progress 2021-22 and Research Program 2022-23 of BLRI	BARC	12-13 Oct.2022	44	16	60
	Workshop on Good Animal Husbandry Practices	BARC	8 June.2023	33	7	40
Nutrition	Wellness through Safe Food & Nutrition	BARC	9 Feb. 2023	73	12	85
Support Service Unit	Workshop on Establishing Good Governance through Practicing Integrity (2)	BARC	3-09-22 & 27-3-23	142	18	160
RTI Focal Point	Seminar on the Right to Information Act	BARC	13.9.2022	48	7	56
	Seminar on the Role of the Right to Information Act. In ensuring transparency & accountability	BARC	18.5.2023	49	6	55
Finance Unit	Workshop on ibas++	BARC	6-8 Feb.2023	22	1	23
	Total (Program 29)			1871	333	2,204

B. Workshop (Funding source: NATP-2 and other)

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
Soil Unit	Project Completion Report (PCR) workshop on Microbial characterization of Bangladesh soil and development of climate-smart biofertilizer for crop production and soil fertility (ID: 043) under NATP-2 project	BARC	12 Dec. 2022	90	10	100
	Workshop of Nutrient Management for Diversified Cropping in Bangladesh (NUMAN) Project	BARC	20 Dec.2022	105	15	120
Fisheries Division	2 workshops on Project Completion Report (PCR) of PBRG Sub-Project (ID-154) & ID-155) under the NATP-2 project	BARC	24.10.2022 & 25.10.2022	134	16	150
PIU-BARC, NATP-2	Total 21 workshops were organized in different titles under PIU-BARC, NATP-2 project source of fund	BARC	2022-23 FY	2,367	238	2,605
Improving Research Qualities of ARI Project, BARC	Total 13 Workshops were conducted in different titles under ARIs project (KGF) source of fund	Different Places	2022-23 FY	559	77	636
EC Office (PTO)	Workshop on AFACI Project-Asian Food Composition database Agril. Technology and Food Security	BARC	12.4.2023	20	8	28
	Total (Program 39)			3,275	364	3,639

C. Seminar (Revenue & other funding source)

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
M&T Unit	Seminar on advanced office management through ICT	BARC	12 Feb. 2023	118	22	140
	Seminar on Transformation of Nutrition-Sensitive Agri-Food System (KGF Finding)	BARC	11 Jan. 2023	66	14	80
	Seminar on ensuring safe food and food security (PIU-BARC, NATP-2 funding)	BARC	12 Jan. 2023	68	12	80
	Seminar on Smart Agriculture to build smart Bangladesh	BARC	14 June 2023	270	30	300

Division/ Unit	Title	Venue	Duration	Participants (nos.)		
				M	F	Total
PTO, EC office, BARC	Seminar on Right to Information Act 2009	BARC	13.9.2022	49	7	56
	Seminar on the Role of the Right to Information Act 2009 in ensuring transparency and accountability in government services	BARC	18.5.2023	49	6	55
	Total (Program 6)			620	91	711
	Total Workshop/Seminar (Program Number 74): (A+B+C)					6,554

8. Summary of Higher Studies (Ph.D.), BARC, 2021-2022

Sl No.	Funding source	PhD		Total	Remark
		Foreign	Local		
3.	PIU-BARC, NATP-2	60	80	140	138 completed
	Total	60	80	140	

9. Human Resources Development (HRD) Status, BARC, 2022-2023

Events	Programs	Participants			Remarks
		M	F	Total	
Training	35	1,131	251	1,382	Rev: 31; Others:4
Workshop/ Seminar	74	5,766	788	6,554	Rev:35; Others: 39
Foreign /Seminar/Workshop	21	24	6	30	Virtual and Physical
Higher Study (PhD)	-	105	33	138	138 Completed
In-country training/workshop/seminar/visit	75	112	34	146	BARC participated
Total		7,138	1,112	8,250	-

FISHERIES DIVISION



FISHERIES DIVISION

The Fisheries Division of BARC is dedicated to promote the sustainable development of fisheries resources in Bangladesh. The division undertook various key activities such as project development, supervision, execution, technology development, monitoring, and evaluation of research projects. It also coordinated research programs with NARS institutes, universities, BFRI, DoF, and other agencies involved in fisheries research for nutrition and development, such as FAO and WorldFish.

Additionally, organizing and participating national and international seminars, workshops, symposiums, conferences, meetings, and training sessions related to fisheries and aquaculture research, technologies, and value addition are regular responsibilities. Reporting on issues of national concern, reviewing scientific papers, providing expert opinions on policy documents, and offering advisory services are also part of its routine tasks.

Furthermore, the fisheries division is responsible for establishing and maintaining communication with both national and international agencies to foster collaboration and enhance the national research and developmental programs in fisheries, as well as agricultural and livestock sectors. Additionally, the division provides technical advisory services to the MoA concerning various issues of agricultural research with particular emphasis on development of fisheries and aquaculture. However, a list of the working professional is furnished in the following table.

Name of the Professionals

Name	Designation
Dr. Fauzia Yasmin	Member Director
Dr. Mohammad Rafiqul Islam	Director (Nutrition)
Dr. Md. Shahzad Kuli Khan	Principal Scientific Officer

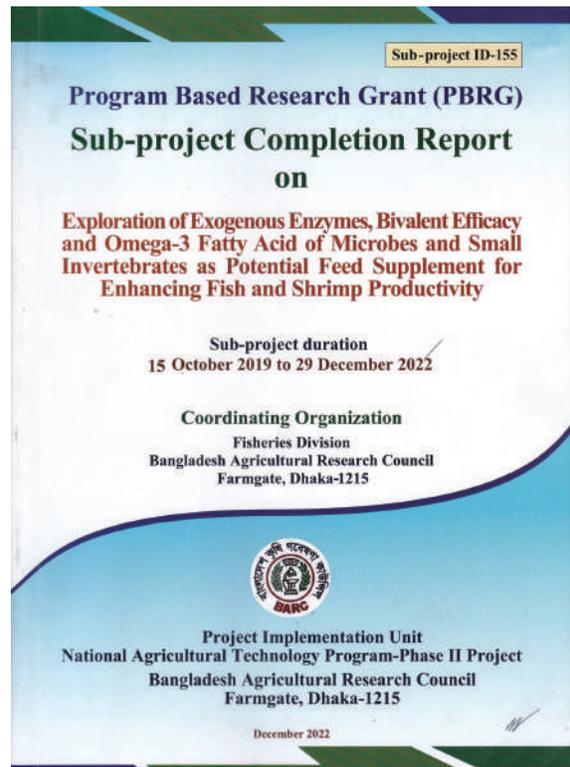
A concise overview of the activities conducted by the division throughout the reporting period of 2022-2023 is given below:

• Program/Project Development and Implementation

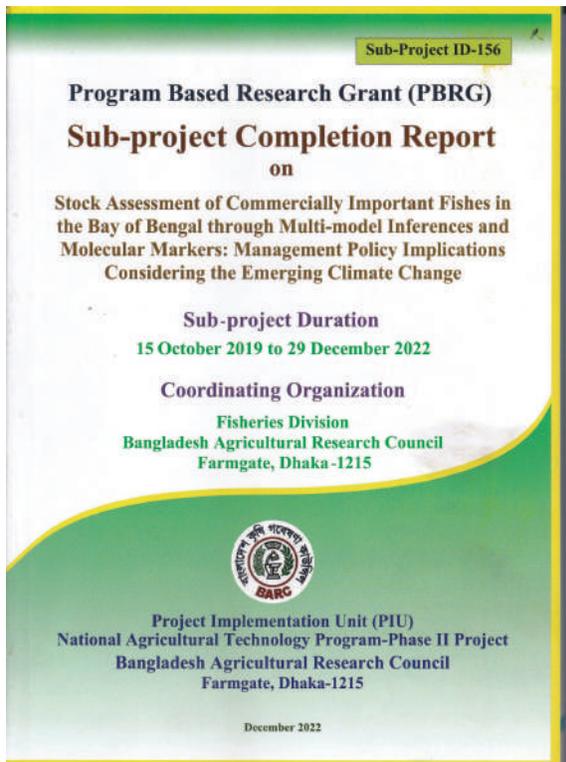
Four PBRG sub-projects entitled (i) *Sustainable development of indigenous fisheries in baors of southwestern Bangladesh through multiple-functions for ensuring the food security (ID-154)*; (ii) *Exploration of exogenous enzymes, bivalent efficacy and omega-3 fatty acid of microbes and small invertebrates as a potential feed supplement for enhancing fish and shrimp productivity (ID-155)*; (iii) *Stock assessment of commercially important fishes in the Bay of Bengal through multi-model inferences and molecular markers: management policy implications considering the emerging climate change (ID-156)* (iv), and *Development of fish-based food products and extension of shelf-life to enhance nutritional security (ID-157)* were coordinated and monitored by the division funded by PIU-BARC, NATP-2. The collaborators of those four PBRG Sub-Prpjects are Bangladesh Fisheries Research Institute, Bagherhat, Noakhali Science and Technology University, Bangabandhu Sheikh Mujibur Rahman Agricultural University, University of Rajshahi, Jessore University of Science and Technology and Sher-e-Bangla Agricultural University. Project Completion Reports (PCR) were also published in December 2022. The front pages of the completed sub-projects are pictured below:



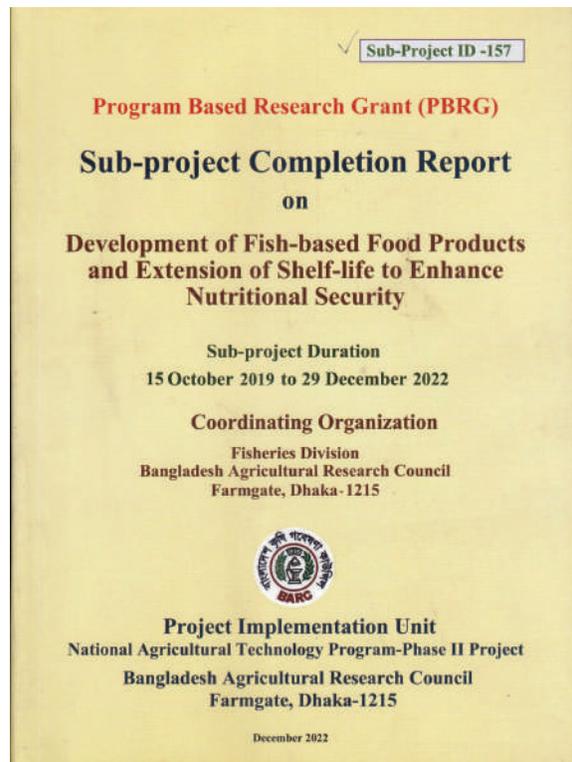
Sub-project Completion Report (ID- 154)



Sub-project Completion Report (ID- 155)



Sub-project Completion Report (ID- 156)



Sub-project Completion Report (ID- 157)

Pictorial view of the sub-project reports coordinated by Fisheries Division.

Conducting Workshops:

One workshop was organized by the division during 24-25 October 2022. In the workshop, 75 participants comprising all principal investigators, scientists, extension workers, university teachers, and reporters from the print and electronic media attended. Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC was present as Chief Guest, while Dr. Mohammad Rafiqul Islam Director (Nutrition) chaired the inaugural session.



Pictorial Views of Workshop activities

Publication (Scientific Journal)

During the reporting year scientists of the division published the following journal article

Khan, M.S.K., Salin, K.R., Yakupitiyage, A., Tsusaka, T.W., Nguyen, L.T. and Siddique, M.A.M. 2023. L-tryptophan mitigates cannibalism and improves the growth of Asian seabass, *Lates calcarifer* reared in a RAS system. *Aquaculture Journal*, 3, 168-180. <https://doi.org/10.3390/aquacj3030014>

Providing Opinion

The division has provided intent on the following documents:

- i) The amendments of gazette related to 'Bangabandhu Matsya Heritage on 14 June 2023.
- ii) The draft agreement prepared for the purpose of bilateral cooperation in the fisheries sector between Bangladesh and Algeria on 31 May 2023.
- iii) The draft of 'Fish and Fish Products (Inspection and Quality Control) Rules, 2023' on April 2023
- iv) The proceedings of the meeting of the technical committee of the Codex Alimentarius Commission on 26 February 2023.
- v) The draft of 'Fish Quarantine Rules, 2023' on 27 February 2023.
- vi) The draft of 'Iodized Salt Rules, 2023' on 02 February 2023.

• Regular Activities:

Scientist of the division attended a good number of training, workshop, seminar, and meeting organized by BARC and other organizations.

Nutrition Unit

The government has set nutrition as a priority area and adopted remarkable measures to ensure a strong policy framework to fulfill the global target as well as promote better nutrition. The Nutrition Unit BARC is working to improve human nutrition as per desired policy. Significant activities were accomplished by the unit through providing opinion on policies issues, assisting in preparing policy documents, project development, supervision, project implementation, technology innovations, monitoring and evaluation of research projects, coordinating research programs with the NARS institutes, universities, BCSIR, BFSA, BIRTAN, and the agencies engaged in nutrition research and development like FAO, WHO, World Vision, World-Fish, IFRI, Hellen Keller, etc. As a part of the regular activities, the scientists of the unit organized and attended the national and international seminars, workshops, symposiums, conferences, meetings, and training in relevant field of agricultural research and technologies, food adulteration, contamination, and mitigation measures. It has also extended service like reporting issues of national interest, reviewing scientific articles, passing expert opinion on the policy document, and advisory services, etc.

Furthermore, cooperation with national and international agencies for strengthening national research and developmental programme in nutrition along with agriculture, fisheries, and livestock sectors are maintained. Moreover, technical advisory services are also provided to the MoA on different issues related to agricultural research (including crop, livestock, fisheries & nutrition as a whole) and development. The professional involved in rendering such activities are Dr. Md. Rafiqul Islam, Director and Dr Zakiah Rahman Moni, PSO. However, the activities rendered during the reporting period are provided below:

- **Program/Project Developed and Implementation**

Three programs were coordinated by the unit during 2022-23. Details description are given below:

Training:

- i) **Training on Food utilization, quality processing and preservation techniques of agro-products at household level**

A two-day-long training session titled 'Food utilization, quality processing and preservation techniques of agro-products at household level' was held during 12-13 September 2022 at Islamic University (IU), Kushtia. As a part of national capacity development as well as awareness building of the stakeholder. The unit organized the training program in the virtual classroom of the ICT cell, IU. Professor Md. Mahbubur Rahman, Pro-vice-chancellor, IU addressed as chief guest, Professor Sheikh Abdur Rauf, Chairman, Applied Nutrition and Food Technology Department (ANFTD), IU was present as special guest while Dr. Mohammad Rafiqul Islam, Director, Nutrition Unit, BARC was in the chair in the inaugural session.

Ten training sessions were conducted by Professor Sheikh Abdur Rauf, chairman, ANFTD. Professors Dr. ATM Mijanur Rahman, Dr. Asad-Ud-Daula, Dr. Selim Reza of ANFTD as well as Dr. Mohammad Rafiqul Islam, Director, Nutrition Unit, BARC and Dr. Zakiah Rahman Moni, PSO, Nutrition Division, BARC attended as trainees along with 20 teachers from different schools and ten Sub-Assistant Agriculture Officers of Kushtia district. The speakers shed light on the use of agricultural products

and quality processing of food at the household level and emphasized conservation strategies to prevent the wastage.



Participants of the Training Program

ii) Training on Food Safety, Nutrition and Public Health Concerns in Bangladesh

The nutrition unit organized a three-day-long training session titled Food Safety, Nutrition and Public Health Concern in Bangladesh during 6-8 December 2022 at Training room, BARC. Dr. Shaikh Mohammad Bokhtiar, EC, BARC, Dr. Md. Baktear Hossain, Member Director, Natural Resources Management Division and Director, Training and Manpower Unit was present as chief guest and special guest, respectively, while Dr. Mohammad Rafiqul Islam, Director, Nutrition Unit, BARC chaired the inaugural session.

A training session was also arranged where scientists from NARS institute, BARTAN, NIB, BCSIR and 30 officers of DAE, DoF, DLS and DAM 30 (thirty) were attendees. Professors from Dhaka University, Islamic University, Member of Bangladesh Food Safety Authority, Former Member Director (BARC), Director Nutrition, PIU-BARC (NATP-2), Budget officer (DLS), respectively, were the resource speakers. The speakers' outbuilding decorations on the Food Safety, Nutrition, and public health concern issues along with research trust in Bangladesh. The participant opined that it is a time demanding training in respect of global and country needs. The duration of the training should be extended with more diversified topics, they further added.

Workshop:

i) Workshop on Wellness through Safe Food and Nutrition

Access to sufficient amounts of safe and nutritious food is an important component of maintaining a healthy life. To address the issue the unit organized a day-long workshop titled Wellness Through Safe Food and Nutrition on 9 February 2023 at Auditorium, BARC. Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC, and Mr. Md. Abdul Wadud, Executive Director (Additional Secretary), BIRTAN were present as chief guest and Special Guest, respectively, while Dr. Mohammad Rafiqul Islam, Director, Nutrition Unit, BARC was in the chair in the inaugural session. Along with NARS scientists, officers of extension agencies (DAE, DoF, DLS), DAM, Hortex Foundation, BIRTAN, BADC, and FAO participated the workshop. Including a keynote paper, five strategic papers were presented covering crop, livestock, and fisheries sub- sectors emphasizing food security, safe food, and nutrition. The major recommendations that have been adopted from this workshop were strengthening national food control systems, assessment of risks in food safety, diversity in food intake, public awareness, challenges and way forward for ensuring safe and nutritious food, as well as misinformation should not be published in the public domain without any accurate data.



Participants of Training on Food Safety, Nutrition and Public Health Concern in Bangladesh



Chief, Special Guest and Chair in The Stage of Inaugural Session of Workshop on Wellness Through Safe Food and Nutrition

- **Inputs and Comments on Policy Document Inputs/Comments**

During the reporting year the unit BARC provided comments and inputs as per following table:

SI No.	Topic	Date
1	Opinions on standards circulated by the Codex Alimentarius Commission	17 February 2022
2	Opinion for the finalization of the draft 'Dhaka Food Agenda-2041'.	3 May 2023
3	Comments on the Proceedings of the Technical Committee of the Codex Alimentarius Commission	2 March 2023
4	Providing opinions on standards circulated by the Codex Alimentarius Commission	20 February 2023
5	Submission of views on the draft 'Iodized Salt Rules 2023'	2 February 2023
6	Opinion on Concept Note on 'Development of a Multi-Sectoral Urban Nutrition Strategy'	3 August 2022

Report writing

A. Annual Progress and Budget Report

The following annual progress and budget reports are being prepared by the unit during the reporting year.

- Islam. M.R., Moni, Z. R. Annual Progress and Work-plan Report: (2022-2023) and future work-plan (2023-24)
- Islam. M.R., Moni, Z. R. Budget Report according to Work-plan: (2022-2023): 'Budget for future work-plan (2022-23)
- Report for Newsletter of BARC and
- Report for APA

B. National and International Linkage (MoU/Agreement)

Director (Nutrition) used to carry duties as a member of different committees of different National and International organizations as listed down.

- i. Perform duties as a Member of the 'Chemical Division' sectional Committee of BSTI, Dhaka.
- ii. Acted as a Member of the Agriculture and Food Division Committee (AFDC), BSTI, Dhaka.
- iii. Carried out responsibility as expert member of the Food Safety Authority (FSA) (Fruits and Vegetables Committee/crop sector)
- iv. Member of the National Plan of Action on Nutrition (NPAN)
- v. Member, Nutrition Working Group (NWG)
- vi. Acted as discussant of the seminar on Food and Nutrition Security: Role of BIRTAN
- vii. Acted as a co-ordinator PBRG sub-project ID: 154, 155, 156, 157



Director Nutrition handing over the PCR to EC, BARC of PBRG sub-project as Coordinator

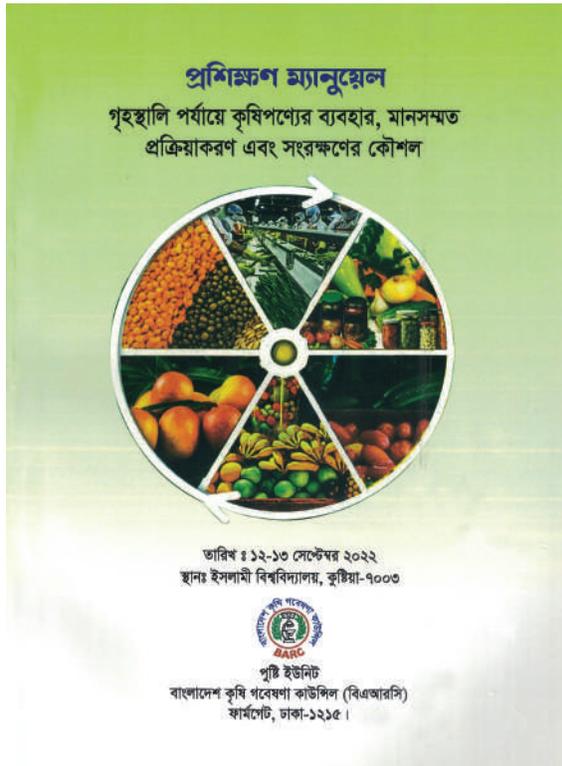
• Publication: (Scientific Journal)

During the reporting year one one publication was made as follow:

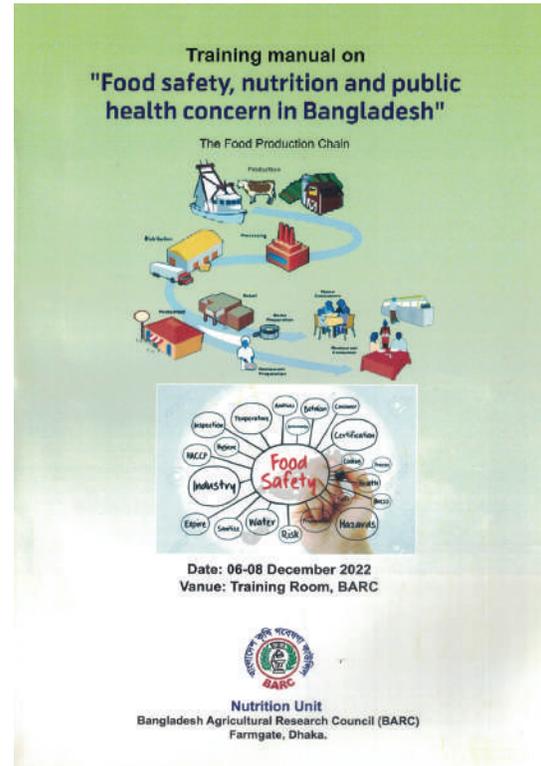
Rahman, M.M., Rahman, A.T.M.M. and Moni, Z. R. (2023). Phyto-synthesis of gold nanoparticles using *Trewia nudiflora* fruit extract with HAuCl₄, characterization, evaluation, and antimicrobial activities Int. J. Bus. Soc. Sci. Res. 11(1): 51–54. <http://www.ijbssr.com/10.55706/ijbssr11110>

Also, two training Manual as listed below was prepared during the reporting period.

- i. Food utilization, quality processing, and preservation techniques of agro-products at household level
- ii. Food Safety, Nutrition, and public health concern in Bangladesh



i



ii

Pictorial view of publication made by Nutrition Unit, 2022-2023

• **Regular Activities:**

The unit has regularly performed miscellaneous responsibilities as follows:

- i. Attended a good number trainings, workshops, seminars, meetings organized by BARC and other organizations.
- ii. Rapporteur report/Speech writing
- iii. Preparation Meeting Minutes

NATURAL RESOURCES MANAGEMENT DIVISION



AGRICULTURAL ENGINEERING UNIT (AEU)

The Agricultural Engineering Unit (AEU), NRM Division, BARC is involved in planning, coordinating, and managing various research and related activities for developing the Irrigation and Water Management (IWM), Farm Mechanization (FM), and Postharvest Technology (PHT). To carry out the mandated responsibilities of BARC and to fulfill the national need this unit is entrusted with the duties of planning, reviewing, prioritizing, approving, monitoring, evaluating, supervising, and coordinating of the IWM, FM, and PHT-related programmes implemented by the NARS institutions and other institutions. This unit is providing training and research support to the NARS institutions, universities, BADC, BMDA, DAE, NGOs, etc. It is imparting policy support to the relevant NARS institutes and extension agencies. The unit has been conducting relevant seminars, workshops and maintains a strong linkage with the national (IEB, BWDB, WARPO, BSTI, NGOs (IDE, BWP/GWP), BAS, Universities, etc.) and international (CIMMYT, IRRI, CSAM, IWMI, FAO, etc.) organizations. The professionals of the division is listed below.

Name of the Professionals

Name	Designation
Dr. Nazmun Nahar Karim	Chief Scientific Officer
Dr. AFM Tariqul Islam	Principal Scientific Officer
Dr. Md. Ashraful Alam	Principal Scientific Officer

Activities of the unit during the reporting 2022-23 have been briefly described as below:

1. Research Program Development of NARS Institute

- i. Guidelines, suggestions, and technical inputs on Farm Machinery, Irrigation and Water Management, and Postharvest Technology were provided to NARS institutes (BARI, BRRI, BINA, BSRI, and BWMRI) through research review workshop held during 13-14 September 2022 with participation from the NARS institutes, DAE, RDA, WARPO, IRRI, BRAC, Bangladesh Food Safety Authority, Square Food Products, Pran Food Ltd. Agricultural Universities, etc. These guidelines, suggestions, and technical opinions were provided by the invited experts of respective fields. The recommendations of the research review workshops were communicated to the research institutes so that NARS institutes can act accordingly. Scientist of the unit also attended internal and central review workshops of BARI.

2. Contribution to Prepare the Research Vision in Agriculture 2041

- i. Contributed to prepare the Bangladesh Agricultural Research Vision 2041 by providing input in Agricultural Mechanization, Irrigation and Water Management and Postharvest area.
- ii. Participated as a lead officer in the workshop to finalize priority areas of research in different crop sub-sectors.

3. Project Monitoring and Evaluation

- i. Conducted field monitoring of a KGF-funded project titled 'Assessment of Cropping Patterns for Sustainable Intensification in Drought Prone Ecosystem using Remote Sensing and Geospatial Modeling (TF51/SBR-17)' at Godagari, Rajshahi during 31 January to 03 February 2023. The BARC team visited the project area in Godagari upazila and discussed with the concerned scientists, and field staff. The team collected updated information on the progress of the activities. Visting team provided on-the-spot suggestions regarding geospatial data collection for analyzing satellite images for crop type mapping and other project activities for the smooth running of the project.

Also conducted field monitoring activities of a KGF-funded project titled 'Feasibility study of the IoT-based Precision Agriculture for sustainable crop production in Bangladesh (ID: TF86-C/21)' at BARI on 07 July 2022, 13 April 2023, and 22 May 2023, respectively. The team visited the project experimental fields and ICT lab at BARI and discussed with the concerned scientists, and field staff. The team collected current information on the research progress activities. The team provided suggestions regarding crop management and other project activities for the smooth implementation of the project.

4. Project Coordination and Implementation

The unit implemented the following projects:

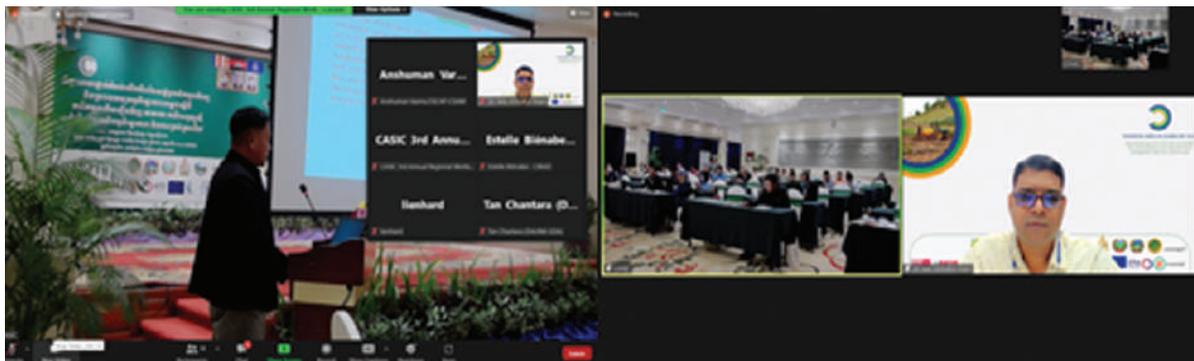
- i. Worked as Co-PI for KGF-funded project titled *Assessment of Cropping Patterns for Sustainable Intensification in Drought Prone Ecosystem using Remote Sensing and Geospatial Modeling (TF51/SBR-17)*.
- ii. Coordinating KGF funded project entitled *Feasibility study of the IoT-based Precision Agriculture for sustainable crop production in Bangladesh (TF86-C/21)* (Ongoing)
- iii. Working as a local coordinator for an ACAIR-funded project titled *Mitigating risk and scaling-out profitable cropping system intensification practices in the salt-affected coastal zones of the Ganges Delta (CSI4CZ Phase II)* (Ongoing)

5. Regional and International Collaboration and Cooperation

The unit scintists attended different regional and international collaboration and cooperation as listed below.

- i. Meetings/seminars/workshops organized by FAO, CSAM, KGF, IWM, WARPO, BARI, and BRRI.
- ii. Agro-Processing Sector Development (APSD) Pre-Validation Consultation Workshop organized by FAO-Bangladesh.
- iii. Closing workshop of the project titled Strategic Support for Development of Investment Strategies and Action Plans for Agro-Processing Sector organized by FAO-Bangladesh.
- iv. A panel discussant in the National stakeholder workshop on Groundwater Irrigation in Bangladesh: Changing Modalities, Resultant Policies organized by IWMI- SDC-SoLAR project and CGIAR TAFSSA and Mitigate+ Initiatives.
- v. Attended as Session Chair in the 3rd Annual Paper Meet 2022, Agricultural Engineering Division, The Institution of Engineers, Bangladesh.

- vi. Workshop on CASIC 3rd Annual Regional Workshop: Regenerative Agriculture through Agroecology, Sustainable Agricultural Mechanization, Bio sequestration, and Water Management held on 02–04 Nov 2022 at Siemreap & Battambang Province, Cambodia (Online). Dr. Md. Ashrafur Alam, Principal Scientific Officer, Agricultural Engineering Unit, BARC participated the workshop and delivered a presentation on Engaging the private sector in Conservation Agriculture/Sustainable Intensification and Agroecology through service providers for machinery and other services in session 5. The workshop was attended by more than 60 participants from 15 countries of the Asia-Pacific region.



CASIC 3rd Annual Regional Workshop

- vii. The 18th Session of the Governing Council of CSAM. Dr. Nazmun Nahar Karim, Member Director (Livestock) & CSO (Ag. Engg.), BARC participated the session virtually.
- viii. The session of the Governing Council of the Centre for Sustainable Agricultural Mechanization (CSAM) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) was organized in hybrid mode at Beijing and Zoom Platform on 09 December 2022. The Session was attended by representatives of all nine members of the Council, namely Bangladesh, Cambodia, China, India, Malaysia, Pakistan, Philippines, Thailand, and Viet Nam. The council of the 18th session has discussed gender mainstreaming in sustainable agricultural mechanization in Asia and the Pacific, reviewed the report on the Centre's activities and financial status in 2022, and discussed the proposed plan of work for 2023. Dr. Nazmun Nahar Karim provided her views in the session.
- ix. Regional knowledge forum on Energizing Agriculture and Enabling Just Energy Transitions in South Asia in Gujarat, India during 6-10 February 2023. Dr. Nazmun Nahar Karim, Member Director (Livestock) and CSO (Agricultural Engineering), BARC participated the regional knowledge forum on 'Energizing Agriculture and Enabling Just Energy Transitions in South Asia' at the Indian Institute of Technology (IIT), Gandhinagar, Ahmedabad, Gujarat, India during 6-7 February 2023.



Visit on Regional Knowledge Forum in Gujrat, India

Dr. NN Karim participated the technical sessions, discussions, and knowledge sharing on 'Energizing Agriculture and Enabling Just Energy Transitions in South Asia.' She also participated the panel discussion session as a panel discussant. She visited solarization of 11 KV Nityanand Feeder as a part of Suryashakti Kishan yojna (SKY) project, Uttar Gujarat Vij Company Limited, Sabarmati, Vehlal, Ahmedabad; 10 MW canal top solar power plant, Vadodara and Gujarat Energy Research and Management Institute during 8-10 Feb 2023. International Water Management Institute organized this regional knowledge forum and exposure visit.

- x. International symposium on 'Agricultural Transformation: Role of Appropriate Scale Mechanization and Postharvest Loss reduction innovation' held during 9-10 November 2022. Dr. Nazmun Nahar Karim attended this program as a panel discussant.
- xi. Workshop on Built Water Storage in South Asia, which was held on 28 January 2023 at Hotel Lake Castle, Gulshan 2, Dhaka.

6. Preparation of Policy Documents and Inputs

The unit has provided furnished Comments on the following policy/aspects/ issues and sent to the MOA and related organizations.

- i. Inception report 'Consultancy Services to Revise Renewable Energy Policy, 2008' proposed by DTCL (28 July 2022)
- ii. Inter-ministerial working paper for 'Bangladesh Flag Ships (Sharthorokkha) Rules, 2021' (08 Sept 2022)
- iii. Interim report entitled 'Consultancy Services to Revise Renewable Energy Policy, 2008' (25 Sept 2022)
- iv. News published in The Daily Ittefaq, The Daily Somokal, and The Daily Bonikbarta (24 Oct 2022)
- v. Draft 'National Agricultural Mechanization Policy 2020' (31 Oct 2022)
- vi. Report: Factual basis for the design of the UIP Dhaka rivers (25 Nov 2022)
- vii. Draft Policy Report of Consultancy Services to Revise Renewable Energy Policy, 2008 (30 Nov 2022)
- viii. Land acquisition and purchase for solar panel installation Policy (08 Dec 2022)
- ix. Draft Road Map to Scale-up Solar PV Irrigation Pumps in Bangladesh (27 Dec 2022)
- x. Post Disaster Needs Assessment Bangladesh Flash Floods 2022 (16 Jan 2023)
- xi. Installation of solar panels and other establishment in three-crop fields (22 Feb 2023)
- xii. Inputs on 'UN 2023 Water Conference' for the Hon'ble Foreign Minister and his team (28 Feb 2022)
- xiii. Master Plan on Meghna River Pollution Control, Navigation increase, and Ensuring River Bank Stability' (07 Mar 2023)
- xiv. Import drone for conducting field research on the convenient application of pesticides to enhance mechanization (09 Mar 2023)
- xv. Position paper on Bangladesh-Netherlands Water Sector Networking (22 May 2023)
- xvi. Inputs for preparing working a paper on coordination of irrigation management and polder management in the southern region for bi-lateral dialogue between Water resources and agricultural ministers (24 Mar 2023)
- xvii. 'Feasibility Study for Implementing Renewable Energy based various sub-projects (solar irrigation pumps, hybrid system, and Water desalination) in Fakirhat Upazilla, Bagerhat' (24 May 2023)
- xviii. 'Vehicles Scrap Policy 2023' (11 Jun 2023)
- xix. 'Haor and wetlands conservation, development, and management Law' (12 Jun 2023)
- xx. 'Policy on Leasing of Khas Land and the Limit of Purchase of Privately Owned Land for Commercial Solar Power Installation, 2023' (12 Jun 2023)



Annual Workshop on Research Review 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS Institutes

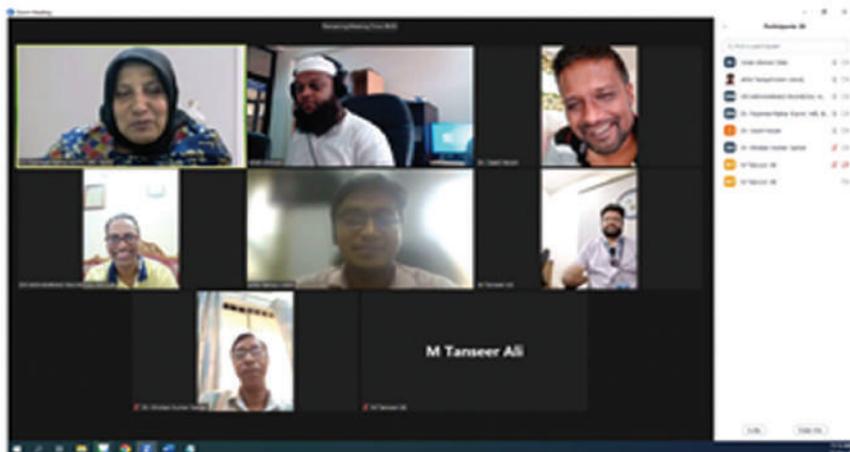
7. Seminar/ Workshop/ Meeting

The unit organized one workshop and two consultation meetings during the reporting year.

- i. Annual Workshop on 'Research Review 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS Institutes: AEU organized Research Review 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS Institutes in BARC during 14-15 September 2022 with the participation of the National Agricultural Research System (BARI, BRRI, BINA, BSRI and BWMRI), DAE, BADC, RDA, Agricultural Universities, Alim Industries, ACI Motors, Pran Food Products, Square Food Ltd., etc. On 14 September 2022 at the beginning of the workshop, Dr. Nazmun Nahar Karim, MD (Livestock) and CSO, Agricultural Engineering Unit, BARC briefed about the purpose of the workshop. There were two sessions, Technical session-I (Farm Machinery) and technical session-II (Post Harvest Technology) held on 14 September 2022 were chaired by Engr. M. Harun Ur Rashid, Ex-Director General, BARI & Ex-Executive Chairman, BARC, and Professor Dr. Md. Shams-Ud-Din, Vice-Chancellor, German University Bangladesh, respectively. Annual Workshop on Research Review 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS Institutes

Technical Session-III (Irrigation and Water Management) held on 15 September 2022 was chaired by Dr. Wais Kabir, former Executive Chairman, BARC and former Executive Director, KGF. Invited expert members provided their opinions on the presentations. Views, comments, and suggestions provided by the participants and experts were recorded and sent to the head of the Divisions for integration in their research programs

- ii. Organized progress meeting of the project titled 'Feasibility Study of the IoT Based Precision Agriculture for Sustainable Crop Production in Bangladesh (TF86-C/21)' on 17 April 2023 on Zoom platform.



Pictorial View of Zoom Meeting

- iii. Organized knowledge sharing meeting on the Introduction of Mechanization (specially Drones) in Bangladesh Agriculture to Support Farmers on 21 June 2023 at BARC. On behalf of Bayer CropScience, two foreign delegates Dr. Mayank Yadav and Mr. Partha Paratim Baruah presented the opportunities, challenges, and way forward of the uses of drone technology for Bangladesh agriculture to support farmers.

8. Training

AEU has organized two training during the reporting year.

- i. Training on IoT Based Precision Agriculture for Sustainable Production: Thirty participants from NARS institutes (BARC, BARI, BRRI, BINA, BSRI, BJRI, SRDI, and CDB), BARTAN, BADC, and DAE attended the training. Fifteen lectures on different topics focused on IoT, artificial intelligence, machine learning, and deep learning in precision agriculture, infrastructure design for precision agriculture and application, adoption, profitability, opportunities, challenges, plan, and policies of IoT-based precision agriculture were delivered by renowned scientists, teachers, and experts from different government and private organizations and universities. The training program was directed and coordinated by Dr. Md. Baktear Hossain, MD (NRM), BARC, and Dr. AFM Tariquul Islam, PSO, AEU, BARC, respectively.



Training on IoT Based Precision Agriculture for Sustainable Production

- ii. Training on the Use of Modern Farm Machinery for Ensuring Food Security: Organized a 3-day long training course on the Use of Modern Farm Machinery for Ensuring Food Security which was held at Training Building, BARC during 12-14 February 2023. Thirty participants from NARS institutes (BARC, BARI, BRRI, BINA, BSRI, BWMRI), BADC, DAE & BAU attended the training. Fifteen lectures on different topics focusing on the status, prospects, and challenges of mechanization, NARS institutes, and private sector initiatives, the business model of farm machinery, renewable energy uses and farm machinery use in crops field, and plan and policies of mechanization in Bangladesh were delivered by the renowned scientists, teachers, and experts from different government and private organizations and universities.



Training on Use of Modern Farm Machinery for Ensuring Food Security

9. Regular Activities

Professionals of AEU performed regular work as follows:

- i. Worked as a member of the different committees of BARC, editorial board of bangladesh journal of agriculture and proposal evaluation committee of PIU-BARC.
- ii. Attended different meetings/seminars/workshops and training programed organized by BARC.
- iii. Worked as a member of the recruitment committee for different projects.

10. Publications

The unit has been able to publish or contribute to 11 different publications as follows:

Journal papers:

- i. Ali, M. H., Zaman, M. H., Biswas, P., Islam, M. A. and Karim, N. N. 2022. Estimating Hydraulic Conductivity, Transmissibility and Specific Yield of Aquifer in Barind Area, Bangladesh Using Pumping Test. *European J. Environment and Earth Sciences*. <https://DOI:10.24018/ejgeo.2022.3.4.308>.
- ii. Hossain, M. B., Islam, M. T., Roy, D., Mahmud, M. N. H., Paul, P. L. C., Yesmin, M. S., Kundu, P. K., Karim, N. N., Kader, M. A. and Kabir, M. H. 2022. Cropping System Intensification: An Approach to Increase Yield, Water Productivity, and Profitability in North-West Bangladesh. *International Journal of Agronomy*. Volume 2022, Article ID 6288494, 10 pages <https://doi.org/10.1155/2022/6288494>.
- iii. S. Aktar, M. A. Alam, M. M. Alam, C. K. Saha and J. C. Roy (2022). Solar Bubble Dryer: Alternative to Sun Drying for Reducing Drying Losses. *Bangladesh Journal of Agriculture*, 47(1): 1-15. DOI: <https://doi.org/10.3329/bjagri.v47i1.60589>
- iv. AFM Tariqul Islam, AKM Saiful Islam, GM Tarekul Islam, Sujit Kumar Bala, Mashfiqus Salehin, Apurba Kanti Choudhury, Nepal C. Dey, M. Golam Mahboob (2023). Simulation of water productivity of wheat in northwestern Bangladesh using multi-satellite data. *Agricultural Water Management*, 281 (2023), 108242. <https://doi.org/10.1016/j.agwat.2023.108242>

Annual Report and BARC Newsletters:

- i. Contributed to publishing BARC Annual Report 2022-23 and contributed to publishing four BARC Newsletters.

Manual

The unit has also published the following documents

- i. Published training manual on 'IoT-based Precision Agriculture for Sustainable Production'.
- ii. Published training manual on 'Use of Modern Farm Machinery for Ensuring Food Security'.

Brief Highlights of Research and Development of the Concerned NARS Institutes

Among the NARS institutes BARI, BRRI, BINA BSRI, and BWMRI have conducted the following research and development during 2022-2023 in the three fields namely farm machinery, irrigation and water management, and postharvest technology under agricultural engineering activities. These institutes have conducted 52 farm machinery, 59 irrigation and water management, and 25 postharvest technology-related research and development altogether during the reporting year. However, the list of the experiments conducted by the institute and research area are furnished below

Farm Machinery (Total #52)

(i) BARI: (#32)

- Development and evaluation of four-wheel tractor-operated seeder
- Design and development of a tractor-operated vegetable seedling transplanter
- Energy use analysis of conservation agriculture tillage systems for Rice-Soybean cropping pattern
- Development of onion and garlic detopper
- Investigation of long-term conservation agriculture at BARI and adaptive trials of conservation machinery and water management systems in the southern delta of Bangladesh
- Design and development of tractor-operated potato harvester
- Development of an orchard weeder cum mini tiller
- Design and development of a self-propelled power boom sprayer for field crops
- Development of an automatic irrigation device
- Development of spraying system for coconut tree
- Development of a barley thresher
- Development of a power-operated coconut tree climber
- Testing and evaluation of combine harvester for harvesting mungbean and soybean in coastal areas
- Design and Development of an oat dehulling machine
- Design and Development of a mungbean dehuller
- Adaptive trial of BARI chilli seed separator
- Development of soymilk-making machinery
- Upscaling and fine-tuning of coffee postharvest processing machinery
- Design and development of a jute decorticator
- Development and adoption of suitable technology for hygienic food production
- Development of four blades automatic cashew shelling machine
- Improvement of mechanical coconut dehusking
- Design and development of a power-operated tomato seed separator cum pulper
- Development of a suitable fruits bagging tool
- Development of a sensor-based automated squirrel repellent
- Development of sensor-based supplementary seed metering device in precision seeder to overcome missing bold grain seeds
- Development of a cost-effective, intensified & sustainable recirculating aquaculture system (RAS) in Bangladesh
- Development of a fertilizer sensor using fluorescence technology and field mapping
- Development of sensor-based automation system for existing storage
- Fine tuning of the solar-assisted cabinet dryer for vegetable seeds
- Adaptability testing of BARI-developed agricultural machinery for high-value crop production in the coastal area
- Adaptation of BARI-developed farm machinery in the selected areas of Bangladesh

(ii) BARRI: (#13)

- Design and development of whole feed mini combine harvester
- Design and development of a whole feed mini combine harvester

- Design and development of a head feed power thresher
- Design and development of a semi-automatic rice transplanter
- Design and development of a manual seed sower machine for raising mat-type seedling
- Design and Development of Power-Operated Automatic Seed Sower Machine for mat-type seedling
- Design and development of double row skid type power weeder for wetland paddy field (developed by the SFMRA project, BIRRI)
- Design and development of rice straw rope maker
- Mitigation of biotic and abiotic stress for mat-type seedlings raising in the Boro season
- Attachment of binding facility in BIRRI self-propelled reaper
- Validation of hermetic technologies in rice storage
- Test, evaluation, and modification of rubber roll de-husker and friction-type polisher
- Training on Operation and Maintenance of Farm Machinery to the Machinery Operators and Mechanic

(iii) BSRI: (#6)

- Design and Development of a Sugarcane Detrasher
- Design and Development of a Climber for Date Palm Tree
- Design and Development of a Mini Power Weeder for Sugarcane
- Developing a Cost-effective Cultivation System for Sugarcane: Approaching CA
- Performance Evaluation of Different Tillage Methods for Sustainable Sugarcane Cultivation
- Demonstration of BSRI Developed Technologies for Sugarcane in Mill and Non-Mill Zone Areas

(iv) BINA: (#1)

- Development of Low-Cost Solar Power Operated Garden/Lawn Mower

Irrigation and Water Management (Total #59)

(i) BARI: (#18)

- Response of Mungbean to Different Levels of Irrigation
- Optimize Fertigation Management to Minimize Nitrate Leaching from Drip Irrigated Brinjal Field
- Daily and Multi-Step Ahead Forecasting of Potential Evapotranspiration using Machine Learning Algorithms with Limited Climatic Data
- Growth and Yield of Chilli as Influenced by Different Levels and Intervals for Drip Irrigation
- Optimum Water and Fertilizer Management of Dwarf Sunflower using APSIM (field experiment)
- Effect of Drip Irrigation and Mulching on Growth and Flowering of Chrysanthemum as Cut Flower
- Performance of Fertigation System on Pumpkin Cultivation
- Effect of Irrigation on Mango Fruit Cracking in Chattogram Region
- Yield and Water Productivity Indices of Different Onion Varieties under Sprinkler Irrigation
- Effect of Fertilizer and Irrigation Frequency on the Yield and Quality of Export and Processing Potato

- Effect of Saline Water Irrigation with Different Doses of Potassium on Crop Growth and Yield of Mung Bean
- Coastal Groundwater Management Using an Uncertainty-Based Coupled Simulation-Optimization Approach
- Prediction of Salt Water Intrusion for Different Scenarios of Aquifer Recharge and Groundwater Extraction Under Changing Climate
- Monitoring of Ground Water Level at Different Research Stations of BARI
- Assessment of Groundwater Quality for Irrigation and Drinking Purposes in Some Selected BARI Research Station
- Conservation of Groundwater and Raising Its Use Efficiency and Productivity in Irrigated Agriculture in Bangladesh
- Effects of Floating Agriculture Practice on the Water Body of Pond
- Dissemination of Water Saving Irrigation Technologies For Non-rice Crops in Saline Prone Areas of Bangladesh

(ii) BRR: (#24)

- Determination of physical and hydraulic properties in different soil types
- Problem and potentials for crop productivity improvement through water management in hilly areas
- Study on water-stress tolerance for different advanced rice genotypes of BRR
- Performance evaluation of the proposed rice varieties under different water regimes
- Improving soil-water availability for crop production in Charland by amendment practices
- Determining minimum irrigation water requirement of rice in different regions of Bangladesh through water balance from on-farm demand and model simulation
- Optimization of water use efficiency through sub-irrigation and mini-sprinkler irrigation system in fine (light) textured soils of Bangladesh
- Irrigation water requirement and rainfall utilization for delayed transplanting of Boro rice in different locations of Bangladesh
- Validation of agricultural drought forecasting for mitigating drought in T. Aman rice at Kushtia region
- Irrigation scheduling of rice (*oryza sativa* L.) based on weather forecasting in Gazipur Saline water irrigation strategies for boro rice cultivation in the coastal saline area
- Conjunctive use of wastewater and freshwater for irrigation in Boro rice cultivation
- Assessment of surface and groundwater quality for irrigation in selected locations of Bangladesh
- Assessing On-farm Water-use Efficiency of BRR Research Farm, Gazipur
- A mass demonstration of suitable Aman rice varieties for facilitating Rabi/Boro crops intensification
- Growing vegetable crops with rice under waterlogged lowland conditions
- Water resources management for Boro/Rabi crops by canal blocking
- Salinity dynamics of water and soil in coastal areas of Bangladesh
- Block demonstration of Boro rice by using stored surface water in coastal areas for cropping intensification
- Upscaling of Improved Water Management Practices for Sustainable Productivity in the Haor

areas

- Mass block demonstration of Aus, Aman, and Boro rice by using high-yielding varieties, improved agricultural practices in the coastal areas to cropping intensification
- Assessment of improved agricultural practices to maximize rice yield in the coastal area during T-Aman season
- Impact of Alternate Wetting and Drying irrigation for Boro rice cultivation in the coastal saline area
- Greenhouse gas emissions from irrigated agriculture in Bangladesh and reduction policies/strategies
- Intervention in surface water utilization through integrated minor irrigation schemes for escalating water and land productivity in the coastal region

(iii) BINA: (#17)

- Evaluation of binadhan-24 under different 'soil moisture stress/drought tolerance level' (in lysimeter)
- Evaluation of binadhan-24 under different 'soil moisture stress/drought tolerance levels' (in the field)
- Optimization of soil moisture for direct seeded (zero tillage) mustard sowing
- Solute transport study in boro rice cultivation (in lysimeter) and simulation modeling using one-dimensional model hydrus
- Irrigation management for sunflower mutants
- Monitoring groundwater table fluctuation at bina hq and its substations
- Effects of irrigation management and amendments in boro rice under saline condition (field study, Satkhira)
- Effect of irrigation regimes and other management practices on water-melon
- Response of rapeseed mutants to irrigation regimes
- Effectiveness of irrigation regimes on the yield and water productivity of potato (in cropping pattern) in the Char-land of Rangpur region
- Effectiveness of irrigation regimes on the yield and water productivity of groundnut (in cropping pattern) in the charland of rangpur region
- Irrigation management for garlic cultivars for higher yield and water productivity under zero tillage condition
- Irrigation management for hybrid maize for higher yield and water productivity
- Irrigation management and soil moisture conservation practices for chilli
- Effect of different tillage practices and irrigation management on mungbean production
- Development of low-cost solar power-operated garden/lawn mower
- Effectiveness of irrigation regimes on the yield and water productivity of potato (in cropping pattern) in the char-land of rangpur region

Postharvest Technology (Total #25)

(i) BARI: (#20)

- Optimization of processing parameters for frozen tender jackfruit
- Effect of packages for vacuum-fried jackfruit chips
- Development of a suitable packet for keeping vacuum-fried jackfruit chips

- Optimization of processing parameters for freeze-dried chips from jackfruit
- Effects of frying temperature and time on physicochemical changes and shelf life of vacuum-fried chips from giant taro
- Comparison of cooking methods and oils on physicochemical, nutritional, minerals, and bioactive compounds of mixed vegetables
- The nutritional, physicochemical, minerals and bioactive compounds analysis of selected BARI masur (lentil) varieties
- Effect of moisture content on the processing and quality of BARI mosur (lentil) chips using a single screw extruder
- Effect of vegetable pomace on the formulation of probiotic pickle
- Comparative study of domestic and internationally produced jam and jelly in terms of their physicochemical, nutritional, color, texture, and sensory evaluation
- Extraction of annatto color and evaluation of their microbial and antimicrobial activity before applying in food processing
- Morphological, physicochemical, nutritional, minerals, and bioactive compounds analysis of fresh figs (*ficus carica l.*) indigenous to Bangladesh
- Physico-chemical characteristics of plum in various concentrations of sodium chloride and sucrose during preservation
- Changes in the quality characteristics during storage of plum jam and its optimal preparation conditions
- Standardization of processing method for osmo-dehydrated sugar coated plum
- Optimization of a processing method for dragon fruit jam
- Effects of different sanitizers on the nutritional quality and shelf life of fresh-cut moringa sticks
- Determination of microbial hazards in fresh-cut fruits and salad vegetables used in street food vendors, hotels, and restaurants at Rajshahi and Khulna
- Optimization of processing technique for roasted jackfruit seed keeping nutritional quality intact
- Development of value-added ready-to-serve (RTS) Sapota powder through fortification with ascorbic acid and β -carotene

(ii) BRR1: (#5)

- Determination of physicochemical and cooking properties of breeding lines
- Determination of Physicochemical and Cooking properties of Transforming Rice Breeding lines
- Study on anti-cancer properties of pigmented (black, red, purple) rice cultivars in Bangladesh
- Method development and validation for the detection of bioactive compounds, Phytohormones, Vitamins, and Aroma in rice grain
- Determination of physicochemical properties and quality of puffed popped and flattened rice from newly released BRR1 varieties

Forestry Unit

The unit has been organizing, prioritizing, planning, authorizing, monitoring, and coordinating OFRD of BARI, and BFRI for agroforestry and forestry technology related research programs of the NARS Institutes since its functioning. It holds seminars and workshops, training sessions, and it kept close ties with both domestic (BARI, BRRI, BFRI, BTRI, BSRTI, BSRI, CDB, BWMRI, BIRTAN, DAE, BFIDC, SPARRSO, BMWA, RDA, WARPO, etc.) and international bodies (ICRAF, ICIMOD, and FAO, etc.) along with non-governmental (BRAC, ADPC, CNRS, Friendship, and CEGIS, etc.) organizations. Professionals working for the unit is shown in the following table.

Name of the Professionals

Name	Designation
Dr. Md. Saifullah	Member Director (Admin and Finance) and Chief Scientific Officer (Forestry)
Dr. Md. Golam Mahboob	Principal Scientific Officer
Dr. Kazi Noor-E-Alam Jewel	Principal Scientific Officer

Activities of the unit in 2022-2023 have been briefly discussed below:

1. Project Development/Project financing

- i) Contributed for developing PARTNER (Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience) project as a preparation team member.
- ii) Developed and got awarded KGF funded project Development of pineapple-based agroforestry models for mitigating climate change impact in response to their 5th Call for Competitive Grants Program (CGP).
- iii) Developed and recognized for funding a sub-project titled Upscaling of climate resilient agroforestry practices as CSA technologies for fragile agroecological areas from the PARTNER project.

2. Policy support

Policy Research on Forestry, Agroforestry, Environmental, and Climate Change aspects: Provided comments on 14 policy documents on the following aspects/issues and send them to the MOA/MoFE/ Rural Development and Co-operatives Division (RD CD) for necessary action

- i) A comprehensive report to MoA on 'Forecast of Aman rice production based on the overall situation of Crop, Weather, Late sowing, Sunshine.'
- ii) Input for the 'The 27th Session of the Conference of the Parties (Cop-27)'
- iii) Talking points for the meeting between MoA and ADB Hybrid Consultation Mission concerning 'Proposed Support for Green Growth and Disaster Resilience Program.'
- iv) Input and comments on the draft versions of 'National Adaptation Plan of Bangladesh 2023-2050'

- v) Passed comments on the draft Bangla translation of 'Rules of Business 1996 of Schedule-1 (Allocation of business among the different Ministries and Divisions)'
- vi) Inputs and comments on the 'Draft First Biennial Update Report of Bangladesh to the UNFCCC (BUR1)'
- vii) Inputs and comments on the 'Policy Draft for ADB's Climate Change Budget Support Program of MoA'
- viii) Inputs and comments on the draft version of 'Administrative Fine Rules, 2023' ('প্রশাসনিক জরিমানা বিধিমালা, ২০২৩')
- ix) Inputs and comments on the draft version of 'Sheikh Zahurul Haque Rural Development Academy, Jashore Act, 2022' ('শেখ জহুরুল হক পল্লী উন্নয়ন একাডেমি, যশোর আইন, ২০২২')
- x) Inputs and comments on the draft version of 'Jute (Licensing and Enforcement) Rules 2023' ('পাট/লাইসেন্সিং এন্ড এনফোর্সমেন্ট) বিধিমালা ২০২৩')
- xi) Inputs and comments on the draft version of 'Performance Evaluation Rules, 2023' ('কর্মমূল্যায়ন বিধিমালা, ২০২৩')
- xii) Inputs and comments on the draft version of AIP Policy 2023 ('এআইপি নীতিমালা ২০২৩')
- xiii) Inputs and comments on the draft version of the 'Joint Action Plan' for implementation of treaty entitled 'Sustainable and Green Framework Engagement' between Bangladesh and Denmark.
- xiv) Comments to ERD on the project document titled 'Public-Private Blended Finance Facility for Climate-Resilient Rice Landscapes' submitted by FAO.

3. Evaluation and Review of forestry research programs

- Seventy research programs of BFRI for 2023–2024, were examined, reviewed, and proposed for further improvement as needed to be technically sound.
- Review workshops for NARS institutes (BFRI, BARI, BRRI, BINA, BSRI) on Forestry and Agroforestry technologies were co-developed

4. Training, workshop, seminar, etc. (Foreign and Local) Organized

a. Review of Workshop of NARS Institutes

Relevant members of the National Agricultural Research System institutions participated in a two-day workshop on 'Annual Review Workshop on Forestry and Agroforestry Programmes of NARS Institutes: Research Progress 2021-22 and Research Programme 2022-23' during October 19-20, 2022, at BARC Auditorium. The workshop had 80 participants while 62 were male and the rest were female. Reviewing the state and requirements of research in forestry, agroforestry, and wildlife conservation technologies was one of the workshop's main goals. Participants and expert members provided insightful comments on research reports (2021–22) and planning for improving future research programme of NARS Institutes (2022–23).



Participants of the Research Review 2021-22 and Research Planning 2022-23 Workshop for agroforestry

b. Organized Training on Contemporary Issues and Technologies in Forestry and Agroforestry for Professionals

A two-day long training course on Contemporary issues and Technologies in Forestry and Agroforestry for Professionals was organized at BARC during 1-2 March 2023. Forty participants from different 18 organizations like NARS institutions (BARC, BARI, BRRI, BJRI, BSRI, BFRI, BWMRI, SRDI, BTRI, etc.), DAE, SPARRSO, BMWA, RDA, WARPO, and NGOs (CNRS and CEGIS) attended the workshop. Ten lectures were delivered by renowned scientists and experts on assigned topics. Member Director, NRM Division offered his valuable speech highlighting importance of training and inspired the organizers to compile an attractive and resourceful training manual. Participants were welcomed to share their feedback and views. Dr. Nazmun Nahar Karim, Member Director (Livestock) BARC, inaugurated the ceremony and distributed certificates among the participants.



Some Pictures of the Training Program on Contemporary Issues and Technologies in Forestry and Agroforestry for Professionals

c. Organized Training on Climate Smart Agriculture for Adaptation

A three-day long training course on Climate Smart Agriculture for Adaptation was organized at Training Building of BARC during 16-18 May 2023. Forty participants from different NARS institutions (BARC, BARI, BJRI, BSRI, BTRI, and SRDI), DAE, SPARRSO, CEGIS, CNRS, RDA, WARPO, BMDA and CHDB, and NGOs (BRAC and ADPC) attended the training program. Sixteen different lectures were delivered by renowned scientists and experts on specific subjects. Member Director, NRM Division offered his invaluable speech highlighting importance of training and inspired the organizer to compile a noteworthy and resourceful training manual. Dr. Nazmun Nahar Karim, Member Director (Livestock) inaugurated the ceremony and distributed course certificates among the participants.



Training Program on Climate Smart Agriculture for Adaptation

5. Training, workshop, seminar, etc. (Foreign and Local) Attended

Dr. Md. Golam Mahboob, PSO (Forestry) participated in the Inception Meeting of the Atlas of Climate Adaptation in South Asian Agriculture (ACASA) Project held at the ICAR Lecture Hall, NASC Complex, New Delhi, India during 25 – 27 April 2023 as a six-member team from Bangladesh



Participants of the Inception Meeting of Atlas of Climate Adaptation in South Asian Agriculture (ACASA) Project

6. Linkage Activities

The division has been successfully maintaining a strong linkage with NARS institutes, BSTI, DoF, BCSIR, DoDM, MoFE, DoE, Universities, NGOs, etc. as and when necessary, along with the following activities.

- i) In collaboration with the Faculty of Earth Observation and Geoinformation (ITC), University of Twente, developed and submitted a customized training proposal on capacity development of NARS Scientists titled 'Multimodal Remote Sensing for Climate Smart Agriculture Applications' to Tailor-Made Training Plus (TMT+) of Orange Knowledge Program (OKP), Netherlands Universities Foundation for International Cooperation (Nuffic), Govt. of The Netherlands through proper channel.
- ii) Scientists joined initiatives of Borlaug Institute for South Asia (BISA) to contribute to develop and started implementation of a project titled 'Atlas of Climate Adaptation in South Asian Agriculture (ACASA)' funded by Bill & Melinda Gates Foundation (BMGF).

7. Publications in Journals/Media

a. Journal Articles: Two journal articles were published during the reporting period as mentioned below

- i. Mohammad Mukhlesur Rahman, Mohammad Amirul Islam, M. Golam Mahboob, Nur Mohammad, Istiak Ahmed (2022) Forecasting of Potato Production in Bangladesh using ARIMA and Mixed Model Approach. Sch J Agric Vet Sci, 9(10): 136- 145, doi: 10.36347/sjavs.2022.v09i10.001.
- ii. AFM Tariqul Islam, AKM Saiful Islam, GM Tarekul Islam, Sujit Kumar Bala, Mashfiqus Salehin, Apurba Kanti Choudhury, Nepal C. Dey, M. Golam Mahboob (2023). Simulation of water productivity of wheat in northwestern Bangladesh using multi-satellite data. Agricultural Water Management. 281: 108242, doi: 10.1016/j.agwat.2023.108242.

b. Annual Report and Newsletters:

- iii. Contributed to publish BARC Annual Report 2021-22 and BARC Newsletters
- iv. Training manuals: Two manual were prepared
- v. 'Climate Smart Agriculture for Adaptation' and
- vi. 'Contemporary Issues and Technologies in Forestry and Agroforestry for Professionals'

d. Workshop Proceedings

- vi. A workshop proceedings on 'Annual Review Workshop on Forestry and Agroforestry Programmes of NARS Institutes: Research Progress 2021-22 and Research Programme 2022-23' has been prepared and distributed.

SOILS UNIT

The Soils Unit, NRM has been implementing the mandated activities and beyond. The unit, since its inception, has been prioritizing, planning, approving, reviewing, monitoring, and coordinating soil fertility and fertilizer management, soil pollution, and climate change-related research programme of the NARS institutes, and other institutions including universities, DAE, and NGOs. The unit conducted training programmes, seminar, workshops and maintain a strong linkage with national and international organizations through coordinating research project. Unfortunately, only two working scientists are available for the unit as shown in the following table.

Name of the Professionals

Name	Designation
Dr. Md. Baktear Hossain	Member Director (NRM), Director (Manpower & Training), and Chief Scientific Officer (Soils Unit)
Dr. Faridul Islam	Principal Scientific Officer

Activities of the unit during 2022-2023 have been described below:

1. Project Development and Coordination

The unit oversees the soil fertility and fertilizer management-related programs of the country. As such it is involved in developing both national and international coordinated/collaboration projects. It had developed three nationally coordinated projects under PBRG sub-projects with NATP-2 funding. After implementation of the sub-projects project completion reports has been submitted. One project is continuing with funding from KGF titled Updating and publication of fertilizer recommendation guide-2023 (ID-TF104-C/23). The unit is also involved in three international collaboration projects, one of such projects titled Sustainable soil management for nutrition-sensitive agriculture in Sub-Saharan Africa and South East Asia with the technical cooperation from FAO has been completed. Two other projects, one funded by Australian Centre for International Agricultural Research (ACIAR) and KGF titled (i) Nutrient management for diversified cropping in Bangladesh (NUMAN)' have been completed and the second one titled Development of National Soil Map and National Soil Information Systems of Bangladesh funded by Asian Food and Agriculture Cooperation Initiative (AFACI) is under implementation.

I. National Coordinated Projects

a. Microbial characterization of Bangladesh soil and development of climate smart biofertilizers for crop production and soil fertility

This project is a coordinated project funded by PIU-BARC, NATP-2 with five components viz. (i) Coordination Component: Soils Unit, NRM Division, BARC, Implementing components: (i) Soil Science Division, BARI (ii) Soil Science Division, BRRI, (iii) Soil Science Division, BINA, and (iv) Soils and Nutrition Division, BSRI, Ishurdi, Pabna. The project objectives were to i) study physical, chemical, and microbial properties of soil of different AEZs of Bangladesh; ii) isolate and characterize climate-smart tolerant nitrogen-fixing and plant growth promoting bacteria/microbes

from the root, nodules and rhizosphere soils of Bangladesh; and iii) develop biofertilizer for cereal, pulse, oilseed, sugarcane and test efficacy for crop productivity and soil fertility. Implementing components followed a unified soil sampling protocol covering 30 AEZs covering 39 districts, Each AEZ includes two districts and in each district two upazila were chosen (10 locations of each upazila) and from upazila followed two unions (5 locations of each union dividing the equal distance of total union) were sampled. In total 1123 soil samples (310 samples from BARI from 8 AEZs, 253 samples from BRRI from 8 AEZs, 320 samples from BINA from 7 AEZs, and 240 samples from BSRI from 7 AEZs) were collected with GPS records along with crop history. Unified standard analytical methods were followed to analyze soil texture, soil pH, Soil Organic C, Total N, Total Bacteria, Fungus, Actinomycetes, N₂- Fixing Bacteria, Phosphate Solubilizing Bacteria (PSB), and Identification of isolated strains. Isolation of organisms, characterization and biofertilizer production, and pot and field experiments were done in respective soil laboratories and fields of BARI, BRRI, BINA, and BSRI.

The range of total bacteria populations was high in the soil of Dighinala upazila of Khagrachari district under AEZ 29 (6.0×10^5 to 2.2×10^9 cfu/g soil) as reported by BARI. The lowest total bacteria population range was (3.0×10^5 - 5.0×10^6 cfu/g soil) in Cox's Bazar Sadar upazila soils under AEZ 23. The lowest total fungus population range was recorded in the collected soils of AEZ 30. On average, Actinomycetes populations were low in all the tested soils of different AEZs. The populations of free-living N₂-fixing bacteria were higher than the Rhizobium and Bradyrhizobium populations. The populations of phosphate-solubilizing bacteria were higher than free-living N₂-fixing bacteria. The soils of AEZ 18 (mostly Bhola) appeared to be alkaline while the soils of Rangpur under AEZ 3 were found to be acidic. Application of biofertilizer (Rhizobium sp. BARIRAh808 for groundnut, Rhizobium sp. FALR114 for lentil) resulted in higher crop performance in groundnut (2.28 t ha⁻¹) at Cox's Bazar and lentil (1.81 t/ha) at Pubna during 2021-2022 over uninoculated control.

Key findings obtained by BRRI revealed that the range of total bacteria populations was significantly high in the Decreechar union of AEZ 10 (2×10^6 to 2×10^9 cfu/g soil), Panisara union of AEZ 11 (2×10^7 to 2×10^9 cfu/g soil), and Deorghachi union of AEZ 22 (7×10^6 to 1×10^9 cfu/g soil). The lowest total bacteria range was in AEZ 13. The total fungus population range was comparatively lower in the AEZ 10, AEZ 13, AEZ 15, AEZ 16 and AEZ 27. On an average, Actinomycetes populations were low in all the tested AEZ's. The populations of free-living N₂-fixing bacteria were higher than the Rhizobium populations. The populations of phosphate-solubilizing bacteria were higher than free-living N₂-fixing bacteria. Isolated 15 potential strains were coated with TSP and Urea fertilizer and named as 'Bio-coated urea' and 'Bio-coated TSP' biofertilizer, respectively. In the glasshouse condition, about 36% grain yield increased in BRRI dhan28 and saved 50% TSP fertilizer by the application of 'Bio-coated TSP' in acid soil compared to TSP fertilizer only. Application of Bio-coated urea improved grain yield by 10.53% of BRRI dhan99 over chemical fertilizer in the Saline soil. Nutrient mineralization from Bio-coated fertilizer and survival of the bacteria during the incubation study and plant growth period (glasshouse study) were at satisfactory level.

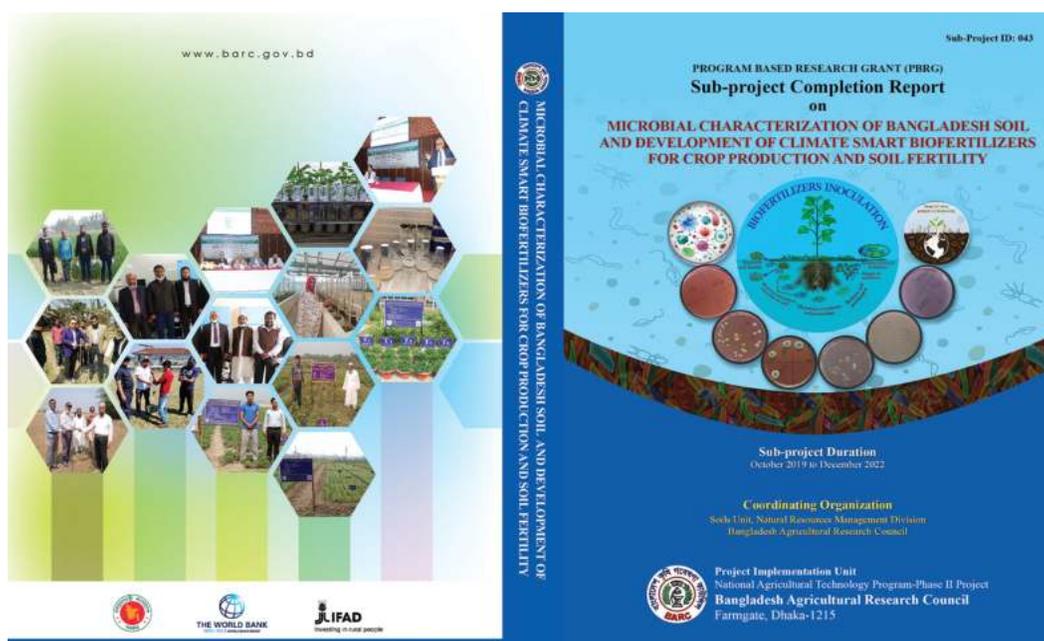
Major findings obtained by BINA were that AEZ 14 recorded the highest total bacteria, Rhizobium, Bradyrhizobium, FLNFB, and Fungi population among 8 AEZs studied. The total bacteria populations were highest in (AEZ 14) Roghunathpur union (12.6×10^7 - 15.8×10^7 cfu/g soil) (mean 15.38×10^7 cfu/g soil), Rangpur union (12.6×10^7 - 19×10^7 cfu/g soil) (mean 14.82×10^7 cfu/g soil) and Gabindapur union (11.8×10^7 - 18.5×10^7 cfu/g soil) (mean 14.02×10^7 cfu/g soil). AEZ 25 recorded the highest population of PSB and AEZ 3 as the highest population of Fungi. AEZ 26 was recorded next

to the highest population of total bacteria and PSB. FLNFB population was found higher over Rhizobium, Bradyrhizobium, Fungi, and Actinomycetes. Rhizobium and Bradyrhizobium populations were found to be higher over PSB, Fungi, and Actinomycetes. PSB population was recorded higher over Fungi and Actinomycetes. The fungi population was found higher than Actinomycetes. The population of Actinomycetes was found the lowest among the microbes studied. Salinity-tolerant biofertilizer was developed for the production of soybean in saline areas.

BSRI conducted studies to determine soil microbial populations from seven AEZ's and characterized the potential free-living N₂ fixing bacteria from sugarcane rhizosphere and develop nitrogenous biofertilizer/inoculants. The identified nitrogenous inoculants were used to test the efficacy of the yield performance of sugarcane. An experiment was conducted and comprising of eight treatments viz. T1 = No fertilizers and strains, T2 = Recommended Dose of Fertilizers (RFD), T3 = 100% N of RFD+N-fixing inoculants, T4 = 50 % N of RFD + N-fixing inoculants, T5= 75 % N of RFD + N-fixing inoculants, T6 = 50% of RFD+ Nitrogen and phosphate solubilizing inoculants, T7= 75 % of P and full amount of NKSZn + phosphate solubilizing inoculants and T8 = 50 % of P and full amount of NKSZn + phosphate solubilizing inoculants using Ild 39 as a test variety. The highest millable cane was found in the T5 treatment and the second highest of 103.85 103 ha⁻¹ was found in the T5 treatment, it was similar to all other treatments except the control. But the highest sugarcane yield of 108.25 was found in the T5 treatment, it was statistically similar to the T2 treatment. So, 75% RFD along with nitrogen-fixing inoculants gave a better performance. Based on the 16S rRNA gene sequencing, the isolated strains were identified as *Bacillus pumilus* BS37a, *Bacillus pumilus* BS37b, *Bacillus pumilus* BS34a and *Bacillus pumilus* BS34b in strain *Bacillus pumilus* and *Kocuria rosea* BSBR1 and *Kocuria rosea* BSBR2 in strain *Kocuria rosea*. *B. pumilus* is significant to ecosystem biochemistry because it functions as a nitrogen-fixing bacteria capable of metabolically transforming molecular nitrogen (N₂) into ammonia (NH₃) (Hernandez *et al.*, 2009). The project completion workshop was held on 12 December 2022 and Project Completion Report was published on 26 December 2022 and submitted to the Director, PIU-BARC, NATP-2



Dr. S M Bokhtiar, EC, BARC addressed before the dignified soil scientists on the occasion of the Project Completion Workshop



Project completion report of the project titled *Microbial characterization of Bangladesh soil and development of climate-smart biofertilizers for crop production and soil fertility (ID:043)*

b. Updating and Publication of Fertilizer Recommendation Guide-2023 (ID-TF104-C/23)

The unit is mandated to update and publish Fertilizer Recommendation Guide at a certain interval. Seven Fertilizer Recommendation Guides (FRG) have been published so far as in 1979, 1985, 1989, 1997, 2005, 2012, and 2018. The next FRG is expected to be published within December 2023. Up-to-date fertilizer recommendations along with other related information for different crops and cropping patterns of different agro-ecological zones (AEZs) of the country developed at the NARS institutes and universities during the last five years after publication of the last Guide in 2018, would be included in the forthcoming guide. The guide is expected to be widely used by farmers, NGOs, extension personnel, input providers, scientists, university teachers, policymakers, etc. for planning and implementation of agricultural production programs at local and national levels. It is helpful to ensure the use of optimum doses of fertilizers in agricultural production and for enhancing sustainable higher crop production, and food and nutritional security of the country. However, the specific objective of FRG is outlined below

Specific Objective (s):

- i) Updating of fertilizer recommendations for crops and cropping patterns under different Agro-ecological Zones (AEZs) of Bangladesh.
- ii) Publication of the updated Fertilizer Recommendation Guides in English (FRG-2023) and Bengali (‘mvi mycvwikgvjv nvZeB-2023Ó), the national documents for fertilizer recommendation for agricultural production in the country.
- iii) Preparation and publication of the mobile app of ‘mvi mycvwikgvjv nvZeB-2023Ó for quick, easy and wide-spread dissemination of the Guide.

The project regarding FRG-23 was held on 29 March 2023 and finished by 28 January 2024. The inception workshop of the project was held on 8 May 2023. Eighty (80) participants from the Soil Science Division of NARS institute (BARI, BRRI, BINA, BJRI, BSRI, BTRI, BFRI, SRDI, CDB, and BSRTI), senior soil scientists, soil experts, professors of soil science from different universities and DAE officials participated the workshop. A series of coordination meetings was arranged with those soil experts and DAE officials for data collection and interpretation toward updating fertilizer recommendation guide-2023. An updated version of the Fertilizer Recommendation Guide will be published by November 2023 both in English as 'Fertilizer Recommendation Guide-2023' and Bengali as 'mvi mycvwikgvjv nvZeB-2023'. A mobile app-based on-line version of mvi mycvwikgvjv nvZeB-2023 will also be published soon.. The Guide will help ensure the use of optimum doses of fertilizers enhancing sustainable higher crop production, and food and nutritional security of the country.



Participants of Inception Workshop on Updating and Publication of Fertilizer Recommendation Guide-2023 Project.

II. International Collaboration Project:

A. Nutrient management for diversified cropping in Bangladesh (NUMAN)

It is an international collaborative project between NARS institutes and public universities of Bangladesh and Murdoch University, Australia. The project is jointly funded by Krishi Gobeshona Foundation (KGF) and Australian Council for International Agricultural Research (ACIAR). The broad objective of the project is to increase the profitability and sustainability of intensive and emerging cropping systems through improved nutrient management. While there are several specific objectives as follows:

- i. Identify differences between current and recommended fertilizer use on farms, gather evidence of nutrient imbalance, and barriers in adopting relatively profitable and sustainable nutrient management practices.
- ii. Develop and test tools for sustainable nutrient management in intensively cropped areas of northwest Bangladesh and emerging cropping systems based on CA and coastal zone soils of southern Bangladesh.
- iii. Outscale the use of tools and development of policies to advance practice change towards improved fertilizer use efficiency through engagement of farmers' groups, extension, private sector aligning the government policy.

- iv. Improve the knowledge on soil resources and capability for nutrient management by research partners and key stakeholders.

As an extensive project it is attending activities involving the following organizations as implementing partners. Besides there are two strategic partners viz. Bangladesh Fertilizer Association (BFA) and Conservation Agriculture Service Provider Association (CASPA).

Organizations	Division/Department	Remarks
BARC	Soils Unit	Coordinator (KGF funding part)
Murdoch University, Australia		Coordinator (ACIAR funding part)
BARI	Soil Science Division	Implementing organization
	On-Farm Research Division	Implementing organization
	Agricultural Economics	Implementing organization
BRRI	Soil Science Division	Implementing organization
SRDI		Implementing organization
BAU	Department of Soil Science	Implementing organization
	Rural Sociology	Implementing organization
Khulna University	Agro-technology Discipline	Implementing organization
PSTU	Department of Soil Science	Implementing organization

Intensive cropping areas of Durgapur (AEZ-11) and Godagari (AEZ-25) Upazilas of Rajshahi and Sadar Upazilas of Thakurgaon (AEZ-1) and Mymensingh (AEZ-9) and coastal areas of Dakope of Khulna (AEZ-13) and Amtali of Barguna (AEZ-13) have been selected as the research hubs.

In this international collaboration project four NARS institutes: BARC, BARI, BRRI, and SRDI; three public universities: BAU, Khulna University, and PSTU; and Murdoch University, Australia are collaborating. The KGF funding part is being coordinated by BARC and ACIAR funding part by Murdoch University, Australia through PIO/Liaison Office in Dhaka.

The activities of the project are grouped into two categories viz (i) socio-economic and gender aspects of fertilizing management and (ii) soil fertility and fertilizer management activities. For the socioeconomic and gender studies, quantitative and qualitative research approaches were employed. Research programs for soil fertility and fertilizer management activities have been developed based on the identification of real field problems through field visits, discussions with farmers, and rigorous discussion among the project team members. Research programs have been designed for on-station, on-farm and laboratory-based studies. In addition to Principal Investigators (PIs) and Co-PIs, six Ph.D and 20 MS fellows have been engaged in the implementation of the project activities. The project activities have been initiated from Kharif-1, 2018 and concluding workshop NUMAN project was held on 20 December 2022.



Field Monitoring and Mid Term Review of NUMAN Project



Participants of Project Completion Workshop of NUMAN project

B. Development of National Soil Map and National Soil Information Systems of Bangladesh

This is a coordinated project between BARC and SRDI where BARC is worked as the coordination agency and funded by AFACI. It was initiated in October 2019 and will be continued until September 2023. The major objective of the project is to develop a National Soil Map for sustainable soil management and food security of Bangladesh, which will be a part of the Soil Atlas of Asia. The project evaluation meeting was held on 3 November 2020. The project has made a remarkable progress viz. (i) preparation of the National Soil Type Map by applying the principles and guidelines of the World Reference Base (WRB); (ii) Soil Organic Carbon (SOC) Map (draft) and also (iii) A soil salinity map has been prepared.

AFACI SOIL project has brought the opportunity for Bangladesh to be part of the activities which has been carried out over the years for the establishment of GLOSI. Harmonization and updating of soil maps and data have been executed accordingly under the framework of publishing the Soil Atlas of Asia. It is proposed to AFACI authority for the extension of the project for at least two years (upto September 2025) to:

- Update the National Soil Profile Database by adding more geo-referenced legacy soil data and updated analytical data of soils collected from different soil profiles.
- Versioning of submitted maps particularly National Soil Salinity Map and SOC Sequestration Potential Map of Bangladesh.
- Preparation of district soil maps as an input for NSIS.

2. Policy support

Activities of Fertilizer Technical Sub-Committee

Fertilizer Technical Sub-Committee was formed by the MoA in 1997 to help the National Fertilizer Standardization Committee. Member-Director (NRM), BARC works as the convener, and Additional Director (Implementation), DAE as the Member Secretary comprising 20 members with CSO (Soils), BARC; CSOs of Soil Science Divisions of different NARS institutes, CSO, OFRD, BARI; representatives from different concerned organizations like Departments of Environment, Livestock, Fisheries, BSTI, SRDI, BADC, BCIC, etc. Director, AIS, has been added as another member of the Technical Sub Committee. The principal activities of the Technical Sub-Committee of Fertilizer Standardization carried out during the reporting years are as follows:

- Organized periodic meetings of Fertilize Technical Sub-committee for the Standardization of new fertilizers and review of the existing fertilizers.
- Organized meetings on Fertilizer needs and quality control.
- Given comments on policy issues related to the use/ import/ export/ production of fertilizer and fertilizer materials as and when necessary.
- Monitoring Fertilizer Quality.



57th Fertilize Technical Sub-committee for Standardization

Two meetings of the Fertilizer Technical Sub-committee were held with Member Director, NRM Division, BARC as meeting chair during 2022-2023. Three meetings of sub-committee (Fertilizer Specification Update Committee, Fertilizer Inspection Manual Preparation Committee and Manual for Fertilizer Analysis Update Committee) under TSC were held during 2021-2022. Many organic and chemical fertilizers and PGRs were evaluated in the meetings through which the following number of organic fertilizers, chemical fertilizers, and plant growth regulators were recommended for standardization to the National Fertilizer Standardization Committee headed by the Secretary, MoA.

Status		Year
Recommended for standardization		2022-2023
01	Organic fertilizer	8
02	Chemical fertilizer	1
03	Plant growth regulator	6
Total		15
Under process of standardization		2022-2023
01	Organic fertilizer	87
02	Chemical fertilizer	17
03	Plant growth regulator	63
04	Bio-fertilizer	14
Total		181



Organic fertilizer factory visited at (a) Gaibanda, (b) Pabna, (c) Kushtia and (d) Thakurgaon by organic fertilizer factory verification committee.

Activities performed during 2022-2023:

CSO/PSO (Soils) has been serving as convener of the three-membered committee of field monitoring for evaluating the capacity of quality organic fertilizer-producing factories. The committee visited the Organic fertilizer, biofertilizer and vermicompost fertilizer factories at Chandpur, Khagrachari, Rajbari, Chuadanga, Kushtia, and Pabna and submitted report to the convener of the technical sub-committee on fertilizer (TSC).

The Soils unit provided comments/opinions to the Ministry of Agriculture on the following aspects:

Sl. No.	Topic	Date
1.	Draft Strategic Partnership Agreement between Wageningen	28/07/2022
2.	University & Research (WUR), Netherlands and Bangladesh Letter of Interest (LOI) for the purpose of establishing an international quality laboratory for agriculture in Bangladesh by Kottermann GmbH, Germany for the purpose of exporting agricultural products from Bangladesh to European Union countries.	11/10/2022
3.	Opinion of Bangladesh Agricultural Research Council on the formulation of National Chemical Management and Safety Policy and Infrastructure in the country	26/10/2022
4.	Import of Non-Urea (DAP) Fertilizers imported by BADC	17/11/2022
5.	Information on 'Chromium Trioxide' report sent from the United States Environmental Protection Agency	24/01/2023
6.	The minutes of the meeting on preparation of TVC with necessary data to inform and motivate the farmers on the moderate use of DAP and Urea fertilizers in the crops sent to the Ministry of Agriculture.	09/01/2023
7.	Feedback on the formulation of guidelines for testing various parameters of food products in mobile laboratories.	13/04/2023
8.	The 'Fertilizer Policy Dialogue Symposium' meeting was held on the findings of the 'Nutrient Management for Diversified Cropping in Bangladesh (NUMAN)' Project at the Bangladesh Agricultural Research Council and the opinion on the brief prepared in the light of the meetings being sent to the Ministry of Agriculture.	21/03/2023

i. Research Management and Coordination

The unit has organized Annual Research Review and Planning Workshop on Soils Program of NARS institutes for 2022-2023 during 27-29 September 2022 with participation of scientists of the NARS institutes. Research programs formulated during 2021-2022 were reviewed. The workshop was divided into seven technical sessions and one recommendation session. Besides reviewing ongoing research programmes, proposed research programmes for 2022-2023 were also discussed. Scientists from different NARS institutes took part in the discussion toward contribution and sharing knowledge, thoughts, and experiences for the improvement of the programs to avoid possible duplication.



Participants of Annual Research Review and Planning Workshop on Soils Program of NARS Institutes, 2021-2022

ii. Monitoring and Evaluation

The unit is actively involved in the regular monitoring and evaluation program of BARC. Scientists of the unit worked as team members of the Monitoring and Evaluation teams formed by the Planning and Evaluation Division, BARC. Director (M&T). CSO (Soils) (Addl. Charge) played role as the team leader of a Monitoring Team almost every year followed by presentation of reports.

iii. Training, Workshop, Seminar and Symposia

Training

Soils Unit, NRM, BARC conducted training programs on the following titles:

- i) Training program on Training on Fertilizer Recommendation Guide-2018 during May 15-17, 2023. There were 40 participants, mainly DAE officials, NARS scientists, university teachers, and BADC officers were invited.



Participants were recieved certificated on Training Program on Training on Fertilizer Recommendation Guide-2018

- ii) Training program on Climate change, carbon sequestration, and adaptation strategies during June 18-20, 2023. There were 40 participants in the training program from NARS scientists, university teachers, BADC officers, and DAE officials.



Participants of Training Program on Climate Change, Carbon Sequestration and Adaptation Strategies

Workshops:

The unit organized four workshops as mentioned below

- i) Research Review and Planning Workshop of Soil Management Program of NARS Institutes during 27-29 September 2022. Eighty participants from the Soil Science Division of NARS institute (BARI, BRRI, BINA, BJRI, BSRI, BTRI, BFRI, SRDI, CDB, and BSRTI), senior soil scientists, soil experts, professors of soil science from different universities and DAE officials participated the workshop. Recommendations for the workshop were sent to respective institutes.
- ii) Project Completion Report (PCR) Workshop of PBRG Sub Project titled 'Microbial characterization of Bangladesh soil and development of climate-smart biofertilizers for crop production and soil fertility' (ID: 043) on 12 December 2022. One hundred participants from the Soil Science Division of NARS institutes (BARI, BRRI, BINA, BJRI, BSRI, BTRI, BFRI, SRDI, CDB, and BSRTI), senior soil scientists, soil experts, university professors and DAE officials attended the workshop. Recommendations of the workshop were passed to the respective institutes for necessary action.
- iii) Concluding Workshop of Nutrient Management for Diversified Cropping in Bangladesh (NUMAN) Project on 20 December 2022. One hundred twenty professionals and DAE officials participated the workshop. Recommendations for the workshop were sent to respective institutes for improving their respective research programmes.
- iv) Inception Workshop on Updating and publication of fertilizer recommendation guide-2023 Project on 8 May 2023. Eighty related professionals from BARI, BRRI, BINA, BJRI, BSRI, BTRI, BFRI, SRDI, CDB, and BSRTI) and soil experts, university professors and DAE officials join the workshop. Recommendations received from audience were forwarded to respective institutes.



Participants of PCR Workshop of PBRG Sub Project Microbial Characterization of Bangladesh Soil and Development of Climate-smart Biofertilizers for Crop Production and Soil Fertility



Participants of Concluding Workshop of NUMAN Project

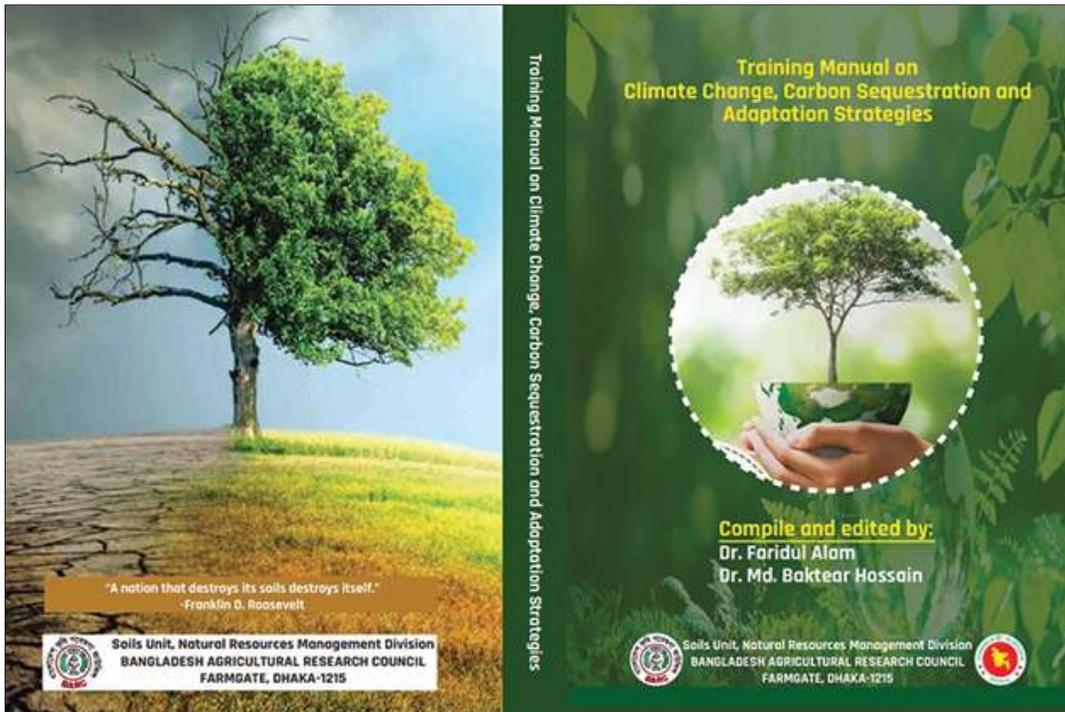


Participants of Inception Workshop on Updating and Publication of Fertilizer Recommendation Guide-2023 Project

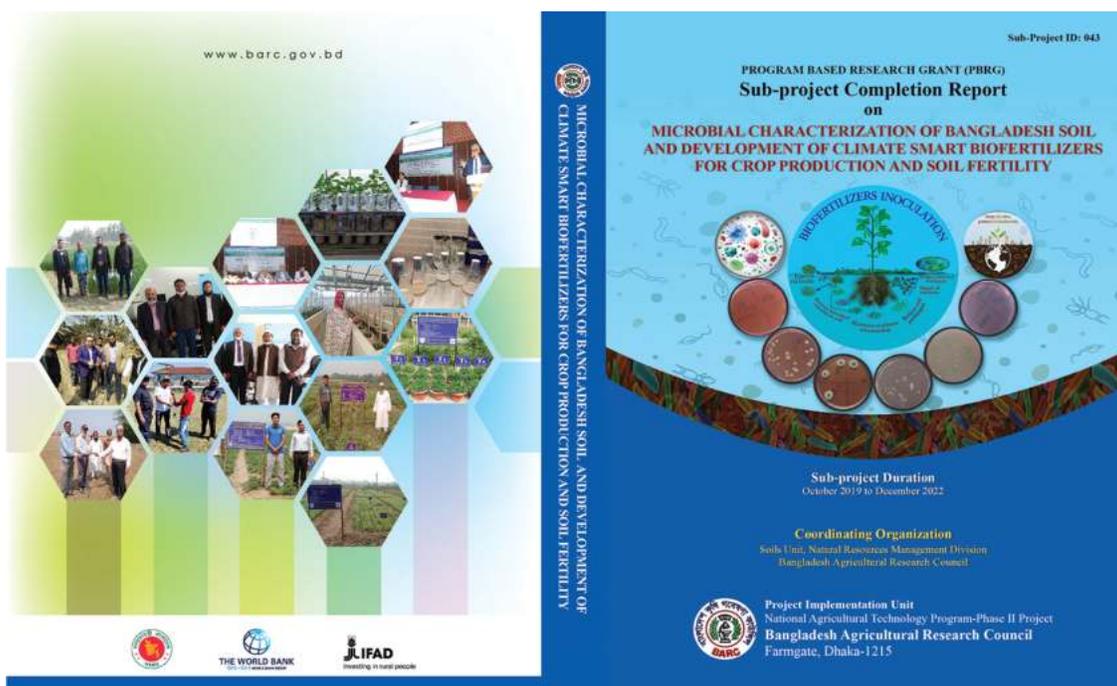
iv. Publications

Soils Unit published the following documents during 2022-2023

- (i) Proceedings of Research Review and Program Planning Workshop of Soils Program of NARS Institutes 2022
- (ii) Manuscript (4) in a high-profile indexed journal.
- (iii) Two proceedings of Fertilizer technical Sub-Committee Meetings.
- (iv) PCR on 'Microbial characterization of Bangladesh soil and development of climate-smart biofertilizers for crop production and soil fertility'.
- (v) Draft PCR on 'Nutrient Management for Diversified Cropping in Bangladesh (NUMAN)'.
- (vi) Training Manuals of the following training program:
 - Climate Change, carbon sequestration, and adaptation strategies
 - Fertilizer Recommendation Guide-2018



Photographs of Some Publications of Soils Unit, NRM Division, BARC



Photographs of Some Publications of Soils Unit, NRM Division, BARC.

Other Activities

Scientist of the unit worked as members of the following committees-

- Online Fertilizer Recommendation Guide-2018 innovation service is now available at www.frg2018.com and at the Google play store.
- Participated as a member/resource person of various committee meetings, training programmes, and development activities organized by ARIs, SRDI, DAE, and NGOs.
- CSO (Soils) has been working as Director (Manpower and Training), BARC since June 2019
- Scientists are been working as convener of the Organic Fertilizer factory investigation committee.
- CSO (Soils) have been working as convener of Fertilizer Inspection manual amendment committee and member of the Fertilizer Analysis manual amendment committee.
- Unit scientists served as external examiner of B.Sc. Ag. (Hons.) and MS level examinations of BAU, PSTU, and SAU and as MSc Ag/PhD thesis examiner at different Universities.
- CSO (Soils Unit) worked as a member of the Steering Committee for the Establishment of Laboratory of SRDI and as a member of Project Management Committee of the Soil Resources Management and Strengthening Farmers Services Project.
- PSO (Soils Unit) is assigned as Associate Editor of the Journal 'Soil and Nature'

Livestock Division



LIVESTOCK DIVISION

The division is working to achieve the goal of improving the nutritional status of the general mass through cost-effective livestock production for an increased supply of animal-origin food, supporting increased crop production through providing healthy draft animals and biological manure and helping rural poor in employment generation, income increase and fuel supply through profitable livestock rearing. It is entrusted with the duties of planning, reviewing, prioritizing, approving, monitoring, evaluating, supervising and coordinating of the livestock research programmes implemented by the relevant NARS institute and other institutions including universities, DLS and NGOs. It is providing training and research support to the NARS institution, DLS, and relevant faculties of various educational institutions and NGOs. It is imparting policy support to the relevant NARS institutes and extension agencies. The division is arranging, conducting, and participating in training, meetings, and seminars/workshops. It is also engaged to support national avian influenza/bird flu prevention and control programs, to recruit scientists/officers in NARS institutes, to support different research activities of NARS institutes, and supported activities of PIU-BARC, NATP-2. However, the professional involved in running the division is mentioned in the following table. Also, the activities attended by the division is outline below.

Name of the professionals

Name	Designation
Dr. Nazmun Nahar Karim	Member-Director
Dr. Mohammad Rafiqul Islam	Chief Scientific Officer
Dr. Ali Akbar Bhuiyan	Principal Scientific Officer

1. Research Programme Development

Two days long workshop on 'Research Progress 2021-2022 and Research Program 2022-2023 of Bangladesh Livestock Research Institute' was held during 12-13 October 2022 at BARC. Participants from different organizations like BARC, DLS, BLRI, FAO, CVH, CDIL, NIB, KGF, PIU-BARC, universities, and other organizations attended the workshop. The objectives were to review the research progress 2021-22 and research programme, 2022-2023 development in production, health, biotechnology, and others areas. Head of the respective division of 80 research divisions of BLRI presented research progress reports for 2021-22 and proposed research programme for 2022-23. Following the presentation, participants, professionals, and a panel expert have given their valuable suggestions and guidelines to align the research activities with national demand and priority, which were noted and forwarded to the institutes for integration into the future research programmes. In this connection the activities were carried out.

- Evaluated final reports of the projects for 2021 -22 of BLRI
- Helped to prepare BLRI's future research plans for 2022-23.
- Technical support to the research programs of BLRI throughout the year
- Attended the Annual Research Review Workshop 2022 of BLRI

2. Monitoring and Evaluation of Research Projects

The division conducted field monitoring and evaluation of different projects of BLRI, Livestock and Dairy Development Projects (LDDP) and KGF funded projects. The BARC team as the technical committee members of the research projects and visited the project sites and laboratory at BLRI and discussed with concerned scientists and field staff. The team collected updated information on the progress activities. The team provided on-the-spot suggestions regarding crop management and other project activities for the smooth running of the project.

3. National and International Collaborations

a) International collaboration with Australia under the project Reducing cost of dairy and beef production in Bangladesh using partnership between science, farmers and industry

Livestock division conducted a coordination meeting for the project titled Reducing cost of dairy and beef production in Bangladesh using partnership between science, farmers and industry on 21 November 2022. Consultative Meeting between the Team Members of Sydney University and BARC Experts was chaired by the Executive Chairman, BARC and the team from the Sydney University, Australia and scientist from the BARC and KGF were present in the meeting. Honorable Executive Chairman also led the BARC team during the discussion regarding joint research. After discussion some collaborative activities have been figured out. Minutes of the meeting for the collaborations have been prepared and sent to each expert of the teams.

b) Online meeting among the MoA, BARC, MoFL and Wageningen University and Research (WUR), The Netherlands

To improve the genetic resources of dairy cattle in Bangladesh for a sustainable resilient dairy sector, an online meeting among the MoA, BARC, MoFL and Wageningen University and Research (WUR), Netherlands was held on 27 February 2023. All the participants actively discussed for *Development of a roadmap for dairy cattle breeding strategy in Bangladesh* and subsequently added their comments, observations, and suggestions.

After discussion the following decisions were taken for the enhancing activities :

- Not only a breeding strategy but also a production and marketing strategy needs to be developed.
- A questionnaire matrix on 'development of a roadmap for dairy cattle breeding strategy in Bangladesh' will be sent by the WUR team to the Bangladeshi focal points.
- The Bangladeshi focal points will respond to it as soon as possible.
- Later the WUR team will determine the next steps.



Consultative Meeting between the Team Members of Sydney University and BARC Experts

4. Preparation of Policy Documents and Providing Inputs

a) Views/Opinion on Egg Production and Supply Related Information by Livestock Division of Bangladesh Agricultural Research Council (BARC)

The opinion on *Egg production and supply related information* was made by Livestock Division of Bangladesh Agricultural Research Council (BARC).

b) Views/Opinion on Adopting Maximum Residue Limits for Veterinary Drugs Zilpaterol

The review on *Adopting maximum residue limits for veterinary drugs Zilpaterol* was done by the Livestock Division of Bangladesh Agricultural Research Council (BARC). Zilpaterol (**zilpaterol hydrochloride**) is a β_2 adrenergic agonist. Under its trade name, **Zilmax**, it is used to increase the size of cattle and the efficiency of feeding them. Regarding this issue, there are some controversial points among the countries of the world to use it in the livestock sector. From the review, it is mentioned that the adoption of MRLs for Zilpaterol is difficult. It needs more scientific research on MRLs for adoption.

5. Workshop/ Meeting/ Seminar

i) Annual 'Research Progress 2021-2022 and Research Program 2022-2023 Workshop

Livestock Division organized a two day-long annual review workshop on 'Research progress 2021-2022 and Research Program 2022-2023 held during 12-13 October, 2022 at BARC. The workshop was inaugurated by the chief guest Dr. Mian Sayeed Hassan, Member Director, NRM Division, BARC, and Dr. Nazmun Nahar Karim, Member Director, Livestock Division, BARC chaired the inaugural session.

The inaugural session started with the recitation of some verses from the holy Quran by Moulana Mahmudul Hasan, Imam, BARC Mosque. The welcome remarks were delivered by Dr. Mohammad Rafiqul Islam, Chief Scientific Officer, Livestock Division, BARC. Dr. Islam welcomed the guest and participants to the Annual Review Workshop on 'Research Progress 2021-2022 and Research

Program 2022-2023 of Bangladesh Livestock Research Institute (BLRI). Participants from different organizations like BLRI, DLS, FAO, CVH, CDIL, NIB, universities, and other organizations participated the workshop. The objectives of the workshop were to review the research progress 2021-22 and research programme development in health, production, biotechnology, and others areas. Research progress reports for the year 2021-22 and proposed research programme for the year 2022-23 were presented before the audience by senior scientist of BLRI. The workshop was concluded by the chief guest Dr. Shaikh Mohammad Bokhtiar, EC, BARC, while Dr. Nazmun Nahar Karim, Member Director, Livestock Division, BARC chaired the concluding session. Following presentation, participants, professionals and a panel of experts have given their valuable comments, suggestions, and guidelines to align the research activities with national demand and priority, which were sorted out. In the concluding session, the rapporteurs presented their report. A draft recommendation was compiled. Later, Member Director, Livestock Division concluded the annual workshop by thanking the participants for their spontaneous contribution. Proceedings of the workshop have been passed to respective institutions for necessary action.



Participants of Inaugural Session of Annual Review Workshop on Research Progress 2021-2022 and Research Program 2022-2023 of Bangladesh Livestock Research Institute

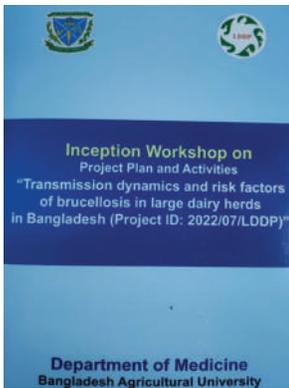
ii) Workshop on Good Animal Husbandry Practices: Present Status and Way Forward

Livestock Division organized a workshop on Good Animal Husbandry Practices: Present Status and Way Forward held on 08 June 2023 at Auditorium-2, Training Building, BARC.

The workshop was inaugurated by Dr. Shaikh Mohammad Bokhtiar, EC, BARC as the chief guest and Dr. SM Jahangir Hossain, DG, BLRI was present as a special guest. Dr. Khan Md. Saiful Islam, Professor, Department of Animal Nutrition, BAU; Dr. Md. Reazul Haque, Director (admin), DLS; Dr. Nasrin Sulatana, Director (Research), BLRI; and Dr. M. A. Salek, Chief Technical Advisor, ACI Animal Health were present as discussants. Dr. Md. Rafiqul Islam, CSO, Livestock Division, BARC; Dr. A. B. M. Khaleduzzaman, and Dr. Nathu Ram Sarker, Director (Livestock and Fisheries), KGF were present as the presenters. A number of recommendations were compiled based on the comments and suggestions of the experts, guests, professionals, scientist, and participants



Dignitaries present in Good Animal Husbandry Practices: Present Status and Way Forward Workshop 2023 at BARC



The personages present in the inception workshop titled Transmission Dynamics and Risk Factors of Brucellosis in Large Dairy Herds in Bangladesh

c) Dr. Ali Akbar Bhuiyan, PSO, BARC attended an inception workshop as a special guest for the project plan and activities on *Transmission dynamics and risk factors of brucellosis in large dairy herds in Bangladesh* a Livestock and Dairy Development Project (LDDP) funded sub-project held on 03 January 2023 at the Medicine Department, Faculty of Veterinary Science, BAU, Mymensingh. Professor Dr. Md. Abdul Awal, Dean, Faculty of Veterinary Science, BAU inaugurated the workshop as chief guest. Professor Dr. Md. Mostafizer Rahman, AMR Surveillance Expert of LDDP was also adorned the occasion as the special guest.

d) Dr. Md. Rafiqul Islam attended *Annual Research Review Workshop and Technology Transfer Program-2022* of BLRI. M. SM Rezaul Karim, Hon'able Minister for MoFL, and Dr. Nahid Rashid, Secretary of MoFL; Dr. Shaikh Mohammad Bokhtiar, EC, Bangladesh BARC; Director General of DLS; DG, BLRI eminent academia and scientists also attended the workshop.

e) The division conducted a coordination meeting for the developmental project on *Climate Change in Bangladesh to Combat and Mitigate Livestock Methane Emission* on 7 June 2022, 6 October 2022, and 13 November 2022 with stockholders from Adorsho Paniseba, BLRI and BAU. This meeting was chaired by the Member Director, Livestock division and scientists of the division were present. After discussion regarding the project activities, recommendations have been compiled. Minutes for all meetings were prepared and DPP would be revised according to the recommendations.

g) Press Briefing on Safety of Broiler Meat by Ministry of Agriculture



The dignitaries involved in the Press Briefing on Safety of Broiler Meat organized by MoA

The division implemented a project titled *Qualitative and Quantitative Study of Hazardous Chemicals in Broiler* from January to June 2022 financed by the MoA.

In order to ascertain broiler meat safety, residues of ten antibiotics and three heavy metals were estimated from broiler meat, bones, and composite samples (liver, kidney, and gizzard) by ISO-certified and accredited laboratories through a sub-project with financial support from PIU-BARC, NATP-2. To proclaim the results of the project, a press briefing was organized by the Press Information Department (PID) of MOA, on 12 January 2023. Dr. Muhammad Abdur Razzaque, MP, Hon'able minister for agriculture, delivered his speech on the issue. In that occasion, Mr. SM Rezaul Karim, MP, Hon'able minister for MoFL, Mr. Wahida Akter, Secretary, MoA, Dr. Nahid Rashid, Secretary, MoFL, Dr. Shaikh Mohammad Bokhtiar, EC, BARC were present. Approximately one hundred journalists from print and electronic media were present in the briefing. Based on the results Hon'able minister for agriculture assured and declared that broiler meat is safe for human consumption.

6. Training

a) Training Program on Bioinformatics for Sustainable Development in Agriculture at Bangladesh Agricultural Research Council, Dhaka-1215.

The division organized a training programme on *Bioinformatics for Sustainable Development in Agriculture* during 27 November to 01 December 2022 at the Computer Lab., Computer and GIS Unit, BARC. In this training course, 20 officers from NARS institutes (BARI, BRRI, BSRI, BFRI, BJRI, BINA, BLRI, BARC) were present as participants. The training program was inaugurated by the chief guest Dr. Shaikh Mohammad Bokhtiar, EC, BARC. The session was graced by Dr. Nazmun Nahar Karim, Member Director, Livestock Division, BARC as chair. The welcome remarks were delivered by Dr. Mohammad Rafiqul Islam, CSO, Livestock Division, BARC. Resource person spoke on Introduction to Bioinformatics and General Aspects, Bioinformatics for Sustainable Agriculture, Hands-on Training on Bioinformatics Database. Introduction to NCBI, Ensembl, and TAIR database, Hands-on training on gene/promoter prediction, Hands-on training on Primer design, Hands-on training on BLAST and Sequence Alignment, Hands-on training on exploring Plant Metabolic Pathway Databases and Ensembl Plants Database, Hands-on training on Protein Identifications, Protein sequence and functional information database (UNIPROT), Hands-on training on Protein functions, Domain and Motif Analysis, Hands-on training on Prediction of Immunogenic and Antigenic Peptides and Antigenic Propensity Analysis, Hands-on training on exploring Kyoto Encyclopedia of Genes and Genomes (KEGG) and Data mining. After successful completion of the course, certificates were awarded to the participants.

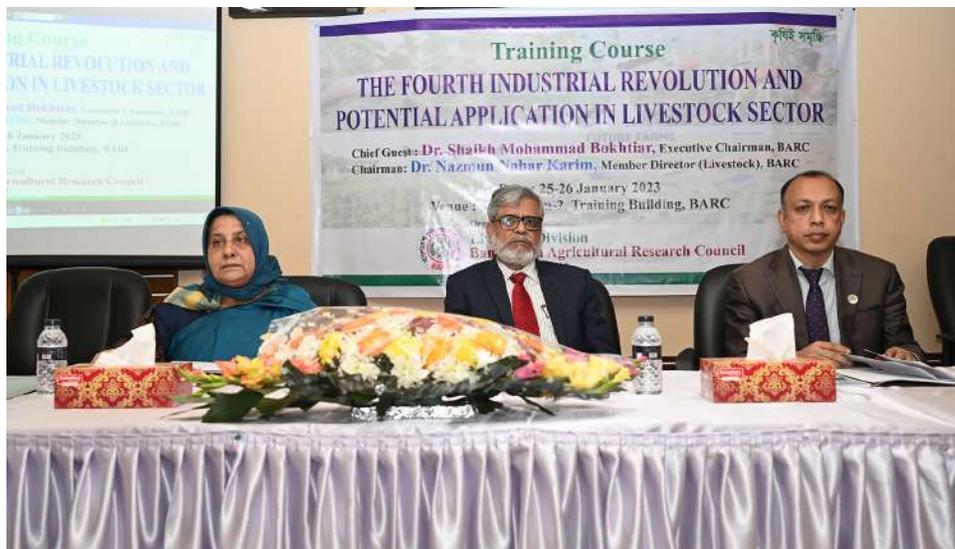


Certificate giving ceremony of Training Program on Bioinformatics for Sustainable Development in Agriculture

b) Training Program on The Fourth Industrial Revolution (4IR) and Potential Application in Livestock Sector at Bangladesh Agricultural Research Council.

The division also organized a training program on *The Fourth Industrial Revolution (4IR) and Potential Applications in Livestock Sector* during 25-26 January 2023 at the Auditorium of BARC. Thirty scientists/officers from NARS and other institutes (BARC, BLRI, BAU, SAU, NIB, and BIRTAN.) were present as participants.

The training program was inaugurated by the chief guest Dr. Shaikh Mohammad Bokhtiar, EC, BARC while Dr. Nazmun Nahar Karim, Member Director, Livestock Division was in the chair. The welcome remarks were delivered by Dr. Mohammad Rafiqul Islam, CSO, Livestock Division, BARC. Resource persons focused on the Fourth Industrial Revolution (4IR) implementation in Agriculture: Bangladesh's preparedness, Big data application in sustainable livestock and poultry production in Bangladesh, Tracing and traceability in GMP of livestock and poultry industries using block chain and other digital technologies, Internet of Things (IoT) based sensors and their applications in livestock and poultry production, IoT based cattle shed monitoring and transformation of veterinary services through 4IR technologies, IoT, Artificial Intelligence (AI) and cloud computing for Climate Smart Livestock and poultry production, IoT based Infrastructure design for precision livestock and poultry production, Drone for counting and monitoring livestock in the field and IoT based anaerobic digestion and biogas utilization prediction, Ammonia (NH₃) and Methane (CH₄) emission monitoring systems in livestock industry and Impact-based smart weather advisory services for livestock and poultry industries. Certificates were awarded to the participants after the successful completion of the training program,



Certificate giving ceremony of the Training Program on The Fourth Industrial Revolution (4IR) and Potential Application in Livestock Sector

7. Publications

The division has contributed in preparing a good number of documents toward publication as below

- i. Annual Report 2021-22
- ii. BARC Newsletter 2022-23
- iii. Training manual on *The fourth Industrial Revolution and Potential Application in Livestock Sector*, January 2023.
- iv. Booklet on *Quantity and Quality Analysis of Heavy Metals and Antimicrobial Drugs Residues in Broiler* January 2023, Bangladesh Agricultural Research Council, Dhaka.

v. Scientific publications:

Scientists of the division were being able to bag the following eight scientific articles in various reputed journal

- a. Bokhtiar, S.M.; **Islam, M.R.**; Ahmed, M.J.; Rahman, A.; Rafiq, K. Assessment of Heavy Metals Contamination and Antimicrobial Drugs Residue in Broiler Edible Tissues in Bangladesh. *Antibiotics* 2023, 12, 662. <https://doi.org/10.3390/antibiotics12040662>
- b. Sajeda Sultana¹, Munmun Pervin, Nazneen Sultana¹, **Md. Rafiqul Islam**, Mohammad Abu Hadi Noor Ali Khan. Validation and standardization of designed N gene primer-based RT-PCR protocol for detecting Peste des Petits Ruminants virus in goats. *J Adv Biotechnol Exp Ther.* 2022 Sep; 5(3): 497-509 eISSN: 2616-4760, <https://doi.org/10.5455/jabet.2022.d131>
- c. **A. A. Bhuiyan**, A. A. Bhuyan, S. A. Azmal, S. Zhao and X. Du (2023). The polymorphisms in the leukocyte-specific transcript-1 gene are associated with gastrointestinal nematode infection in goats. The proceedings of the 11th Biannual Seminar of Bangladesh Animal Husbandry Association (BAHA), Dhaka-1215, Bangladesh, 27 May 2023, pp 42.
- d. Sultana S, Pervin M, Sultana N, Siddique MP, **Islam MR**, Khan MAHNA. Identification of peste des petits ruminant's virus along with co-infecting diseases of goats in Bangladesh. *J Adv Vet Anim Res* 2022; 9(3):463–470.
- e. T. Ahamed, P. Sultana, M. Z. Rahman, P. Bose, **M. R. Islam**, Khatun MM, and Islam MA (2023). Protection of Khaki Campbell Ducks against Duck Plague Using an Inactivated Duck Plague Vaccine. *World Vet. J.*, 13 (2): 332-340. DOI: <https://dx.doi.org/10.54203/scil.2023.wvj36>
- f. **A. A. Bhuiyan**, S. A. Azmal, A. A. Bhuyan, and S. Li (2023). Polymorphisms in the rap guanine nucleotide exchange factor-6 gene and their association with egg production of chickens. The proceedings of the 12th International Poultry Seminar, WPSA-BB, 14-15 March 2023, Dhaka, Bangladesh, pp 57.
- g. A. A. Bhuyan, S. Saha, **A. A. Bhuiyan**, Rubayea, M. Salimullah and J. Alam (2023). Isolation, Identification and Molecular Characterization of Pigeon Newcastle Disease Virus from Savar and Natore Regions of Bangladesh. The proceedings of the 12th International Poultry Seminar, WPSA-BB, 14-15 March 2023, Dhaka, Bangladesh, pp 43.
- h. R. Jannat, MAMY Khandoker, **A. A. Bhuiyan**, N. R. Disha, M. Mahbubul and Y. Ali (2023). Productive Performance of Jamunapari goat under semi-intensive production system. The proceedings of the 11th Biannual seminar of Bangladesh Animal Husbandry Association (BAHA), Dhaka-1215, Bangladesh, 27 May 2023, pp 41.

8. Linkage with national organizations

- i. Scientists of the division participated in different training courses as resource speaker
- ii. They were actively worked in the different Committees
- iii. Acted as a member of the National Avian Influenza Control Committee, DLS.
- iv. Acted as an Academic Council Member for Sylhet Agricultural University
- v. Acted as a member of the committee on Market value assessment for BARC
- vi. Acted as a member of the Antimicrobial Resistance Sectorial Working Group, DLS.
- vii. Acted as a member of the National PPR Control Committee, DLS.
- viii. Acted as an External examiner for different universities and co-supervisor for MS thesis and thesis examiner
- ix. Worked as a member of the different committee of BARC and as a member of the Editorial Board of the Bangladesh Journal of Agriculture (BJA)
- x. Attended training programme organized and meetings/seminar/ workshops organized by BARC
- xi. Worked as a member of the recruitment committee of BLRI, BIRTAN, LDDP, and other projects as a member of the recruitment committee of BLRI Promotion Committee-2.
- xii. Worked as a member of the BLRI Technology Evaluation Committee and Technical programme evaluation Committee
- xiii. Worked as a member of the different committees of PIU-BARC
- xiv. Acted as member of the selection committee for research and Innovation Sub-project of LDDP, DLS

9. Regular/Routine Activities

Some regular/routine activities performed by the scientists of the division are enumerated as follows:

- a. Writing speeches for the high officials of BARC and MoA for different national and international events
- b. Acted as a member/member secretary in different committees formed for observing national and international days (world food day, national Independence Day, national victory day, etc.).
- c. Acted as rapporteurs in different workshops conducted by BARC and MoA
- d. Preparation of proceedings of different meetings and seminars.
- e. Attended project workshops (inception, review, and completion) arranged by different Divisions/Units of BARC and other organizations

Agricultural Economics and Rural Sociology Division



AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY DIVISION

Agricultural economics and rural sociology (AERS) division is one of the most important divisions of BARC dealing with socio-economic aspects of crops, forecasting and demand supply, market analysis/economy and strategic policy formulation in various ways as and when asked by the ministry of agriculture. Various pertinent research programs are either developed sole or in coordination followed by implementation. Also, research progress and programs of NARS institutes are reviewed regularly in order to coordinate research without duplication. The professionals working for the division are listed below.

Name of the Professionals

Name	Designation
Dr. Md. Mosharraf Uddin Molla	Member Director (C.C.) and Chief Scientific Officer
Dr. Md Abdus Salam	Principal Scientific Officer
Md. Sazzadur Rahman Sarker	Principal Scientific Officer (A.C.)

During the reporting year a wide variety of activities were done the scientists of the division as below.

1. Project Development/Financing

- Study on Cost and Return analysis of Rice and Wheat cultivation in Bangladesh
- Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience (PARTNER) in Bangladesh
- Atlas of Climate Adaptation for South Asia Agriculture Project

2. Project Implementation

- Atlas of Climate Adaptation for South Asia Agriculture

3. Policy support

Comments Passed

- National Agricultural Marketing Policy 2022
- CIP (Export) Policy 2020
- Bangladesh's Action Plan on Intellectual Property Rights (IPRs) in the Context of LDC Graduation
- Real-Time Cost and Income Forecasting of Rice and Wheat Farming in Bangladesh Using Standardized and Representative Sampling Structure Project
- Dr. M A Wazed Miah Agricultural University Act-2022
- Draft Completion and Learning Review of CPF FY16-FY21

- The Information of the Annual Report Submitted to CDP
- Questionnaire for developing National Financial Inclusion Strategy, Bangladesh (NFIS-B)
- National Tariff Policy 2023

Intent provided

- Matching Grant Policy of Smallholder Agricultural Competitiveness Project (SACP)
- Draft Concept Paper of Poverty Alleviation Development by the People's Republic of China in the priority area of Agriculture
- Accelerating Economic and Social Inclusion of Smallholder Farmers through Strong Producers' Organizations (ACCESS) project
- Bangladesh - Russian Intergovernmental Commission on Trade, Economic, Scientific and Technical Cooperation (BR-IGC) Roadmap (2022-2025) by Ministry of Economic Development of the Russian Federation'
- Doha Programme of Action (DPoA) (2022-2031)
- Agreement on Economic Cooperation between the Government of the Republic of Kosovo and the Government of the People's Republic of Bangladesh
- MoU between Bangladesh and Greenwich University
- Bangladesh Microfinance Market Development Programme (BMMDP) Phase-II
- Investment Partnership between Bangladeshi and Egyptian companies to rent agricultural lands in Egypt and cooperation in planting crops
- Country Partnership Framework (CPF) for The Peoples' Republic of Bangladesh for the Period FY23-27
- Bangladesh Standards and Testing Institutions Regulations 2022 draft for import-export between Bangladesh and India with Foreign Manufacturers Certification Scheme (FMCS) and Mutual Recognition of Laboratories
- Aide-Mémoire for Flood Reconstruction Emergency Assistance Project (FREAP) Fact-Finding Mission
- Betel Nut Research Institute establishment

Information and Inputs delivered

- Input for Information and Data Portal Agrocorp Corporate Loan Project of Internal Finance Corporation (IFC)
- Prepared talking points with US Trade Representative for South and Central Asia
- Input for incorporation in the 5th meeting of Bangladesh Japan Public and Private Dialogue
- Talking points with Bangladesh and Japan regarding Trade, Investment, and Economic cooperation
- Inputs for the 38th Ministerial Session of the COMEC
- Inputs for United Nations Conference on the Least Development Countries
- Prepared Draft Speech for Honorable Prime Minister, Govt. of the People's Republic of Bangladesh on '79th Session, Economic and Social Commission for Asia and Pacific (ESCAP)'
- Inputs for the session Towards a Globally Competitive Agribusiness Sector: Emerging Opportunities in Agro Trade and Investments at Bangladesh Business Summit 2023
- Provided information/inputs from BARC for the Budget speech 2023-24 of the Hon'ble Finance Minister

- Talking points of Collaboration in Mitigating the Effect of Climate Change on Agriculture
- Talking points for the Hon'ble Secretary, MoA with US Trade delegates
- Prepared draft speech for Hon'ble Minister, MoA on Seminar on Agriculture Sector and Way forward
- Prepared draft speech for hon'ble Secretary, MoA on Impacts of LDC Graduation on the Agriculture Sector and Way Forward
- Prepared draft speech for honorable Minister, MoA for Workshop on Agri-business Trade Mission
- Preparation of a time-bound action plan for sustainable transformation of agriculture to meet post-LDC transition challenges

4. Research Management/ Financial Management and Coordination

- Coordinated PBRG Sub-projects (ID: 158) titled 'Analysis of Agricultural Policy on Food System and Rural Development in Bangladesh: Case of Haor Area (Wetland) Management'
- Monitoring, Reviewing and Evaluation Report of NARS Institutes' Program/ Activities: Reviewed Research Progress and Future Research Program of Agricultural Economics Division of BARI, BRRI, BINA and BSRI, Socio-economic Research Division, BLRI of BLRI and Forest Economics Division of BFRI

5. Research Program Development of NARS Institutes: Contributed in research program development of BARI, BRRI, BINA, BSRI, BLRI and BFRI

6. Training, Workshop and Seminar Organized (Foreign and Local)

a) Reviewed Workshop on Socio-Economic Research Programs of NARS Institutes

The Annual Review Workshop on *Socio-economic Research Programme (2022-23) and Future Research Program (2023-24) of NARS Institutes* was held on 19 June 2023 organized by AERS division. In the inaugural session, Dr. Shaikh Mohammad Bokhtiar, EC, BARC graced as the chief guest. Dr. Md. Mosharraf Uddin Molla, Member Director (AERS), presided over the session. Dr. Md. Abdus Salam, PSO AERS welcomed and presented last year's implementation status of recommendations. As session chair Dr. Molla also welcomed all and stated the workshop aims highlighting the importance of review workshop, as a part of the Annual Performance Agreement (APA). In total 90 participants including scientists, professors, agriculture experts, and delegates attended the workshop from different research organizations, universities, and private sectors. The present and future research activities were presented by the representative of the related division of six NARS institutes (BARI, BRRI, BINA, BSRI, BLRI & BFRI) in the technical session. The first technical session was presided over by Prof. (Ex) Dr. Mohammad Rezaul Karim Talukdar, BAU, and the second technical session by Prof. Dr. Jahangir Alam Khan, Former Director General, BLRI. Five expert reviewers namely Prof. (Ex.) Dr. Shaikh Abdus Sabur, BAU, Mymensingh, Dr. B A A Mustafi, Former Director (Admin and CS), BRRI, Gazipur, Dr. A.S.M. Anwarul Huq, Former Director General, BJRI, and Prof. Dr. Mizanul Haque Kajol, Department of Development and Poverty Studies, SAU, Dhaka, reviewed the presented research program. However, there were comments/suggestions on research progress and programs from the the day-long workshop by the expert reviewers and valued participants which were passed to the NARS institutes for integrating in formulating future research programs.

b) Project Completion Report (PCR) of Review National Workshop on Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050

A National workshop on Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050 was held at Bangladesh Agricultural Research Council, Farmgate, Dhaka on 23 August 2022. In this workshop, Dr. Muhammad Abdur Razzaque, Hon'ble Minister, MoA, adorned the session as the chief guest. The workshop was presided over by Dr. Shaikh Mohammad Bokhtiar, EC, BARC. The session chair welcomed all and stated the workshop's importance with a briefing of study results, which could be important policy support. The inaugural and welcome speech was given by Md. Mosharraf Uddin Molla, Member Director, AERS and coordinator of the research team. The keynote paper was presented by Prof. Dr. S.M. Fakhru Islam, Professor (Retired), BSMRAU, Gazipur, and lead researcher. In total 117 participants including team members and members of the advisory committee, Additional Secretaries, MoA, professors, agriculture experts, delegates from different research organizations and private sectors attended the workshop. Media persons were also present at the workshop for news coverage.

The team leader highlighted the future supply-demand and thereby surplus/deficit of important food crops in Bangladesh, as per instruction of MoA to BARC to carry such as a study. Accordingly, BARC set up a research team as well as an advisory committee with agricultural economists of NARS institutes to conduct the study. He also presented the projections about food consumption which are slowly diversifying with a share of cereals consumption decrease over the period, 2030 to 2050. Under a pessimistic scenario, the rice deficit would be 3.62 MMT in 2030 and 1.93 MMT in 2050, while the wheat deficit would stand at 5.22 and 6.85 MMT during the same period. Domestic supply of maize, pulses, mustard, and spices would remain surplus, whereas groundnut, potato, sweet potato, vegetables, and fruits would prevail deficit in the future. Recommendations focused for developing climate resilient rice varieties and other technologies; building a strategic rice grain reserve between 1.5 to 2.5 MMT in public warehouses; preparing a long-term plan for technology development and transformation of agriculture; promoting export of surplus potatoes, vegetables, and fruits; and requiring government supports through incentives to the exporters, investment in value chain development activities, food quality and safety certification.



Dignitaries at the National Workshop on Projections of Supply & Demand for Selected Food Crops in Bangladesh by 2030 and 2050

c) Review Workshop on National Budget 2023-24 Analysis: Agricultural Development Perspective



Participants of National Budget 2023-24 Analysis: Agriculture and Agricultural Development Perspective

A review workshop on *National Budget 2023-24 Analysis: Agriculture and Agricultural Development Perspective* was organized in Conference-1, BARC on 21 June 2023. The Resource Speaker was the Dr. Md. Abdus Salam, PSO, AERS, BARC. All scientists and officers of BARC participated the workshop.

d) Training on Application of Quantitative and Qualitative Methods for Scientific Paper Writing

A training programme titled *Application of Quantitative and Qualitative Methods for Scientific Paper Writing* was organized during 12-16 February 2023 at Computer Lab., BARC organized by AERS Division. The Resource Speakers were the Professors from Sher-e-Bangla Agricultural University, Dhaka. Twenty Agricultural Economist from NARS Institutes (sixteen participants from BARI, BRRI, BINA, BSRI, BLRI, and BFRI) and agricultural universities (four participants from Sylhet Agricultural University and Sher-e-Bangla Agricultural University) attended the training programme. Dr. Md Saifullah, Member Director (A & F), BARC was the chief guest at the concluding session and handed over the certificates to the participants.

This training aimed to enable the participants to understand the importance of data analysis and learn about the application of different analytical techniques in social research; to develop an understanding the importance of scientific writing; to learn the process of writing scientific articles for journals and enabling to select right journal for publishing article. The overall objective of the course is to improve the knowledge and analytical skills of scientists in the application of quantitative and qualitative methods for scientific paper writing. The scientists themselves applied the method using a data set provided for the purpose. They also developed their skill in the operation of the software packages such as STATA, Eviews, and R software.



Participants in Application of Quantitative and Qualitative Methods for Scientific Paper Writing Training

7. Training, Workshop and Seminar (Foreign and Local) Attended

a) Training

- 'E-filing system for BARC's scientist and officer'
- 'Right to Information Act 2009' organized on 04 October 2022
- 'Annual performance agreement' organized
- Annual Performance Agreement (APA) on 24 May 2023
- A day-long training on the Grievance Redress System and GRS software for the participation of officers and staff under the Annual Performance Agreement of Bangladesh Agricultural Research Council
- Macro-economic Impact Analysis of Global Commodity Price Inflation and Response to Crisis on 5F (Food, Feed, Fertilizer, Fuel, and Finance) during 24-26 September 2022

b) Workshop

- Dr. Md. Abdus Salam, Principal Scientific Officer, AERS division participated the Inception workshop on South Asia Climate Adaptation Atlas for Agriculture Project held during 24-28 April 2023, New Delhi, India and 'Upscaling and application of solar photovoltaic pump for smallholder irrigation and household appliances in the central coastal region of Bangladesh' by BARC on 11 January 2022
- Knowledge Sharing on Fighting Back Against Fall Armyworm jointly organized by BARC and CIMMYT on 24 June 2023
- Good Animal Husbandry Practices: Present Status and Way Forward organized by livestock division of BARC on 08 June 2023
- workshop on awareness building to meet the challenges of the fourth industrial revolution on 31 May 2023

- Progress Review Workshop of Biotechnology Research based on Biotechnology Policy-2012 on 22 May 2023
- Workshop to prepare draft Annual Performance Agreement of BARC for the financial year 2023-24 on 09 May 2023
- Workshop on Implementation of E-Governance and Innovation Action Plan 2022-23 on 18 April 2023
- Workshop on Wellness Through Safe Food and Nutrition on 09 February 2023
- First Year Progress Workshop of Improving Research Qualities of ARI's through Review and Evaluation by an External Panel of Experts Project on 07 February 2023
- Workshop on Bangladesh Delta Plan-2100: Activity Progress and Future Plan organized by the planning and evaluation division of BARC on 06 February 2023
- Concluding Workshop of Nutrient Management for Diversified Cropping in Bangladesh (NUMAN) Project on 20 December 2023
- Workshop Field testing and Result Validation of Khamari Mobile App organized by BARC on 04 December 2023
- Review workshop on Citizen Charter Implementation Action Plan, 2022-23 of BARC
- Annual Review Workshop on Forestry and Agroforestry Program of NARS Institutes Research Progress 2021-22 and Research Program 2022-23 organized by forestry unit, BARC during 19-20 October 2023
- Annual review workshop on Research Progress 2021-22 and Research Program 2022-23 of BLRI during 12-13 October 2023
- Research Review and Planning Workshop on Soil Management Program of NARS Institutes, 2022 organized by soil unit, BARC during 27-29 September 2022
- Research Progress 2021-22 and Research Program 2022-23 on Agricultural Engineering of NARS Institutes organized by Agricultural Engineering Unit, BARC during 14-15 September 2022
- Technical Workshop on National Food Safety Policy on 22 September 2022

c) Seminar

- Development of Khamari App and Crop Zoning Information System organized by BARC on 20 February 2023
- Discussion on the proposed project on South Asia Climate Adaptation Atlas on 11 January 2023
- Dr. Md. Abdus Salam, Principal Scientific Officer, AERS presented an article on Potential Areas for Trade & Investment, Agribusiness Environment, and Incentives for Dutch Private Sector organized by Netherland Agro Trade Mission

8. Publication by the Division/ Section in Different Journals/ Media

Three articles were published during the reporting period, 2022-2023 and one project completion report has been complied as stated below.

a) Journal Article

- (1). Bokhtiar, S.M.; Islam, S.M.F.; Molla, M.M.U.; Salam, M.A.; Rashid, M.A. Demand for and Supply of Pulses and Oil Crops in Bangladesh: A Strategic Projection for These Food Item Outlooks by 2030 and 2050. *Sustainability* 2023, 15, 8240. <https://doi.org/10.3390/su15108240>.
- (2). Hossain, M.D.; Salam, M.A.; Ahmed, S.; Habiba, M.U.; Akhtar, S.; Islam, M.M.; Hoque, S.A.M.; Selim, A.S.M.; Rahman, M.M. Relationship of Meteorological Data with Heat Stress Effect on Dairy Cows of Smallholder Farmers. *Sustainability* 2023, 15, 85. <https://doi.org/10.3390/su15010085>.
- (3). Kamruzzaman, M., Almazroui, M., Salam, M.A., Mondol, M. A. H., Rahman, Deb, L., Kundu, P. K., Zaman, M. A. U., Reza, A. and Islam, M. T. (2022) 'Spatiotemporal drought analysis in Bangladesh using the standardized precipitation index (SPI) and standardized precipitation evapotranspiration index (SPEI)' *Scientific Reports, Nature portfolio*, <https://doi.org/10.1038/s41598-022-24146-0>.

b) Project Completion Report

S. M. Bokhtiar, M. M. U. Molla, S. M. F. Islam, S. A. Sabur, M. A. Rashid, M. A. Salam, M. S. Rahman, S. Islam and S. Hossain (2022). Projections of Supply and Demand for Selected Food Crops in Bangladesh by 2030 and 2050. *Agricultural Economics and Rural Sociology Division, Bangladesh Agricultural Research Council, Farmgate, Dhaka, Bangladesh.*

9. Regular Activities

Scientists of the division are rendering service as listed below.

- The member of the division worked as a member of the Executive Council, BARC, Tender Committee, Technical Committee, Recruitment Committee, Investigation Committee, Receiving Committee (Goods), Project Implementation Committee, etc.
- Expert Member of the Socio-economic Research Review Workshop of NARS institutes.
- Performed as an Expert Evaluator of CGP project under KGF-BKGET
- Resource Person in the training programme titled FGD and PRA: Concept and Progress organized by PIU-BARC, NATP-2.
- Resource Person in the training programme titled SWOT and Sensitivity Analysis and Collection of Data in Social Science organized by PIU-BARC, NATP-2
- Participation in the Inter-ministerial Committee of MoA for estimating the cost of production of paddy, rice, and wheat
- Participation in the Agricultural Price Advisory Committee for estimating the minimum price of Tobacco
- Member of Steering Committee for Strategic Plan for Agricultural and Rural Statistics (SPARS) formed by BBS
- Participation in procurement activities of SACP project of DAM
- Respective part of Annual Report 2022-23

10. Other Activities

One MS thesis of SAU, Dhaka titled Adoption Status and Livelihood Impact of Improved Lentil Varieties in Selected Districts of Bangladesh was examined

COMPUTER and GIS UNIT

The major responsibilities of the GIS Unit, BARC unit involve overall management of Information and Communication Technology (ICT) related activities in view of hardware, software, networking, etc. The ultimate goal is to establish BARC as the information hub of NARS so that overall agricultural research system becomes strengthened and robust in terms of information accessibility, confidentiality, integrity, availability, dissemination, etc. through online system. The unit plays a vital role to establish/strengthen ICT infrastructure to facilitate MIS-related activities/services among NARS institutes. It is also involved in assessing the needs of Computer hardware, software, network equipment, preparing technical specifications for procurement of the goods/accessories, evaluating technical proposals, receiving and distributing ICT goods, etc. It provides support for troubleshooting of hardware, software, network, internet/email, e-file, and related services for the smooth running of the system. In addition, it conducts various ICT-based capacity-building trainings, workshops, and seminars for the personnel of BARC and NARS institutes. Furthermore, the unit conducts a number of other activities such as preparation of progress reports, need assessment, review, and evaluation of research programs, recruiting of computer personnel, etc. Personnel of the unit are also working in innovation team and 4IR implementation of BARC.

Geographic Information System (GIS) is another important functional part of the unit. Providing regular and ad-hoc basis cartographic support is a routine job of this unit. Maintenance, necessary updating, and output preparation of Agro-Ecological Zone (AEZ) land resources database and local level Upazila Nirdeshika database (soil, land, nutrition, and others) is an ongoing activity of the unit. Land suitability assessment and crop zoning in Bangladesh is another important activity of the GIS unit which has been carrying out since 2017.

Innovation and e-Governance, Service Process Simplification (SPS), Service Digitalization, etc. activities are led by the Computer and GIS unit as a regular job. This unit administers an e-Filing system of BARC, updates and uploads files in website, provides various inputs and reports to the MoA and other organizations. However, the unit works in formulation/ implementation of different ICT and GIS-based national, international and regional projects and programmes since inception. Some examples are: ARMP, NATP-1, NATP-2, AFACI-ATIN, AgMIP, ARMIS, Drought Monitoring, Crop Zoning, ACASA, etc. However, the professional working for the unit is enumerated below.

Name of the Professionals

Name	Designation
Hasan Md. Hamidur Rahman	Director
Hasan Mahmud	Senior System Analyst
Md. Hanif	System Analyst
Mst. Deloara Khushi	Programmer (resigned)
Al-Helal	Programmer
Rashedul Islam	Data Entry Officer
Md. Nura. Alam Uzzal	Data Entry Officer

The most pertinent activities carried out by the unit is delineated below:

1. Project Proposal Preparation:

The division has prepared two project proposals during the reporting period titled:

- i. Piloting Light Detection and Ranging (LiDAR) Technology for Fast-tracking Agricultural Transformation and Sustainable Development which is being under implementation.
- ii. Budgeting for the Data Management component of the project *Establishment of Bangabandhu- Pierre Elliot Trudeau Agricultural Technology Center (BP-ATC) Project* of GIFS Project.

2. Project Implementation

Development of Upazila Land Suitability Assessment & Crop Zoning System of Bangladesh

During July 2022 to June 2023, crop suitability assessment and zoning have been completed for 83 upazilas. Meanwhile, such activities have been completed for 355 out of 495 upazilas. The important activities performed during the period are mentioned below:

- Compilation, editing, and coding of land and soil properties data (physical & chemical) have been completed for 88 upazila. These data are used for agro-edaphic suitability assessment of crop(s).
- Compilation and editing/updating soil chemical data of 88 upazilas have been completed. The soil fertility status data are used for preparing fertilizer recommendations for crops/cropping patterns.
- Reviewed cropland-specific and union-based fertilizer recommendation outputs of different upazilas for detection and subsequently correction of anomalies.
- Reviewed and modified the agro-edaphic and agro-climatic suitability limitation ratings data based on crop suitability outputs.
- The information related to crop varieties, crop management, production technology, etc. required for the crop zoning study has been gathered, compiled, edited, and documented in Bangla and English and the information is uploaded into the agri-advisory portal (www.cropzoning.gov.bd).

- Socio-economic data from 133 upazilas have been collected through Focus Group Discussion (FGD) during the reporting period. Socioeconomic data are used for computing socioeconomic indicators to measure crop profitability.
- Socio-economic data editing and economic profitability analysis of cropping patterns have been completed for 127 Upazila. Up to now cropping pattern-wise profitability analysis for 432 upazila has been completed.
- Economic profitability indicators in terms of gross margin and BCR were calculated for 76 crops for 29 upazilas selected as study locations under Dhaka, Chattogram, Sylhet, Khulna, Barishal, and Mymensingh divisions. At present the economic profitability indicator for 358 hundred upazilas has been completed.
- Reviewed and edited cropping patterns data and their economic profitability for 280 upazilas.
- Updated upazila soil and landform map for 84 upazila. Such information is used for preparing individual map layers of nine land and soil factors required for the edaphic suitability assessment of crop and creation of a soil sample location map.
- Upazila wise updated land use map has been prepared using satellite imagery, required for land use planning as it provides actual extent of cultivable land and miscellaneous land area by upazila. During the reporting period, the updated land use map has been prepared for 36 upazila.
- The updating of the pourashava (ward), union and mauza boundary has been carried out for 48 upazila. Small area atlas maps of BBS, BBS Geocodes, National Window Portal and LGED Digital Maps have been reviewed to adjust the administrative boundary.
- The geocode and name of division, district, upazila, union, and mouza both in Bangla Unicode and English have been updated as required for the crop zoning study.
- Prepared 1185 soil fertility status maps for fifteen soil chemical properties (soil salinity, soil pH, om, n, po, pb, k, s, zn, b, ca, mg, fe, cu, mn) of 79 upazila.
- Land and soil properties map layers required for suitability assessment of crop(s) have been prepared for 83 upazilas. At present the land and soil properties map layers for 355 upazilas have been prepared.
- Agro-climatic map layers required for the suitability assessment of crop(s) have been prepared for 83 upazilas.
- The weather data was extracted based on the BMD observation and globally available grid data. During the period daily maximum and minimum temperature, rainfall, relative humidity, cloud coverage, and wind data have been prepared for each of the 64 districts for the period of 1981-2021.
- The boundary of 113 upazilas lying within the international borders of Bangladesh was adjusted with SoB international boundary as it is authentic and internationally recognized.

- The difference was from 10m to around 900m (Boda upazila and Matiranga upazila).
- In view of rabi maize and wheat crop area estimation ground truth data of those crop fields were collected through handheld GPS from 50 districts. During the field visit data on geolocation (GPS coordinates), cropping patterns, sowing and probable harvesting dates, and photos of crop fields were gathered.
 - Demonstration trials were carried out at 16 locations for seven rabi crops (Boro rice, Wheat, Maize, Potato, Mustard, Lentil, and Onion) for validating fertilizer recommendations provided through the 'Khamari' mobile app.
 - Conducted field testing and result validation training on the 'Khamari' mobile app and crop zoning application system at 53 upazilas for agriculture extension officers, farmers, and input providers. In total 1900 persons were trained and quite a number of improvements on CZIS and 'Khamari' app has been made based on the user feedback.
 - Some features like (1) Calculator for determining the location and union-wise fertilizer quantity according to cropland area; (2) Save searched outputs to facilitate offline availability of information; (3) 'Soil properties' for displaying important soil characteristics and nutrient status information of a land parcel; (4) Links to websites, videos, call centre, infographics related to different useful agricultural services were added to the 'khamari' mobile app.
 - The crop zoning dashboard has been overhauled for quick and easy access to information. The users will be able to access information on crop suitability, land use, cropping pattern with profitability, crop zone, etc. in the form of a map, table, and chart instantly by upazila, district, division, country.
 - The development of CZIS software, crop zoning dashboard, 'Khamari' mobile app, and agri-advisory portal in terms of adding new features, enhancement of existing features, improvement of user interface, fixing bugs, etc. is ongoing.
 - The first Project Advisory Committee (PAC) meeting of the Crop Zoning project (2nd Phase) was organized on 07 August 2022.
 - A national workshop on 'Field testing and result validation of 'Khamari' mobile app' was held on 4 December 2022. Dr. Shaikh Mohammad Bokhtiar, Executive Chairman of BARC was present as chief guest, and Dr. Kristofer Dee Jonson, Environment, Forestry and Climate Change Consultant, FAO was present as guest of honor as FAO Representative.
 - A discussion meeting on the progress of crop zoning was held in the 25th meeting of the Parliamentary Standing Committee for MoA on 22 September 2022.
 - Prepared Annual Report for the period from February 2022 to January 2023 and submitted to KGF

3. Policy Support

Computer and GIS Unit plays an important role in providing opinion and feedback upon ICT-related policy-level issues asked from MoA from time to time. During the period, following opinions are sent to MoA:

- 'National Helpline 333 Policy 2022'
- Prepared a brief of the discussion of the Hon'ble Minister, MoA in the discussion meeting titled 'From Digital Bangladesh towards Smart Bangladesh' in the Ministerial Conference of Basis Soft Expo 2023.
- Innovation activities report of BARC (half yearly and yearly) according to Innovation work plan 2022-2023 to MoA.
- Monthly e-Filing, e-GP reports to MoA.
- Monthly website update/upload reports to MoA.
- Progress Report of BARC activities according to ICT Policy 2018 to MoA.
- Quarterly APA, integrity report sent to planning division, BARC.
- Quarterly service delivery report sent to citizen charter update committee according to BARC citizen charter

4. Research Management/ Financial Management and Coordination

The Director (Computer and GIS) has been working as Principal Investigator of Crop zoning project since 2017. As a PI of the project, he managed project activities as well as budgetary issues aligning financial rules and regulations.

5. Training, Workshop, Seminar etc. Organized

- i. Training on Online Software Developed by BARC:** The training was held on 3 October 2022. In total 40 participants were present from BARC.
- ii. Training on Geographical Information System (GIS):** The training was held during 4-8 June 2023. There twenty participants from BARC and NARS institutes officers.
- iii. Training on e-Filing for Officers:** The training was held on 20-21 December 20, 2022 with 22 participants from BARC.
- iv. Training on e-Filing for Staff:** The training was organized on 22 December 2022 with 20 participants from BARC.
- v. Workshop on Actions to Combat 4IR Challenges:** One daylong workshop was held on 14 February 2023 with 59 BARC
- vi. Workshop on e-Governance and Innovation Action Plan 2022:** The Daylong workshop was held on 18 April 2023 60 BARC participans
- vii. 2nd Workshop on Actions to Combat 4IR Challenges:** The daylong workshop was held on May 31, 2023. Eighty participants attended the workshop from BARC, NARS institutes, and other institutions/organizations under the MoA

vii. Standardization and Interoperability of Agro-Data Ecosystem for Smart Agriculture:

The Daylong workshop was held on 7 May 2023. The workshop was organized by the Crop Zoning Project of BARC and 71 participants including the head of organizations of MoA and other relevant institutions/organizations were present.

viii. Workshop on ‘Standardization and Interoperability of Agro-Data Ecosystem for Smart Agriculture’:

The Workshop took place at NATA, Gazipur during June 18-20, 2023. Thirty scientists/officers from various institutions/organizations under the MoA and other relevant institutions/organizations attended the workshop. Honorable Secretary, Reforms, Cabinet Division was present online as Chief guest in the workshop. The workshop was chaired by Honorable Executive Chairman, BARC.

Training, Workshop, and Seminar

The personnel of the unit attended various meetings/seminars/workshops under different capacities at BARC and other organizations during this period. Some of those are focal point meetings and workshops, PCR workshops, stakeholder workshops, GIS and Remote sensing related workshops, etc.

Transferable Technology: One such technology titled Mobile app ‘Khamari’ is developed under the crop zoning project and organized training for field-level stakeholders including farmers, traders, and extension efforts are on going.

6. National and International Linkages

- Director (Computer & GIS) attended a 10-day long Tailor-made training (4th phase) on ‘Open-Source Scientific Computing for Agro-Geospatial Big data analysis’ at ITC, University of Twente, Netherlands from 27 June 2022 to 06 July 2022.
- The Director (Computer & GIS) attended a 14 days counterpart training of ‘The Project for Establishment of National Spatial Data Infrastructure (NSDI) for Bangladesh’ implemented by the Survey of Bangladesh (SoB). The training was held in Japan from 27 February to 15 March 2023.
- The Director and Senior System Analyst attended the inception workshop of the ACASA project held from during 25-27 April 2023 in India at ICAR campus. Six participants from BARC, BARI, and BRRI attended the program as representatives from Bangladesh.

7. Publication

The unit contributed in publishing the journal articles and other:

- Contributed in preparing a book chapter titled ‘Prospects of Precision Agriculture in Farming Systems Research and Development of Bangladesh’ to be published under the NATP-2 project.
- Three video documentaries were published related to the ‘Khamari’ mobile app and soil fertility jointly with FAO.

8. Other Activities

a. Server and Network Operation

- Configured High Availability between the newly installed Firewalls and Switches. Updated the firmware of the devices and installed a new virus detection signature. The training was conducted on the newly installed core switch and a core firewall.
- Email account creation of all BARC officers is done along with newly recruited professionals in the new platform. Smooth access and availability of internet service were ensured throughout the year. In connection with this, worked with BTCL to resolve the issue of the optical fiber teardown beside the police box at BARC campus due to the storm.
- Procured and installed cloud-based antivirus Bit Defender (150 users) in desktop computers, laptops, workstations, and servers of BARC centrally for the protection of computers from viruses, spyware, adware, ransomware, or malware.
- SSL/TLS certificate installed for cropzoning website.
- Renewed BARC domain (barc.gov.bd) for the next 10 years.
- Cable dressing, tagging & labeling were done in the main building and AIC building.

b. Procure Zoom License and Host Virtual Meetings using Zoom Platform

Received 5 Zoom users with 300 participants license each from BdREN as supplementary service by membership subscription. Created more than 45 meetings during this period and provided support to host and manage virtual events.

c. National Agricultural Display Centre (NADC) Operations (Operations and Maintenance of Digital Display part of NADC)

The Director (Computer & GIS) worked as member secretary of NADC operations and maintenance committee. Some organizations visited the NADC during the period.

d. Database and Apps Development

- The updated version of the 'Khamari' app is uploaded to the google play store (version is 5.5).
- The Personnel Data Sheet (PDS) application is upgraded to version 4.0 from the earlier version 3.0.
- New user request approval of different online applications of BARC as a routine job.
- Renewed yearly flip book hosting subscription and hosted some new important e-Books including 'A Development Trajectory of Bangladesh Agriculture: From Food Deficit to Surplus' and 'Agricultural Development for Fragile Ecosystems of Bangladesh'.
- Started in-house development of the flipbook web application and a primary version is already released.

e. Uploading, Updating, and Maintenance of BARC Website

- A new feature (event calendar) of our national web portal was explored and implemented for BARC.

- A new section for Good Agricultural Practices (GAP) was designed and necessary documents were also uploaded.
- A new menu item was added for the information of retired Chairmans, Member Directors, and other high officials.
- Anchoring of NATP website was done along with uploading project-related important documents to the main site.
- BARC web portal (www.barc.gov.bd) was being updated regularly based on data received from different sections/units/ divisions. Files were uploaded and pages were updated regularly. The website structure was changed several times as per instruction from MoA.
- Website upload and update report sent to MoA, BARC administration, and APA focal point within the 7th day of each month as well as quarterly. During this period 1612 files were uploaded and 207 pages updated.

f. e-Filing administration and support

- Updated/created several positions in the e-Filing system of BARC with the help of BCC professionals.
- e-Filing administration activities performed, including user creation for newly recruited personnel, updating and deleting users, etc.
- e-Filing report generation in prescribed format and sent to MoA, BARC administration and APA focal point within 7th day of each month as well as quarterly basis.
- Technical support in e-Filing operation provided to scientists, officers, and staff of different divisions, units, and sections.

g. Functioning of BARC innovation team

The Director (Computer & GIS) has been working as an Innovation officer of BARC since 2013. As an innovation officer, conducted the following activities during this financial year:

- Prepared Innovation work plan-2023-2024, Innovation Report-2022-2023 with the help of innovation team members.
- Conducted four trainings and two workshops for BARC officers.
- Conducted 4 Innovation team meetings at BARC.
- Information on the innovation team and its activities is uploaded to BARC website under the 'innovation' menu/box as per the guideline of MoA.
- Conducted other activities according to the Innovation work plan 2022-2023 with the help of innovation team members.
- Launched a new innovative idea of 'Newspaper Clipping Service' for our AIC Unit.

h. Climate Database Update:

The daily weather data for 2019~2021 was purchased from BMD, processed, generated monthly data, and uploaded in the website (<http://climate.barcapps.gov.bd>). The purchasing process of the weather data for the year 2022 is ongoing.

i. Continuation of GIS Activities:

Maintenance and necessary output preparation of AEZ land resources database and local level Upazila Nirdeshika database (soil, land, nutrition, and others) is an ongoing activity. AEZ land resources data is used for earlier crop zoning studies of Bangladesh. The AEZ database is being used extensively in the current Crop zoning project. Part of these data is also been used in ACASA project.

j. Support to BARC and Different Components of NATP2 etc.

Supports provided to KGF, SAC, and NATP-2 from time to time in the procurement of goods, works, and services along with BARC.

k. Support to Divisions/Sections of BARC for Hardware/ Software; Data analysis; Information Sharing and Resource Management

Support provided to different divisions/units/sections to fix various types of computer hardware, software, and networking-related problems. Several types of maps, NARS maps, climatic maps, etc. provided to scientists/ researchers/ extensionists as per requirement.

l. Support for Planning, Budgeting, and Procurement of Computer Resources (Hardware, Software & Accessories, etc.)

Prepared requirement assessment, specification, and budgeting for procurement of computer hardware, software, and accessories under BARC and distribution of hardware, software, and networking equipment. Support was provided to KGF as the focal point of BARC in ARMIS project implemented by KGF.

m. Support for Planning, Budgeting, and Procurement of Computer Resources (Hardware, Software & Accessories, etc.)

As per the new procurement policy, the unit has completed the process of purchasing computer related and toner for all the official printers centrally.

n. Personal Data Sheet (PDS) Management

Personal Data Sheet (PDS) Management system was updated that promises a more efficient and user-friendly experience for all employees. A letter was issued to request every employee to keep their PDS profile updated. With improved user activation, seamless upgradation, and robust operations and maintenance procedures, the PDS platform aims to enhance data management and security, contributing to a more reliable and effective data management solution. It is also mentioned that BRRI is utilizing the PDS in full swing since inception.

o. ACASA Project

A project titled 'Atlas of Climate Adaptation in South Asian Agriculture (ACASA)' funded by the Borlaug Institute for South Asia (BISA) is under implementation from March 2023 to August 2025 by Bangladesh Agricultural Research Council (BARC) in Bangladesh part. Mr. Hasan Md.

Hamidur Rahman, Director (Computer & GIS) is working the PI of the project while 06 more participants altogether from BARC, BARI, and BIRRI are also working as team members in Bangladesh part of the project.

p. LiDAR Project

A project titled 'Piloting Light Detection and Ranging Technology (LiDAR) for fast-tracking Agricultural Transformation and Sustainable Development' has been under implementation. MoA, FAO, and BARC are working as the sponsoring ministry, implementing agency, and executing agency respectively. In this project, DAE, SPARRSO, SRDI, and SoB are working as collaborating agencies. The main objective of the project is to establish a working group and a consortium of resource partners and technical partners towards procuring national LiDAR datasets that benefit multiple sectors; and to build capacity for utilization of and demonstrate LiDAR benefits to the agricultural sectors, thus helping the Government to develop a sustainable model for financing LiDAR.

q. Data Management Component of GIFS Project

The unit had developed the budget for the Data Management component of the project 'Establishment of Bangabandhu - Pierre Elliot Trudeau Agricultural Technology Center (BP-ATC) Project'.

r. Training and Certifications

i. My-Gov: MyGov is a comprehensive service platform where citizens can register once with a single web address and then apply for and avail of all government services online. Five officers of the Computer & GIS unit completed the official certification of the My-Gov course in the Muktopath online learning platform of the government.

ii. e-Nothi: E-Documentation is a process of transitioning from conventional paper-based documentation to electronic documentation. Five officers of the Computer & GIS unit completed the official certification of the e-Nothi course in the Muktopath online learning platform of the government.

iii. Tathya Batayan (তথ্য বাতায়ন): The government desired to utilize the 'One-Stop Service' of the National Information Exchange to provide citizens of the country with information related to agriculture, education, health, law, tourism, and other sectors. Five officers of the unit completed the official certification of the 'তথ্য বাতায়ন' course in Muktopath online learning platform of the government.



Participants and Guests of the Inception Workshop of ACASA Project at ICAR, New Delhi



EC, BARC delivering inaugural speech on occasion of Training on Online Software Developed by BARC



Dignitaries in stage on the Occasion of Participants of 1st Workshop on Actions to Combat 4IR Challen



Dignitaries of Participants of Workshop on e-Governance and Innovation Action Plan 2022-23



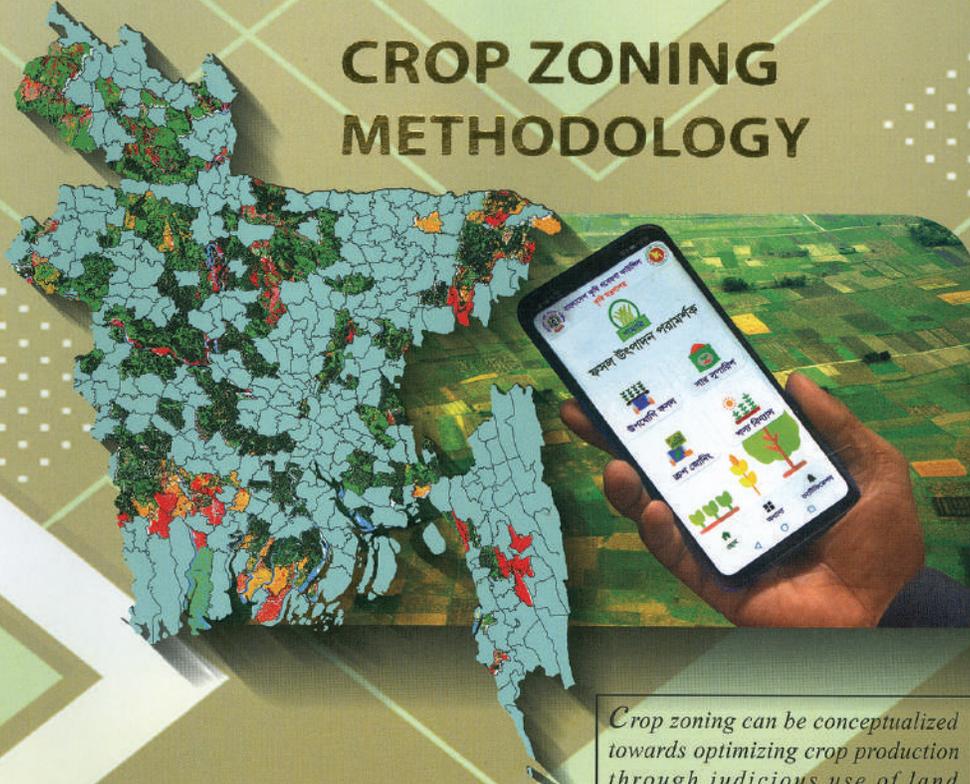
Participants of Workshop on Standardization and Interoperability of Agro-Data Ecosystem for Smart Agriculture



Dignitaries on the Occasion of Workshop on Standardization and Interoperability of Agro-Data Ecosystem for Smart Agriculture



CROP ZONING METHODOLOGY

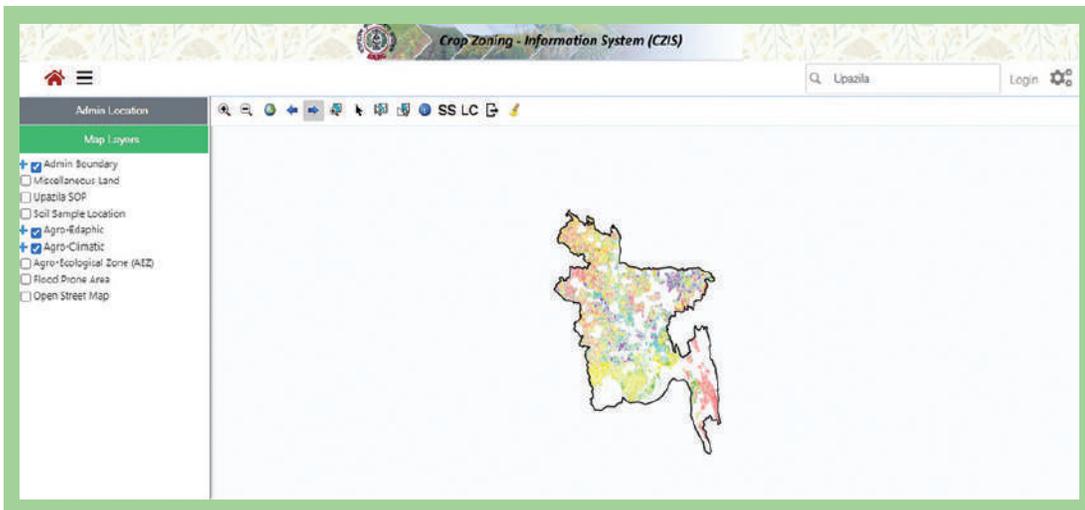
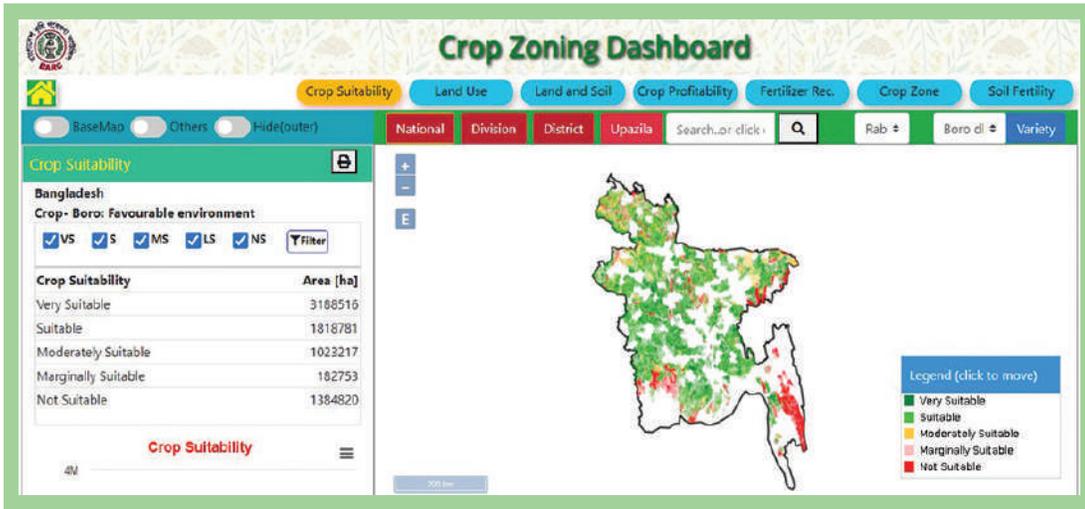


Crop zoning can be conceptualized towards optimizing crop production through judicious use of land and water resources

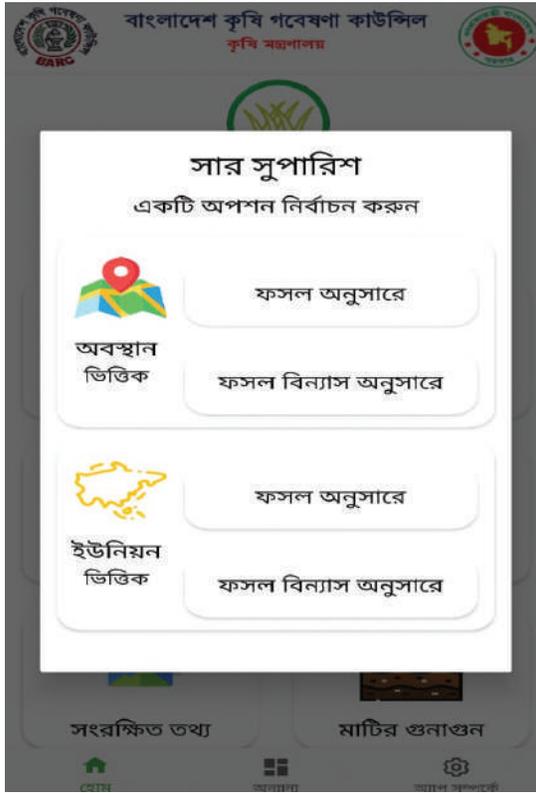


Bangladesh Agricultural Research Council

Pictorial view of Crop Zoning Methodology

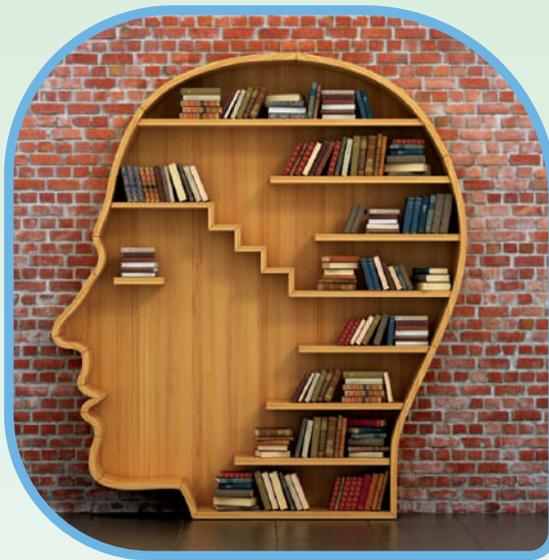


Snapshot of GIS based Software Crop Zoning Information System (CZIS)



Snapshot of 'Khamari' Mobile Apps

AGRICULTURAL INFORMATION CENTRE



AGRICULTURAL INFORMATION CENTRE

Agricultural Information Centre (AIC), a knowledge management hub of BARC, is engaged in collecting, organizing and disseminating research information. It renders knowledge services to the stakeholders ranging from researchers to policy makers with a view to enhancing their capacity. This service is aimed to promote agricultural productivity. The center works on the principle of providing quality agricultural information in order to accelerate research and development. The documents generated in the institutes of NARS and beyond are huge in number subsequently deposited in the AIC library of BARC. Information in terms of quantity and quality is managed in an institutional repository. AIC maintains two sections: 1. Documentation and Publication, 2. Library and Reprography. However, the working personeel are as follows.

Name of the Professionals

Name	Designation
Dr. Kabir Uddin Ahmed	Director
Dr. Susmita Das	Principal Documentation Officer
Dr. Md. Taibur Rahaman	Principal Librarian (A.C.)
Md. Sazzadur Rahman Sarker	Senior Reprographic Officer
Dr. Mst. Sufara Akhter Banu	Senior Scientific Editor
Md. Saimum Hasan	Information Officer
Mohammad Nazmul Islam	Graphics Designer
Md. Wasiuzzaman	Junior Bibliography Officer

The activities performed during the reporting period is furnished below:

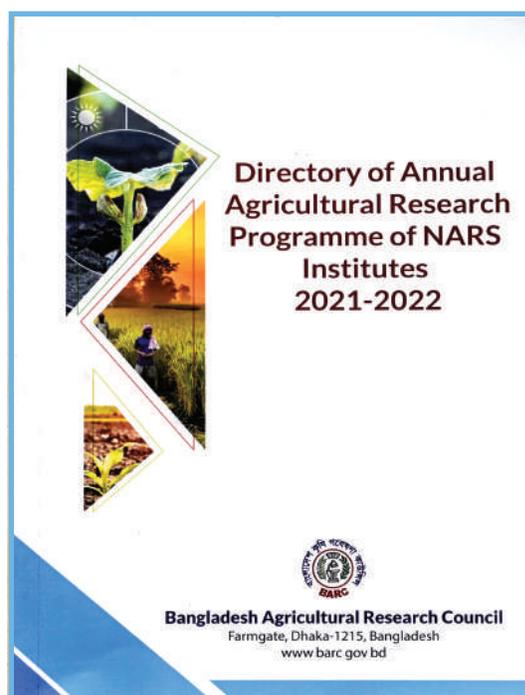
1. Documentation and Publications

Agricultural Information Centre published the biannual Bangladesh Journal of Agriculture (BJA), Annual Reports, Quarterly BARC newsletter, technical directories, technical reports, telephone directory, yearly diary, greeting cards. It prepared a good number of reports for Agriculture Standing Committee and question-answers including supplementary, star-marked and non-star marked questions required by the Parliament Sessions and relevant ministers for Parliament Meeting. AIC also organized annual religious and national events through designing and distributing Eid, Bangla and English New Year Greeting Cards, Banner, taken part in advertisement for disseminating scientific information, and designs of different research publications. It monitored different research projects and participated National and International seminars, workshops, symposiums and other relevant programs. It was also involved in preparing notes for the events organized by BARC or ministries including guests of different national seminars, workshops, symposiums. The member of the centre as master of ceremonies or facilitator for different national and international seminars, workshops and symposiums.

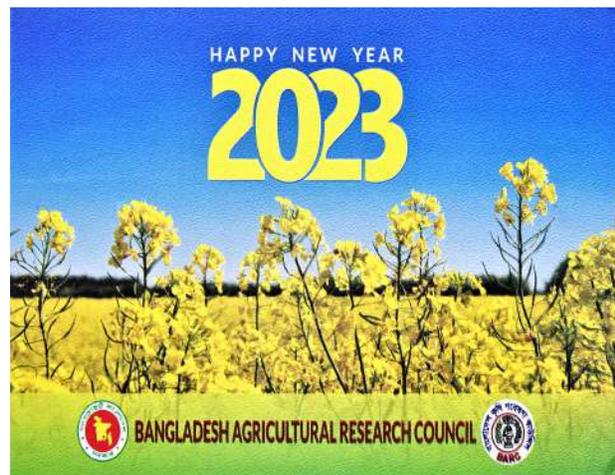
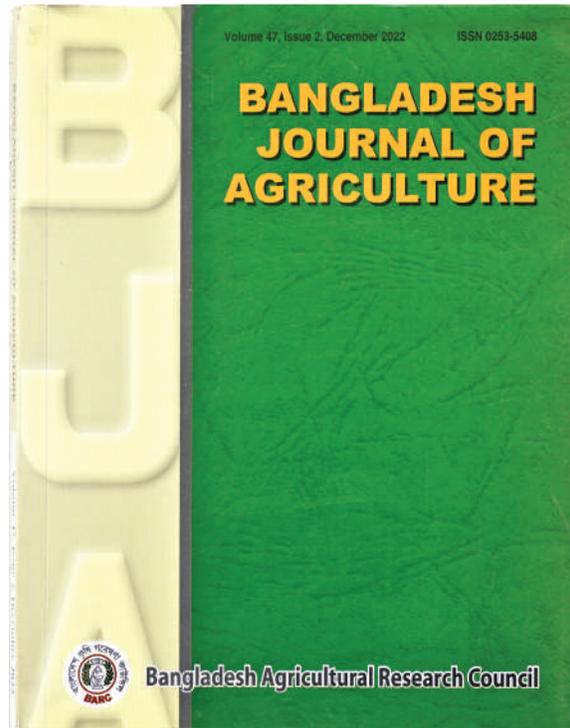
Information was maintained by AIC in two ways: in the digital databases for easy access for the users and in printed inventory documents available in the library. The center attempted in bringing out the printed inventory of the information resources in series publication. This inventory is hoping to help the users to identify the materials of their interest.

During this period, the following publications were accomplished by AIC

- a. Publication of BARC Annual Report 2021-22
- b. Publication of NARS Directory 2021-22
- c. Publication of BJA Vol: 47(2), December 2022
- d. Publication of BJA Vol: 48(1), June 2023
- e. BARC Newsletter April-June, 2022 (Vol. 20.2)
- f. BARC Newsletter July-September 2022 (Vol. 20.3)
- g. BARC Newsletter October -December 2022 (Vol. 20.4)
- h. BARC Newsletter January-March 2023 (Vol. 21.1)
- i. BARC Calendar 2023
- j. BARC Diary 2023 with different quotes of Bangabandhu Sheikh Mujibur Rahman



Glimpse of Different Publications from AIC



Glimpse of Different Publications from AIC

2. Library and Reprography

This section is responsible for the development of the collection, literature search, update and maintenance of databases, news clipping services, resource exchange and sharing, and photography and photocopy services. Receiving publications from different national and international organizations and providing publications to NARS and other national and international institutes on request. This section is dedicated to scientific professionals, graduate students, and policy makers.

AIC devoted considerable efforts and resources to the development of an outstanding library collection to meet the expanding needs of agricultural research and to serve as an information resource center for NARS institutes. AIC library had a total collection of about 25,400 information materials in the form of **21,000** books and reports, pamphlets, and **1,400** bound journals and serials, etc.

2.1 Development of Collection

Every year new books, reports, pamphlets, bound journal, etc., were added in professionally to manners to the existing ones. The AIC library maintained a total collection of about 25,400 information materials in the form of books, reports, pamphlets, bound journals, etc. In the previous year **1,277** new books and reports were procured and **9** current journals/ Newsletters were published and collected by AIC during 2022-23.

2.2 Literature Search

The Centre rendered literature search services from digital full-text using CDS-ISIS and D-space database management to satisfy the queries of the researchers, agricultural scientists, planners, and policy-makers. It also provided search services on specific requests by teachers, students, and users from NARS institutes and other organizations during 2022-23.

2.3 Update and Maintenance of Databases

Agricultural Information Centre updated and maintained the databases of different publications. It had its repository using D-space with a database on Koha **6,622** books and reports of different sorts out of which **411** records were added during the previous year. The database was rich in Journals, Newsletters, and Periodicals of about **1,220** records. A new entry has been added and updated regularly the existing records.

2.4 News Clipping Services

News clippings from daily newspapers both in Bangla and English on different research-related issues or events, programs, and ceremonies related to agriculture were identified and processed in different formats and circulated to the users for their attention. These had been compiled, and prepared with a content list and finally preserved in the library. During the reporting year **6,807** Articles in Bangla and English were identified, compiled and preserved in the library for users. Later, these clippings were compiled with a content list and preserved in the library. One hard copy was prepared and preserved as a reference copy.

2.5 Resource Exchange and Sharing

The AIC library performed resource exchange and sharing activities with national and international organizations during 2022-23 like the previous years. Recently the library has started collecting information materials from FAO, CGIAR Centers, BBS, BANSDOC, and NARS institutes regularly.

2.6 Online Archive of Important Documents

The AIC library developed a database-driven online archive based on Content Management System (CMS) last year. The database contained digital contents of non-conventional documents of high archival value (policy documents, all kinds of reports, proceedings and other mimeographs).

2.7 Photography and Photocopy Services

AIC regularly provides photography and photocopy services to all divisions and units. Last year, it captured photographs of 136 workshops/trainings/seminars/meetings. It also supplied **13,344** photos in digital and 34 large printed forms to the concerned divisions and officials.

2.8 Library and Information Service

During 2022-23, **1,672** users of different categories used the BARC library. Besides the BARC and NARS scientists, university teachers and students, NGO and private organizational personnel used the library for meeting their queries.

2.9 International Linkage

Agricultural Information Center, BARC is linked with different international organizations. Dr. Susmita Das, Principal Documentation Officer, AIC, acted as Asia Ambassador of Plan S- an International Expert Group of Open Access Research, a board member of the working group of AgriXiv-a preprint repository for agriculture in India, and a Core Member of YPARD Bangladesh. Dr. Kabir Uddin Ahmed, Director, AIC, and Dr. Susmita Das, attended AIP, Bangabandhu National Agriculture Award for the Bangla years of 1425 and 1426, World Food Day 2022, programs, etc. The entire AIC officers are also attended the World Soil Day 2022, Vegetable Fair 2022, etc., programs.

2.10 Training/Workshop/Seminar

Agricultural Information Centre (AIC) also arranges different workshops, trainings, seminars, and meetings for wider and quick delivery of agricultural scientific findings.

2.10.1 Training Program

Agricultural Information Centre (AIC), BARC, organized a 3-day long training program on *Technical Report Writing and Editing* during 05-07 March 2023 at BARC. The main objective of the training program was to make the NARS scientists and officers skilled in scientific and modern techniques of technical report writing and journal paper editing. Thirty scientists from NARS institutes attended the training. The inaugural ceremony of the training program was graced by the chief guest Dr. Nazmun Nahar Karim, Member Director, Livestock Division, BARC. Dr. Md. Mosharraf Uddin Molla, Member Director, AERS Division, was present as a special guest.

The program was chaired by course director Dr. Kabir Uddin Ahmed, Director, AIC. Dr. Susmita Das, Principal Documentation Officer, AIC the welcomed and highlighted the objectives of the training program as course coordinator.

As the chief guest, Dr. Nazmun Nahar Karim emphasized the importance of technical report writing and journal paper editing for scientists. She also shared some techniques for effective technical writing. Dr. Md. Mosharraf

Uddin Molla, as a special guest uttered the necessity of technical report writing for every agricultural scientist. After successful completion, the training program ended with a closing ceremony. Dr. S M Bokhtiar, EC, BARC as chief guest of the closing program distributed the certificates among the participants. In his closing remarks, he highlighted the importance of technical report writing. Dr. M. Baktear Hossain, Member Director, Natural Resources Management Division and Director, SAARC, was present as a special guest. Dr. Kabir Uddin Ahmed, Director, AIC chaired the concluding and certificate-giving session and thanked the guests and participants.



Hon'ble Chief Guest of the Closing Session EC, BARC Handing over the Certificate to the Participants

2.10.2 Workshop

Agricultural Information Centre (AIC), BARC, organized a day-long workshop *Introducing BanglaJol Open Access Portal and Improving BJA Publishing* on 1st December 2022 at BARC. The main objective of the workshop was to make the journal more useful for supporting and connecting global science and contribute to exchanging technological knowledge and experiences. This journal also provides an immediate new horizon in open access and greater global



Dr. SM Bokhtiar, EC Delivering Speech as Chief Guest

exchange of knowledge freely available to the public. Sixty scientists and officers from BARC attended the workshop. The inaugural ceremony of the program was graced by Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC as chief guest. Dr. Md. Baktear Hossain, Member Director, Natural Resource Management Division and Director, Training & Manpower Unit, BARC, and SAARC Agriculture Centre was present as a special guest. Dr. Kabir Uddin Ahmed, Director, AIC presided over the inaugural session of the program. Dr. Susmita Das, Principal Documentation Officer, AIC offered welcome speech and highlighted the objectives of the workshop. The inaugural session was followed by a technical session conducted by Dr. Kabir Uddin Ahmed, Director, AIC, BARC. Resource persons Md. Fahmid Uddin Khondoker, IT cum Monitoring Officer, BUEP and amp; Journal Manager (BanglaJOL), BAS, and Mr. Abdullah Al Faysal, Jr. IT Officer,

BanglaJOL, BAS gave lectures on the topic and its practical application for Introducing BanglaJol Open Access Portal and Improving BJA Publishing. As the chief guest, Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC emphasized the importance of BanglaJOL service which provides greater visibility for the online publication of the Bangladesh Journal of Agriculture (BJA). He also highlighted the necessity of the online BJA journal and sharing scientific knowledge in all spheres for the global scientific community. Dr. Kabir Uddin Ahmed, Director, AIC chaired the concluding session and thanked the respected guests and participants.

2.10.3 Preparation of Policy Documents and Inputs

Agricultural Information Center provided information for inclusion in the speech (both English and Bangla) of HE the president for the 1st Session of 11th National Parliament 2023. It prepared reports for Agriculture Standing Committee and Question-Answer including Supplementary, asterisk and non-asterisk and highlighting the recent remarkable success in agriculture. It provided information for the 11th meeting of the Committee on Government Assurances. AIC also provided 48 Questions-Answer of Hon'ble Agriculture Minister, among those 17 for the Agriculture Minister, and other for Parliament Members.

3. Publications

Six scientific papers, two issues of the journal, one annual report, one training manual, one NARS directory and four issues of BARC newsletters were published by Agricultural Information Centre (AIC), BARC during 2022-23.

3.1 Scientific Paper (06)

- **Das, S.**, Mondal, P., and Das, R. 2022. ICT Based Agricultural Knowledge Transfer of Women Farmers: A Case of Gender Responsiveness from a Developing Country Perspective. 2021. *Library Philosophy and Practice (e-journal)*. 6496. <https://digitalcommons.unl.edu/libphilprac/6496>
- **Das, S** and Gutam, S. 2023. Awareness and Perception of Preprints in the Scholarly Community: A Study on India and the SAARC Region, Research Square: <https://doi.org/10.21203/rs.3.rs-2565275/v1>
- **Banu, M. S. A.**, Tuteja, N., K. M. K. Huda., Rashid, M. H., et.al. 2023. Phenotypic and microarray analysis reveals salinity stress-induced oxidative tolerance in transgenic rice expressing a DEAD-box RNA helicase, *OsDB10*. *Plant Molecular Bio*. <https://doi.org/10.1007/s11103-023-01372-2>
- **Banu, S. A.**, Tuteja, N., K. M. K. Huda., Rashid, M. H., and Parveen, S.2023. A DEAD box helicase Psp68 positively regulates salt stress responses in marker-free transgenic rice plants. *Transgenic Res*. <https://doi.org/10.1007/s11248-023-00353-x>
- **Banu, S. A.**, Tuteja, N., and K. M. K. Huda. 2022. Overexpression of a DEAD BOX helicase *Psp68* gene and its mutant confers salinity stress tolerance in bacteria *Bangladesh J. Agri*. 47(2):17-26. DOI: <https://doi.org/10.3329/bjagri.v47i2.63334>
- Kundu, P. K., Parveen, S., **Banu, M. S. A.**, and Rashid, M. H., et. al. 2023. Morphological variations in some Brinjal (*Solanum melongena L.*) Genotypes. *Bangladesh J. Agri*. 48(1):123-129. <https://doi.org/10.3329/bjagri.v48i1.667633>

3.2 Annual Report (01)

Ahmed. K. U., Das, S., Sarker, M. S. R., Banu, M. S. A., and Hasan, M. S. Annual Report. 2021-22. Bangladesh Agricultural Research Council (BARC). Farmgate, Dhaka-1215, Bangladesh.

3.3 NARS Directory (01)

Bokhtiar, S. M., Ahmed. K. U., Das, S., and Hasan, M. S. Directory of Annual Agricultural Research Program of NARS Institute. 2021-22. Bangladesh Agricultural Research Council (BARC). Farmgate, Dhaka-1215, Bangladesh. Published on 2023.

3.4 BARC Newsletter (04)

Ahmed, K. U., Das, S., Sarker, M.S.R., Banu, M. S. A., and Hasan, M. S. 2022. Newsletter. Bangladesh Agricultural Research Council (BARC), Farmgate, Dhaka-1215, Bangladesh. 20(2, 3 & 4):1-12.

Ahmed, K. U., Das, S., Sarker, M. S. R., Banu, M. S. A., and Hasan, M. S. 2023. Newsletter. Bangladesh Agricultural Research Council (BARC), Farmgate, Dhaka-1215, Bangladesh. 21(1):1-12.

3.5 Collection of ISBN Numbers (02)

ISBN Numbers for two books of BARC were brought by AIC through proper formalities. i.e.,

1. Agricultural Development for Fragile Ecosystems in Bangladesh.
2. A Development Trajectory of Bangladesh Agriculture from Food Deficit to Surplus.

3.6 Popular Articles (04)

Dr. Susmita Das, Principal Documentation Officer, AIC, BARC wrote popular articles on-

1. Exploiting Opportunities of Bangladesh Agriculture Towards Fourth Industrial Revolution, Dr. Susmita Das, Published on 15 June 2023, Daily Asian Age.

Krishi Kotha (কৃষিকথা)

১. বঙ্গবন্ধুর দূরদর্শিতা ও আজকের কৃষি গবেষণার সাফল্য (শ্রাবন-১৪৩০ (জুলাই-আগস্ট ২০২৩) ড. শেখ মোহাম্মদ বখতিয়ার,^১ ড. সুস্মিতা দাস^২
২. নিরাপদ সবজি চাষ ও পুষ্টি নিরাপত্তা, ড. শেখ মোহাম্মদ বখতিয়ার,^১ ড. সুস্মিতা দাস^২
৪. বিশ্ব খাদ্য দিবস-টেকসই উন্নয়ন অর্জনের পথে আমাদের সম্মিলিত অগ্রযাত্রা, ২০২২. ড. শেখ মোহাম্মদ বখতিয়ার,^১ ড. সুস্মিতা দাস^২

4. Additional Activities

Agricultural Information Centre (AIC) also performed additional activities for meeting different requirements of the Bangladesh Agricultural Research Council.

- i. Agricultural Information Centre (AIC), BARC prepared a good number of reports on the Agriculture Standing Committee and Question-Answer including supplementary, star-marked and non-star-marked questions raised by the Parliament Members and other concerned ministers for 11th parliament sessions during 2022-23.
- ii. Agricultural Information Centre (AIC), BARC organized Editorial Board Meeting undertaken by Bangladesh Agricultural Research Council.
- iii. Agricultural Information Centre designed and distributed 4 greeting cards i.e., 2 Eid cards, Nabo Barsha, and New Year Greeting Card. It Prepared 20 Banners and 12 cover designs for different programs and publications. Also designed 4 Greeting cards, 1 Glass Board, 4 Logos, 4 Newsletter's Must Head, 1 Calendar, 1 Diary, and 631 pages illustrations
- iv. Involved with different research projects and participated in different national and international seminars, workshops, symposiums, and relevant programs were mentored by during 2022-23.
- v. The centre monitored different research projects undertaken by Bangladesh Agricultural Research Council.
- vi. As a member of different monitoring teams, Agricultural Information Centre participated in different field visits to various localities where projects have been undertaken by BARC and NATP-2 during 2022-23.
- vii. Agricultural Information Centre, as a member of the BARC innovation team, contributed to generating innovative ideas, piloting and showcasing different innovations in BARC.
- viii. During 2022-23, Agricultural Information Centre prepared speeches for chief guests, special guests of different national seminars and international conferences, seminars, workshops, and symposiums.
- ix. AIC was involved in preparing notes and rapporteur's reports for the events organized by BARC during the reported time.
- x. AIC contributed to the creation of reports for Bangladesh's Standard Operating Procedure (SOP) for Genome Edited Plants. Newsletter for the South Asian Biosafety Program. 20(6):1 Published in June 2023.
- xi. AIC worked as focal person of Krishi media in last year.
- xii. Distributed publications to different national & international organizations.
- xiii. AIC was involved in preparing the message of Hon'ble Prime Minister on the occasion 50 years' anniversary of BRRI.
- xiv. Monitored research projects, participated as a member of different team/committee.

ADMINISTRATION AND FINANCE



ADMINISTRATION AND FINANCE DIVISION

This division focuses on administration, management and financial aspects of the organization. Regular financial matters including budgeting are also handled. Besides, various high profile management body meetings are organized.

Name of the Professionals

Name	Designation
Dr. Md. Saifullah	Member Director
MD. Abdul Mottakin	Director (Support Service)
Muhammad Mahbubul Hassan	Deputy Director (Establishment)
Mirza Tosaddeque Hossain	Executive Engineer (Engineering Section)
Dr. Md. Taibur Rahman	Senior Assistant Director (Procurement)
K. M. Ali Haider	Senior Assistant Director (Establishment)
MD. AL-AMIN	Protocol Officer (Admin. and Finance)
MD. Shohag Fokir	Assistant Director (Establishment)
Aysa Siddika	Assistant Director (Establishment)

BARC Recruitment/Promotion Committee-1 (DPC-1)

In the financial year 2022-2023, A total of 3 meetings of DPC-1 were held. 18 Nos. of Principal Scientific Officer (4th Grade) from BARI, BRRI, BINA, BJRI & BWMRI were promoted to Chief Scientific Officer/Director (3rd Grade) in these meetings. No Direct Recruitment was given.

BARC Recruitment/Promotion Committee-2 (DPC-2)

In the financial year 2022-2023, Only one meeting of DPC-2 was held. 5 Principal Scientific Officers, 1 Programmer, 1 Protocol Officer, and 1 Data Entry officer were directly recruited in this meeting.

BARC Recruitment/Promotion Committee-3 (DPC-3)

Three meetings of DPC-3 were held in the financial year 2022-2023. 13 People were directly recruited. The name & number of the post has given below:

01 Transport Inspector, 02 Word Processing Assistant, 02 Stenographer cum Computer Operator, 01 Auditor, 01 Cataloguer, 01 Audio Visual Assistant, & 05 Office Assistant cum Computer Operator.

Increment Order, Promotion Order, Retirement Order, and Retirement Benefit

All increment orders, promotion orders, PRL orders were issued by the Establishment unit. Eleven employees went on PRL during reporting fiscal year. Retirement benefits for all employees have been cleared or are in process.

Finance UNIT

Finance Unit is responsible for all kinds of financial aspects of BARC. This unit serves a fundamental role in making financial decisions for internal and external affairs. They manage the budget, prepare financial reports, and ensure all financial transactions which conducted legally and ethically. The primary functions of the unit are accounting and reporting, auditing, payroll management, cash management and investment of the fund. The unit is also responsible for the issuance of debt for capital projects, the retirement fund, payment to suppliers, budget preparation and execution etc.

Name of the Professionals

Name	Designation
Mr. Ajit Kumar Chakraborty	Director (Finance)
Mr. Md. Jashim Uddin Chowdhury	Deputy Director (Budget)
Mr. Md. Daloar Hossain	Deputy Director (Accounts)
Mr. Kamrul Hasan	Senior Asstt. Director (Budget)
Mr. Md. Mominul Islam	Senior Asstt. Director (Audit)
Mr. Md. Jobair Reza	Senior Asstt. Director (Accounts) (C.C.)
Mr. Kazi Golam Azam	Asstt. Director (Audit) (C.C.)

1. Introduction

BARC received funds from the Development and Revenue Budgets of the Govt. to conduct its annual mandated activities like research management, coordination, monitoring, evaluation, technology transfer, and manpower development. In this respect, The Finance Unit prepared the MTBF budget and financial plan of medium-term activities and accordingly disbursed funds. It kept all the records of expenditures incurred during the year and reported to the Ministries, CAO, IMED, Development Partner, and other Govt. Offices in time. It also reconciled the Accounts with CAO to prepare the final accounts which are submitted before the Public Accounts Committee (PAC) of the National Assembly.

2. Budget and Expenditure Control

The Govt. has implemented the 'Medium Term Budgetary Framework (MTBF)' for all the Ministries including the Ministry of Agriculture and its Divisions, Bodies, and Corporations since 2005-06. Accordingly, BARC prepared a budget in the form of MTBF for Revenue Head and Development Projects and submitted it to the Ministry of Agriculture for approval.

3. Fund Release/Disbursement

In the Financial year 2022-23, BARC received Tk. 3897.97 lakh for Salary and allowances, Supply and services, Research, Pension and retirement benefit, Repair and maintenance, manpower development, and capital fund. To implement the activities like technology transfer & manpower

development etc. As required funds were released to the Agricultural Research Institutes (ARI's) and associated organizations according to the budget plan. The overall financial progress made during the FY 2022-23 is as follows:

Financial Progress Under Revenue Budget

(Taka in lakh)

Sl. No.	Line Items	FY 2021-22		Achievement (%)	Remarks
		Budget	Expenditure		
1.	Basic Salary	780.00	738.34	94.66%	
2.	Allowances	611.45	523.94	85.69%	
3.	Supply and Services	496.03	404.70	81.59%	Embargo at 03 subheads
4.	Workshop, Seminar	80.00	75.08	93.85%	
5.	Training	100.00	49.43	49.43%	Embargo 50%
6.	Repair and Maintenance	84.00	77.13	91.82%	
7.	Retirement Benefit	780.00	780.00	100%	
8.	Research	637.42	257.84	40.45%	Couldn't send rest money at abroad
9.	Municipal tax	13	10.56	81.23%	
10.	Motor vehicle	0.00	0.00	-	
11.	Buildings	287.50	192.35	66.90%	Embargo 100% after NOA
12.	Computer & Accessories	6.20	1.32	21.29%	Embargo 100% after 1 st qtr
13.	Office equipment	20.00	19.10	95.50%	
14.	Furniture	2.37	2.37	100%	
	Total	3897.97	3132.16	80.35%	
	(+) Own income	10.00	0.00	-	
	Total	3907.97	3132.16	80.15%	

4. AFACI Projects and Others

Sl. No.	Projects Name
1.	AFACI Salt tolerant Rice
2.	Feed the Future Biotechnology potato partnership
3.	Development of Upazilla Land suitability assessment and crop zoning system of Bangladesh (KGF)
4.	Capacity building for conducting adaptive trials of seaweed cultivation in coastal areas (KGF)
5.	Nutrient management for diversified cropping in Bangladesh (KGF)

5. Accounting

BARC's Finance Unit maintained its accounts following a standard accounting system. It has kept a well-printed Cash Book, General Ledger, Trial balance, Bank reconciliation, Advance Register, Budget Control Register, iBAS++ software posting (Budget and Expenditure), CPF, Gratuity, Leave salary, Benevolent fund, Group insurance, and other related books to record all transaction during the year.

6. GoB Audit

GoB Agriculture and Environment Audit Department has not yet conducted audit for the FY 2022-2023.

7. Settlement of Audit Objections:

During the year 2022-23 five (05) audit objections have been settled out of twenty-one (21) audit observations:

Sl. No.	Particular objections	Settled audit	Amount (Tk)
1.	Revenue	05	15,28,587.00
2.	Development	0	0
	Total:	05	15,08,587.00

8. Reporting

BARC Finance unit has kept all the records of expenditures incurred during the year and reported to the Agriculture Ministry, IMED, CAO, Development Partner, and other Government offices monthly, quarterly, half yearly, and annually for revenue and development programs.

9. Monitoring and Evaluation

Monitoring and Evaluation are the integral part of effective planning and performance-based budgeting plans became successful and the value for money was realized only when the proposed targets for outcomes/outputs were achieved. To attain the targets, the BARC Finance section regularly maintained desk monitoring on the utilization of funds for planned activities including budgetary and expenditure control mechanisms.

10. Reconciliation

BARC also reconciled the Accounts with CAO.

11. Retirement Benefits

During the year 2022-23, retirement benefits and CPF payments made to the Officers and Staff of BARC are shown below:

A) CPF Final Payment

1.	Officers (5 persons)	Tk. 1,36,68,511.00
2.	Staff (9 persons)	Tk. 91,00,183.00
	Total	Tk. 2,27,68,694.00

B) CPF Non-Refundable

1.	Officer's (Nill)	Tk. 0.00
2.	Staff (Nill)	Tk. 0.00
	Total	Tk. 0.00

C) CPF Loan

CPF loan provided to the Officers and Staff during the year is as follows:

1.	Officer's (Nill)	Tk. 0
2.	Staff (5 persons)	Tk. 30,50,000.00
	Total	Tk. 30,50,000.00

D) Gratuity payment

1.	Officer (5 persons)	Tk. 2,42,51,921.00
2.	Staff (7 persons)	Tk. 1,64,80,026.00
	Total	Tk. 4,07,31,947.00

E) Leave Salary payment:

Leave Encashment allowed to the Officers and Staff during the year are as follows:

1.	Officer (5 persons)	Tk. 50,29,778.00
2.	Staff (9 persons)	Tk. 33,60,550.00
	Total	Tk. 83,90,328.00

F) Benevolent Fund

1.	Officers & Staff (18 persons)	Tk. 2,07,000.00
2.	Burial shroud allowance (01 person)	Tk. 15,000.00
	Total	Tk. 2,22,000.00

12. Income tax

Salary statement provided to the Officers and Staff for payment of Income tax during the year.

BARC Personnel

Annexure – I

Bangladesh Agricultural Research Council (BARC)
Farmgate, Dhaka-215
www.barc.gov.bd

SL	Name	Designation	Office	Phone (Office)	Email
1.	Dr. Shaikh Mohammad Bokhtiar	Executive Chairman	Executive Chairman's Office	02-41025252	ec.barc@barc.gov.bd
2.	Dr. Nazmun Nahar Karim	Member Director (C.C.)	Livestock Division	02-222242629	nazmun.karim@barc.gov.bd
3.	Dr. Md. Abdus Salam	Member Director (R.C.)	Crops Division	02-222242626	md.crops@barc.gov.bd masalamss@yahoo.com
4.	Dr. Md. Abdus Salam	Member Director (C.C.)	Planning and Evaluation Division	02-222242648	ma.salam@barc.gov.bd
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7.	Dr. Md. Baktear Hossain	Member Director (R.C.)	NRM Division	222242626	md.nrm@barc.gov.bd baktear.sac@gmail.com
8.	-	Member Director	Fisheries Division	-	-
9.	Ajit Kumar Chakraborty	Director	Finance Unit	02-41025251	dir.finance@barc.gov.bd
10.	Dr. Md. Baktear Hossain	Director	Training & Manpower Unit	02-41025276	m.baktear@barc.gov.bd
11.	Dr. Kabir Uddin Ahmed	Director	Agricultural Information Centre	02-41025257	dir.aic@barc.gov.bd kabir@barc.gov.bd
12.	Md. Abdul Mottakin	Director & Focal Point of National Integrity Strategy	Support Service Unit	02-41025253	a.mottakin@barc.gov.bd
13.	Hasan Md. Hamidur Rahman	Director & Focal Point of E-governance	Computer and GIS Unit	02-41025258	h.rahman@barc.gov.bd
14.	Dr. Md. Harunur Rashid	Director, PIU-BARC, NATP-2	PIU-BARC	02-41025271	directornatpbarc@gmail.com
15.	Dr. Mohammad Rafiqul Islam	Director	Nutrition Unit	02-222242624	dir.nutrition@barc.gov.bd
16.	-	Director	TTMU	02-41025266	-

SL	Name	Designation	Office	Phone (Office)	Email
17.	Dr. Shah Md. Monir Hossain	Chief Scientific Officer	Crops Division	02-41025270	monirmsmh@yahoo.com
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19.	Dr. Susmita Das	Principal Documentation Officer	Agricultural Information Centre	02-41025259	susmitabar@gmail.com s.das@barc.gov.bd
20.	Dr. Suraya Parvin	Principal Scientific Officer & Focal Point of APA	TTMU	02-41025280	s.parvin@barc.gov.bd parvin.su1980@gmail.com
21.	Hasan Mahmud	Senior System Analyst	Computer and GIS Unit	02-41025255	hasan.mahmud@barc.gov.bd
22.	Dr. Md. Ashraf Alam	Principal Scientific Officer	Planning and Evaluation Division	02-41025277	ashrafuw@yahoo.com
23.	Dr. Md Golam Mahboob	Principal Scientific Officer	Forestry Unit	02-41025760	golam.mahboob@barc.gov.bd
24.	Dr. Md. Mahfuz Alam	Principal Scientific Officer	Crops Division	02-41025286	mahfuz.alam@barc.gov.bd mahfuzbari@gmail.com
25.	Dr. A B M Khaldun	Principal Scientific Officer	Planning and Evaluation Division	02-41025275	abm.khaldun@barc.gov.bd
26.	Dr. Ali Akbar Bhuiyan	Principal Scientific Officer	Livestock Division	02-222242640	aab_bau@barc.gov.bd
27.	Dr. Faridul Alam	Principal Scientific Officer	Soil Unit	02-41025274	farid443@barc.gov.bd
28.	Dr. Abul Fatta Mohammad Tariqul Islam	Principal Scientific Officer	Agricultural Engineering Unit	02-222242653	tariqul.islam@barc.gov.bd
29.	Dr. Md. Ashraf Alam	Principal Scientific Officer	Agricultural Engineering Unit	02-41025269	a.alam@barc.gov.bd
30.	Dr. Md: Abdus Salam	Principal Scientific Officer	AERS Division	02-41025272	abdus.salam@barc.gov.bd
31.	Dr. Zakiah Rahman Moni	Principal Scientific Officer	Nutrition Unit	58157492	zakiah@barc.gov.bd zrmoni@yahoo.com
32.	Md. Al Mobasher Hussen	Principal Training Officer & Focal Point of Citizen Charter	Training Unit	58151798	mobasher1973@gmail.com
33.	Dr. Md. Rezwan Molla	Principal Scientific Officer	Crops Division	-	rezwan.molla@barc.gov.bd rezwanbt@gmail.com

SL	Name	Designation	Office	Phone (Office)	Email
34.	Dr. Md. Jamal Uddin	Principal Scientific Officer	Crops Division	02-223314573	jamal.uddin@barc.gov.bd
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38.	Mohammad Mahbul Hassan	Deputy Director (Establishment) & Focal Point of GRS	Support Service	02-22242663	m.hassan@barc.gov.bd
39.	Md. Daloar Hossain	Deputy Director (Accounts)	Finance Unit	02-22242635	d.hossain@barc.gov.bd
40.	Md. Hanif	System Analyst	Computer and GIS Unit	02-41025283	hanif@barc.gov.bd
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51.	Shohag Fakir	Assistant Director (Establishment)	Support Service Unit	58154916	shohag_1988@yahoo.com

SL	Name	Designation	Office	Phone (Office)	Email
52.	S. M. Mustafizur Rahman	Personal Secretary	Office of the Executive Chairman	02-41025252	mustafizur.rahman@barc.gov.bd
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55.	Mohammad Tawfiqur Rahaman	Assistant Director	Support Service Unit	02-58154915	tawfiq@barc.gov.bd
56.	MD. Nura. Alam Uzzal	Data Entry Officer	Computer and GIS Unit	-	md.uzzal@barc.gov.bd
57.	Rashedul Islam	Data Entry Officer	Computer and GIS Unit		rashedul.islam@barc.gov.bd
58.	Md. Mustafa Kamal	Data Entry Officer (CC)	Executive Chairman's Office	02-41025252	mkamal.barc@gmail.com
59.	Aysha Siddika	Assistant Director (CC) (Establishment)	Support Service Unit	41025285	siddika.barc1979@gmail.com
60.	Kazi Ghulam Azam	Assistant Director (Audit) (C.C.)	Finance Unit	-	azam.barc@gmail.com
61.	Abu Hashem Mostofa Kamal	Security Officer	Support Service Unit	41025263	mostafa.kamal@barc.gov.bd
62.	Md. Monowar Karim	Deputy Assistant Engineer (Deputation)	Engineering Section	02-41025254	monwar380@gmail.com
63.	Md. Wasiuzzaman	Junior Bibliographic Officer	Agricultural Information Centre	-	wasibarcaic@gmail.com
64.	Madhab Banik	Site Engineer	Engineering Section	02-41025254	sengr.barc@gmail.com
65.	Md. Rashedur Rahman Polash	Transport Officer	Support Service Unit	-	r.polash@barc.gov.bd

THE GOVERNING BODY
BANGLADESH AGRICULTURAL RESEARCH COUNCIL (BARC)

1	Honorable Minister for Agriculture	Chairman
2	Honorable Minister for Fisheries and Livestock	Co-Chairman
3	Honorable Minister for Environment, Forests and Climate Change	Co-Chairman
4	Begum Matia Chowdhury, Parliament Member, Sherpur-2	Member
5	Mr. Abdul Mannan, Parliament Member, Bogra-1	Member
6	Secretary, Ministry of Agriculture	Member
7	Secretary, Ministry of Fisheries and Livestock	Member
8	Secretary, Ministry of Environment and Forests	Member
9	Member (Agriculture), Planning Commission	Member
10	Vice Chancellor, Bangladesh Agricultural University	Member
11	Chairman, Bangladesh Agricultural Development Corporation	Member
12	Executive Chairman, Bangladesh Agricultural Research Council	Member
13	Director General, Department of Agricultural Extension	Member
14	Director General, Bangladesh Agricultural Research Institute	Member
15	Director General, Bangladesh Rice Research Institute	Member
16	Director General, Bangladesh Jute Research Institute	Member
17	Director General, Bangladesh Institute of Nuclear Agriculture	Member
18	Director General, Bangladesh Sugarcrop Research Institute	Member
19	Director General, Department of Livestock Services	Member
20	Director General, Department of Fisheries	Member
21	Joint Secretary, Finance Division, Ministry of Finance	Member
22	Joint Secretary (Discipline and Law), Ministry of Public Administration	Member
23	Chief Conservator of Forests, Forest Department	Member
24	Professor Dr. Mostafa Ali Reza Hossain, Bangladesh Agricultural University, Mymensingh	Member
25	Professor Dr. Alok Kumar Paul, Sher-E-Bangla Agricultural University, Dhaka	Member
26	Professor Dr. Haseena Khan, Dhaka University, Dhaka	Member
27	Mr. Motahar Hossain Mollah, President, Bangladesh Krishok League, Kapasia, Gazipur	Member
28	Dr. F. M Ansarey, Managing Director, ACI, Dhaka	Member
29	Dr. Muhammad Musa ED, BRAC, 65, Mohakhali, Dhaka	Member
30	Member Director (Administration & Finance), BARC	Member & Member Secretary

ANNEXURE-III**THE EXECUTIVE COUNCIL
BANGLADESH AGRICULTURAL RESEARCH COUNCIL**

1	Executive Chairman, Bangladesh Agriculture Research Council, Dhaka	Chairman
2	Director General, Bangladesh Agricultural Research Institute, Gazipur	Member
3	Director General, Bangladesh Rice Research Institute, Gazipur	Member
4	Director General, Bangladesh Jute Research Institute, Dhaka	Member
5	Director General, Bangladesh Institute of Nuclear Agriculture, Mymensingh	Member
6	Director General, Bangladesh Sugarcrop Research Institute, Ishurdi, Pabna	Member
7	Director General, Bangladesh Livestock Research Institute, Savar, Dhaka	Member
8	Director General, Bangladesh Fisheries Research Institute, Mymensingh	Member
9	Director, Bangladesh Tea Research Institute, Srimongal, Moulvibazar	Member
10	Director, Bangladesh Forest Research Institute, Chittagong	Member
11	Director General, Soil Resource Development Institute, Dhaka	Member
12	Director, Bangladesh Sericulture Research and Training Institute, Rajshahi	Member
13	Executive Director, Cotton Development Board, Dhaka	Member
14	Executive Director, Krishi Gobeshona Foundation, Dhaka	Member
15	Member Director (Crops), BARC	Member
16	Member Director (Planning and Evaluation), BARC	Member
17	Member Director (Natural Resources Management), BARC	Member
18	Member Director (Agricultural Economics and Rural Sociology), BARC	Member
19	Member Director (Livestock), BARC	Member
20	Member Director (Fisheries), BARC	Member
21	Member Director (Administration and Finance), BARC	Member Secretary







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