

## **PREPARATION OF THE REPORT ON GM CROPS UNDER THE AUSPICES OF ACADEMIES**

### **Preliminaries**

The letter given below, with minor changes pertaining to contact address, was sent to the respective Fellowship during 5 to 8 April, 2010 by the Presidents of the three Science Academies.

Dear Colleague,

At the suggestion of Shri Jayaram Ramesh, Minister of Environment, and Dr. K. Kasturirangan, Member, Planning Commission, the Presidents of Indian Academy of Sciences, Indian National Science Academy, Indian National Academy of Engineering, National Academy of Agricultural Sciences, National Academy of Medical Sciences and National Academy of Sciences (India) and a few experts had a meeting with them at INSA on 19 March. Arising out of the very productive discussions at that meeting, Shri Ramesh has sought from the Academies

(a) a detailed report on the subject of biotechnology in food crops with focus on transgenic crops (letter attached) and (b) review of and comments on the draft Biotech Regulatory Authority bill

This initiative presents us with a wonderful opportunity to work together on a very important policy issue. The logistics of doing so could be formidable and we have to go step by step in a coherent manner. As a first step, we would like to request those interested to send by e-mail to Dr. Seema Mandal at INSA ([sci-soc@insa.nic.in](mailto:sci-soc@insa.nic.in)) before 20 April, 2010,

(a) Your preliminary views on transgenic crops and your interest in participating in the discussions on the project  
and (b) Your interest in participating in the discussion on the Bill.

With regards,

Yours sincerely

A Similar letter was sent by the President of National Academy of the Medical Sciences to the Fellowship of that Academy. The Presidents of the Indian National Academy of Engineering and the National Academy of Agricultural Sciences indicated that they would nominate Fellows from their respective Academies.

The three Science Academies invited all those who showed interest for the brain storming meeting on June 1. The other three Academies nominated a few identified fellows each. All of them were also invited. From among them, the list of those who participated in the brain storming meeting is given in Annexure 1. The responses of all those who showed interest and the documents brought to attention by them were made available to the participants.

### **The report prepared for limited circulation**

The report, subsequently prepared on the basis of the above discussions and inputs, was made available to the Government and the Fellowship. It was hoped that further inputs and feedbacks could strengthen it. However, perhaps inevitably, the document became an object of wide public discussion. One glitch was acknowledged and appropriate corrections promised. In the report, a long narrative is preceded by a Preamble, a description of the issue and an enunciation of the approach. The report concludes with a Summary and a set of Recommendations. Among the different sections, that on the approach and that containing recommendations are perhaps the most important. They are fully reproduced below.

#### **“The approach**

The scientific approach does not involve absolute certainties. Some uncertainties are likely to remain in every conclusion. An action is proposed based on the balance of evidence obtained from experimentation, observation and logical reasoning. Scientific conclusions also do not involve absolute unanimity. There is no central authority which directs or controls scientific pursuit. It is important to minimize uncertainties and to strive towards broad consensus. However, to make action contingent on elimination of all uncertainties and unanimity among scientists, would be a sure prescription for inaction. Most of the scientific advances, which helped to shape the world as we see today, have been accompanied by uncertainties as well as dissenting voices. While inaction is undesirable, as mentioned earlier, it is important to continuously strive to minimize or eliminate uncertainties and to build the broadest possible consensus.

All human activities and beneficial technologies cause some environmental perturbations and also involve some risk. Introduction of agriculture millennia ago certainly affected the natural environment. Modern means of transportation involve elements of risk. There is no drug which is entirely devoid of side effects. Wisdom lies in adopting technologies and practices, the benefits from which far outweigh the harmful effects and in not taking undue risks. Gluten allergy cannot be a reason for stopping cultivation of wheat. We should also remember occasions when unexpected harmful effects ensued from practices which appeared to be almost wholly beneficial to start with. Therefore, utmost caution should be exercised when introducing new practices and technologies. New technologies and practices should be introduced only after ascertaining that the deleterious effects caused by them are well within reasonable limits and are very small compared to the benefits accruing from them.

Any vibrant scientific community is characterized by a measure of plurality in views and approaches around some widely accepted principles. The scientific community of India is no exception to this observation and this plurality was reflected in the written and spoken comments of the Fellows of the Academies. However, the overwhelming common thrust of the views of the Fellows was very clear. This report builds on it while paying adequate attention to all shades of opinions and concerns.

Much has been written and several evidences have been produced for and against GM crops. Different shades of opinion have also been expressed on the subject. It is not necessary to repeat or refer to all of them. The attempt here has been to formulate a set of conclusions and recommendations, based on the approach enunciated above, in the light of the spoken and written comments of the Fellows, and the document brought to attention by them.”

### **“Recommendations**

1. After taking into consideration all available evidences and opinions, the overwhelming view is that transgenic crops, along with traditional breeding, molecular breeding and other innovative alternatives, should be used for sustainable agriculture to meet the increasing food, feed and fiber demand of the growing population of India. GM crops are not a panacea, but they should be an important component of our strategy. Decisions have to be made on a case to case basis.
2. GM crops which are already in use and which are proposed to be introduced, should be continuously studied for environmental and health effects. Post-introduction monitoring is as important as studies prior to introduction. Particularly, in relation to food crops, perceptions are nearly as important as facts. Sometimes, it is difficult to easily distinguish between the two. Therefore, facts as well as perceptions need to be adequately addressed. For instance, while use of antibiotic resistance selection markers in present day transgenics do not seem to compromise biosafety, use of alternative as well as marker free technology should be encouraged.
3. While the role of the private sector in the development of GM crops is important, food security is too critical and strategic an area to be left wholly or predominantly in private hands. The main responsibility for the development of transgenic technology in the country should rest with publicly funded institutions. This calls for massive government investment in the programme. Capacity should be expanded and further strengthened for designing and implementing different biosafety tests of international standards, including those for long term effects, where necessary. Mechanisms should also exist for sharing experience and expertise among different institutions. A PPP model may be considered for commercialisation.
4. The available scientific evidence does not indicate any appreciable effect of GM crops on biodiversity. However, it is necessary to address the perceptions in relation to this issue. In any case, biodiversity is seriously threatened on account of other human

activities. Therefore, the effort at collection, conservation and preservation in relation to biodiversity needs to be further strengthened.

5. An independent high-power expert committee, with a strong component of scientists, should be in place to oversee efforts involving transgenics in the country. This committee should be entrusted with the responsibility of strategic planning and establishing priorities in the area. For example, transgenics to improve nutrition and combat abiotic and biotic stresses are a priority for India.

6. The regulatory mechanism in place in India for approval of release of transgenic crops is strong. However, the same is not true about monitoring after release. A specific mechanism should be created for post-release monitoring, which should include provisions for providing effective technical advice to the farmer.

7. The issue of Bt brinjal deserves special attention in terms of its immediate relevance. The overwhelming view is that the available evidence has shown, adequately and beyond reasonable doubt, that Bt brinjal is safe for human consumption and that its environmental effects are negligible. It is appropriate now to release Bt brinjal for cultivation in specific farmers' fields in identified states. Appropriate distance isolation needs to be maintained, although no deleterious environmental effect is anticipated. The performance in the field, in all its aspects, should be monitored by an independent committee which should not include the suppliers or their representatives. The limited release of Bt brinjal need not wait for the establishment of BRAI.

8. Development of resistance to Bt is a real concern. Therefore, in parallel with the introduction of Bt brinjal, efforts for gene stacking should be seriously pursued preferably in publicly funded organizations. Improvements such as the elimination of antibiotic resistance selection markers, should be seriously explored. Efforts should also be made to treat Bt as part of the Integrated Pest Management strategy.

9. Immediate steps should be taken to restore confidence and allay fears that the moratorium would influence research on transgenics and their use on individual merit. Spreading public awareness on Bt brinjal, indeed transgenics in general, is important and mechanisms for doing so should be set up. Transparency should be maintained in methods of testing, different procedures, results and impact assessment.

10. The National Bureau of Plant Genetic Resources (NBPGR) already holds 4350 accessions of brinjal germplasm. In parallel to the limited release of Bt brinjal, NBPGR along with other concerned persons, should work towards ensuring that the collection is as exhaustive as possible.

11. As indicated earlier, there does not seem to exist any reasonable doubt on the biosafety of Bt brinjal. However, particularly to address public concerns as well as to doubly ensure biosafety, a group of experts or/and institutions should be constituted for conducting post market surveillance study of short, medium or long term health hazards, if any, of Bt brinjal and other genetically modified food items. This group should regularly submit its follow up report to the Government/Regulatory Body.

It might be appropriate to end this report with two quotations, one from a joint statement of six major Academies of the world and the other from an article by the acknowledged leader of Green Revolution.

“.....GM technology, coupled with important developments in other areas, should be used to increase the production of main food staples, improve the efficiency of production, reduce the environmental impact of agriculture, and provide access to food for small-scale farmers.” –*the Royal Society of London, the US National Academy of Sciences, the Brazilian Academy of Sciences, the Chinese Academy of Sciences, the Indian National Science Academy, the Mexican Academy of Sciences, and the Third World Academy of Sciences, In **Transgenic Plants and World Agriculture (2000)**, Document made available by the Indian National Science Academy, New Delhi*

“The affluent nations can afford to adopt elitist positions and pay more for food produced by the so-called natural methods; the 1 billion chronically poor and hungry people of this world cannot. New technology will be their salvation, freeing them from obsolete, low-yielding, and more costly production technology.” –*Dr. Norman E. Borlaug (Nobel Prize Laureate for Peace 1970), Plant Physiology (2000). 124, 487-490”*

### **Explanatory notes**

As is to be expected when dealing with a highly controversial area, there have been much public discussion, although the document was not meant for that at this stage. A detailed consideration of all the comments is not appropriate now. Yet some clarifications are called for.

No unanimity or certainty is claimed. The recommendations are based on overwhelming views or views held by a vast majority.

The report is not meant to be the result of a new scientific investigation. It is meant to convey opinion on the basis of investigations already conducted. A report of this type may or may not contain references or footnotes. There have been reports by Academies in the past without references or footnotes. In the present instance, references could have been added in the initial stage itself and can be given now. Then, of course, the controversy can shift to which references have been and have not been cited.

In public discourse, only one of the 11 recommendations figured prominently. The first six recommendations enunciate a national strategy on GM Crops. The remaining five primarily deal with Bt brinjal. One of them is on limited release of Bt brinjal. The rest deals with concerns. The view that these correspond to the opinion of one person, could perhaps have resulted from inadequate perusal of the recommendations or insufficient attention to them. They emanated from the collective wisdom of the bulk of the participants in the discussion.

The recent discussions have led to a few more suggestions to strengthen the report. They also need to be carefully considered. The intense pressure from interested groups and media attention do not help free discussion. Reports of premature comments from those in authority, if correct, are also not conducive to free and uninhibited discussion. However, the Fellowship has sufficient maturity and spirit of independence to proceed further without fear or favour.

### **Annexure 1**

List of participants in the June 1, 2010, Brain Storming Session

IP Abrol  
Mahtab S Bamji  
A Banerji  
KC Bansal  
CR Bhatia  
Dipankar Chatterjee  
Bharat Bhusan Chattoo  
VS Chauhan  
Atul Chokshi  
Malavika Dadlani  
Bhudev C Das  
Asis Datta  
KK Datta  
SK Datta  
Vibha Dhawan  
SN Gaur  
PS Goel  
HS Gupta  
PK Gupta  
VP Kamboj  
PC Kesavan  
Jayant Modak  
D Mukhopadhyay  
HY Mohan Ram  
Indira Nath  
Oommen V Oommen  
G Padmanaban  
R Rajaraman  
Prema Ramachandran  
Arjula R Reddy  
Asha Chandola Saklani

PV Sane  
B Sesikera  
PK Seth  
Balram Sharma  
Manju Sharma  
NK Singh  
KK Talwar  
PN Tandon  
Akhilesh Tyagi  
S Varadarajan  
Anupam Varma  
M Vijayan  
VK Vijayan  
MP Yadav  
S Yashonath

### **A request**

Factual errors, if any, may kindly be communicated by those involved to [sci-soc@insa.nic.in](mailto:sci-soc@insa.nic.in) with a copy to [esoffice@insa.nic.in](mailto:esoffice@insa.nic.in)