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# South Asia Biosafety Program

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BANGLADESH

## Webinar on Genome Editing in Agriculture: Potential Opportunities and Way Forward in Bangladesh

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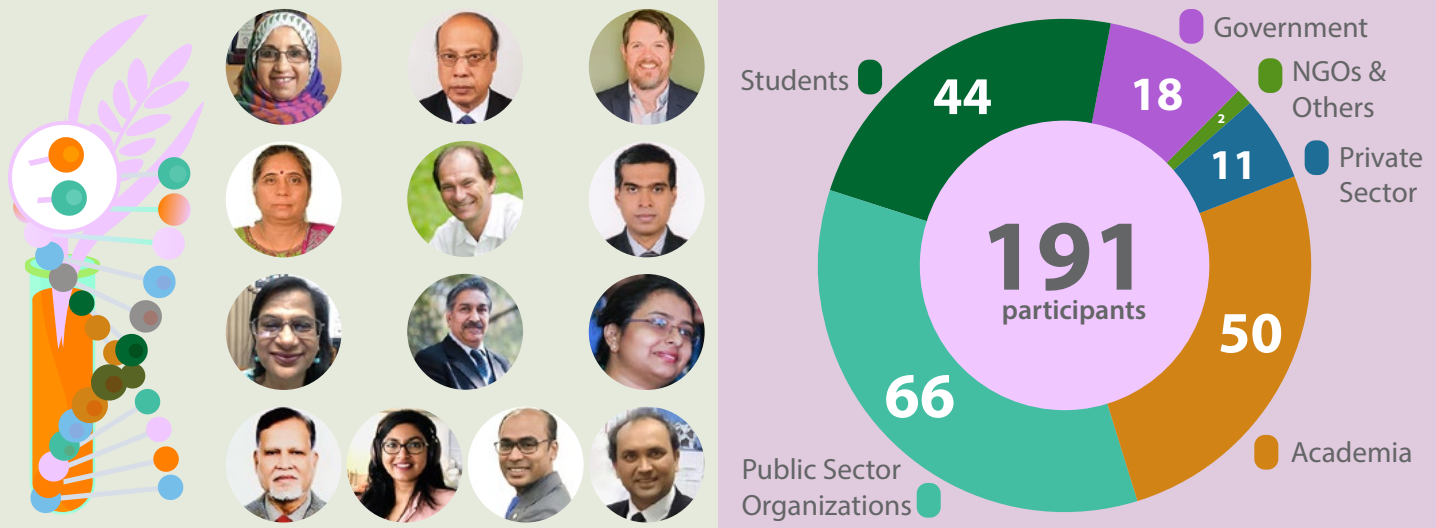


*Speaker photos and breakdown of participants at the webinar on Genome Editing in Agriculture: Potential Opportunities and Way Forward in Bangladesh (October 4, 2021).*

In recent years, genome editing has emerged as a novel tool for crop improvement, as it enables both precise and efficient modification of a plant's genome. The Nobel Prize in chemistry in 2020 was awarded to inventors of the CRISPR/Cas9 genome editing technology, i.e., Dr. Emmanuelle Charpentier from France and Dr. Jennifer Doudna from the USA. CRISPR/Cas9 and other genome editing techniques are currently being used extensively all over the world to incorporate desirable traits in different crops, including cereals, pulses, oilseeds, fruits, and vegetables. Translating these research initiatives into products requires enabling policies. Under this context, a webinar entitled *Genome Editing in Agriculture: Potential Opportunities and Way Forward in Bangladesh* was organized by the Bangladesh Academy of Sciences (BAS), South Asia Biosafety Program (SABP), Agriculture & Food Systems Institute (AFSI), and Biotech Consortium India Limited (BCIL) on October 4, 2021 via the Zoom platform. This webinar was a knowledge-sharing initiative focused on developments in gene editing and the need for enabling policies in Bangladesh, so as to make use of this new technology in order to meet the urgent need for improved crops. Dr. Vibha Ahuja, Chief General Manager, BCIL & Senior Advisor, SABP, moderated the webinar. About 150 BAS Fellows, scientists, researchers, and faculty members participated in the webinar.

**This webinar was a knowledge-sharing initiative focused on developments in gene editing and the need for enabling policies in Bangladesh, so as to make use of this new technology in order to meet the urgent need for improved crops.**

At the beginning, Dr. Ahuja expressed greetings to all participants and welcomed them to the webinar. She started out by introducing, Prof. Haseena Khan, Secretary, BAS, who has many scientific accolades and an excellent academic and professional career.

Prof. Dr Haseena Khan, spoke about the history, establishment, and contributions of BAS and briefly mentioned how gene editing technology can be a game changer. Emeritus Professor Dr. A. K. Azad Chowdhury, President, BAS emphasized the importance and possibilities of various genome editing technologies, especially CRISPR/Cas9, in cures of some deadly diseases like cancer, Alzheimer's, or aging. In addition, he addressed the dire need for improvement of crops in view of the growing population, consumer demand, and climate change.

Dr. Jimmy Botella, Professor, University of Queensland, gave a brief overview of genome editing technologies and their latest developments and presented some of the applications of CRISPR/Cas9 technology in the agricultural sector. He also presented his work on the development of sticky rice in just two generations and transferring yield QTLs from one variety to another. Dr. Zeba Islam Seraj, Fellow, BAS and Professor, Department of Biochemistry and Molecular Biology, University of Dhaka, who works on abiotic stress tolerance in rice, emphasized

*Continued on page 2*

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the importance of non-GMO crops for Bangladesh. She explained how one can select gene-edited plants without foreign genes, since CRISPR/Cas9 gene editing can occur *in trans*. She also presented ongoing work in her own lab, like production of a salt tolerant rice line by downregulating a transporter gene in sensitive IR29 rice. This gene has been shown to be downregulated in a salt tolerant landrace of Bangladesh, called Horkuch, under salt stress. She also mentioned that so far, plants with useful properties have been produced by down-regulating genes using CRISPR/Cas9 technology. In conclusion, she elaborated on how gene editing can be a blessing for the agricultural sector of Bangladesh.

While Dr. Bottela and Dr. Seraj discussed the applications, possibilities, and progress made in the field of crop improvement by incorporating desirable agronomic traits with the use of genome editing technology, Dr. A.B.M. Md. Khademul Islam, put emphasis on the applications of genome editing in the healthcare sector. In his presentation, diagnosis of both infectious and non-infectious disease using the CRISPR/Cas system was explained. Dr. Khademul also elaborated on the role of CRISPR in treating deadly human diseases like cardiovascular, ocular, or brain disease, cancers or tumors, and even some viral infectious diseases. He also stated that from 2012, the CRISPR/Cas system has been widely used in studying gene function in human and/or human-related traits, particularly on human development and genetic disease related aspects. Lastly, Dr. Khademul shared the possibility of using CRISPR to resurrect lost species and drew attention to the ethical concerns of genome editing in terms of fairness, safety, and religious objections.

With all these initiatives undertaken by research scientists, there are some requirements related to the regulatory oversight for releasing plants to the farmer or field level. In this regard, Dr. Andrew Roberts, Chief Executive Officer, Agriculture & Food Systems Institute, USA, gave a presentation on the requirements for releasing gene edited plants in the environment or commercially in various countries. Dr. Roberts started his presentation with a brief discussion about the Agriculture & Food Systems Institute, which is an independent non-profit organization that advances science for the public benefit. He then gave a comprehensive overview on the evolving landscape around genome editing in agriculture. In his concluding remarks, Dr. Roberts mentioned the importance of gene editing and that many countries have relaxed oversight if there are no foreign genes in the final product after editing. In the same context, Dr. K.C. Bansal, Secretary, National Academy of Agricultural Sciences, India and Former Director, National Bureau of Plant Genetic Resources, presented the recommended framework for regulating gene editing in plants in India. Dr. Bansal gave a brief introduction of new techniques used for plant breeding, such as site directed nucleases (SDN-1, SDN-2, and SDN-3), oligonucleotide directed mutagenesis (ODM), base editing (BE) and prime editing (PE), and science-based regulation. He mentioned some of the key observations of the National Academy of Agricultural Sciences regarding genome edited products. It is not necessary to regulate products obtained using SDN-1 and SDN-2 and that these should be exempted from risk assessment, as they do not carry any vector DNA and are similar to the products of spontaneous or induced mutations. In conclusion, Dr. Bansal proposed that global regulatory coordination is a must for sustainable agricultural innovation and international trade. However, no additional regulation is necessary if the products could have been generated using "conventional" methods of breeding and possess no foreign DNA.

In the panel discussion on the need for enabling policies for the use of gene editing in Bangladesh, Dr. Mirza Hasanuzzaman, Professor, Sher-e-Bangla Agricultural University and Fellow, BAS, talked about how climate change is affecting Bangladesh with increases in environmental stresses like salinity, drought, and high temperature and that it has become imperative to develop climate resilient crop varieties. As stress tolerance involves multigenic traits, genome editing could be a potential tool. Dr. Mirza expressed his opinion that there should be proper guidelines and sustainable use of genome editing technology for implementation and commercialization of products for which research is underway in Bangladesh.

A wealth of genomic data is available due to advances in genome sequencing technology. These data can be coupled with the tools used by plant breeders to achieve the desired goals. In this context, Dr. Tahmina Islam, Assistant Professor, University of Dhaka, shared her views about the importance of sequencing data and stated that without proper information about gene sequences and exact locations, it will be quite impossible to do precise gene editing for crop improvement. She also mentioned the time consuming and non-precise nature of traditional breeding or mutation breeding.

Bangladeshi scientists are working to improve crop quality using genome editing technology. However, there is no regulatory framework regarding this. Dr. Aparna Islam, Professor, BRAC University, shared her valuable thoughts regarding this problem during the panel discussion. Dr. Islam mentioned that the first protocol regarding biosafety in Bangladesh came in 1999, which was updated in 2008, and also talked about the Cartagena Protocol on Biosafety, which Bangladesh signed in 2000, and some other protocols. She added that SDN-1 and SDN-2 cannot be distinguished from mutation breeding and conventional breeding since there is no insertion of novel genes, so according to the existing protocol, these should not be considered as transgenic or GMO and should have no restraints from commercialization.

**In his closing remarks, Dr. Zahurul Karim, Vice President, BAS stated that genome editing is undoubtedly a revolutionary approach, which can be used in improvement of crops, restoring biodiversity, screening, and diagnosing diseases and last but not least, in treatment for some deadly diseases.**

Dr. Md. Tofazzal Islam, Professor, BSMRAU and Fellow, BAS, stated that Bangladesh agriculture is aimed at achieving food and nutritional security of the increasing population of this country. However, this has become difficult more than ever due to the increasing threat of climate change and over-usage of cultivable lands. So, in this context, genome editing technology, especially CRISPR/Cas methods, which are evolving very fast since their discovery in 2012, can be of great help. Dr. Tofazzal also suggested that more and more biochemists and molecular biologists should be trained to work with genome editing technology to keep pace with the fast evolvement of these tools and use their expertise not only in sustainable agricultural development, but also in creating biodiversity.

In his closing remarks, Dr. Zahurul Karim, Vice President, BAS stated that genome editing is undoubtedly a revolutionary approach, which can be used in improvement of crops, restoring biodiversity, screening, and diagnosing diseases and last but not least, in treatment for some deadly diseases. However, for inviting those systems to Bangladesh, there needs to be a proper regulatory system. He also suggested forming regional regulatory and global regulatory coordination systems, which can help present the views of scientists to policy makers and can undertake capacity building initiatives in countries that are lagging behind in genome editing technology.

**VIDEO**

**A recording of the webinar can be accessed at:**

**https://foodsystems.org/event/ge-ag-bangladesh-2021/**

BANGLADESH

# Progress Review Meeting of the Biosafety Research in Bangladesh Grants Program (BRBGP) 2019 and 2020

Sium Ahmed, South Asia Biosafety Program

*Panel members and awardees at the Biosafety Research in Bangladesh Grants Program (BRBGP) progress review meetings (October 5 and 7, 2021).*

The Biosafety Research in Bangladesh Grants Program (BRBGP) was established to support science-based biosafety decision-making in Bangladesh. With support from the USAID mission in Dhaka, this program funds research that builds local knowledge and establishes baseline data needed to support comparative assessments for agricultural biotechnology, which is the core of risk assessment in biosafety. This grant program was launched in 2019. In the first year, three scientists received the grant. Among them, two received one-year extensions due to the pandemic while one has successfully completed the project. In 2020, two scientists received the grant, and their research is being conducted during this unique time. For the four ongoing projects from 2019 and 2020, the South Asia Biosafety Program (SABP) arranged individualized virtual meetings to discuss the progress, challenges, and way forward for their research activities. The meetings were facilitated by Dr. Andrew F. Roberts, Chief Executive Officer, Agriculture and Food Systems Institute (AFSI). Dr. Joe Smith, President, International Society for Biosafety Research (ISBR) and Dr. Joerg Romeis, Head of the Biosafety Research Group, Agroscope, were present at the meetings to review the progress of the projects as advisors of BRBGP. Dr. Aparna Islam, Professor, Brac University was present as an expert, and Mr. Sium Ahmed, SABP, was also present. The meetings took place on October 5 and 7, 2021.

**With support from the USAID mission in Dhaka, this program funds research that builds local knowledge and establishes baseline data needed to support comparative assessments for agricultural biotechnology, which is the core of risk assessment in biosafety.**

Each meeting aimed to review the progress achieved thus far and the way forward. If any modifications were needed to generate valuable data for biosafety assessment, then they were also discussed during the meetings. The first session of the first day started with BRBGP-2019 grant recipient, Dr. Abdun Noor Muhammad Iftekhar Alam, Senior Scientific Officer, National Institute of Biotechnology, who briefed the panel about his project "*Assessment of Weed Management Practices in Rice Cultivation in Bangladesh.*" Dr. Alam discussed the progress on his survey in different agro-ecological zones of Bangladesh and findings on the use of herbicides and some herbicide-tolerant weeds. The panel shared their suggestions for some analysis to relate the collected data with biosafety.

In the second session, Prof. Dr. Md. Shahidul Haque, Bangladesh Agricultural University, discussed the progress of his project "*Vegetable Pest Management Practices in Bangladesh and Their Impacts on the Environment.*" Professor Haque reported findings on the commonly applied pest management practices and pesticide usage in summer and winter vegetables. He also shared results on the detection of pesticide residues in soil and vegetables.

In the first session of the second day, BRBGP-2020 grant recipient, Dr. Abu Shamim Mohammad Nahiyan, Principal Scientist, Advanced Seed Research and Biotech Centre (ASRBC), discussed the progress of his project "*Study on Fertilizer Management and Agricultural Practices of Potato Cultivation in Bangladesh.*" The presentation delineated findings on the status, crop management practices, fertilizer uses, and effect of current practices on the surrounding ecosystems of potato cultivation.

In the second session, Prof. Dr. Md. Fuad Mondal, Sylhet Agricultural University, shared updates from his project on "*Insect Pest Management Practices and Biosafety Status of Country Bean in Bangladesh.*" Professor Mondal discussed the current insect pest status and the management practices that have been found in his study. He also reported on various country bean varieties and the diversity of their major pests, which have led farmers to apply multiple pesticides. The panel suggested that he summarize the pesticide-related information along with the biological controls that may be present as alternative methods.

After reviewing the progress, the panel agreed that all the projects have progressed significantly since their inception. The data and results collected thus far have value and will be useful to biosafety practitioners in Bangladesh. The experts in the panel observed that the projects are well aligned with the objectives and expressed their interest in seeing the final results. To take the projects further, the panel suggested ideas and information that will aid in the successful completion of the projects.

Though there were challenges due to the pandemic, as strict restrictions and lockdowns were in place throughout the year, the scientists tried their best to conduct the research activities. The challenges ranged from not being able to collect the data in the field, seasonal barriers, and delay in data analysis. The scientists expressed their strong determination to successfully complete the projects and share the final outcomes with the global community. The BRBGP board also committed to keep in close contact with the researchers to support the successful completion of their work.

Finally, the scientists were notified about the upcoming ISBR Symposium, which is a vital forum for key players in the fields of biotechnology and biosafety around the world to promote best-practice science and regulation in a sustainable manner. The PIs were encouraged to submit their abstracts for poster or oral presentations so that they can share their findings with the global audiences at the symposium.

# Fast Forward Breeding and Rapid Delivery Systems to Win the Race of Food and Nutrition Security

Nilesh Mishra, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

"Slow and steady wins the race" is the story we all would have heard and inculcated in our learnings. However, in the context of climate change, sustainable agriculture, and food and nutrition security, the world needs a different approach than following the literal meaning of the phrase. Let us understand this with another example. India's performance in the recently concluded Tokyo Olympics was historic in over four decades. The credit goes to our star performers, who were efficient and faster than their counterparts to clinch several medals, and to the enabling environment. So, be it the Olympics or attainment of food and nutrition security, holistic support together with a faster and more efficient approach is the need of the hour, especially when the world is racing against time and a burgeoning population. For a food and nutrition secure world, there is a need to reengineer and accelerate our approach across all the dimensions of crop improvement programs.

**A group of researchers [...] have proposed a concept and roadmap to fast-forward breeding for accelerated crop improvement and rapid delivery systems, for a food-secure world.**

Against this backdrop, a group of researchers from India, Australia, Austria, China, Mexico, and the United Kingdom have proposed a concept and roadmap to fast-forward breeding for accelerated crop improvement and rapid delivery systems, for a food-secure world. These recommendations were recently published in two articles, "Fast-Forward Breeding for a Food-Secure World" in *Trends in Genetics*, a Cell Press journal, and "Rapid Delivery Systems for Future Food Security" in *Nature Biotechnology*.

These two articles propose and advocate development of improved varieties in a faster manner using a fast-forward breeding framework and establishing a strengthened system for rapid delivery of improved crop varieties in the hands of smallholder farmers in the developing world.

The authors of these papers also envision that the fast-forward breeding framework will provide a comprehensive strategy for deploying advanced tools and technologies like crop genome sequencing, phenotyping, and systems biology, together with efficient trait mapping procedures for accurate genomic prediction by integrating machine learning and artificial intelligence. In addition, adoption of strengthened seed input supply systems, robust digital infrastructure, and new production and harvesting technologies would generate increased incomes for farmers and deliver better products to consumers. This would lead to establishing rapid delivery systems into global farming practices, which is required to achieve sustainable food security in the developing world.

These papers are outputs of the joint workshop of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the University of Western Australia, which was held in Perth in 2019. "In this workshop, we had very productive brainstorming with colleagues from several organizations and subsequently, we worked with them to present the concept of 'Fast-Forward Breeding' and 'Rapid Delivery Systems for Future Food Security'", says Dr. Rajeev K. Varshney, Research Program Director–Accelerated Crop Improvement, ICRISAT and Adjunct Professor, Murdoch University. "I am sure these concepts will pave the way for accelerating global scientific efforts towards a food secure world," added Dr. Varshney, who also introduced several other novel concepts like genomics-assisted breeding (GAB), GAB 2.0, 5Gs for crop genetic improvement, Super-Pangenome, etc., which have been true to their expectations of advancing science and development and delivery of improved crop varieties in record time.

*References*

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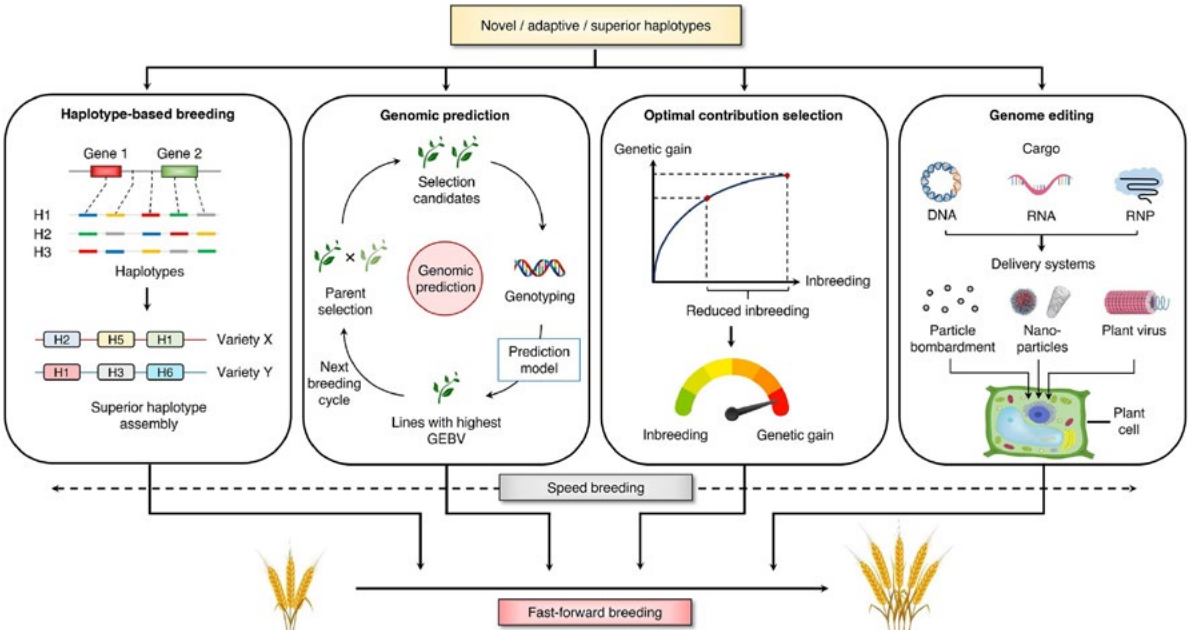
Varshney RK*, Bohra A, Roorkiwal M, Barmukh R, Cowling WA, Chitikineni A, Lam HM, Hickey LT, Croser J, Edwards D, Farooq M, Crossa J, Weckwerth W, Millar H, Kumar A, Bevan MW, Siddique, KHM (2021) Rapid delivery systems for a food-secure future. Nature Biotechnology 39:1179–1181 https://doi.org/10.1038/s41587-021-01079-z




*Rapid, precise, and targeted manipulation of important plant traits is crucial for delivering new cultivars. Haplotype-based breeding and genomic editing approaches rely on a set of significant genes, whereas breeding methods such as genomic selection use genome-wide marker information rather than* a priori *gene-trait associations. Genomic selection is likely to reduce the genetic diversity of a breeding program in the long-term. Hence, maintaining genetic diversity in breeding programs will be crucial for sustaining genetic gains from breeding innovations. Integrating optimal selection contributions with these approaches may help retain genetic diversity while improving genetic gains. (Varshney et al. 2021, Trends in Genetics © 2021, Elsevier | reproduced under the Creative Commons CC-BY license)*

INDIA

# Training on Biosecurity and Biosafety: Diagnostics, Phytosanitary Treatments, and Issues – A Training Program by the ICAR-National Bureau of Plant Genetic Resources, New Delhi

Dr. V. Celia Chalam, Head, Division of Plant Quarantine, ICAR-NBPGR & PI of the DBT Project "National Programme for Quarantine and GM Diagnostics of Genetically Engineered Plant Material", Component 1

*Resource persons for the Training on Biosecurity and Biosafety: Diagnostics, Phytosanitary Treatments, and Issues (September 15-24, 2021)*

The training on *Biosecurity and Biosafety: Diagnostics, Phytosanitary Treatments and Issues* was organized from September 15-24, 2021 at the ICAR-National Bureau of Plant Genetic Resources (NBPGR) in virtual format under the DBT-funded project "National Programme for Quarantine and GM Diagnostics of Genetically Engineered Plant Material" operational at ICAR-NBPGR especially for the researchers from ICAR institutes, State Agricultural Universities, private sector, and plant quarantine officials from the Directorate of Plant Protection, Quarantine and Storage (DPPQS). One of the objectives of this project is to train human resources in the area of biosecurity/biosafety issues related to Genetically Engineered plants.

The training course was attended by 80 participants (27 from ICAR institutes, 31 from SAUs, 14 from the private sector, and 8 from DPPQS) from different parts of the country representing all Indian states except Punjab. The training was inaugurated by Dr. Pranjib K. Chakrabarty, Member, ASRB and former ADG (PP&B), which was followed by the inaugural lecture by Dr. Ashok Kumar, Director, ICAR-NBPGR giving an overview of PGR management at ICAR-NBPGR.

The training was conducted by 21 in-house faculty from ICAR-NBPGR belonging to the Division of Plant Quarantine, Division of Genomic Resources, Germplasm Exchange & Policy Unit and DBT project staff. In addition, there were 16 guest faculty from DPPQS, DBT, MoEF&CC, BCIL, CFTRI/FSSAI, ICAR, ICAR-IARI, ICAR-NCIPM, ICAR-NBAIR, SABC, Mahyco, and Syngenta.

The course curriculum included both lectures and practical exercises conducted through videos to give the trainees a good idea of the various techniques used for diagnostics for different pests and GMOs, phytosanitary treatments, and policy issues. Also, two virtual visits were conducted for the National Containment Facility at ICAR-NBPGR and Phytotron Facility at ICAR-IARI. The topics covered included: biosecurity and biosafety concepts and international framework, national plant quarantine set-up for bulk imports, exchange procedures for germplasm including transgenics, detection and identification of insects, mites, plant pathogenic fungi, bacteria, viruses, nematodes and weeds in quarantine, phytosanitary treatments for disinfestation and disinfection, post-entry quarantine regulations in India, concepts and methodology for pest risk analysis, status of agricultural biotechnology in India, biosafety regulatory framework for GE plants, Cartagena Protocol on Biosafety and risk assessment for GMOs/LMOs including laboratory practices for GMOs, biosafety issues and concerns related to field trials/release of GM crops, policy issues related to new emerging technologies *viz.* CRISPR, case studies on gene editing of banana and surveillance and early warning of fall army worm, DNA-based diagnostics of GMOs and information sharing and biosafety clearing house mechanism, management practices for containment facility green house and strategies and challenges in plant protection and biosafety, and surveillance, monitoring, and identification of pest-free areas. The trainees were given both a pre-training and post-training evaluation quiz and a substantial improvement was seen in their knowledge post-training.

**The course curriculum included both lectures and practical exercises conducted through videos to give the trainees a good idea of the various techniques used for diagnostics for different pests and GMOs, phytosanitary treatments, and policy issues.**

The training was concluded with a Valedictory Session with Dr. SC Dubey, ADG (PP&B), ICAR as Chief Guest, in which Dr. Ashok Kumar, Director, ICAR-NBPGR delivered welcome remarks. The course director, Dr. V. Celia Chalam presented a brief about the training program and the trainees gave feedback for the training. The trainees were given certificates online. In his address, Dr. Dubey emphasised the importance of such trainings and their role in awareness generation among stakeholders. The vote of thanks was proposed by Dr. Kavita Gupta, convenor of the training.

## CALENDAR OF EVENTS

| EVENT | ORGANIZED BY | DATE | WEBSITE |
|---|---|---|---|
| **INDIA** | | | |
| XV Agricultural Science Congress–Energy and Agriculture: Challenges in the 21st Century | National Academy of Agricultural Sciences and Institute of Agricultural Sciences, Banaras Hindu University | November 13-16, 2021 Varanasi, Uttar Pradesh | http://www.rvskvv.net/images/Agricultural-Science-Congress-Brochure_27.10.21.pdf |
| National Symposium–Achieving Sustainability in Crop Production through Alimentation and Plant Protection | Vasantrao Naik Marathwada Krishi Vidyapeeth and Indian Phyto Pathological Society | November 17-18, 2021 Latur, Maharashtra | https://www.vnmkv.ac.in |
| 9th Indian Horticulture Congress-2021: Horticulture for Health, Livelihoods, and Economy | Indian Academy of Horticultural Sciences and Chandra Shekhar Azad University of Agriculture and Technology | November 18-21, 2021 Kanpur | https://csauk.ac.in/9th-indian-horticulture-congress-from-18-21-november-2021 |
| International Potato e-Conference: New Paradigms in Food Security and Industrial Application | ICAR-Central Potato Research Institute, Shimla | November 23-26, 2021 Shimla | https://cpri.icar.gov.in |
| 5th International Agronomy Congress on Agri-Innovations to Combat Food and Nutrition Challenges | Indian Society of Agronomy | November 23-27, 2021 Hyderabad | https://isa-india.in |
| Golden Jubilee International Conference-Global Perspectives in Crop Protection for Food Security | Tamil Nadu Agricultural University | December 8-10, 2021 Coimbatore | https://tnau.ac.in |
| International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship, and Environment (ICVEG-21) | Indian Society of Vegetable Sciences, Varanasi | December 14-16, 2021 Varanasi (in person and online) | https://icveg21.isvs.org.in |
| International Conference on Harnessing the Potential of Finger Millet for Achieving Food and Nutritional Security: Challenges and Prospects (ICFM-2022) | University of Agricultural Sciences, Bangalore | January 19-22, 2022 V.C. Farm, Mandya | https://www.millets.res.in http://uasb-icfm2022.in https://www.uasbangalore.edu.in |
| **INTERNATIONAL** | | | |
| 24th Meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice \| 3rd Meeting of the Subsidiary Body on Implementation \| 3rd Meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework | The Secretariat of the Convention on Biological Diversity (SCBD) | January 12-28, 2022 Geneva, Switzerland | https://www.cbd.int/meetings/?thm=CPB |

SOUTH ASIA BIOSAFETY PROGRAM

**The South Asia Biosafety Program (SABP)** is an international development program implemented in India and Bangladesh with support from the United States Agency for International Development (USAID). SABP aims to work with national governmental agencies and other public sector partners to facilitate the implementation of transparent, efficient, and responsive regulatory frameworks for products of modern biotechnology that meet national goals as regards the safety of novel foods and feeds, and environmental protection.

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