

South Asia Biosafety Program

NEWSLETTER FOR PRIVATE CIRCULATION ONLY – NOT FOR SALE



**Capacity Building Workshop
on Confined Field Trials of
Living Modified (LM) Plants in
Malaysia**

PAGE 2

**Youth for Science: Evidence,
Urgency, and Action Campaign**

PAGE 2

**Agricultural Biotechnology
Research in Sri Lanka**

PAGE 4

**Agricultural Biotechnology
for Improving Sri Lankan Rice
Varieties**

PAGE 5

7th Annual South Asia Biosafety Conference September 14-16, 2019, Dhaka, Bangladesh

Attended by over a hundred participants each year, the South Asia Biosafety Conference covers topics spanning biotechnology and biosafety research, risk assessment and regulation, science communication, and engagement with stakeholders. Below is a brief overview of the plenary sessions:

Plenary Session I: Biosafety Regulation in South Asia

Biotechnology is a highly dynamic field. Novel techniques and products are continuously being developed and regulatory systems mandated to address health and environmental safety must respond accordingly. Plenary Session I will focus on the status of biosafety regulatory frameworks and policies in Bangladesh, Bhutan, India, Pakistan and Sri Lanka. The session also features a talk from Dr. Rufus Ebegba, Director General of National Biosafety Management Agency, Nigeria about how the NBMA approached its recent approval of insect-resistant cowpea, a critically important food security crop in that country.

Plenary Session II: Building a Community of Biosafety Practitioners

The Biosafety Research in Bangladesh Grants Program (BRBGP) is a new competitive grants program funded by USAID and implemented under the South Asia Biosafety Program. The BRBGP is designed to help support the development of a biosafety research community of practice in Bangladesh and promote inter-institutional collaboration and partnerships. This session will include a keynote address by Dr. Rob Bertram, Chief Scientist for USAID's Bureau for Food Security, about the importance of fostering agricultural innovation to help promote food and nutrition security, as well as presentations by the inaugural cohort of BRBGP grantees.

Plenary Session III: Rationalizing Risk Assessment and Regulation of Low Risk Activities

This session will address the concept of proportionality in risk assessment and how approaches to the regulation of products of modern biotechnology might benefit from a re-examination, particularly given some of the newer techniques and products. Presentations will explore examples of genetically modified organisms that might be characterized as low-risk because of genotypic or phenotypic characteristics, or management and production practices that have a mitigating impact on potential risks to human health or the environment.

Plenary Session IV: Biotechnology Research and Development in South Asia

Innovations in agricultural research are essential to meet the challenges of sustainably producing food, feed, and fiber for a growing global population under conditions of increasing resource constraints and changing climate. Biotechnology provides a suite of tools that are being applied to develop plants and animals with a range of traits designed to improve productivity, quality, and resiliency. This session includes talks by scientists who are applying genetic engineering to address important biotic and abiotic challenges faced by South Asian farmers and producers

Plenary Session V: Planning and Permitting Field Trials for Novel Organisms

Moving from the lab to the field can be a challenge for both the scientists who develop transgenic organisms, as well as the risk assessors and regulators who must evaluate and approve these activities. This session will provide insights into the design and management of field trials of some novel insects and plants.

Plenary Session VI: Sharing Outcomes from Workshops and Recent SAARC Expert Consultation Meeting

The outcomes and recommendations from the three parallel workshops conducted during SABC, as well as the recent SAARC Regional Expert Consultation Meeting on the Progress and Prospects of Agricultural Biotechnology and Biosafety in South Asia, will be presented.

Plenary Session VII: Public Sector GE Crop Development and Deployment

Public sector institutions play a significant role in advancing the research, development, and deployment of novel crops, and particularly those that are key for food and nutrition security in low- and middle-income countries. This session features presentations about public-sector developed genetically engineered crops that have been, or will soon be, released for commercial cultivation.

View the full agenda, submit an abstract, and register for the conference at:

<http://sabc.biotech.co.in>

Capacity Building Workshop on Confined Field Trials of Living Modified (LM) Plants in Malaysia

Dr. Vibha Ahuja, Biotech Consortium India Limited and South Asia Biosafety Program



Dr. Vibha Ahuja with participants of the Capacity Building Workshop on Confined Field Trials of LM Plants (August 1, 2019).

The Genetic Modification Advisory Committee (GMAC), Malaysia is responsible for scientific evaluation of applications for various activities involving living modified organisms (LMOs) in Malaysia. The Biosafety Office, Malaysia organized the *Capacity Building Workshop on Confined Field Trials of LM Plants* on August 1-2, 2019. The objective of this workshop was to strengthen the competence of the GMAC members through a capacity building component, and specifically to strengthen the preparedness of GMAC, as well as the Department of Biosafety Malaysia, in handling field trials of GMOs.

Dr. Vibha Ahuja, Chief General Manager, Biotech Consortium India Limited (BCIL) and Senior Advisor, South Asia Biosafety Program was

the resource person. The workshop had three sessions to introduce key aspects and monitoring of confined field trials (CFTs) to members of GMAC. These included:

- Confined Field Trials of GE Plants: Introduction and Key Principles
- Application for CFTs and Resources for Regulatory Review
- Monitoring of CFTs

Dr. Vibha Ahuja gave presentations on the above topics and conducted the workshop, along with case studies and group exercises. Members of GMAC greatly appreciated the sharing of experience by Dr. Ahuja.

Youth for Science: Evidence, Urgency, and Action Campaign Launched to Engage Youth in Evidence-Based Information Sharing

Md. Arif Hossain, Farming Future Bangladesh

A campaign devoted especially to engaging and empowering youth in initiatives aimed at sharing evidence-based information and improving understanding of modern science and innovation was

launched on July 27, 2019 at a program in Dhaka, Bangladesh. The initiative aims at enhancing food security and improving environmental sustainability, incorporating the use of agri-biotechnology.

Continued on page 3



Participants at the Youth for Science: Evidence, Urgency, and Action Campaign (July 27, 2019).



Figure 2: Experts' knowledge and opinion sharing, from left—Dr. Sudhir Chandra Nath, Head of ACI Seed, ACI Agro; Dr. Aparna Islam, Country Manager, South Asia Biosafety Program; Ms. Patricia Orlovitz, Deputy Office Director, Feed the Future, USAID Bangladesh; Mr. Arif Hossain, CEO & Executive Director, Farming Future Bangladesh; Dr. Jiban Krishna Biswas, National Consultant for IRRRI, Advisor to Farming Future Bangladesh, and Former DG, BRRI (July 27, 2019).

Farming Future Bangladesh (FFB), a comprehensive communications initiative under the auspices of Cornell University's Alliance for Science, launched the campaign titled *Youth for Science: Evidence, Urgency, and Action* at a hotel in the capital. The Bill & Melinda Gates Foundation supports the initiative.

Youth representatives, academics, experts from 11 leading public and private universities, the public sector, agricultural industry, and donor agencies attended the event.

Addressing the program, Dr. Jiban Krishna Biswas, National Consultant to the International Rice Research Institute (IRRI) and Advisor to FFB, said:

"Youth can play a vital role in developing new technologies to overcome existing development challenges, bringing in new and traditional solutions with their dedication and creativity." Dr. Hamidur Rahman, Advisor to the Ministry of Agriculture and FFB, highlighted the urgent need for fact-based information-sharing, saying: "We need youth in agriculture and the food sector to eradicate hunger and hidden hunger from our country."

Other experts, while addressing the event, emphasized taking timely initiatives to encourage young scientists to become self-sufficient in research and innovation, as well as encouraged youth engagement for sustainable development of food and agriculture sector in the country.

"Youth can play a vital role in developing new technologies to overcome existing development challenges, bringing in new and traditional solutions with their dedication and creativity."

"We are committed to engaging and empowering youth for better understanding of science and agricultural innovations, including agri-biotechnology, through the campaign activities," said Arif Hossain, CEO of FFB.

The FFB authorities divulged that they will continue working with public universities, including but not limited to, the University of Dhaka, Jahangirnagar University, Sher-e-Bangla Agricultural University, Bangabandhu Sheikh Mujibur Rahman Agricultural University, North South University, University of Liberal Arts Bangladesh, Bangabandhu Sheikh Mujibur Rahman Science and Technology University, East West University, Independent University Bangladesh, Jagannath University, and BRAC University, all of which were represented at the launch.

Farming Future Bangladesh is a comprehensive communications initiative to help improve awareness about modern agricultural innovations, including crop biotechnology, in Bangladesh. Based in Dhaka, it operates under the auspices of Cornell University's Alliance for Science, USA, with support from the Bill & Melinda Gates Foundation.

For more information, contact: Md. Arif Hossain, CEO & Executive Director (E-mail: mdarif.hossain@cornell.edu; Mobile: +8801705786206)



Figure 3: Students participating in the Youth for Science: Evidence, Urgency, and Action Campaign (July 27, 2019).

Agricultural Biotechnology Research in Sri Lanka

Dr. D.M.J.B. Senanayake, Rice Research and Development Institute

Sri Lanka has a total land area of 65,610 km² and a population of around 21,670,000. The agriculture sector in Sri Lanka consists of many crops such as rice, vegetable crops, fruit crops, and other field crops, tea, rubber, coconut, sugarcane, export agricultural crops (Palmyra and cashew), forestry sector, livestock and poultry sector, fisheries and aquaculture sector, and floriculture sector. There is a vast potential to address some of the major problems found in the agriculture sector in the country, such as inadequate availability of new high-yielding varieties, low productivity due to rain-fed cultivation in marginal lands, high incidence of pest and diseases, inadequate availability of quality seeds, high price of hybrid seeds, unavailability of water during critical growth periods, lack of soil fertility, and low levels of input uses such as fertilizers through biotechnology.

Research investment in Sri Lanka on agricultural biotechnology amounted to 34 million Sri Lankan rupees in 2018. Many government universities of Sri Lanka carry out biotechnology-related research while a few Sri Lankan private institutes also conduct degree and non-degree courses in this field. Many entities such as Research Stations of the Department of Agriculture, Rubber Research Institute, Tea Research Institute, Coconut Research Institute, Sugarcane Research Institute, Research Division of the Department of Export Agriculture, National Aquatic Research Authority, Veterinary Research Institute, and National Institute of Fundamental Studies in the country have research programs related to aspects of plant biotechnology. Some biotechnological research aspects and products have shown higher progress over the last couple of decades. These include the production of plants through tissue culture, with or without mutation/

modifications, anther culture, embryo rescue, crop improvement for biotic and abiotic resistance using marker-assisted selection (MAS), i.e., rice and maize, gene tagging for pest and disease resistance and disease and pest diagnostics, germplasm characterization/DNA fingerprinting, diversity analyses of crops/varieties/accessions and land races with various molecular markers, and transgenic plant development for virus resistance. However, success stories about the end products through novel biotechnologies such as gene editing, etc. are yet to be unveiled in Sri Lanka. Presently, most of the research stations in the country, which carry out biotech related research, are equipped with basic equipment such as PCR machines.

The present developments in biosafety policies and regulation in Sri Lanka that take place with the support from relevant stakeholders will help the country keep pace with other countries in the South Asian region for biotech research and GMOs.

At the policy level, the National Science Foundation established a steering committee for biotechnology in 1994. Sri Lanka ratified the Cartagena Protocol in 2004. In 2009, the National Biotechnology Policy was formulated by the National Science Foundation in Sri Lanka, and it was unveiled in 2010, providing the directions for biotech-related research in the country.

The National Committee on Agricultural Biotechnology has been established by the Council for Agricultural Research Policy, Sri Lanka. Presently, the National Biosafety Framework is in operation and the National Biosafety Act, along with regulations, is being developed in order to regulate genetically modified organisms (GMOs) in the country. Presently, research on transgenic and cisgenics in the country are limited to laboratories. However, the present developments in biosafety policies and regulation in Sri Lanka that take place with the support from relevant stakeholders will help the country keep pace with other countries in the South Asian region for biotech research and GMOs.



View over the rice fields on the edge of Tissamaharama, Sri Lanka.

Agricultural Biotechnology for Improving Sri Lankan Rice Varieties

Prof. Dr. Chamari Hettiarachchi, University of Colombo, Sri Lanka

Sri Lanka is a tropical island in the Indian ocean, rich with biodiversity, natural resources, and diverse climatic conditions. Agriculture is the key sector of Sri Lanka's economy. More than 70% of the Sri Lankan population living in rural areas depend directly or indirectly on agriculture for their livelihoods. Agricultural productivity has remained relatively stable, except for rice, which has reached near self-sufficiency in the previous years. Compared to previous years, rice yield has been stagnant. This clearly demonstrates that further developments and improvements in this sector are essential. Modern agricultural biotechnology has provided a new tool to develop and improve the agricultural sector. This may provide ample scope for enhancing rice yield and plant protection, enable rice to grow in drought and saline conditions, and lead to more nutritious rice. Modern biotechnology is the application of cellular and molecular biology to meet human needs, and it is a part of the natural evolution of agricultural biology that could shorten the time for developing improved crops.

Rice is the single most important crop in Sri Lanka, occupying 34% (0.77/million ha) of the total cultivated area. Sri Lanka currently produces 2.7 million tons of rough rice annually and satisfies around 95% of the domestic requirement. It is projected that the demand for rice will increase at 1.1% per year and to meet this, rice production should grow at the rate of 2.9% per year. Hence, to meet the growing needs of the population, it is necessary to produce more rice or to improve existing rice varieties. This goal could be achieved by increasing the productivity

of existing rice varieties by altering its light signaling pathways and photosynthetic rate. The Bg 250 Sri Lankan rice variety was selected as the candidate rice variety to increase its productivity by over-expressing the *Arabidopsis* *BBX21* gene (SALT TOLERANCE HOMOLOG2). Bg 250 is an improved Sri Lankan rice variety with high quality grains and is resistant to leaf blast, bacterial leaf blight, thrips, and brown plant-hopper. Despite all these valuable qualities, it is a very low yielding variety. Hence, the *BBX21* gene was overexpressed in transgenic Bg 250 rice plants to improve its productivity. The results showed Bg 250 transgenic plants (Figure 1 and 2) with enhanced plant height and number of panicles, as well as increased number of filled seeds in a panicle.

It is important to develop rice plants with salinity and drought tolerance to combat harsh conditions due to climate change. We have made an attempt to develop drought and salinity resistant rice by overexpressing the *OsDREB2A* (Dehydration-responsive element-binding protein 2A) transcription factor under the *HVA1* promoter in Bg 94-1. Transgenic plants expressing *HVA1-OsDREB2A* showed early recovery from stressed conditions and higher dry mass with respect to plants carrying *CaMV35S-OsDREB2A*-nos transgene constructs and untransformed Bg94-1 plants (Figure 3). Altogether, our results suggest that this approach is an effective method for developing rice cultivars with increased drought and salinity stress tolerance. The seeds obtained from these transgenic plants need to be analyzed under field conditions.

Modern agricultural biotechnology has provided a new tool to develop and improve the agricultural sector. This may provide ample scope for enhancing rice yield and plant protection, enable rice to grow in drought and saline conditions, and lead to more nutritious rice.



Figure 1: Transgenic Bg 250 rice plants in tissue culture.



Figure 2: Bg 250 transgenic rice (hardened) growing in pots.



Figure 3: Transgenic Bg 94-1 HVA1-OsDREB2A (left), wild type (middle) & CaMV35S-OsDREB2A (right).

EVENT	ORGANIZED BY	DATE	WEBSITE
BANGLADESH			
7 th Annual South Asia Biosafety Conference	South Asia Biosafety Program (SABP), ILSI Research Foundation, and Biotech Consortium India Limited (BCIL)	September 14-16, 2019 Dhaka	http://sabc.biotech.co.in
14 th Asia-Pacific Biosafety Conference: Biosafety & Biosecurity for Sustainable Development in Health and Agriculture	Asia Pacific Biosafety Association (A-PBA)	September 17-20, 2019 Dhaka	https://www.a-pba.org
4 th IPFS-ICBHA 2019-GNOBB Conference	Global Network of Bangladeshi Biotechnologists (GNOBB)	November 11-13, 2019 Dhaka	http://gnobb.org/conference/IPFS-ICBHA-2019
INDIA			
Seed World 2019	Indian Council of Food and Agriculture	September 4-7, 2019 Bengaluru	http://icfa.org.in/event.php
2 nd International Conference on Recent Advances in Agricultural, Environmental & Applied Sciences for Global Development	Agro Environmental Development Society (AEDS) and Dr. Y. S. Parmar University of Horticulture & Forestry	September 27-29, 2019 Nauni, Solan, Himachal Pradesh	http://www.yspuniversity.ac.in/trainings/Conference_Brochure__Solan.pdf
5 th International Conference on Plant Genetics and Genomics: Germplasm to Genome Engineering	Select Biosciences India Pvt Ltd. (supported by National Academy of Agricultural Sciences)	October 17-18, 2019 New Delhi	http://www.selectbioindia.com
National Symposium on Breeding for Biotic Stress Resistance in Potential Crops	Indian Society of Genetics & Plant Breeding and Indian Council of Agricultural Research-Indian Agricultural Research Institute Regional Station, Wellington	December 7-8, 2019 Wellington, The Nilgiris, Tamil Nadu	https://isgpb.com/
INTERNATIONAL			
Course: Basic Laboratory Training on GMO Analysis	International Center for Genetic Engineering and Biotechnology (ICGEB) and National Biotechnology Development Agency, Abuja, Nigeria	September 15-21, 2019 Abuja, Nigeria	https://www.icgeb.org/courses/course-basic-laboratory-training-on-gmo-analysis/
BIT's 10 th World Gene Convention	BIT Group Global Ltd.	September 20-22, 2019 Qingdao, China	http://www.bitcongress.com/wgc2019/default.asp



SOUTH ASIA
BIOSAFETY PROGRAM

The South Asia Biosafety Program (SABP) is an international developmental program implemented in India and Bangladesh with support from the United States Agency for International Development. 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.



CONTACT SABP

BANGLADESH

Dr. Aparna Islam
Country Manager
South Asia Biosafety Program
c/o CIMMYT
House-10/B, Road-53, Gulshan-2
Dhaka-1212, Bangladesh
Email: aparnaislam@southasiabiosafety.org

UNITED STATES

Ms. Layla Tarar
Communications Manager
ILSI Research Foundation
740 Fifteenth Street NW, Suite 600
Washington, D.C. 20005, USA
Email: ltarar@ilsil.org
Twitter: @ILSIRF

INDIA

Dr. Vibha Ahuja
Chief General Manager
Biotech Consortium India Limited
Anuvrat Bhawan, 5th Floor
210, Deendayal Upadhyaya Marg
New Delhi 110 002, India
Email: vibhaahuja.bcil@nic.in

To receive an electronic copy of this newsletter, send your name, institutional information, and e-mail address to: vibhaahuja.bcil@nic.in