Document

The Chennai Declaration: Bridging the Genetic Divide*

1. Indian Agriculture is at the crossroads. On the one hand, the hard working small farm families of India have demonstrated that they will produce more and keep the country self-sufficient in its food requirements, if they are helped to do so through mutually reinforcing packages of technology, services and public policies, particularly in the areas of input and output pricing and producer oriented marketing. On the other hand, Indian agriculture, in addition to its traditional vulnerability to the vagaries of the monsoon, is also becoming very sensitive to the vagaries of the market. Suicides by farmers are growing and the year 2002 has been a particularly cruel year for farmwomen and men due to the integrated onslaught of an aberrant monsoon and an unfriendly market, partly arising from external trade conditions. Building sustainable Climate Management and Trade Security Systems have become extremely urgent tasks, if the agricultural progress so far achieved is to be sustained and expanded to dry farming areas. Agriculture, including crop and animal husbandry, fisheries, forestry and agro-processing and agri-business, is the backbone of the livelihood and ecological security systems of the country, in addition to being the foundation for a national food security system. Also, past experience shows that agricultural progress is the best safety net against hunger and poverty, since it provides enduring social protection to the majority of people of the country.

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2. The four pillars of sustained agricultural progress and agrarian prosperity are: technology, training, techno-infrastructure and trade. Globally, two cultures of agriculture are emerging – one prevailing in industrialised countries, where the size of land holdings is large and where farmers are supported by heavy inputs of technology, machinery, capital and subsidy. For example, the 10 million large farmers of USA and OECD countries receive over a billion US dollars of subsidy each day. In contrast, the 110 million farming families of India, in general, struggle to produce under conditions of smallholdings and poor access to technology, farm equipment, capital and remunerative markets. There is a growing mismatch between production and post harvest technologies resulting in much spoilage and little value-addition to primary products. This is particularly true in horticultural commodities. Our reaching the number one position in the world in milk production, has, however, shown that given a systems approach to production, processing and producer oriented marketing, small-scale farming will be a strength and not a handicap.

3. An ever-green revolution leading to enhancement of productivity in perpetuity without associated ecological or social harm can be achieved only if we pay attention to pathways which can help to achieve revolutionary progress in enhancing productivity, quality and value-addition (both through farming systems diversification and agro-processing). Such revolutions are essential both for meeting the needs of the emerging Indian Common Market catering to over one billion persons, and for becoming competitive in the global market. Above all, the smaller the farm, the greater is the need for marketable surplus in order to generate cash income for the family. The productivity, quality and value addition revolutions have to be achieved under conditions of diminishing per capita arable land and irrigation water availability, expanding biotic and abiotic stresses, and fast changing consumer and market preferences. This will call for mobilising the best in both traditional wisdom and technologies and frontier science. Among frontier technologies relevant to the next stage in our agricultural evolution, the foremost is biotechnology.

4. India is a mega biodiversity country. Biodiversity serves as the feedstock for the biotechnology industry and hence India has a natural

advantage in becoming a world leader in food and agricultural biotechnology. The term, "Biotechnology" encompasses a wide range of technologies – both traditional and frontier. For example, the production and use of biofertilizers, biopesticides, vermiculture, and bioremediation agents are essential for fostering ecologically sustainable farming methods. Bioprocessing and bioprospecting offer new opportunities for skilled jobs and livelihoods. These areas of biotechnology also offer scope for decentralised village level enterprises operated by self-help groups. The area of biotechnology which, however, has evoked public, professional and political concern and apprehensions is recombinant DNA technology or genetic engineering, which affords opportunities for generating novel genetic combinations through parasexual methods of transfer of genetic material. This area of research gained momentum with the discovery of the double helix structure of the molecule of deoxy ribose nucleic acid (DNA), which is the chemical substance of heredity, by James Watson and Francis Crick in 1953.

5. The apprehensions relating to molecular genetics and genetic engineering fall under the following broad categories:

- Issues relating to science itself, such as its ethical implications and the problems associated with the antibiotic markers used.
- Issues relating to the control of science such as the probability of the control of global food security falling into the hands of a few transnational corporations.
- Issues relating to access, such as the implications of IPR for the poor, technologies becoming more exclusive than inclusive leading to a further expansion of the rich-poor divide in terms of technological empowerment.
- Issues relating to the environment, such as impact on biodiversity, possibility of "genetic pollution" in the centres of origin and diversity of crop plants emergence of super weeds.
- Finally, issues relating to human and animal health and food safety and allergenicity, which are extremely important in the case of food, feed and fodder plants.

Of the above, the ethical issues assume greater importance in medical biotechnology in areas such as human cloning. A disaggregated approach to the study of the above issues will be important for a rigorous analysis of risks and benefits. If a disaggregated approach is not used to analyse the issues involved, the conclusions arrived at international meetings that will tend to deal with them in a composite manner as will be clear from the following statement made by NGO and civil society organisation at the World Food Summit +5 meeting held in Rome in 2002.

"Genetically Modified Organisms represent a threat to family farmers, other food producers, the integrity of genetic resources and human and environmental health. They will affect particularly the rural poor, who cannot afford this costly alternative"

6. The benefits of molecular breeding techniques like the use of molecular markers and undertaking precision breeding for specific characters through recombinant DNA technology are immense. The work already done in India has revealed the immense potential for breeding new GM varieties possessing tolerance to salinity, drought, some major pests and diseases and improved nutritive quality. A new era of Integrated Mendelian and Molecular Breeding has begun.

This is the only way we can face the challenges of the future, particularly in the context of the growing water scarcity as well as the urgent need to step up productivity in semi-arid and dry farming areas. Denying ourselves the power of the new genetics will be doing great disservice to both resource poor farming families and to the building of a sustainable national food and nutrition security system. Food self-sufficiency is essential for preserving our national sovereignty in foreign policy. There is no time to relax on the food production front.

7. Scientific progress in the areas of functional genomics, proteomics and the use of genetic modification techniques in medicine and agriculture, is spectacular. During the last 50 years, a majority of Nobel Prizes in Physiology and Medicine have gone to molecular biologists. The 21st century

will belong to those who help to advance the frontiers of science and technology in the areas of functional genomics, proteomics, bioinformatics and molecular breeding (ie, genetic modification). Scientific leap-frogging in both the theoretical and applied aspects of the new genetics will take place mostly in industrialised countries. China is fast becoming a developed country in respect of achieving mastery of techniques relating to genomics and recombinant DNA technology for improving human nutrition and health. India will experience serious genetic divide, if we do not have a well defined and forward looking national policy in the field of food and agricultural biotechnology. A similar policy is also needed in the area of medical biotechnology which involves ethical issues with reference to both human and animal experiments.

8. The country has well defined policies in the fields of atomic energy, space applications and information technology. No further time should be lost in developing a National Food and Agricultural Biotechnology Policy through political consensus. The present paper is designed to assist in the preparation of such a National Policy statement, which can guide the national agenda and endeavour as well as resource allocation for this sector of science.

Implementing the National Food and Agriculture Biotechnology Policy

9. Any policy without an appropriate and effective implementation framework will have no value. Therefore, the Policy should provide the terms of reference to an autonomous and professional Biotechnology Regulatory and Advancement Commission. The aim of regulation should be to help in harnessing this powerful technology in a risk free and responsible manner. The Commission should not only develop and enforce a code on "dont's", but should also propose "dos", which will help to gain benefits without risks. It should build on the Cartagena international protocol on biosafety and introduce a system of regulation and monitoring which inspires public, political and media confidence. Regulation for the responsible advancement of biotechnology for public good should be the motto. The

National Biotechnology Regulatory and Advancement Commission, which could be attached to the Ministry of Agriculture for administrative purposes, should be headed by an eminent professional known for objectivity and credibility. There should be a multi-stakeholder representation on the Commission and its standing Committees, including scientists, concerned government officials, representatives of public and private sector industry, consumer and womens' associations, farmers' associations and the mass media. Such a Commission will be effective only if it is created on the basis of consensus among political parties.

10. The Following could be some of the important responsibilities of the Commission

- Create the expertise and infrastructure needed to undertake a critical and transparent scientific assessment of the food and environmental safety of GM crops.
- Coordinate the work of the Ministries of Agriculture, Health, Environment and Science and Technology (DBT) in the area of biosafety assessment.
- Provide guidelines for research collaboration between public and private sectors in areas such as functional genomics, proteomics and bioinformatics as well for priorities in public investment, as for example research on drought tolerance, water use efficiency and salinity assistance.
- Assist in fostering linkages among biodiversity-biotechnology-biosafety management, conservation of habitats rich in agro-biodiversity should receive special attention
- Monitor the role of the biotechnology industry in assisting the effective implementations of the Protection of Plant Varieties and Farmers' Rights Act and the Biodiversity Act.
- Help to upgrade patent offices and develop expertise in dealing with issues connected with the Trade Related Intellectual Property Rights (TRIPS) regime of WTO.
- Promote regional and international biosafety collaboration, particularly among SAARC and ASEAN countries.

- Serve as a single window regulatory and monitoring agency and develop and introduce a time bound regulatory process.
- Help to create public awareness and understanding on issues relating to biosafety and biotechnology in local languages and vernacular media.
- The Commission should submit an annual report to parliament on the State of Food and Agricultural Biotechnology in India.

11. In order to build the national capacity in all areas of risk assessment and biosafety valuation and monitoring, it will be useful to set up a National Research Centre for the Safe and Responsible Use of Genetically Modified Crops. Such a National Research Centre could provide the scientific and technical support needed by the proposed National Biotechnology Regulatory and Advancement Commission. The centre should maintain a global database on biosafety assessment procedures and legislation. It should undertake training, capacity building and networking in the field of biosafety evaluation. Ultimately, considerations of human health and environmental safety should be the bottom line in risk assessment.

12. India has made striking progress in both basic and applied biotechnology as related to medicine and agriculture. The country has also a reasonably well developed infrastructure for biotechnology research and education. Therefore, the country is in a position to move forward vigorously in mobilising the power of biotechnology for strengthening the national food, water, livelihood and environmental security systems. However, to tap this opportunity, we need a well defined and forward looking policy for food and agricultural biotechnology research, training and development.

Guidelines for Contributors

References: A list of references cited in the article and prepared as per the style specified below should be appended at the end of the article. Reference must be typed in double space, and should be arranged in alphabetical order by the surname of the first author. In case more than one work by the same author(s) is cited, then arrange them chronologically by year of publication.

All references should be embedded in the text in the anthropological style – for example '(Hirschman 1961)' or '(Lakshman 1989:125)' (Note: Page numbers in the text are necessary only if the cited portion is a direct quote)

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The following example illustrate the detailed style of referencing:

(a) Books:
Hirschman, A.O. (1961), *Strategy of Economic Development*. New Haven: Yale University Press.

(b) Edited volumes:
Shand, Ric (ed.) (1999), *Economic Liberalization in South Asia*, Delhi:Macmillan.

(c) Articles form edited volumes:
Lakshman, W.D. (1989), "Lineages of Dependent Development: From State Control to the Open Economy in Sri Lanka', in Ponna Wignaraja and Akmal Hussain (eds), *The Challenge in South Asia:* Development, Democracy and Regional Cooperation, pp. 105-63. New Delhi: Sage.

(d) Articles from Journals:
Rao, M.G. K.P. Kalirajan and R.T. Shand. (1999), 'Convergence of Income across Indian States: A Divergent View', *Economic and Political Weekly*, 34(13): 769-78

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(e) Unpublished Work:
Sandee, H. (1995), 'Innovations in Production', unpublished Ph.D thesis. Amsterdam: Free University