

# South Asia Biosafety Program

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## INDIA

### The South Asia Biosafety Conference: An Initiative Towards Regional Cooperation in the Area of Agricultural Biotechnology and Biosafety Regulations

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The South Asia Biosafety Conference and two workshops on related topics were held from September 18-20, 2013, in New Delhi, India. This conference was co-organized under the South Asia Biosafety Program (SABP) by the Center for Environmental Risk Assessment (CERA), the Bangladesh Academy of Sciences (BAS) and the Biotech Consortium India Limited (BCIL) with support from the Ministry of Environment and Forests (MoEF) and the Department of Biotechnology (DBT), Government of India.

The conference aimed at promoting regional harmonization in taking forward agriculture biotechnology and strengthening the regulations in South Asia by sharing experience, expertise and knowledge with international experts from around the world. South Asia, with its core seven countries, covers about 4.48 million km<sup>2</sup> (2.4% of the world's land surface area) with 22% of the world's population but only generates less than 2% of global income. More than 70% of the South Asian populations live in rural areas mostly depending on agriculture for their livelihood. In fact, agriculture in the region is dominated by small farmers with an average holding size of less than 2 hectares. In this context, it is essential for the South Asian countries to adopt latest technologies which can address problems related to agriculture, food security and healthcare and accordingly regional cooperation is the need of the hour.

Agricultural biotechnology, particularly Genetically Modified (GM) crops, is one of the important options for improving agricultural productivity and addressing abiotic and biotic stresses. The best example of this technology has already been demonstrated with the use of Bt cotton in India, wherein now almost 90% of the cotton cultivation area is under Bt cotton. The data, based on estimates for the year 2010-2011, shows that out of total area of 111.42 lakh

hectares under cotton cultivation, 98.54 lakh hectares are under Bt cotton. This has changed the status of India from the 3rd position to the 2nd position in the list of largest producers of cotton globally.

The conference was inaugurated by Prof. R.B. Singh, President, National Academy of Agricultural Sciences, India, New Delhi, who also stressed the need for adoption of GM crops for South Asian regions in order to address the problem of food security and malnutrition. Shri Hem Pande, Additional Secretary, MoEF and Chairman of Genetic Engineering Appraisal Committee (GEAC) appreciated the initiative and offered fullest support for regional cooperation in this key area. He shared that India is currently holding presidency of COPMOP and several such initiatives are in pipeline. He also launched an E-Learning course on "Compliance Management of Confined Field Trials", prepared under SABP. Prof. Mesbahuddin Ahmad, President, Bangladesh Academy of Sciences spoke about ongoing efforts for capacity building in this area in Bangladesh.

This conference had participation from 14 countries, especially from the South Asian countries including Bangladesh, Bhutan, Sri Lanka, Pakistan and India. The Conference was attended by 187 participants representing a cross section of stakeholders from concerned Government Departments, Research Institutions, Universities, State Agricultural Universities (SAU's) and industry.

Eminent Scientists and experts from regulatory agencies, public sector institutions and private sectors in Australia, Brazil, Canada, France, Hungary, New Zealand, Switzerland and the USA made technical presentations on important topics relevant to challenges in development of GE plants and their regulations in context of Biodiversity, phytosanitary and food/feed safety laws.

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## The South Asia Biosafety Conference: An Exchange of Ideas and Innovations Between Scientists

DR. NAIYYUM CHOUDHURY, FORMER CHAIRMAN, BANGLADESH ATOMIC ENERGY COMMISSION AND MEMBER, BIOSAFETY CORE COMMITTEE (BCC), DHAKA

Along with 19 other participants from Bangladesh, I was invited to attend the South Asia Biosafety Conference and Workshops in New Delhi, India, by the conference organizers. The participants of Bangladesh were selected from the concerned ministries who either develop the GE plants or regulate the GE technologies. Most of the Biosafety Core Committee (BCC) members, including the Chairperson and the Member Secretary, were included in the team. Two participants were taken from the Ministry of Agriculture and two from the Bangladesh Agricultural Research Council (BARC). One participant from Bangladesh, who was selected, is directly involved in the golden rice project.

The main purpose of bringing together scientists and professionals from the region and abroad was to share experiences and knowledge of the science and practice on different aspects of the biosafety of genetically engineered crops.

The conference agenda contained diversified topics which were chosen based on the suggestions of the prospective participants. It was under this background the conference was very much useful for the participants. The experience gained through the exchange of ideas and interaction among scientists of developed and developing countries will be effectively utilized by the participants in their respective countries in risk assessment strategies for transgenic crops.

The first two days were assigned for the conference and on the third day two workshops were held. On the second day of the conference, two very important sessions were held. The first session was on "New Plant Breeding Techniques and Biosafety Risk Assessment" and the second session was on "Post-Approval Considerations for the Commercial Release of Genetically Engineered Organisms".

A total of five presentations were presented in the first session. The first presentation was presented by Dr. K. Veluthambi of Madurai Kamaraj University, India. In his presentation, Dr. Veluthambi showed the possibility of using cisgenics, intragenic and site specific mutagenesis as alternatives to genetic engineering to develop improved crop varieties using related plant genetic materials. These techniques may minimize many biosafety concerns raised by the general public.

Dr. Andrew Roberts presented twice in this session. The first one was on zinc finger nucleases and transcription factors. The second presentation was on the risk assessment and regulation of RNAi pesticides in the context of genetically engineered plants and the novel plant breeding techniques in the United States. Dr. Roberts described that the post-transcriptional gene silencing (PTGS) or RNA interference (RNAi) have opened up the door to new uses for crop improvement and pest protection. He also explained that the use of risk assessment in regulation of GE plants and provided insight into how this will impact the future of RNAi mediated pesticides. Dr. Roberts shared some insights on the way novel plant breeding techniques may be regulated in the USA.

Dr. Ervin Balazs of the Hungarian Academy of Sciences presented on "Planting the Future: Opportunities and Challenges for using Crop Genetic Improvement Technologies for Sustainable Agriculture" – a Report from the European Academies Science Advisory Council. Dr. Balazs mentioned that the EU has fallen behind in its adoption of the technology associated with the genetic modification of crops, compared to many other regions of the world. He also expressed that a time consuming and expensive regulatory framework in the EU compounded by politicization of decision-making by member states and coupled with other policy inconsistencies has tended to act as an impediment to agricultural innovation.

Dr. Michael Dornbusch from the Office of the Gene Technology Regulator (OGTR), Australia, presented on new plant breeding techniques and Australian gene technology legislation. Dr. Dornbusch pointed out that the Australian legislation that regulates gene technology came into effect in 2001. During this time, the majority of GE plants were produced using agrobacterium mediated transformation to introduce desired genes. Recently, a range of other techniques have been developed that utilize the tools of modern molecular biology to modify the genome of plants in a site specific, targeted manner to produce desirable traits. He pointed out that although the stage of development differs for each of these techniques, their regulatory status has been the subject of discussion in a number of countries. In Australia, modified plants that are considered to be covered by the gene technology regulation 2001 scheme would require the appropriate authorisation from the OGTR for work in contained facilities or for release into the environment.

The second session of the day had five more presentations. The first presentation was presented by Dr. Thiago Souza of Embrapa Rice and Beans, Brazil, on "Consideration for the Commercialization of Embrapa's Virus Resistant Common Bean". Dr. Souza mentioned that Bean Golden Mosaic Virus (BGMV) is one of the major biotic causes of bean crop losses in Brazil. This gemini virus causes severe losses in grain production which may range from 40 - 100% depending on the disease severity, environmental condition, etc. Recently, Embrapa has been able to develop BGMV resistant common bean. He disclosed that the Event Embrapa 5.1 will be available soon in the domestic market after the final field trials to

evaluate the agronomic performance of the advanced lines are finished.

Mr. Eric Reynoso, International Rice Research Institute, the Philippines, presented "Bringing Golden Rice to Market in South Asia: Perspectives from Plans and Processes for the Philippines". Mr. Eric described that golden rice is being developed as a potential new food-based approach to improve Vitamin A status. In the Philippines, field tests and other evaluations will be completed to help assess the food, feed and environmental safety of golden rice. If approved by national regulators and deemed safe for human consumption, Helen Keller International will independently evaluate the efficacy of whether or not golden rice improves Vitamin A status.



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Dr. Aldo Malavasi, from Moscamed, Brazil, presented "PAT- Project Aedes Transgenic – in Brazil: Planning, Operation and Commercialization". Dr. Malavasi mentioned that the genetic control of insects is a promising technology to be applied for control of the wild population in urban and agricultural areas as an alternative for the widely used methods based on chemicals and mechanical control. He pointed out that in Brazil, there is considerable concern about the number of cases of dengue across the country, and there is a clear demand for improved vector control. A joint project among Medfly and Mosquito Facility Brazil, University of Sao Paulo and Oxitec was agreed upon in order to test social, technical and operational aspects of a genetic control for *Aedes aegypti* population in urban areas employing RIDL transgenic strain. As the first large project releasing transgenic insects in a human populated area, the PAT would follow all phases and steps recommended by international forum and fit with the strict Brazilian biosecurity laws. Field trials are being carried out in some selected districts under the current project. After this project, the commercialization is planned for the health authorities in the federal and state level using different models of the business plan.

Dr. Franz Bigler, Agroscope ART, Switzerland, presented "Genetically Modified Crops and Integrated Pest Management". Dr. Bigler described that GM Insect Resistant (GMIR) plants, used within Integrated Pest Management (IPM), offer a number of advantages compared to insecticides. They are effective against target pests with little or no harm to non-target organisms, safe for the environment and users. GMIR plants have the potential to replace insecticides and thus contribute to reduce pesticide loads in foods and in the environment. Due to their efficacy, high deployment of Bt varieties has been reported to cause region-wide reductions in target pest populations in different parts of the world. He pointed out that despite the benefits of GMIR, the plants used today express only a few cry genes from *Bacillus thuringiensis*. This bears the risk of resistance build-up in target insect populations. A recent study showed that although most pest populations remained susceptible to Bt toxins, reduced efficacy of Bt crops by field evolved resistance has been reported for some populations of 5 out of 13 major species examined worldwide. These results imply that resistance

management remains essential to prevent or delay resistance of target insects and to use Bt crops preferentially in combination with other pest control tactics.

The last topic of the conference was presented by Dr. Stuart Smyth, University of Saskatchewan, Canada, on the perspectives on coexistence of agricultural production systems. Dr. Smyth described that when the commercialization of genetically modified crops occurred in the mid-1990's, the functioning coexistence system already utilized in the trade of agriculture commodities was expanded once again to include differentiation of GM and non-GM products when dictated by consumer demand. He mentioned that Canada was one of the few countries that differentiated a GM product, when GM canola was differentiated from the rest of the canola trade. This was done to ensure that canola trade with the Japanese government would continue while the Japanese regulators assessed GM canola. Once Japan approved the import of GM canola, the differentiation of GM canola was discontinued. Dr. Smyth also pointed out that over the intervening period from the mid-1990's, numerous markets have been disrupted due to the co-mingling of GM commodities into non-GM commodity shipments. The insistence of some commonly importers for zero tolerance of GM comingling has resulted in loss in trade in the tens of millions of dollars.

After all the presentations were finished, there was an open floor question and answer session. A lively discussion was held in this session.

It may be mentioned here that the Bangladesh National Committee on Biosafety (NCB) has approved Bt-brinjal and Late Blight Resistant potato confined field trial in different locations of Bangladesh. NCB also gave permission to the Bangladesh Rice Research Institute (BRRRI) for contained trials of golden rice. The Biosafety Core Committee (BCC), as the technical committee, has been playing an active role in the decision-making process for contained, confined and future open field trials of genetically engineered plants. Most of the BCC members attended the conference and gained experiences on different aspects of GM crop development and their regulations which will be useful in the decision-making process on the field release of GM crops in Bangladesh.



These presentations served as a basis for the discussions at the conference and sessions focused on the accumulated international experience of regulatory framework and status of biosafety regulations in South Asian countries.

Regional cooperation and harmonization among countries not only helps the nations in addressing common problems but also provides the much needed ecosystem and platform for discussing and resolving issues related to strengthening of their regulatory systems for appropriate decision making. The critical elements for regional cooperation in South Asia could entail sharing of resources among countries within the region, including expertise, facilities, materials and knowledge in development of GMOs and also for strengthening of regulatory guidelines and procedures in harmony with international best practices followed globally. Realizing the significant benefits offered by sharing views at the South Asia Biosafety Conference, the participants were of the view that similar conferences should be organized on an annual basis under the aegis of SABP. This would provide a platform for sharing experience and knowledge for addressing the biosafety concerns for expeditious development of agricultural biotechnology in the region.



### View the presentations from the South Asia Biosafety Conference by visiting:

[http://cera-gmc.org/index.php?action=sabp\\_activities](http://cera-gmc.org/index.php?action=sabp_activities)



## The South Asia Biosafety Conference: An Effort to Create Awareness

ZAHID ALI, ASSISTANT PROFESSOR, DEPARTMENT OF BIOSCIENCES, COMSATS INSTITUTE OF INFORMATION TECHNOLOGY (CIIT), ISLAMABAD



The South Asian Regional Biosafety conference was recently held in New Delhi, India, where the key note speaker from developed as well as developing countries pinpointed the biosafety issues related to Genetically Engineered (GE) plants. Awareness for safe handling and regulation processes of GE plants was highlighted.

From this regional platform, Pakistan learned a great deal about efforts to create awareness for GE plants and improve public perception of farmers and other stake holders. In this regard, great efforts are required to introduce products of modern biotechnology to the common people so they may be able to take benefit of that deliberately.

Communication skills can play an important role to make this knowledge transfer effective both to policy makers and end users. All the stakeholders must take part in the debate to understand technical details as well as to be aware of moral, societal and economical aspects of the modern scientific product. The role of the scientific community being developers as well as good communicators counts very much. Organization of conferences and workshops where developers, regulators and representatives of common farmers can play a significant role for acceptance of GE technology. Due to low literacy rates, provision of technical literature in national language is also an important communication tool.

In addition, it was learned that the regulation system of GE should be implemented efficiently but without exploiting the threats of GE. Otherwise, the end consumers will be difficult to agree to use it. The emphasis of scientists should be integrity and honesty. They have to be in a position that the public will listen and trust upon them.

The lack of information on biotech issues is undermining its adoption in our country and yet, it holds great promise for all around the economic development of the nation. Therefore, it has become crucial for sustainable development in every biological sector, including agriculture, forestry, medicine, and environment. The awareness and regulations regarding the transgenic and biosafety issues is essential.

## Science Communication and Transparency in Biosafety Regulation in Pakistan:

### The Current Scenario

ZAHID ALI, ASSISTANT PROFESSOR, DEPARTMENT OF BIOSCIENCES,  
COMSATS INSTITUTE OF INFORMATION TECHNOLOGY (CIIT), ISLAMABAD

Pakistan is a developing nation of more than 179 million people. More than 60% of the population is directly or indirectly associated with the agriculture sector. About 25% of total land area is under cultivation. The area under cultivation is watered by an irrigation system which is one of the largest irrigation systems in the world. The major crops grown are wheat, rice, sugarcane and cotton which together accounts for ~ 75% of the value of total crop output.

Recent breakthroughs in biotechnology have resulted in rapid progress in understanding the genetic basis of living organisms, and the ability to develop products and processes useful to human health, food and agriculture. Since 1996, the area under cultivation of biotech crops increased from 1.7 million hectares to 170 million hectares worldwide which is a 100-fold increase over the seventeen year period. In 2011, there were approximately 17.3 million farmers growing biotech crops in 28 countries around the world, while biotech cotton is grown in 11 countries. Almost 90 percent of these farmers were poor farmers from developing countries (The News – International, Sep. 15th, 2013).

Agriculture biotechnology has contributed a lot over these last two decades and significant investments have been made in this sector for development of basic and applied research. The sector is also dominating in Pakistan and 41 biotech institutes have been developed during the last 20 years all around the country. Many of these are involved in development of genetically engineered (GE) plants. However, cotton is the only GE plant which could get approval for field testing. In Pakistan, the work on development of genetically modified (GM) cotton was started in 1996 and National Biosafety Committee (NBC) approved eight GM Bt cotton varieties for field testing in 2009. In the year 2010-2011, the first commercial Bt cotton crop was cultivated. Now Pakistan is the 4th largest user of Bt cotton seed in the world. Although significant attempts were made during the last ten years for the development and regularization of Bt cotton, which is a major cash crop in Pakistan, there are growing concerns among the farming community about the transgenic Bt cotton. This is the social responsibility of scientists to provide knowledge of the Bt story at farmers fields.

It is important that public and political understanding of science should be based on evidence and debates with an open mind. People and decision makers must be made aware of the implications of emerging technologies, including their ethical, social and economic dimensions. Unfortunately, the literacy rate is very low and the farmers trust upon what they hear. The developers should step forward and face the community. Honesty and transparency should be above all that the population at large should trust upon what they provide and communicate. Unfortunately, a huge gap exists between policy makers, scientists and the public on issues of GM technology especially in the introduction of GM crops. Due to the low literacy rates, the farmers concern is on the maximum outcome with low inputs. Integrity and honesty should be the highest goal for these scientists. National bodies that may look over the rules, policies and approval process of transgenic need to be strengthened.

Being signatory to the Cartagena Protocol on Biosafety, which is an agreement under the convention of Biological Diversity and specifically addresses the safety of LMOs (Living Modified Organisms) in environment and international trade, National Biosafety Guidelines (NBG) were developed and finalized by the Ministry of Environment. The major emphasis was to provide guidelines and directions for conducting

basic and applied work related to the development of GMOs. The mechanism of monitoring and implementation of the NBG is built on three tiers, specifically i) the National Biosafety Committee (NBC), ii) the Technical Advisory Committee (TAC) and iii) the Institutional Biosafety Committee (IBC) as specified in the Biosafety Rules 2005.

To strengthen the biosafety rules and application, the National Biosafety Center (NBC) was established under the Pakistan Environmental Protection Agency (EPA). The objective is to serve as secretariat body for NBC and TAC in order to handle administrative functions related to biosafety. The center was functional and active for implementation of biosafety rules but due to devolution of federal ministries, it's function now is not clear.

Government should take a stance that, in addition to provinces, there should be an independent body who may overlook the issues related to LMOs, including their approval, reinforcement of national decisions and policies related to biosafety and transboundary movements at national as well as international levels.

In the current scenario, there are numerous challenges ahead including low literacy rate, unstable organizations and economic instabilities. Scientists being good developers and communicators can play a key role. This may have a significant influence on the formation of a farmer's values and standards and the farming community may adopt the developed product more efficiently. The direct contact and provision of actual knowledge is important to adopt new products as well as technology.

To cope with the problems and to speed up the adoption of GE crops, serious steps should be taken to create awareness regarding GMOs and associated laws, improve the transparency of the regulatory process and associated skilled human resource developments in Pakistan. This will be possible when public communication and trust is developed by providing access to technical documentation as well as regular conferences and workshops.

### USING SOCIAL MEDIA TO COMMUNICATE

LIBBY MULDOON, COMMUNICATIONS AND PROGRAM SPECIALIST,  
CENTER FOR ENVIRONMENTAL RISK ASSESSMENT (CERA)

With over 500 million followers, Twitter has become an important method of communicating. Information can be shared in real time and go viral in a matter of minutes. As CERA's Communications Specialist, I had the unique opportunity to use social media to communicate key messages throughout the three days of the South Asia Biosafety Conference and Workshop. Using the Twitter handle @SAsiabiosafety and the keyword #SABC2013, people from around the world could follow along to 275 short messages posted, commonly referred to as tweets. These tweets could then be reposted by someone else and shared with their own contacts. Using this communication channel, highlights from the event ultimately reached 9,500 Twitter followers. Social media can be intimidating, but if used in the right way, it is a powerful tool for communicating.

Follow the South Asia Biosafety Program on Twitter



## CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
<b>INDIA</b>			
International Conference on Biotechnology (ICB-2013)	University School of Biotechnology, Guru Gobind Singh Indraprastha University	October 22 - 25, 2013 New Delhi	<a href="http://ipu.ac.in/usbt/usbtiicb2013/iicb2013main.htm">http://ipu.ac.in/usbt/usbtiicb2013/iicb2013main.htm</a>
National Seminar on Technology for Development and Production of Rainfed Cotton and Farmers' Day	Navsari Agricultural University	October 24 - 26, 2013 Bharuch, Gujarat	<a href="http://www.nau.in/announce.php?id=11897">http://www.nau.in/announce.php?id=11897</a>
National Symposium on Changing Disease Scenario and Management Approaches for Sustainability in Agriculture	Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir	October 26-27, 2013 Srinagar	<a href="http://www.skuastkashmir.ac.in/images/newsevents/brochure_national_symposium_pp.pdf">http://www.skuastkashmir.ac.in/images/newsevents/brochure_national_symposium_pp.pdf</a>
Workshop on the Application of Genetic Engineering in Grain Legumes and Its Translation	International Crops Research Institute for Semi Arid and Tropics (ICRISAT)	November 18-27, 2013 ICRISAT Headquarters, Andhra Pradesh	<a href="http://www.icrisat.org/what-we-do/learning-opportunities/application.pdf">http://www.icrisat.org/what-we-do/learning-opportunities/application.pdf</a>
<b>INTERNATIONAL</b>			
3rd ABSANZ Biosafety Conference	International Federation of Biosafety Associations	October 29 - November 1, 2013 Auckland, New Zealand	<a href="http://www.absanz.org.au/Conference%202013.html">http://www.absanz.org.au/Conference%202013.html</a>
Global Conference on Entomology – 2013	V S Research Foundation and University of Technology MARA, Sarawak; Directorate of Agriculture, Govt. of Sarawak	November 8-12, 2013 Kuching, Sarawak, Malaysia	<a href="http://www.gce2013.com/about-conference/">http://www.gce2013.com/about-conference/</a>

## RESOURCES

### PRESENTATIONS AND VIDEOS ARE NOW AVAILABLE FROM THE PLANT COMPOSITION WORKSHOP

The ILSI International Food Biotechnology Committee (IFBiC) hosted a workshop on September 13-15, 2012, in Washington, DC, to identify and address topics related to plant composition from a scientific perspective. The workshop brought together experts in plant breeding and crop composition from all over the world.

Fifteen invited speakers participated in four thematic sessions: conventional development of new crop varieties, development of crops using modern biotechnology, compositional analysis methods, and interpretation of composition data. In addition to these formal presentations, round table discussions were held involving all conference attendees to address four related topics: the effects of transgenic versus conventional crop improvement methods on germplasm development, the effect of natural variability in crop composition on data interpretation and safety evaluations, the selection of comparators for compositional analysis as part of safety assessments, and design of compositional analyses/adequacy of existing OECD consensus guidelines.

To download resources from this workshop, go to: <http://www.ilsil.org/FoodBioTech/Pages/2012PlantCompositionWorkshop.aspx>



**The South Asia Biosafety Program (SABP)** is an international development program implemented in India, Bangladesh and Pakistan 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.



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