



# Stakeholders' Interface on GM Food Crops

## RECOMMENDATIONS



*Organized by*

**Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)  
Trust for Advancement of Agricultural Sciences (TAAS)**

*Co-sponsored by*

**Indian Council of Agricultural Research (ICAR)**

*held at*

**National Agricultural Science Centre, Pusa Campus, New Delhi  
19 May, 2011**



## Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)

The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) was established in 2003 under the umbrella of Asia-Pacific Association of Agricultural Research Institutions (APAARI). APCoAB has the mission to “harness the benefits of agricultural biotechnology for human and animal welfare through the application of latest scientific technologies while safeguarding the environment for the advancement of society in the Asia-Pacific Region”. APCoAB's main thrusts are (i) to serve as a neutral forum for the key partners engaged in research, development, commercialization and education/learning of agricultural biotechnology as well as environmental safety in the Asia-Pacific region; (ii) to facilitate and promote the process of greater public awareness and understanding relating to important issues of IPR, *sui generis* systems, biosafety, risk assessment, harmonization of regulatory procedures, and benefit sharing in order to address various concerns relating to adoption of agricultural biotechnology; and (iii) to facilitate human resource development for meaningful application of agricultural biotechnology to enhance sustainable agricultural productivity, as well as product quality, for the welfare of both farmers and consumers.



Progress Through Science

## Trust for Advancement of Agricultural Sciences (TAAS)

The Trust for Advancement of Agricultural Sciences (TAAS) was established on 17 October 2002 based on the decision of National Organizing Committee of 88<sup>th</sup> Session of the Indian Science Congress held at the Indian Agricultural Research Institute (IARI), New Delhi in January 2001 for harnessing the agricultural sciences for the welfare of the people. Its mission is to promote growth and advancement of agriculture through scientific interactions and partnerships. The major objectives are (i) to act as think tank on key policy issues relating to agricultural research for development (ARD), (ii) organizing seminars and special lectures on emerging issues and new developments in agricultural sciences in different regions of India, (iii) instituting national awards for the outstanding contributions to Indian agriculture by the scientists of Indian origin, and (iv) facilitating partnerships with non-resident Indian agricultural scientists. The main activities include organizing foundation day lectures, special lectures, brain storming sessions/symposia/seminars/workshops on important themes, developing strategy papers on key policy matters, promoting farmers' innovations and conferring Dr. M.S. Swaminathan Award for leadership in Agriculture.



## Indian Council of Agricultural Research (ICAR)

The Indian Council of Agricultural Research (ICAR) is an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India. Formerly known as Imperial Council of Agricultural Research, it was established on 16 July 1929 as a registered society under the Societies Registration Act, 1860 in pursuance of the report of the Royal Commission on Agriculture. The ICAR has its headquarters at New Delhi. The Council is the apex body for coordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. With 97 ICAR institutes and 47 agricultural universities spread across the country, this is one of the largest national agricultural systems in the world. The ICAR has played a pioneering role in ushering Green Revolution and subsequent developments in agriculture in India through its research and technology development that has enabled the country to increase the production of food grains by 4 times, horticultural crops by 6 times, fish by 9 times (marine 5 times and inland 17 times), milk 6 times and eggs 27 times since 1950-51, thus making a visible impact on the national food and nutritional security. It has played a major role in promoting excellence in higher education in agriculture. It is engaged in cutting edge areas of science and technology development and its scientists are internationally acknowledged in their fields.



# Stakeholders' Interface on GM Food Crops

## Preamble

The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) and Trust for Advancement of Agricultural Sciences (TAAS) organized a "Stakeholders' Interface on GM Food Crops" at National Agricultural Science Centre, New Delhi on 19 May 2011 to deliberate on issues related to adoption of GM food crops in India. The event was co-sponsored by the Indian Council of Agricultural Research (ICAR). The day long event was held in the background of ongoing controversy surrounding the moratorium imposed by the Ministry for Environment on the release of Bt brinjal, that has sparked a debate on future of GM food crops in India.

The meeting was attended by 45 participants representing a wide cross section of stakeholders including policy makers, technical experts on biotechnology and biosafety, agricultural scientists, representatives of seed sector, NGOs and the farmers. Dr. M. K. Bhan, Secretary, DBT; Dr. S. Ayyappan, Secretary, DARE and DG, ICAR; Dr. R. S. Paroda, Former Secretary, DARE and DG, ICAR; Dr. Manju Sharma, Former Secretary, DBT and Dr. R.B. Singh, President, National Academy of Agricultural Sciences (NAAS) were among those present. Besides, opinions on the subject were received from Dr. M. S. Swaminathan and Dr. G. Padmanaban and the same were circulated in the meeting, since they were unable to attend.

The technical program started with key note presentations on national and regional

agricultural biotechnology and biosafety status and future needs, followed by panel discussion which focused on four key issues: (i) Is GM technology necessary for Indian Agriculture? (ii) Is the present biosafety regulatory system adequate? (iii) How to address public concerns on GM food crops? and (iv) How to ensure public private partnership for promoting GM crops? The highlight of the meeting was active participation of a diverse range of stakeholders involved in development, commercialization and cultivation of GM crops in the discussion. Farmers having first hand experience of cultivating Bt cotton, the only GM crop grown in India, narrated their positive experiences.

## Perspective

Despite Green Revolution and several recent innovations, the challenge of food and nutrition security still looms large. India's population now stands at 1.21 billion and is increasing by about 15 million each year. By 2020, we would need to increase our food grain production from the current level of 235 million tonnes to around 285 million tonnes. It means that we shall have to ensure an increase of 5 million tonnes per year. Moreover, India currently faces the biggest challenge of poverty and nutrition security. Around 250 million people are below poverty line, who do not have economic access to food. In the whole world, India has the maximum number of malnourished children below 5 years of age. In this context, the National Advisory Council is currently drafting a Food Security

Bill to ensure an easy access to food and nutrition for all the children recognizing the principle that food is a fundamental right of every individual in free India.

In order to achieve future targets as well as the second Green Revolution, we need not only meet the challenges of increasing threats on account of biotic and abiotic stresses but also we have to address the concerns of declining natural resources (soil, water, genetic resources, energy, etc.) as well as emerging threats on account of global climate change.

Obviously, we would require a paradigm shift towards twin pillar approach, which balances Genetic Resource Management (GRM) on one side and the Natural Resource Management (NRM) on the other. We shall have to move vertical and adopt new science (biotechnology, ICT, nanotechnology, GIS, etc.) for new innovations that can lead to bigger impact in reducing poverty, enhanced nutritional security and better environmental sustainability. Poverty of small holder farmers can only be overcome by providing them new technologies that can reduce cost on inputs, build resilience in farming and increase their income by linking to market. In this context, we do see a prominent role of biotechnology, which needs to be highlighted in the present context.

Recent global developments have demonstrated that biotechnology in agriculture will play a key role in meeting the current challenges. In India, our own experience with Bt cotton during the last one decade clearly reflects the great potential of biotechnology in benefiting the small holder farmers throughout the country. Impact of this fiber revolution (which in no way is less than the Green Revolution) dispels all doubts about the potential of agricultural biotechnology. Similar achievements have been witnessed

in case of GM food crops like corn, soybean and canola in other countries such as Argentina, Australia, Brazil, Canada, the Philippines, South Africa, U.S.A. etc.

Relevance of GM technology for Indian agriculture is much more in the present context since farmers need technologies that can save cost on their inputs and are also environmentally safe while ensuring faster production growth to meet ever increasing demands for food and nutrition.

Biotechnology will play a key role in our nutrition security, especially through designer crops and biofortification through genetic enhancement. In nutshell, we need targeted approach for new genes for new products and new traits.

The first Green Revolution was successful because of scientific breakthrough, policy support and faster adoption of technologies by Indian farmers. Second Green Revolution would obviously require similar holy alliance without which it will be impossible to achieve it. Enabling environment, policy support, public private partnership and needed faith and confidence in both science and scientific community are all important cradles to move forward. Current unfortunate trend to have perception other than facts is rather proving counter productive. It has demoralizing effect on agricultural biotechnologists in India, which indeed is a dangerous trend. It appears that second Green Revolution is presently at cross roads, since scientific accomplishments, public-private-partnership in research and genuine efforts to outscale innovations for helping the resource poor farmers are being seen for the first time with suspicion. Both public and policy support, that enabled us achieve faster growth in the past, seem to be dwindling. Obviously, business as usual will not work. Concerns, if any, for biosafety and biosecurity, will have to be addressed with a clear and strong commitment in a given time frame to move forward in a mission mode. It is ironical that on one side we are testing and releasing

pesticides on a regular basis and on the other we can not release biotech products.

The stakeholders attending the meeting strongly felt that we must not miss this opportunity and must not let misconceptions prevail in the interest of our farmers, as well as our country. It was general consensus in the meeting that we should adopt a proactive approach to correct the wrong perceptions in the minds of both the public and policy makers. Finally, the stakeholders felt convinced that there is a need to build the same confidence and establish the same holy alliance that had led us to achieve the first Green Revolution in mid-sixties or else our dream for the second Green Revolution will never be realized.

Hence, let us not let our dream shatter. The participants felt that the stakeholders must rise and let their views known rather than being on receiving end. Let there be an extensive debate on pros and cons and the genuine concerns, if any, be debated. At the same time, let us express our views boldly to change the mind set of those who seem to have been wrongly informed and thus lost faith in both science and scientific community.

We, therefore, resolve to adopt the following recommendations emerging from this interface on GM food crops and urge to take immediate action for their speedy implementation in the best interest of our resource poor farmers.

## Recommendations

- The second Green Revolution is needed in India especially for our nutrition security, since India has the maximum concentration of malnourished children and anemic pregnant women in the world. We also need good nutrition rather than food alone. For this, the use of GM technology is highly relevant in the present context. This technology offers new options to enhance nutrition security through designer grain, oilseed, pulse, fruit and vegetable crops and to meet the challenges of biotic and abiotic stresses as well as those of global climate change. Moreover, the poverty of small holder farmers can be overcome by providing them new technologies that can reduce cost on inputs, build resilience in farming and increase their income by linking to the markets. In this context, we do see a prominent role of biotechnology, which needs to be harnessed on priority.
- Development and adoption of appropriate GM technologies would need a mission mode approach for which a strong public research system needs to be built /strengthened. Along with public sector, the private sector investments on GM technologies have to be enhanced for which an enabling environment is a must. Appropriate protocols and IPR regimes need to be developed to encourage public-private partnership.
- There is an urgency now for the prioritization of crops in order to effectively use GM technologies for improving specific traits. To achieve this, a National Mission on GM food crops be initiated soon, being a national priority, jointly by DBT and ICAR. It should be a time targeted and well monitored program linked to specific outputs.
- It was strongly felt that the Biotechnology Regulatory Authority of India (BRAI) Bill, which is already with the Parliament, must be cleared soon and a strong message in this regard needs to be sent to all concerned policy makers and authorities since we have already lost valuable five years. The proposed BRAI is also recommended in order to ensure a single window system for testing, clearance and monitoring. At the same time, the regulatory system should not be too stringent to slow down the release process.
- The biosafety regulatory system, though well defined and in place, needs to be



made more efficient and fool proof so as to facilitate effective and safe application of biotechnology. We need a clear and well defined pathway and transparent system for which there is an urgent need to establish a few accredited laboratories in reputed public sector institutions like NIN, IARI, CDRI, etc. having excellent infrastructure with modern equipments and well trained staff. Accreditation of some of these public sector laboratories is a must in order to build much needed public confidence. Also a referral laboratory needs to be established so as to deal with any dispute arising on account of variations in results of different laboratories. There is no mechanism existing presently for the seed testing of GM crops. Hence, efforts are needed to establish accredited laboratories for this purpose.

- There is also an urgency to have proper post-release monitoring system, for which a suitable mechanism be put in place jointly by ICAR and DBT. Also, need for undertaking survey on farmers' fields is justified in order to assess the uptake and impact of GM technologies. Socio-economic assessment should be an integral part of GM crops evaluation process. Also, opportunity costs of not adopting the technology should be a part of this assessment.
- Plant breeders and biotechnologists must join hands and work as one team to address specific research problems. Their efforts should be synergistic and not competitive. Similarly, strong public-private-partnership right from the beginning of the project, with needed

understanding, mutual trust and defined roles for research and benefit sharing, be encouraged through enabling environment. This is a must for faster delivery to the end users of agricultural biotechnology.

- Public perceptions about GM technology are often not based on scientific facts. Information communication system, including public extension and awareness services, need to be considerably improved in order to effectively deliver correct and unbiased information to farmers and the general public. Also, there is an urgent need to properly inform and educate people at all levels, including policy makers and planners, farmers, consumers and other stakeholders on all aspects of agricultural biotechnology and biosafety. Required communication tools must be used for effective delivery of knowledge.
- Priority investments are needed on capacity building, especially in areas of biosafety research, regulatory systems (including legal aspects), communication tools and IPR issues since they are all critical for outscaling innovations for greater impact.
- There must be a defined focus on agri-business and agri-biotechnology in the 12th Five Year Plan for which ICAR should take a major initiative and DBT must extend required funding support. Agri-business Platforms and Technology Parks have to be established for building much needed public-private-partnership and for faster delivery of GM products to both the farmers and consumers.

## Acronyms & Abbreviations

APCoAB	: Asia-Pacific Consortium on Agricultural Biotechnology	IARI	: Indian Agricultural Research Institute
BRAI	: Biotechnology Regulatory Authority of India	ICAR	: Indian Council of Agricultural Research
CDRI	: Central Drug Research Institute	NAAS	: National Academy of Agricultural Sciences
DBT	: Department of Biotechnology	NGO	: Non Government Organization
GM	: Genetically Modified	NIN	: National Institute of Nutrition
GRM	: Genetic Resource Management	NRM	: Natural Resource Management
		TAAS	: Trust for Advancement of Agricultural Sciences





# Recent Publications

## APCoAB publications

- Micropropagation for Production of Quality Banana Planting Material in Asia-Pacific, 2011
- Expert Consultation on Biopesticides and Biofertilizers for Sustainable Development Proceedings, 2010
- Bt Cotton in India- A Status Report (Second Edition), 2009
- Expert Consultation on Agricultural Biotechnology for Promotion of Food Security in Developing Countries - Proceedings, 2008
- Production and Cultivation of Virus-Free Citrus Saplings for Citrus Rehabilitation in Taiwan, 2008
- Biosafety Regulations of Asia-Pacific Countries, 2008
- Micropropagation for Quality Seed Production in Sugarcane in Asia and the Pacific, 2008
- Tissue Culture Innovations for Production of Quality Potato Seed in Asia-Pacific Region, 2007
- Brainstorming Session on Models of Public-Private-Partnership in Agricultural Biotechnology- Highlights and Recommendations, 2007
- Workshop on Biosafety Regulations for Transgenic Crops and the need for Harmonizing them in the Asia-Pacific Region- Highlights and Recommendations, 2006
- Bt Cotton in India- A Status Report, 2006
- Commercialization of Bt Corn in the Philippines - A Status Report, 2005
- Brainstorming Session on Public-Private-Partnership in Agricultural Biotechnology - Highlights and Recommendations, 2005

## TAAS Publications

- Overcoming the World Food and Agriculture Crisis through Policy Change, Institutional Innovation and Science. Fourth Foundation Day Lecture, delivered by Dr. Joachim von Braun, Director General, International Food Policy Research Institute, Washington, March 6, 2009
- Brainstorming Workshop on Emerging Challenges before Indian Agriculture - The Way Forward, March 6, 2009 - Proceedings & Recommendations
- Brainstorming Workshop on Strategy for Conservation of Farm Animal Genetic Resources, April 10-12, 2009 - Ranchi Declaration
- Brainstorming Workshop on Strategy for Conservation of Farm Animal Genetic Resources, April 10-12, 2009 - Proceedings
- Brainstorming Workshop on Climate Change, Soil Quality and Food Security, August 11, 2009 - Proceedings & Recommendations. (English and Hindi)
- Fourth Dr. M.S. Swaminathan Award for Leadership in Agriculture - A Brief Report, August 11, 2009
- Millions Fed: Proven Successes in Agricultural Development, January 19, 2010 (Translation in Hindi) jointly published by IFPRI, APAARI and TAAS
- National Seminar on Quality Seed for Food Security through Public-Private Partnership, April 13-14, 2010 - Proceedings & Recommendations
- TAAS Foundation Day Lecture on Climate Change and Food Security: From Science to Sustainable Agriculture by Dr. Mahendra M. Shah, May 7, 2010
- NSAI Foundation Day Lecture on Revitalizing Indian Seed Sector for Accelerated Agricultural Growth, October 30, 2010

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