

South Asia Biosafety Program

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INDIA

Environmental Risk Assessment Workshop on Non-Target Organism in Ames, Iowa Organized by the Agriculture & Food Systems Institute

Dr. Y.G. Prasad, Director, ICAR-Central Institute for Cotton Research (CICR)



Participants and faculty at the Environmental Risk Assessment (ERA) Workshop on Non-Target Organism Testing (26 June 2023)

The author of this article, Dr. Y.G. Prasad, was nominated by Biotech Consortium India Ltd. (BCIL) to participate in the "Environmental Risk Assessment (ERA) Workshop: Non-Target Organism Testing," organized on 26-30 June 2023 in Ames, Iowa by the Agriculture Food Systems Institute (AFSI).

The training workshop was attended by 13 participants from Ghana, India, Indonesia, Malawi, Nigeria, Philippines, and Vietnam. Apart from Dr. Prasad, another workshop participant from India was Dr. Chandish Ballal, former Director of the ICAR-National Bureau of Agriculturally Important Insect Resources (NBAIR).

The focus of the workshop was on non-target organism (NTO) testing. NTOs are organisms such as honey bee pollinators and ladybird beetle predators feeding on genetically modified (GM) crops. The workshop included meticulously planned hands-on activities both in the

laboratory and field, along with presentations from experts in the field of ecological safety and regulatory assessment of GM crops.

The concept of tiered testing, including lab, semi-field, and field testing, was introduced. Practical sessions dwelled on GM cry protein stability, homogeneity, and equivalence between bacterially produced

and plant expressed cry toxin, and standardized bioassay protocols for dose response studies against target lepidopteran insect pests and non-target organisms. Data interpretation of results and implications was discussed. The main takeaway was the use of surrogate NTOs for risk assessment of GM crops

while ensuring the inclusion of functionally relevant NTO taxa in such measurements. The concept of using surrogate species has the potential of overcoming problems such as lack of rearing protocols, insect cultures, and standardized protocols for testing all NTOs in a given

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Participants and faculty during a field session at the workshop (27 June 2023).

region. Field assessment of the diversity of NTOs was demonstrated practically in a specially raised GM maize field with a non-GM control field. A field team from Bayer demonstrated the monitoring of NTO abundance by setting up pitfall and yellow sticky traps, followed by lab examination and identification of the NTOs trapped. Inferences based on results were discussed. The key learning was that field studies are relatively less reproducible and less reliable for decision-making in comparison to lab assessments.

Two dossiers for ERA were vetted by the participants from a regulatory perspective, which gave deep insights for informed decision-making

while processing applications for the de-regulation of GM events. A session on data portability across boundaries and different country regulatory bodies was introduced to the participants. The portability of tediously generated laboratory data appeared practical and useful for speedy assessment for obtaining regulatory clearances in another country and was quite interesting and informative.

A visit to the regulatory division of Corteva Center at Des Moines gave useful insights on protocols for ecological safety assessment, event characterization, protein toxin characteristics, allergenic information,



Participants and faculty during a field session at the workshop (27 June 2023).

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Participants and faculty during a laboratory session at the workshop (29 June 2023).

digital PCR for copy number data, etc., which are required for regulatory assessment for deregulation of GM events.

The NTO workshop brought together participants from diverse countries who shared best practices and exchanged case studies. Expert lectures on key topics included Andrew Roberts from AFSI, Rick Hellmich

from Iowa State University, Chad Boeckman and Kristine Le Roy from Corteva, and Jörg Romeis from Agroscope, Switzerland. Visits and tours of the conservatory at Reiman Gardens, Iowa Monarch butterfly conservation efforts, and Iowa State University (lab and research farm) were also organized.

INDIA

Webinar on GM Crops and Their Derivatives for the Aqua Sector

Vinod Kumar, Manager, Biotech Consortium India Limited

A webinar on “GM Crops and Their Derivatives for the Aqua Sector” was jointly organized by the Department of Fisheries, Government of Andhra Pradesh and Biotech Consortium India Limited (BCIL) on 7 July 2023, with an objective to discuss issues regarding the use of genetically modified (GM) crops and their derivatives as an alternative source of protein for the aqua sector. The deliberations of the webinar included presentations by Dr. K. Ambasankar, Principal Scientist and Acting HoD of the Nutrition, Genetics, and Biotechnology Division at the ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Chennai, and Dr. Vibha Ahuja, Chief General Manager, BCIL, followed by questions and answers with participants. The webinar was attended by various shrimp and fish feed manufacturers, progressive farmers, and state government officers.

Ms. Angeli Sudarsi, Additional Director of Fisheries, Department of Fisheries, Andhra Pradesh, welcomed the participants of the webinar and emphasized the importance of GM crops and derivatives in addressing the challenges faced by the aquaculture sector. She informed participants that Andhra Pradesh has achieved a leading position in shrimp and fish production. However, the availability of cost-effective, protein-rich aqua feed remains a major concern, with aqua feed constituting a significant portion (50 to 60 percent) of input costs. Fish meal, the primary source of protein for aqua feed, is expensive, posing a challenge for the sector.

Ms. Sudarsi highlighted the need to explore alternate sources of protein for aqua feed, including GM crops and derivatives. She acknowledged that the acceptance of GM-derived proteins might take time and expressed her opinion on the importance of creating awareness among feed manufacturers and farmers about using GM plant proteins in the sector.

Ms. Angeli Sudarsi, Additional Director of Fisheries, Department of Fisheries, Andhra Pradesh, [...] emphasized the importance of GM crops and derivatives in addressing the challenges faced by the aquaculture sector.

Dr. K. Ambasankar presented on “Plant-Based Proteins for the Aqua Sector.” He provided an overview of the aqua sector in India, with a focus on Andhra Pradesh. Dr. Ambasankar discussed the research and development efforts undertaken by ICAR-CIBA to develop protein-rich feed, including alternative protein sources, for the aqua sector. He highlighted that fishmeal is a primary component in shrimp and marine fish feed. Despite fluctuations in fish meal availability, feed production has consistently increased by 10%. Between 2010 and 2023, the consumption of shrimp feed has risen from 0.2 million metric tons (MMT) to 1.4 MMT, and fish feed consumption has increased from 0.1 MMT to 1.4 MMT in India.

Dr. Ambasankar informed participants about the use of various feed ingredients, including corn, soybean meal, canola meal, cotton seed meal, and DDGS derived from maize. The incorporation of GM crops aims to meet the growing demand for animal feed. He emphasized that plant proteins are considered more sustainable and offer consistent quality. Biotechnological tools are available to enhance specific functional nutrients in feed ingredients. Ongoing research focuses on nutrigenomics, nutritional programming, the use of GM crop-based ingredients, and the development of functional ingredients that do not compromise human food safety. Dr. Ambasankar stressed the need for modern scientific research accompanied by appropriate regulations to ensure food and nutritional security.

Dr. Vibha Ahuja delivered a presentation on “GM Crops and Derivatives: Safety and Nutritional Aspects.” Dr. Ahuja highlighted the development of GM crops for desirable traits, such as insect resistance, disease resistance, and herbicide tolerance, which have contributed to increased yields. She also discussed the use of GM soybean, canola, cotton seed meal, and DDGS derived from GM corn as animal feed, particularly

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beneficial for shrimps and fish. Dr. Ahuja informed the participants about internationally accepted methodologies for safety assessments of GM crops before cultivation and use in food and feed.

She emphasized the existence of a well-structured biosafety regulatory framework in the country, which reviews the information provided by technology developers before approving cultivation and use. She provided an overview of internationally accepted safety assessment methodologies by organizations such as Codex Alimentarius, the OECD, and the Convention on Biological Diversity.

She further highlighted that GM crops have gained widespread commercial cultivation and global trade, with an increasing number of crops and cultivation areas since their introduction. These crops are currently utilized in 71 countries for food, feed, and processing purposes. Dr. Ahuja mentioned the existing systematic regulations that cover environmental impact, human health, and food safety, which are enforced by regulatory bodies to ensure the responsible development and use of GM crops. The utilization of products derived from GM cotton was also noted. Overall, the presentation shed light on the safety and

nutritional aspects of GM crops and their derivatives, highlighting their significance in global agriculture and the existence of regulatory frameworks to ensure their safe use.

During the interaction, participants discussed various issues with the presenters, which included the use of corn-based DDGS for aquaculture, the export of soybean meal despite high demand, the impact of using GM-derived proteins on exports, certification requirements for certain countries, etc. Dr. Ambasankar clarified that there are various studies indicating that corn-based DDGS have high protein content.

However, when it comes to fiber content, both maize-based DDGS and rice/wheat-based DDGS have similar fiber content. Dr. Vibha Ahuja informed participants that preferential pricing for soybean meal to foreign countries is particularly for organic food. However, the quantity is very less.

Officials from the Department of Fisheries, Government of Andhra Pradesh, thanked the speakers and participants for knowledge sharing on a very important topic and committed to continue this interaction through in-person workshops in the future.

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Speakers at the webinar on "GM Crops and Their Derivatives for the Aqua Sector" (7 July 2023).

Third Training Workshop on the Biosafety Clearing House

Sium Ahmed, South Asia Biosafety Program

The Department of Environment (DoE), with the support of United Nations Environment Programme-Global Environment Facility (UNEP-GEF), organized the Third Training Workshop on the Biosafety Clearing House (BCH) on 21 June 2023 in the conference room of DoE, Dhaka. Dr. Farhina Ahmed, the Honorable Secretary of the Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh, graced the workshop as the Chief Guest. Dr. Abdul Hamid, the Director General of DoE, chaired the session. The BCH is an online platform for exchanging information on Living Modified Organisms (LMOs) and a key tool for facilitating the implementation of the Cartagena Protocol on Biosafety. The objective of the workshop was to enhance the capacity of the National Authorized Users (NAU) and the relevant stakeholders on the BCH in Bangladesh. Approximately 25 participants, including those from NARS Institutions, DoE, and MoEFCC, along with academic and professional experts on biosafety, received hands-on training during the workshop.

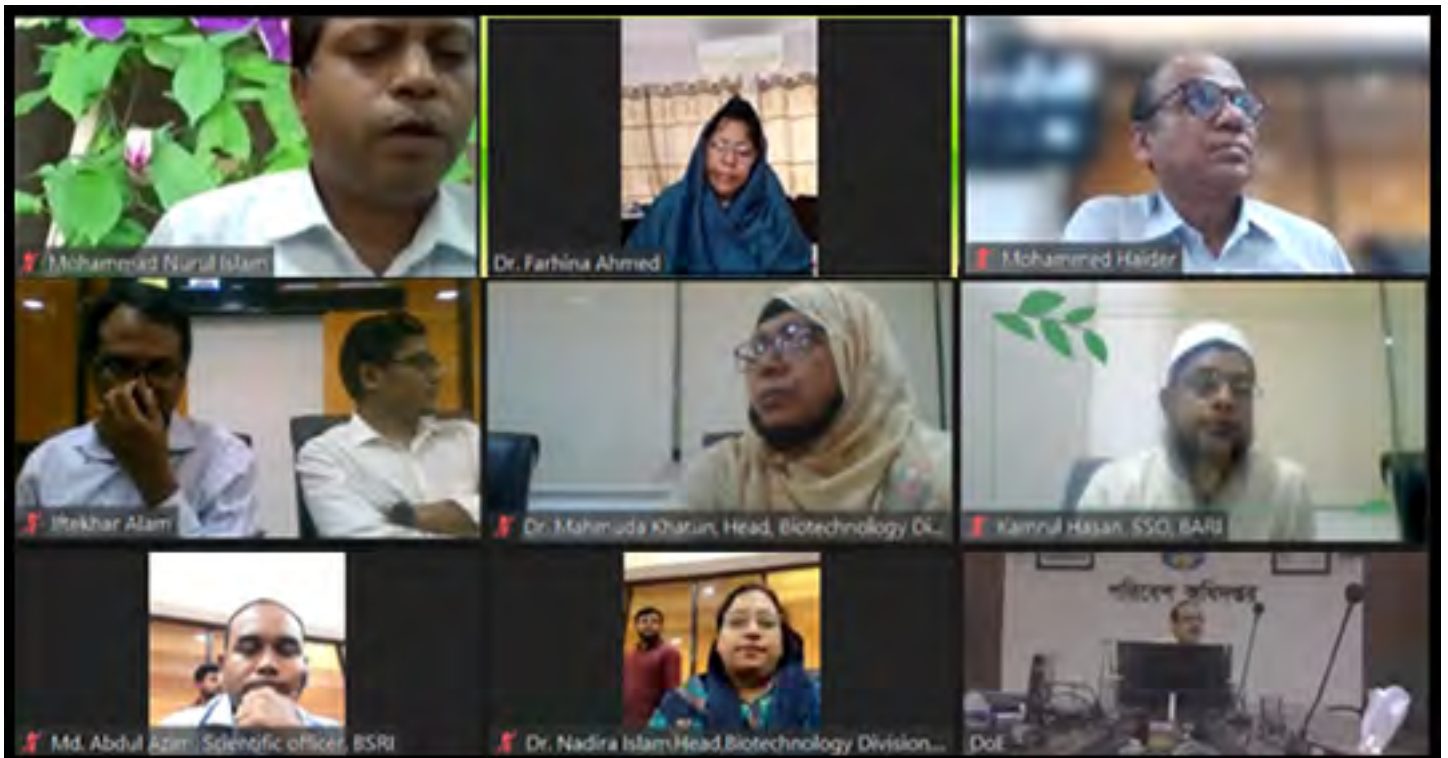
The first and second training workshops on the BCH were held on 24-26 January 2021 and 2-4 August 2022, respectively. In the first two workshops, participants were introduced to the tools and techniques of the BCH. The third workshop focused on the recapitulation of managing and retrieving information from the BCH Central Portal to the National BCH. Participants also discussed the sustainability of the BCH and how to establish effective networking among various institutes and organizations.

The workshop was facilitated by Mr. Mohammed Solaiman Haider, Director (Planning) at DoE. He welcomed all the participants and provided a short briefing about the outcomes from the past two workshops, the objectives of the third workshop, and the future implications of the learnings. He gave a brief overview of the Cartagena Protocol on Biosafety (CPB), Supplementary Protocol, and BCH. He

also demonstrated how to access the BCH central portal and explore information from it. In the second session after lunch, he explained the interconnectivity of the BCH central portal with the national BCH portal. Then, the participants engaged in searching for and submitting information to the BCH. The session was lively as participants could ask questions to the facilitator and discuss among themselves the problems and how to better solve them. The interactive session triggered discussions about the relevance of the BCH, the necessity of information sharing, which information should be shared with the BCH, compliance with international protocols, and the progress of Bangladeshi research organizations in submitting necessary information related to genetically engineered crops to the BCH national and central portal. The participants raised their concerns regarding the proper access that should be given to scientists and experts as nationally authorized users (NAUs) so that the information can be readily shared on the portal.

In the closing session of the workshop, Mr. Haider gave a brief outline of the status of the BCH and updated the honorable Secretary, MoEFCC, about the current scenario of the BCH's access, information upload, and approval system. Dr. Farhina Ahmed, the Honorable Secretary of MoEFCC, in her speech, talked about Bangladesh's progress on biodiversity and biosafety-related issues. She instructed the scientists to take full advantage of the workshop and train their colleagues so that the benefits of the learning can be utilized. The closing remarks were provided by Dr. Abdul Hamid, the DG of DoE. In his speech, Dr. Hamid thanked all the participants for their continued participation in the workshops, and he expressed his expectation that the participants and experts would now be able to effectively use the BCH and cooperate among themselves to further improve their compliance with the national commitments for the successful implementation of the CPB and other international legislations.

The interactive session triggered discussions about the relevance of the BCH, the necessity of information sharing, [...] and the progress of Bangladeshi research organizations in submitting necessary information related to genetically engineered crops to the BCH national and central portal.



Dr. Farhina Ahmed (highlighted in yellow), Honorable Secretary, Ministry of Environment, Forest and Climate Change, providing her speech as the Chief Guest during the closing session of the workshop (21 June 2023)

CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
BANGLADESH			
5 th International Conference on Biotechnology in Health and Agriculture (ICBHA)	Global Network of Bangladeshi Biotechnologists (GNOBB), Bangladesh Biosafety and Biosecurity Society (BBBS), and the Federation of Asian Biotech Associations (FABA)	1-3 September 2023	https://gnobb.org/conference
INDIA			
BIOZION 2023	Kerala Agricultural University	7-11 August 2023 Kerala	https://biozion.in/index.php
Workshop on Progress in Agricultural Biotechnology: Policies and Practices	University of Agricultural Sciences (UAS) and BCIL	18 August 2023 Dharwad	https://www.biotech.co.in
ASGC 2023: 8 th Agricultural Graduate Students Conference	Tamil Nadu Agricultural University (TNAU)	22-23 August 2023 Coimbatore	https://tnau.ac.in/site/pgschooltnau/agsc-2023/
Training Programme on Genomic Approaches for Insect Pest Management	Center for Advanced Agricultural Science and Technology (CAAST) and ICAR-Indian Agricultural Research Institute	12-22 September 2023 New Delhi	https://www.iari.res.in/bms/announcements/training.php
XVI Agricultural Science Congress and ASC Expo	National Academy of Agricultural Sciences (NAAS)	10-13 October 2023 Kochi	http://www.16asc2023.in
Asian Citrus Congress - 2023	Indian Society of Citriculture (ISC)	28-30 October 2023 Nagpur	https://accindia2023.iscindia.org.in/
International Conference on Biochemical and Biotechnological Approaches for Crop Improvement	Society for Plant Biochemistry and Biotechnology, ICAR-Indian Agricultural Research Institute (IARI), ICAR-National Institute for Plant Biotechnology (NIPB), and CSIR-National Botanical Research Institute (NBRI)	30 October-1 November 2023 New Delhi	https://www.ibbaci.org/
10 th Indian Horticulture Congress (2023): Unleashing Horticultural Potential for Self-Reliant India	Indian Academy of Horticultural Sciences (IAHS)	6-9 November 2023 Jorhat	http://www.aau.ac.in
INTERNATIONAL			
6 th International Rice Congress 2023	International Rice Research Institute and Department of Agriculture, Republic of the Philippines	16-19 October 2023 Manila, Philippines	https://www.irri.org/IRC2023-teaser.html



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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