

The region should set up a common forum to challenge infringements and violations pertaining to use of biological resources and indigenous knowledge.

The region should have a mechanism like an Inter-Regional Standing Committee for early warning, containment and emergency responses to accidents like unintended release of genetically modified organisms (GMO).

The region should have a common position in international negotiations and intervene strongly in follow-up negotiations.

The indigenous technology of the area should be collected and ownership established over this and over the resource itself. Patenting and extensive use of traditional practices must be prohibited unless there is adequate compensation to the community.

Countries should exercise control over export of their biological resources on the same stringent level as export controls over 'dual-use' technology for national security and foreign policy reasons.

The voluntary sector must be strengthened.

Constitutionally-guaranteed rights over resources should be given to all communities that have been living for, say a hundred years, in forest

and other reserved areas, sanctuaries and national parks. The management of these areas must involve these communities in a way that they have a major voice in the management of the area.

- Every organization - governmental or non-governmental, funded wholly or partially by public money, must be transparent and accountable for its statements and actions, and must be taken to task if any information that it presents is shown to be substantially wrong.
- Patent laws should be revised, where necessary, to prohibit the patenting of any living form (micro-organism, plant or animal) or of any product made directly by or from the living form. This provision would thus prohibit the patenting of any genetically engineered life-form, or a product such as azadirachtin derived from neem.
- Asian countries including India should design their own *sui generis* systems for protection of plant varieties, farmers' rights and breeders' rights. Their system should reflect the strengths and compulsions of gene-rich developing countries.
- Appropriate steps should be taken, both by the government and NGOs to make the people of the Asian region aware of their bioresources and of biotechnology; of the legal, so-

cial, moral, ethical, political and economic implications of modern biotechnology and of the role that biotechnology can play today in both conservation of bioresources and their utilization for development. An appropriate policy in regard of the above-mentioned use of biotechnology must be evolved and reviewed continuously in real time.

- As a rule, no foreign aid should be accepted for work in sensitive areas that relate to biodiversity and/or conservation unless it is ensured with full transparency that the aid being given has no conditions attached that would not be in national interest. This would obviously not apply to genuine bilateral or multilateral collaboration that permits free use and publication of the results of the research.
- Asian countries must come out with a viable and sensible science policy, technology policy and agricultural policy.
- Political organizations such as parliamentary scientific committees should play an important role in the evolution of the above-mentioned policies, by providing an interface between professional scientists and parliamentarians.

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## Biosafety concerns in biotechnology\*

The Convention of Biological Diversity (CBD), which has now been ratified by over 170 countries, contains several provisions related to biosafety and safe handling of biotechnology products. The question of developing an agreed international protocol for biosafety is being considered at meetings of an open-ended ad hoc working group of the

conference of parties to the CBD. It is hoped that an agreed biosafety protocol will emerge at the next conference of parties scheduled to be held in 1998. Such a development will enable all countries, particularly developing ones, to derive benefit from the striking progress made during recent decades in mobilizing the tools of molecular biology and biotechnology for achieving the goals of food and health security.

There is understandable public concern about the safety, equity and ethical aspects of biotechnology. Although one could ask, 'how safe is safe?', it is essential that scientists undertake a thor-

ough action-reaction analysis, using a systems approach. Public concerns must be addressed and fears allayed. The emerging challenges in the field of agriculture can be met only through appropriate integration of frontier science and ecological prudence. The Asia-Pacific region with a vast population and a high degree of poverty needs, in particular, all that science and technology have to offer in alleviating hunger and deprivation. This calls for greater R&D investment in low external input, sustainable agriculture and aquaculture technologies rooted in the principles of ecology, economics, and social and gender equity.

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Report of the Asia-Pacific workshop organized jointly by M. S. Swaminathan Research Foundation and Department of Biotechnology, Government of India with technical and financial support from Cornell University and USDA.

It is in this context that an Asia-Pacific Workshop on Biosafety with particular reference to the Environmental Impact Analysis of Transgenic Plants, held at the M. S. Swaminathan Research Foundation from 20 to 26 July, 1997, assumes importance. The well-attended workshop was designed to expedite the process of establishing scientifically credible and competent regulatory and field testing protocols.

The workshop was timely and was designed to promote capacity building in this region to use biosafety assessment and environmental impact assessment as tools for technology assessment and adopting biotechnology for agricultural development and international harmonization of biotechnology regulatory policies. It was hoped that would help in establishing credible and scientifically competent biotechnology review policies and protocols for reviewing agricultural biotechnology products in the Asia-Pacific region. In addition, the workshop was intended to help in articulating issues which should find a place in the proposed biosafety protocol to be included in the convention of biological diversity.

During the workshop, several issues of direct relevance to the field of genetic engineering and biotechnology, such as general environment impact assessment, biosafety and convention of biological diversity, effects on non-target organisms, concerns of gene transfer and gene introgression, integrated pest management, marker genes, genetically modified microorganisms, genetic engineering and food safety, international guidelines, perception of industrial, government, private and public sector and trade-related issues in agricultural biotechnology were discussed in great detail.

The participants were provided with hands on review on case studies related to transgenic Bt rice, herbicide-tolerant and virus-resistant transgenic plants. Four lively panel discussions, on the perception of scientists, government sector, industrial sector and mass media and a public forum on Biotechnology for Public Good formed part of the programme.

The participants of the Asia-Pacific Biosafety workshop on Environmental Analysis of Transgenic Plants urged the political and scientific leaders, the civil society and the mass media of countries in this region to promote accelerated efforts in mobilizing the tools of biotechnology and genetic engineering for improving the productivity, profitability, stability and sustainability of the major cropping systems of this region. It was pointed out that care should be taken to eliminate unacceptable risks with reference to human and animal food and health security as well as to basic life support systems through an effective biosafety and risk assessment and management mechanism established in accordance with the legally binding CBD.

The papers presented at this workshop have clearly established that biotechnology can become a powerful instrument of public good. The participants noted that in the Asia-Pacific region, some countries such as China, India, Japan and Thailand are already engaged the field testing and release of transgenic crops, while others are in different stages of finalizing the field testing aspects of their biosafety regulations. Genetic engineering is a young science and there is a need to go through a process of learning. This is where both caution and sharing of experience and information will be of particular value.

The participants suggested the following recommendations for the consideration of appropriate national authorities and scientific community. The prescribed regulatory agency should ensure that the transgenic material will not have unfavourable ecological repercussions before permission is granted for field trials. Once the material has been deregulated after being subjected to safety evaluation, the product could be commercialized by the agency which had submitted it to the regulatory authority. Every country should designate a National Focal Point (NFP) with reference to biosafety policy and implementation. Well-defined procedures will have to be introduced for material produced by indigenous R&D as well as those obtained from abroad. It is neces-

sary to tailor the management of safety procedures to the local social, cultural and agronomic practices. Careful cost-benefit analysis should be done before new materials resulting from recombinant DNA experiments are recommended for commercialization.

The workshop recommended that as part of the capacity-building exercise, Genetic Enhancement Centres could be set up in suitable institutions where novel genetic combinations could be produced for the use of breeders who can then develop location-specific varieties. As information empowerment of the civil society is the best insurance against unfavourable risks, the workshop suggested that there should be public debates and discussions on matters relating to risk assessment. The assessment procedures must be transparent and timely information should be provided to the public through the mass media. The participants also called for collaboration between public and private sector research institutions and benefit sharing.

The participants felt that as the Asia-Pacific region shares in common many crops and is also characterized by similarities in agro-ecological and socio-economic conditions, there is considerable scope for regional co-operation in biosafety regulation and implementation. Such regional co-operation will need adequate financial and trained manpower resources for being placed on a sustainable foundation.

The participants also recommended several specific suggestions in important areas relevant to biosafety, such as, (a) Biotechnology, biosafety and potential environment impact, (b) Impact of biotechnology on biodiversity, (c) Ethical concerns in biosafety reviews and environmental risk assessment, and (d) Harmonization, risk assessment, and funding for capacity building. The detailed recommendations have been published by the M. S. Swaminathan Research Foundation.

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