

South Asia Biosafety Program

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INDIA

Gene Edited Rice with Improved Phosphate Uptake and Grain Yield by BRIC-NIPGR

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited



Rice field in India © Efadul Haque Efad | Dreamstime.com

Scientists from the Biotechnology Research and Innovation Council National Institute of Plant Genome Research (BRIC-NIPGR) in New Delhi developed rice lines with improved phosphate uptake and grain yield, even in low phosphate soil conditions, through gene editing. The gene-edited rice lines are expected to decrease the need for phosphate fertilizers, lower cultivation input costs, and prevent fertilizer loss into water bodies.

This is a significant breakthrough, as India imports nearly 4.5 million tonnes of Diammonium phosphate (DAP), a phosphate fertilizer used in agriculture. Rice cultivation is the largest consumer of phosphate (Pi) fertilizers, as it occupies approximately 36% of India's cultivable land. As only about 20% of the applied phosphate fertilizer is utilized by the crop, the rest becomes fixed in the soil, and, hence, there is a need for improved rice varieties for better phosphorus use efficiency.

Using CRISPR/Cas9, researchers have eliminated the repressor binding site from the promoter of OsPHO1;2, resulting in higher phosphate uptake from the soil and a 26% increase in grain yield under low phosphate conditions. The findings of the study offer promising potential for better phosphorus use efficiency and contribute to more sustainable rice farming.

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LINKS

For more information, visit:

<https://nipgr.ac.in/nipgrv2/docs/JGIRI-Write-up%20on%20PB%20paper.pdf>

Access the journal article in *Plant Biotechnology*:

<https://doi.org/10.1111/pbi.70165>

Experts from India and Bangladesh Participate in the Asia-Pacific Plant Breeding Innovation Consultation

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited



Group photo of participants at the APSA 2025 Regional Plant Breeding Innovation Consultation (8 July 2025).

The Asia and Pacific Seed Association (APSA) organized the APSA 2025 Regional Plant Breeding Innovation Consultation on 8-9 July 2025 in Kuala Lumpur, Malaysia. The consultation was organized in association with the American Seed Trade Association (ASTA), CropLife Asia, Canada Grains Council, International Seed Federation (ISF), French Interprofessional Organisation for Seeds and Plants (SEMAE), National Seed Association of Malaysia, and Mekong-US Partnership Project. Policymakers, researchers, and seed industry leaders from 14 countries across the region participated in the consultation.

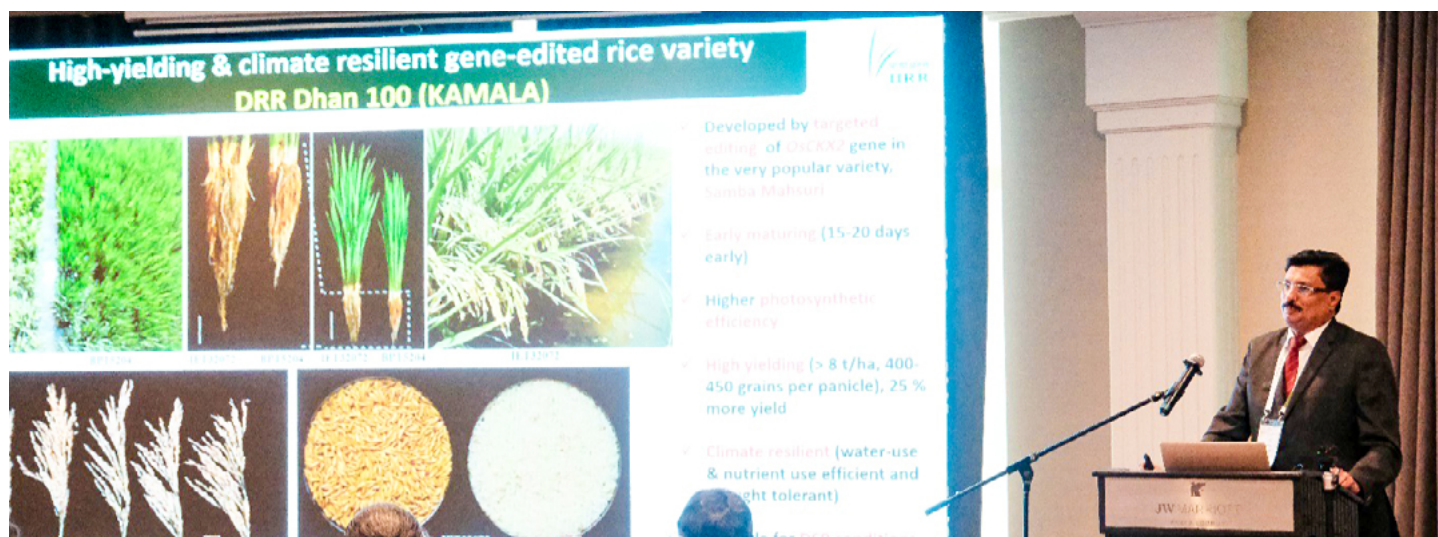
Many countries in the Asia-Pacific region have developed policies to govern the development of genome editing products, while other countries are in different stages of decision-making. The two-day consultation provided a platform for discussing global developments in genome editing and progress in the Asia-Pacific region. Eminent speakers delivered presentations on the latest developments globally. Country updates for the Asia-Pacific Region were provided by regulators and experts from Bangladesh, Cambodia, China, India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Singapore, and Vietnam. Breakout sessions were also organized to deliberate on topics such as future-proofing regulations for plant

breeding, trade facilitation, and collaborations/support needed. The key themes from the consultation were:

- Enhancing understanding of genome editing as a transformative tool for plant breeding
- Developing science-based, predictable, and innovation-friendly regulatory frameworks
- Promoting regional cooperation and cross-country knowledge exchange

Speaking about recent developments on gene editing in India, Dr. Raman Meenakshi Sundaram, Director of the ICAR-Indian Institute of Rice Research, shared a success story of two genome edited varieties released recently by the Minister of Agriculture and Farmers Welfare. He also spoke about other products in the pipeline, including enhanced phosphorus uptake even in low-phosphorus soil in rice, the enhancement of iron and zinc content in rice, improved canola quality in Indian mustard, and bananas with enhanced β -carotene content. Dr. Sundaram also shared the process of deregulation of rice varieties as per Indian regulatory requirements for gene edited plants.

Country updates for the Asia-Pacific Region were provided by regulators and experts from Bangladesh, Cambodia, China, India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Singapore, and Vietnam.



Dr. Raman Meenakshi Sundaram from the ICAR-Indian Institute of Rice Research speaking at the consultation.

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Dr. Vibha Ahuja from BCIL speaking at the consultation.

Dr. Vibha Ahuja, Chief General Manager of Biotech Consortium India Limited and Senior Advisor for the South Asia Biosafety Program (SABP), gave an update about the process of exemption of gene edited plants of SDN-1 and SDN-2 categories and spoke about the process followed by regulatory authorities in notifying this process. She highlighted the *Standard Operating Procedures for Regulatory Review of Genome Edited Plants*

under SDN-1 and SDN-2 Categories, wherein clear protocols have been provided to show that the genome edited plants are free from exogenously introduced DNA and accordingly, seek exemption from biosafety regulations. She informed attendees that research efforts in India are moving at a very fast pace, with support from the Indian Council of Agricultural Research, Department of Biotechnology, Government of India, as well as the Council of Scientific and Industrial Research.

Dr. Mohammad Kamrul Hasan, Principal Scientific Officer and Institutional Biosafety Officer for the Biotechnology Division of the Bangladesh Agricultural Research Institute (BARI), provided the country update for Bangladesh. He explained the process of deregulation of genome editing

The deliberations in the consultation clearly indicated that global regulatory approaches to plant breeding innovation are fragmented and there is an urgent need for science-based and internationally aligned frameworks.



Dr. Mohammad Kamrul Hasan from BARI speaking at the consultation.

in Bangladesh, informing the audience that in December 2023, the Ministry of Agriculture under the Government of the People's Republic of Bangladesh approved the *Standard Operating Procedures for Research and Release of Genome Edited Plants of Categories of SDN-1 and SDN-2 in Bangladesh* to facilitate the research and release of genome edited crops that meet the needs of the farmers and consumers. He indicated

that limited technical capacity and expertise are among the few challenges that need to be addressed for explaining the development of gene edited plants in Bangladesh.

The deliberations in the consultation clearly indicated that global regulatory approaches to plant breeding innovation are fragmented and there is an urgent need for science-based and internationally aligned frameworks to unlock the full potential of genome-edited crops. It was generally agreed that consultations are very important for working towards policy harmonization at regional and global levels to harness the benefits of gene editing for crop improvement.

India BioEconomy Report 2025

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited

The *India BioEconomy Report 2025* provides a comprehensive overview of advancements in biotechnology in the country. The report indicates that India's bioeconomy reached \$165.7 billion in 2024, surpassing the initial target of \$150 billion by 2025. According to the report, the sector contributes 4.25% to overall GDP. Valuable insights have been provided into the progress across key biotech sectors—BioPharma, BioIndustrial, BioAgri, and BioServices. The report states that the number of biotech startups reached 10,075 in 2024.

The report also recognizes key contributions from all sectors, with India being the world's largest vaccine producer and home to 60% of global vaccine manufacturing. Key recommendations in the report emphasize scaling up investments, strengthening private sector participation, and expanding India's biotech capabilities through strategic policy interventions. This initiative reaffirms India's commitment to integrating biotechnology into national development and fostering an innovation-driven bioeconomy.

The report can be accessed at:

https://birac.nic.in/webcontent/indian_bioeconomy_report_2025.pdf



RESOURCE

Workshop on Biotechnology Applications for Crop Improvement: Key Developments

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited



Participants at the workshop on "Biotechnology Applications for Crop Improvement: Key Developments" (22 May 2025).

Acharya Narendra Deva University of Agriculture and Technology (ANDUAT) and Biotech Consortium India Limited (BCIL) jointly organized a workshop on "Biotechnology Applications for Crop Improvement: Key Developments" on 22 May 2025 in Ayodhya, Uttar Pradesh. The event focused on biotech innovations, including genetic engineering and gene editing, for sustainable farming. More than 100 participants attended the workshop, including scientists, researchers, students, state agriculture officials, and industry representatives from Uttar Pradesh. The event was supported by the Federation of Seed Industry of India (FSII).

Dr. Sanjeet Kumar, Professor & Head, GPB, ANDUAT, welcomed the participants. Dr. Vibha Ahuja, Chief General Manager of BCIL, provided a brief introduction about the background and objectives of the workshop. The keynote address was delivered by Dr. T.R. Sharma, Former Deputy Director General–Crop Sciences at the Indian Council of Agricultural Research (ICAR), who detailed various crop improvement technologies, ranging from conventional breeding to genetic engineering and gene editing. He also spoke about various initiatives by ICAR related to the use of biotechnologies for crop improvement. Dr. Ajit Kumar Shasany,

More than 100 participants attended the workshop, including scientists, researchers, students, state agriculture officials, and industry representatives from Uttar Pradesh.

Director of the Council of Scientific and Industrial Research (CSIR) National Botanical Research Institute (NBRI), spoke about how modern technologies can help increase crop productivity and fight various pests and diseases. Dr. K.V. Raju, Economic Advisor, Hon'ble Chief Minister of Uttar Pradesh (UP), highlighted the tremendous progress made by the State of UP in recent years. He indicated that agriculture is a key pillar for growth in UP and called for collective efforts by both the public and private sectors. He shared a bold vision for agri-modernisation driven by technology and science for UP. He stressed the need for using modern technologies, including biotechnology, to achieve the growth targets.

Mr. Raghavan Sampathkumar, FSII Executive Director, delivered a presentation on GM crops, emphasizing the urgency of advancing scientific innovation and urging that it is time to embrace technologies that can help mitigate the challenges posed by climate change. He emphasized that precision biotech tools can optimize the use of agri inputs by enhancing their efficiency and ultimately strengthen the livelihoods of farmers.



Speakers and guests at the workshop on "Biotechnology Applications for Crop Improvement: Key Developments" (22 May 2025).

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The presentation on gene editing was delivered by Dr. Naveen C. Bisht, Staff Scientist VI, National Institute of Plant Genome Research (NIPGR), who highlighted the success story of developing gene edited mustard. Dr. P.K. Singh, Chief Scientist, Department of Molecular Biology and Biotechnology, NBRI, spoke about the Pink Bollworm-resistant Bt cotton developed by NBRI, which has been transferred to Ankur Seeds. Presentations were also made by scientists working on various crops,

viz., pigeon pea, sugarcane, and vegetables. Dr. Vibha Ahuja provided an overview of the regulatory policies for GM crops and gene edited plants. Prof. Sanjeet Kumar shared information on research underway at ANDUAT.

Researchers, students, and farmers actively interacted with the experts. All the participants expressed their appreciation of the deliberations and requested more such capacity building activities.

RESOURCE

Guide to the Cali Fund: Sharing the Benefits of Genetic Data from Nature

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited

The Secretariat of the Convention on Biological Diversity, in association with the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), released their first guide on the CALI Fund. Adopted in a landmark decision of the Parties to the CBD at COP 16 in Cali, Colombia, the Cali Fund is the financial arm of the multilateral mechanism on the fair and equitable sharing of benefits arising from the use of digital sequence information on genetic resources (DSI).

The guide provides an introduction to the Cali Fund and the multilateral mechanism, including a snapshot of how the fund works, who it serves, and how organizations can engage. As DSI applications span a range of life sciences sectors, including pharmaceuticals, cosmetics, and biotechnology, it is important for biotech stakeholders to be aware of these developments. Among other aspects, the guide covers:

- What qualifies as DSI;
- Who is expected to contribute and from which sectors;
- How much contributors are expected to pay;
- Why it makes sense to contribute to the Cali Fund;
- How the Fund can help meet the self-identified needs of indigenous peoples and local communities—key custodians of biodiversity;
- How contributions are verified and an explainer on the certificates issued by the Secretariat of the Cali Fund.

The Guide to the Cali Fund can be downloaded at:
<https://www.cbd.int/dsi-gr/califund.guide.pdf>



RESOURCE

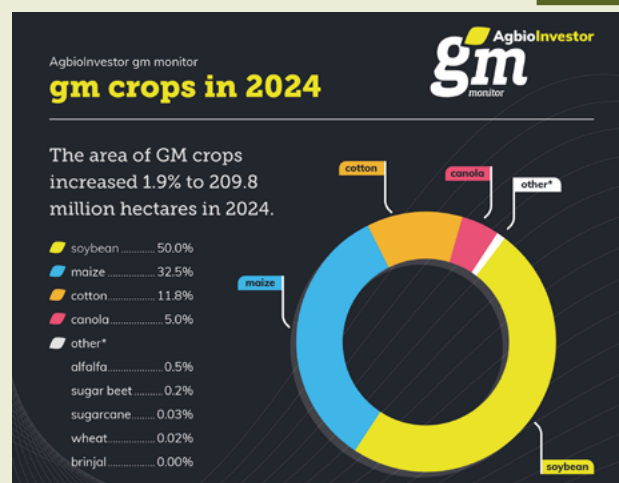
Global GM Crop Area Review 2025

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited

AgbioInvestor's GM Monitor provides information on the cultivation of GM crops, such as planted area, percentage of total area, production, trade, and approval status. According to the updates released in April 2025, the global area under GM crops in 2024 increased by 1.9% over the previous year, reaching 209.8 million hectares. Twenty-eight countries cultivated a range of 10 different GM crops, with soybean the most widely planted at 105.1 million hectares. Soybean represented half of the global GM crop area in 2024. Following soybean, the most widely planted GM crops are maize, at 68.4 million hectares, and cotton, at 24.8 million hectares. GM maize traits and stacks have gained 472 cultivation approvals, more than double those of cotton. GM wheat is the most recent crop to be commercialized.

Excerpted from the report, the table to the right shows the rate of global adoption of major crops. Cotton has the highest rate of GM utilization as a percentage of total cultivated area, at 78.4% of the world's total cotton area, followed by soybean at 74.9%, maize at 33.7%, and canola at 24.3%, after which the rate of global adoption falls quickly.

AgbioInvestor's GM Monitor can be accessed at:
<https://gm.agbioinvestor.com/downloads>



Crop	GM Area (Ha m.)	Total Area (Ha m.)	GM % Share
Cotton	24.2	30.9	78.4
Soybean	105.1	140.5	74.9
Maize	68.4	202.9	33.7
Canola	10.4	42.9	24.3
Sugar beet	0.5	4.5	10.3
Alfalfa	1.1	35.0	3.2
Sugarcane	0.06	27.0	0.23
Brinjal	0.003	1.9	0.15
Wheat	0.05	222.2	0.02
Total	209.8	707.8	29.6

CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
INDIA			
Conference on the Role of the Vegetable Seed Sector in Making India a Global Seed Hub	Federation of Seed Industry of India (FSII)	25 July 2025 New Delhi	https://fsii.in/
Workshop on Biotechnology Applications for Crop Improvement: Key Developments	Biotech Consortium India Limited (BCIL) and Professor Jayashankar Telangana Agricultural University	7 August 2025 Hyderabad	http://www.biotech.co.in
ThinkAg Harvesting Tomorrow Summit 2025	ThinkAg	3-4 September 2025 Goa	https://thinkag.co.in/harvesting-tomorrow-summit-2025/
Hands-on Training Program on Plant Tissue Culture and Transgenics	Gujarat Biotechnology Research Centre and Ahmedabad University	15-26 September 2025 Gandhinagar	https://io.gbrc.res.in/ptc
10 th Asian PGPR India Chapter National Conference on Fostering PGPR's for Secondary Green Revolution Towards Soil and Crop Health Management	Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu	15-17 September 2025 Jammu	https://skuast.org/newsite/pdf/brochure-27-06-2026.pdf
7 th South Asian Biotechnology Conference	South Asian University and the International Centre for Genetic Engineering & Biotechnology (ICGEB)	29-31 October 2025 New Delhi	https://sabc.sau.ac.in https://www.icgeb.org/south-asian-biotechnology-conference-india-2025/
21 st Biennial International Conference on Global Resilience in Animal Nutrition: Innovations for Sustainable Future (ANSICON 2025)	Animal Nutrition Society of India	19-21 November 2025 Ayodhya	https://ansi.org.in/conferences/
INTERNATIONAL			
BIO Asia-Taiwan 2025	Bio Industry Organization	23-27 July 2025 Taipei, Taiwan	https://bioasiataiwan.com/en
8 th Asian Short Course on Agribiotechnology, Biosafety Regulation, and Communication (ASCA8)	International Service for the Acquisition of Agri-biotech Applications (ISAAA), Inc. and Malaysian Biotechnology Information Centre (MABIC)	8-12 September 2025 Manila, Philippines	https://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=21394
17 th ISBR Symposium (ISBR 2025)	International Society for Biosafety Research (ISBR)	2-6 November 2025 Ghent, Belgium	https://isbr.info/
2025 Asian Seed Congress	Asia and Pacific Seed Alliance (APSA), National Seed Association of India (NSAI), and Federation of Seed Industry of India (FSII)	17-21 November 2025 Mumbai, India	https://web.apsaseed.org/asc2025



SOUTH ASIA
BIOSAFETY PROGRAM

The South Asia Biosafety Program (SABP) is an international development program implemented in India and Bangladesh by the Agriculture & Food Systems Institute (AFSI). 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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