MAJOR ISSUES FOR PLANT GENETIC RESOURCES

THE CHALLENGES AHEAD

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The period between August 18, 1988 when the first Keystone International Dialogue on Plant Genetic Resources concluded at Keystone, Colorado, U.S.A., and January, 29, 1990, when the second Dialogue begins in Madras, India, has been marked by a widespread global awakening to the need for stepping up of efforts in establishing national and international institutional structures to help build food, nutrition and livelihood security systems for all children, women, and men for all times to come. The publication titled "Keeping Options Alive" published by the World Resources Institute brings together the reasons why the decade of the nineties will prove to be crucial in determining the fate of the global genetic estate.

I. PROGRESS

The progress made since August, 1988 in the technology of producing transgenic plant material has further enhanced the economic value of wild species of flora. Considerations of potential changes in global and local climatic conditions have resulted in the initiation of anticipatory research designed to help humankind to adapt to global change. Studies on adaptation to new patterns of precipitation, temperature and sea levels indicate the need for access to new gene pools. All these considerations have placed the topic of biological diversity high on the agenda for meetings of Heads of State. Thus during the past nine months, Heads of Government of (a) the Group of Seven Industrialised nations (G7), (b) Non-aligned countries and (c) the Commonwealth, have all stressed the need for preventing gene erosion and for protecting habitats rich in biological diversity.

A group of Eminent Persons invited by the UN Secretary General in October, 1989, to advise him on priority issues in Science and Technology recommended the setting up of an UN-FAO- UNEP Commission on Biological Diversity.

Besides the spread of awareness of the importance of biological diversity for achieving sustainable advances in biological productivity, several other significant developments have taken place, which have led to substantial progress in moving the Keystone process forward.

First, support both for *in situ* and ex situ and *in vivo* and *in vitro* conservation of biological diversity has grown. We now know that 230 years after Linnaeus, only about 1.5 million species have been named and described, although the total number of species on our planet may be as high as 30 million. Progress in genetic engineering has underlined the fact that there are no "useless species". Support for exploration, conservation and classification is therefore steadily increasing at all levels - national, bilateral and international governmental and non- government organizations.

Second, a significant advance was made at the third meeting of the FAO Commission on Plant Genetic Resources held at Rome from April 17-29, 1989 in achieving a consensus on methods of sharing the economic benefits arising from the utilization of plant genetic resources. The FAO Commission endorsed the concept of **Farmers' Rights** and urged all nations "to allow farmers, their communities and countries in all regions, to participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources, through plant breeding and other scientific methods". The FAO Commission further urged all countries "to assist farmers and farming communities, in all regions of te world, but especially in the areas of origin/ diversity of plant genetic resources, in the protection and conservation of their plant genetic resources, and of the natural biosphere".

Third, progress is being made in developing an International convention on the conservation of biological diversity *in situ* and *ex situ*. The draft convention prepared by IUCN is now being processed by UNEP for inter-governmental approval. This convention also provides a mechanism for funding *in situ* and *ex situ* conservation efforts and for the protection of the biosphere from all significant damaging impacts. It also provides a mechanism for the transfer of resources to allow implementation of the convention by the poorer countries which are also the custodians of much of the biological heritage of the earth.

II. CONCERNS

While these developments are encouraging, the fact remains that destruction of the habitats rich in genetic diversity is proceeding at an alarming pace. Some experts believe that between 1990 and 2020, species extinctions caused primarily by tropical deforestation may eliminate between 5 and 15 percent of the world's species (Reid and Miller, 1989). One example of the harm that can be done to future generations with reference to their ability to cope with new environmental situations such as a rise in ocean levels is the on-going damage to the mangrove ecosystem. Today, the mangrove ecosystem is one of the most threatened wetland types. These plants have genes providing tolerance to sea water intrusion. The rate of loss of mangrove forests is high. According to FAO statistics (1982, 1985), Thailand has lost 22 percent of its mangroves since 1961, while the Philippines has lost nearly half of the mangrove forests since the beginning of this century. Unless the remaining material is conserved, a valuable gene pool would have been lost for ever.

A second major area of concern is the poor response to the International Fund established by FAO for implementing the principles of the International Undertaking. Hence, a funding mechanism which will attract wider and larger support will be necessary to implement the concept of Farmers' Rights.

Third, issues relating to intellectual property rights and the Informal Innovation System at GATT are assuming importance in the context of new biotechnologies. WIPO (World Intellectual Property Organization) and UPOV (Union for the Protection of New Varieties of Plants) are discussing the need for possible changes in their rules to incorporate the products of biotechnological research. This has intensified the apprehensions of developing countries with regard to easy access to new technologies.

Finally, there is concern about the wholesomeness of foods arising from biotechnological research. Agreed guidelines for assessing wholesomeness will have to be prepared.

III. ACTION

1. National Strategy for the Conservation of Plant Genetic Resources

Every country should prepare a national strategy for conserving its biological wealth through appropriate *in situ* and *ex situ* and *in vivo* and *in vitro* methods. Highest priority should go to the conservation of ecological and economic key species and to the plants listed in the Red Data Books published by IUCN as well as national conservation Monitoring agencies. A priority task is to bring to a halt the further extinction of species and land races. Genetic, species and ecosystem diversity needs to be preserved through an integrated action plan involving Government and non-governmental organizations and professional institutions and universities. Appropriate bilateral and multilateral support - technical and financial - should be extended to countries needing such help both for developing and implementing an integrated genetic resources conservation strategy.

2. Establishment of Mechanism for Genetic Enhancement

Such work could be organized at suitable locations in the major centres of origin and diversification of crop plants, using the system proposed by N.I. Vavilov for determining the centres of origin. Specially designated centres should help plant breeders in developing countries to get breeding material possessing "candidate genes" for specific characters, particularly those conferring resistance/tolerance to biotic and abiotic stresses. Such a mechanism could be developed by the International Centre for Genetic Engineering and Biotechnology sponsored by UNIDO, in collaboration with appropriate national/international research centres in developed and developing countries. Such an arrangement would help developing countries to derive speedy benefit from advances in recombinant DNA technologies. The colloborative network on Rice Biotechnology developed by the Rockefeller Foundation is a good example of the kind of symbiotic partnership that can be fostered between scientists working in the forward edge of biotechnology and those engaged in practical rice breeding work. An appropriate blend of Mendelian and molecular genetics can be achieved through such research networks.

3. Institutional Structures

The Heads of State of government of seven seven major industrial nations and the President of the Commission of the European communities in their communique issued on July 16, 1989, stressed, "the increasing complexity of the issues relating to the protection of the atmosphere calls for innovative solutions. New instruments may be contemplated". The participants of the first Keystone Dialogue on Plant Genetic Resources made several suggestions relating to the strengthening of institutional structures at the national, regional and global levels. The time has come for finding agreed formulae for the following purposes.

a. Promoting the involvement of local communities in the conservation of genetic resources.

b. Achieving active cooperation among government agencies, Universities, private and public sector industry and non-governmental organizations in tasks relating to the collection, conservation, classification and utilization of plant genetic resources at the national, regional and international levels.

and c. Coordination of measures for the conservation of PGR and biological diversity at the global level and implementation of appropriate international conventions. Division of responsibilities among UN organisations and CGIAR institutions will have to be worked out.

4. Funding Mechanisms

It is now widely realised that unless developing countries are assisted speedily on a much larger scale, both financially and technically, to conserve their genetic wealth, loss of material at the genetic, species and ecosystem levels willcontinue. The severe debt serving burden faced by many developing nations further cripples their capacity to provide adequate resources for genetic conservation. Several suggestions have been made recently for establishing a global fund for environmental protection, with a separate window for the conservation of biological diversity. Contributions for such a fund may be both

mandatory (a small percentage of national GNP and contributions by industry for the Farmers' Rights Programme) and voluntary.

Such a Fund will have to be administered by a Technical Advisory Committee, as proposed at the first Keystone Dialogue at PGR. Priorities will have to be set and mechanisms will have to be developed to support the work of local NGOs as well as Universities and Government institutions.

It is hoped that agreed solutions to these issues can be developed soon, so that they can be formalised at the inter- governmental level at the 1992 U.N. Conference on Environment and Development.