

South Asia Biosafety Program

NEWSLETTER FOR PRIVATE CIRCULATION ONLY – NOT FOR SALE



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South Asia Biosafety Program: Year in Review - 2023

Dil Afroj Moni, Program Officer, South Asia Biosafety Program



Participants and organizers at the first activity in the workshop series with the Department of Environment, "Origins of Biosafety Internationally, the Relevant Policies and Regulations in Bangladesh, and the Necessary Regulatory Process During Each Phase of Biotechnology Research, Development, and Release" (14 July 2023).

With hope and enthusiasm, the South Asia Biosafety Program (SABP) completed another dynamic year, organizing multiple activities to help scientists and regulators make a positive impact by contributing to their scientific knowledge. Throughout the year, SABP organized meetings, trainings, and workshops with its partners and stakeholders to facilitate biosafety compliance to the regulatory framework for products of modern biotechnology in Bangladesh. SABP also undertook other initiatives to contribute to the biotechnology research community that will eventually benefit the sustainable development goals of the country.

For a long time, SABP has been instrumental in biosafety capacity building activities at public research institutes and universities to ensure proper implementation of biosafety regulatory processes. SABP designed a comprehensive workshop series on biosafety capacity building in 2022 that concluded in the year 2023. In response to the need of stakeholders, the Agriculture & Food Systems Institute (AFSI),

under the auspices of SABP, organized six workshops for the Institutional Biosafety Officers (IBOs) in collaboration with the Ministry of Agriculture (MoA), Government of the People's Republic of Bangladesh and Biotech Consortium India Limited (BCIL). This training workshop was successfully conducted, and the Concluding Session of the Institutional Biosafety Officer (IBO) Training Program was held on 25 February 2023 at Hotel Sarina, Dhaka, Bangladesh. More information about this event can be found at: foodsystems.org/event/ibo-6/

Throughout the year, SABP met with various stakeholders at different institutes and discussed capacity development needs in the areas of biosafety and biotechnology.

Twenty participants from different institutes, including the National Agriculture Research

Systems (NARS) institutes, the National Institute of Biotechnology (NIB), and universities, successfully completed this training program and received a certificate of appreciation. This IBO Training Program aimed to ensure that institutions in Bangladesh are more competent and confident, equipped with a better understanding of their obligations under the biosafety regulatory system, and empowered to work

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Guests and invitees at the MoU Signing Ceremony Between the Ministry of Science and Technology, Bangladesh and Agriculture & Food Systems Institute (26 February 2023).

with researchers to meet these obligations while conducting research involving genetically engineered plants.

Throughout the year, SABP met with various stakeholders at different institutes and discussed capacity development needs in the areas of biosafety and biotechnology. Considering an increased need to effectively implement biosafety regulations and strengthen biosafety compliance, a Memorandum of Understanding (MoU) was signed between the Ministry of Science and Technology (MoST), Government of the People's Republic of Bangladesh and AFSI to facilitate biosafety activities in areas of mutual interest, to be implemented through SABP. The signing ceremony was held on 26 February 2023, at the Multipurpose Hall of the National Science & Technology Complex in Dhaka. More information about the event can be found at: foodsystems.org/event/most-afsi-mou-2023/

The purpose of the MoU is to strengthen both policy and technical capacity within MoST to facilitate the effective implementation of a

coordinated biosafety regulatory framework for Bangladesh. The MoU also aimed for collaborative activities to improve awareness regarding products derived from agricultural biotechnology, their safety assessment, and their use in food and feed, as well as the evolving nature of ongoing research and development in Bangladesh.

2023 was also exceptional because the SABP team, awardees of Biosafety Research in Bangladesh Grants Program (BRBGP), and several scientists from Bangladesh attended the largest gathering in the biosafety community, the 16th ISBR Symposium (ISBR 2023).

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BRBGP Awardees during the Poster Session at the 16th ISBR Symposium (1 May 2023).



Dr. Abdul Hamid, the honorable Director General of the Department of Environment (DoE), delivering his speech as the Chief Guest at the second activity in the workshop series with DoE, with Dr. Andrew Roberts, Ms. Syeda Masuma Khanam, and Dr. Rakha Hari Sarker seated on stage (8 September 2023).

While many capacity development initiatives have been organized for scientists, SABP also worked with regulators to support regulatory committees and officials at the Department of Environment (DoE). In partnership with the DoE, AFSI conducted a workshop series titled “Origins of Biosafety Internationally, the Relevant Policies and Regulations in Bangladesh, and the Necessary Regulatory Process During Each Phase of Biotechnology Research, Development, and Release.” The purpose of the activities in this workshop series was to strengthen capacity on biosafety and biotechnology for the regulatory authority of Bangladesh, Biosafety Core Committee (BCC) members, and DoE experts who are involved in the biosafety regulatory system. More information about the individual workshops can be found at the links below:

- Introduction to Concepts of Biosafety and Regulator’s Responsibilities During Biotechnology Research and Development (14-15 July 2023): foodsystems.org/event/doe-sabp-biosafety-workshop-1/
- Food Safety Concepts and the Bangladesh Guidelines for Safety Assessment of Food Derived from GE Plants (8-10 September 2023): foodsystems.org/event/doe-sabp-biosafety-workshop-2/
- Environmental Safety Concepts and the Bangladesh Guidelines for Environmental Risk Assessment of GE Plants (13-14 October 2023): foodsystems.org/event/doe-sabp-biosafety-workshop-3/
- Pre-Release and Post-Release Regulation of GE Plants (17-18 November 2023): foodsystems.org/event/doe-sabp-biosafety-workshop-4/

While many capacity development initiatives have been organized for scientists, SABP also worked with regulators to support regulatory committees and officials at the Department of Environment (DoE).

The workshop series was attended by a group of young, energetic, and dedicated officials from the DoE who will eventually lead future biosafety assessments. Therefore, the workshop series emphasized diversified exercises, case studies, and discussions on biosafety concepts and risk assessment tools, which turned out to be a very significant part of the technical training. It is expected that the learnings from the workshops will create a firm foundation for participants to work efficiently while reviewing applications, with a better understanding of the concept of problem formulation and biosafety regulations in Bangladesh.

In line with various activities, SABP proudly continued publishing its monthly *SABP Newsletter* and distributed it to 1500 local and more than 29,000 international recipients. The newsletter covers SABP’s activities in South Asia and recent developments in biosafety and biotechnology. For the past 18 years, SABP has been working in good faith and with a positive attitude to facilitate the implementation of transparent, efficient, and responsive regulatory frameworks in Bangladesh. This is only possible thanks to the cooperation from stakeholders, collaborators, and team members, and we would like to take this opportunity to offer them our sincere gratitude, along with the promise to continue our work and deliver impactful programs in 2024.

Learn more about the South Asia Biosafety Program:
foodsystems.org/sabp



Group photo of participants, speakers, and organizers at the third activity in the workshop series with DoE (13 October 2023).

Annual Plant Tissue Culture and Biotechnology Conference 2023

Dr. Ishita Haider, Assistant Professor, Department of Botany, University of Barishal



Opening session of the Annual Plant Tissue Culture and Biotechnology Conference 2023 (23 December 2023)

The Annual Plant Tissue Culture and Biotechnology Conference 2023 was held at the Bangladesh Council for Scientific and Industrial Research (BCSIR), Rajshahi Laboratories, Bangladesh, on 23 December 2023. The conference was organized by the Bangladesh Association for Plant Tissue Culture and Biotechnology (BAPTC&B) and BCSIR. It was co-sponsored by the Bangladesh Climate Change Trust (BCCT). The conference was divided into an inaugural session, two scientific sessions, one poster session, and a special session in remembrance of the late Prof. Dr. Md. Imdadul Hoque, one of the founding members of BAPTC&B.

The focus of the inaugural session was the keynote presentation by Dr. Rakha Hari Sarker, Professor, University of Dhaka and Country Coordinator, South Asia Biosafety Program (SABP), entitled “Genome Editing for Crop Improvement: Opportunities and Challenges,” where he addressed the various aspects of genome editing, including the global status of research and development of genome editing, as well as

The research topics of the speakers varied from CRISPR-mediated genome editing to agricultural use of plasma technology.

regulatory aspects of genome edited products. He also highlighted the importance of research on genome editing for the improvement of crop plants in Bangladesh. The welcome address for this session was delivered by Dr. Md. Salim Khan, Director, BCSIR Rajshahi Laboratories. The Chief Guest, Professor Dr. Md. Aftab Ali Shaikh, Chairman of BCSIR, delivered a speech that motivated all the participating scientists. The session ended with a vote of thanks from the BAPTC&B General Secretary, Prof. Dr. Mohammad Nurul Islam, University of Dhaka.

Renowned scientist Prof. Dr. Md. Monzur Hossain, University of Rajshahi, chaired the first scientific session. Four scientists presented their research work in this session, including Dr. Tahmina Islam, University of Dhaka, Dr. Mousona Islam, BCSIR, Md. Rasel Rana, Islamic University, Kushtia, and Dr. Md. Abu Reza, University of Rajshahi.

The speakers fascinated the audiences with their innovative research activities. The research topics of the speakers varied from



Participants at the conference (23 December 2023).

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Opening ceremony for the poster session at the conference (23 December 2023).

CRISPR-mediated genome editing to agricultural use of plasma technology.

The poster session of the conference displayed 70 research posters from various universities and research institutes in Bangladesh. The topics for these posters were wide-ranging and innovative. The conference ended with the awards ceremony for the poster session. The best three posters were awarded the Prof. Dr. Md. Imdadul Hoque Poster Award. Md. Abdul Azim, Bangladesh Sugar Crop Research Institute (BSRI) won first place for his poster titled "Biotechnological Advancement of Different Sugar Crops in Bangladesh." Dr. Md. Ashrafal Alam, Spices Research Centre, Bangladesh Agricultural Research Institute, came in second place for pioneering work on the "Whole Genome Sequence of BARI Pia-1 (*Allium cepa*) from Bangladesh." Rifat Hossain Rafi, Department of Pharmacy, Rajshahi University, was awarded third place for his work titled "Repurposing Diclofenac Based Modulation of Antibacterial Effect of the Existing Antibiotics."

The second scientific session of the conference was chaired by Prof. Dr. Md. Shamsul Haque Prodhan of Shahjalal University of Science

and Technology, Sylhet. In this session, five scientists presented their research work, including Jeba Faiaz Rahman, Shahjalal University of Science and Technology, Sylhet, T. Azim, University of Dhaka, Md. Belal Hossain, Mawlana Bhasani Science and Technology University, Tangail, Barna Goswami, BCSIR, and Dr. Most. Ferdousi Begum, University of Rajshahi. The diverse research topics discussed by the speakers made this session scientifically stimulating. The speakers presented their works regarding abiotic stress tolerance of rice, in-vitro regeneration of medicinal plants, and green synthesis of salt nanoparticles.

The day-long Annual Plant Tissue Culture and Biotechnology Conference 2023 was not only a showcase of the latest research advancements in this field but also a propitious occasion for scientists of all ages to enhance and share their knowledge. About 150 participants attended this conference, and a total of 81 abstracts were submitted, indicating a high interest from scientists.

The poster session of the conference displayed 70 research posters from various universities and research institutes in Bangladesh.

BANGLADESH

Crop Chronicles: Unraveling Public Perceptions Surrounding Gene Editing in Agriculture

Tshering Choden, Brac University

STUDENT SHOWCASE

To encourage written discourse on topics related to biosafety and biotechnology among the younger generation, the *SABP Newsletter* dedicates space in select issues to spotlight pieces written by students residing in South Asia. Since articles with the "Student Showcase" tag are meant to reflect the actual views and capabilities of the author(s), they are not revised for content and only lightly edited to conform with the newsletter's style guide.

Suha, a young biotechnologist, posed a question to her parents about their willingness to consume or cultivate gene edited crops, receiving the expected response of "obviously no." The answer to Suha's question was foreseeable. However, what most individuals ignore is the fact that not everyone knows what gene edited crops are, and most people think genetically modified (GM) crops are the same as gene edited crops. Gene edited crops are basically the crops that have had their genes "edited." For instance, when

editing a paragraph, we either add missing words or correct the spelling and grammar, only trying to "edit" the paragraph. On the other hand, GM crops are crops that have their genes modified. To illustrate, imagine the same paragraph was given without any edits, and an individual was asked to "modify" it. That individual would try to change it by adding new information or sentences.

Gene edited crops are preferred over GM crops as gene editing techniques alter existing genetic material in ways similar to natural

Gene edited crops are preferred over GM crops as gene editing techniques alter existing genetic material in ways similar to natural mutations.

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Banana plantation in Paharpur village, Bangladesh © Matyas Rehak | Dreamstime.com

mutations, which sometimes produce advantageous results. On the other hand, GM crops introduce novel configurations of genetic materials that are often derived from other organisms (Karavolias, 2022) to confer beneficial traits. Despite the fact that gene editing has significant potential for use in agriculture, its application in everyday life has raised ethical and political concerns, as well as questions about public perception and awareness (Kokotovich and Kuzma, 2014). Therefore, it is crucial to understand the factors impacting public perception and varying public attitudes in different countries towards the use of gene editing technology in agriculture.

According to the *Cambridge Dictionary*, "knowledge is awareness, understanding, or information that has been obtained by experience or study, and that is either in a person's mind or possessed by people generally." Similarly, a lack of scientific knowledge about gene editing technology is the real problem between public perception and acceptance of gene edited crops. Using gene editing technologies, scientists have come up with a new method of increasing the quality, yield, and quantity of crops for the world's growing population; however, its application to food is still a topic of debate. In addition, evidence of what public perception is when it comes to the use of this technology in food is scarce, although it was noticed that new policy measures faced issues regarding acceptance from the public.

Different people have different levels of scientific knowledge regarding the use of gene editing technology in agricultural crops. For instance, according to a research investigation, it was observed that the public tends to consider the process used to create gene edited products and believes that gene editing is closer to gene modification, i.e., it involves DNA manipulation, so it should be considered unconventional. On the other hand, experts who have knowledge of biotechnology tend to agree with product-based regulations that consider the characteristics of the final product rather than the method used to create it. Gene editing technology is closer to conventional breeding methods as it does not introduce exogenous genes, unlike genetic modification (Kato-Nitta, 2022).

Gene editing technology is closer to conventional breeding methods as it does not introduce exogenous genes.

Moreover, based on the knowledge respondents had regarding the technology, two web-based surveys using the information deficit model found that scientific knowledge does impact their perception of it (Kato-Nitta et al., 2022). Two research questions were supposed to be answered after the surveys: i) does the attitude of the people change after they were provided with the basic knowledge of the technology? (comparison before and after the information was provided) and ii) according to the domain-specific knowledge in three groups (lay public, experts in other fields, and experts in molecular biology), how do attitudinal changes on different techniques differ (Kato-Nitta et al., 2022)?

The three groups were asked for their opinion on the benefits, risks, and values of the techniques (conventional method, genetic modification, and gene editing technology) before and after they were provided with the information regarding those techniques.

As mentioned above, two web-based surveys were conducted for three months (December to February) by Kato-Nitta et al., and the first survey was done using a sample of 3000 lay public volunteers in Japan. The lay public was not able to distinguish between genetic modification and gene editing, and according to them, these technologies had low benefits and low values, but high risks. To add, after they were provided with the information, the benefit perception increased significantly for gene editing technology in comparison to genetic modification, and though there was not a significant difference, in the case of gene editing compared to genetic modification, value perception increased and risk perception decreased.

The second survey was conducted among two groups that consisted of experts in molecular biology and experts in other fields. For the group consisting of experts in molecular biology, the benefit and value perception did not change after the information, but risk perception decreased after the information was provided. As for the perception of experts in other fields, they showed similar characteristics to the molecular biologists in value perceptions, whereas they showed characteristics similar to the lay public in risk perceptions.

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Potatoes at a market stall in Nirala, Khulna, Bangladesh. © Nazrul Islam | Dreamstime.com

Hence, scientific literacy influences attitudes or perceptions towards the technologies used for agriculture. While debating the use of technologies in agriculture, it is crucial to compare the perception of people in countries with different levels of regulation, such as the USA, Germany, and Japan. By using identical items for the animal-illustrated information and plant-illustrated information, Kato-Nitta et al. followed the empirical study and compared people's perceptions in all three countries. During the survey, each country's respondents were randomly assigned and divided into two groups. One of the groups was shown animal-illustrated information on conventional breeding, genetic modification, and gene editing, and the other was shown plant-illustrated information. As a result, it was observed that participants in the USA had the most positive attitude towards the technologies, followed by Japanese participants, who demonstrated an attitude similar to the US regarding benefit perception and an attitude similar to German participants regarding risk perceptions (Kato-Nitta et al., 2019). Moreover, the Japanese and German participants showed higher benefit perceptions when given plant-illustrated information compared to animal-illustrated. Nevertheless, in the three countries, the use of plant or animal illustration had no impact on the risk perception towards gene edited products. Also, in comparison to the Japanese and German participants, the American respondents did not differentiate between conventional and gene edited food.

From the survey results, it could be understood that even though the same information was being conveyed, the way it was conveyed, i.e., via plain text, plant illustration, or animal illustration, matters, and people's perceptions can vary among countries. Furthermore, public perception towards the use of gene editing in agriculture varies according to their scientific knowledge, the type of information conveyed, and the countries to which they belong. Summing up the surveys, it was observed that the public's perspective depended on their scientific knowledge regarding the technologies, and being able to acquire it helped in the way they perceived those technologies. In addition, depending on the country, public perception varied, as participants from the USA had a

Public perception towards the use of gene editing in agriculture varies according to their scientific knowledge, the type of information conveyed, and the countries to which they belong.

positive attitude towards gene editing technology compared to German and Japanese participants. Likewise, the use of illustrations helped the participants from Germany and Japan change certain perspectives towards gene editing technology.

Therefore, to change the perspective of the public towards gene editing technology, they should be educated about the technologies so they can avoid confusion, distinguish between GM and gene edited crops, and make judgments accordingly. Also, to increase the level of awareness regarding technologies used in agriculture, illustration-based information should be used, such as presenting either plant illustrations or animal illustrations instead of text information. Since the public's perspective is important for the use of technologies, such as gene editing in agriculture, there should be methods to help people clearly understand the benefits and risks of using these technologies. Maybe, if Suha had helped her parents become aware of the technologies used in agriculture and food production and addressed their confusion, her parents' answers might have changed.

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CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
INDIA			
45 th Annual Meeting of the Plant Tissue Culture Association (India) and Symposium on Recent Advances in Plant Biotechnology	Department of Biotechnology, Pondicherry University	23-25 January 2024 Pondicherry	https://www.pondiuni.edu.in/university_news/45th-annual-meeting-of-plant-tissue-culture-association-india-symposium-on-recent-advances-in-plant-biotechnology/
20 th Biennial International Conference on Sustainable Animal Nutrition for Global Health and Production: Innovations and Directions	Animal Nutrition Society of India	23-25 January 2024 Chennai	https://ansi.org.in/
ICAR Sponsored Winter School on Climate Smart Sugarcane Agriculture for Food and Energy Security in India	ICAR-Sugarcane Breeding Institute (SBI)	31 January-20 February 2024 Coimbatore	https://sugarcane.icar.gov.in/
National Conference on Plant Health for Food Security: Threats and Promises	ICAR-Indian Institute of Sugarcane Research, in collaboration with the Indian Phytopathological Society	1-3 February, 2024 Lucknow	https://iisr.icar.gov.in/iisr/
ISMPP 3 rd Asian Congress on Plant Pathology: Plant and Soil Health Management for a Better Tomorrow	Sardarkrushinagar Dantiwada Agricultural University and Indian Society of Mycology and Plant Pathology	7-10 February 2024 Sardarkrushinagar	http://www.sdau.edu.in/
International Conference on Reviving Ancient Grains Millets on the Global Stage (ICRAG 2023)	ICAR-Krishi Vigyan Kendra, Sri Devaraj Urs Academy of Higher Education and Research, ICAR-Agricultural Technology Application Research Institute, and College of Horticulture	8-9 February 2024 Kolar	https://icrag2023.uhsbagalkot.edu.in/
DST-SERB Sponsored Workshop on Application of Molecular and Genomic Tools for Biofortification in Crops	ICAR-Indian Agricultural Research Institute (IARI)	27-29 February 2024 New Delhi	https://www.iari.res.in/en/index.php
INTERNATIONAL			
Second Meeting of the Multidisciplinary Ad Hoc Technical Expert Group on Synthetic Biology to Support the Process for Broad and Regular Horizon Scanning, Monitoring and Assessment	CBD Secretariat	29 January-2 February 2024 Montreal, Canada	https://bch.cbd.int/protocol#tab=2
Second Meeting of the Ad Hoc Technical Expert Group on Risk Assessment	CBD Secretariat	27 February-1 March 2024 Montreal, Canada	https://bch.cbd.int/protocol#tab=2



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.



Agriculture & Food Systems Institute



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