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REPORTS FROM INTERNATIONAL ORGANIZATIONS ON THEIR POLICIES, PROGRAMMES AND ACTIVITIES ON AGRICULTURAL BIOLOGICAL DIVERSITY

- PART I, UNITED NATIONS AND OTHER INTER-GOVERNMENTAL ORGANIZATIONS

- PART II, INTERNATIONAL AGRICULTURAL RESEARCH ORGANIZATIONS ON THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

- PART III, INTERNATIONAL NON-GOVERNMENTAL ORGANIZATIONS

These reports have been submitted to the Secretariat of the Convention on Biological Diversity (CBD) by the Food and Agriculture Organization of the United Nations (FAO) as an information document to the Third Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA).

They were prepared for and presented to the Seventh Session of the Commission on Genetic Resources for Food and Agriculture, (May 1997) as CGRFA/7/97 Part I, II, III and Part III Corr. 1. (They are posted on the Internet at <http://www.fao.org/waicent/FaoInfo/Agricult/AGP/AGPS/PGR/CGRFA.htm> in English, French & Spanish)

Attention is drawn to this information document under Item 6 of the Provisional Agenda of the Third Meeting of the Subsidiary Body of Scientific, Technical and Technological Advice (SBSTTA).

May 1997

منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Organización de las Naciones Unidas para la Agricultura y la Alimentación

Item 6 of the Provisional Agenda

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Seventh Session

Rome, 15-23 May 1997

REPORTS FROM INTERNATIONAL ORGANIZATIONS ON THEIR POLICIES, PROGRAMMES AND ACTIVITIES ON AGRICULTURAL BIOLOGICAL DIVERSITY

PART III: INTERNATIONAL NON-GOVERNMENTAL ORGANIZATIONS

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REPORTS FROM INTERNATIONAL ORGANIZATIONS ON THEIR POLICIES, PROGRAMMES AND ACTIVITIES ON AGRICULTURAL BIOLOGICAL DIVERSITY

PART III: INTERNATIONAL NON-GOVERNMENTAL ORGANIZATIONS

INTRODUCTION

1. The Commission on Genetic Resources for Food and Agriculture is the only inter-governmental body where member countries, both donors of funds and technology and users of genetic resources, discuss matters specifically related to agricultural biological diversity. The Commission, while still the Commission on Plant Genetic Resources, regularly received reports from relevant international organizations, including FAO, on their policies, programmes and activities for the for the conservation and sustainable use of plant genetic resources. It considered that such reports would be of value both to the Commission, and to those organizations which would thereby be able to better acquaint countries that are donors of germplasm and funds with their objectives and programmes, and benefit from their comments.

2. At the Commission's Sixth Session, nine United Nations and other inter-governmental organisations, twelve International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR), and four international non-governmental organizations provided reports.[1] The Commission welcomed these reports, and thanked the organizations that had presented them. It felt that they provided the Commission and its member countries with very useful information on world activities on plant genetic resources for food and agriculture. It considered that such reports also contributed to the mutual enrichment of understanding, which would lead to a greater coordination and synergy in plant genetic resource activities. The Commission also considered it important to be regularly apprised of the activities of organizations active in the field of plant genetic resources for food and agriculture, and encouraged organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture. The Commission encouraged those organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture, such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Development Programme (UNDP), the World Intellectual Property Organization (WIPO), the Conference of the Parties to the Convention on Biological Diversity, the Global Environment Facility (GEF), l'Association de coopération des Universités partiellement ou entièrement de langue française (AUPELF), the World Wide Fund for Nature (WWF), and the Rural Advancement Fund International (RAFI). It also *asked* the Secretariat to invite relevant regional forums (the Council of Europe, the Southern Common Market (MERCOSUR) and the Junta del Acuerdo de Cartegena were mentioned) to submit reports to its future sessions. The Secretariat accordingly invited this range of organizations to submit reports to the present session.

3. In requesting reports to this session, the expansion of the Commission's mandate to cover not only plant genetic resources for food and agriculture, but all components of agricultural biological diversity of interest to food and agriculture has been taken into account in two ways: firstly, all organisations were invited to report on their activities in agricultural biological diversity generally;

[1] IFAD, UNCTAD, UNEP, UNIDO, UPOV, World Bank, WTO, AsDB, Commonwealth Secretariat; CIAT, CIFOR, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IITA, ILRI, IPGRI, IRRI, WARDA; ACWW, IUCN, GRAIN, ICUC.

and, secondly, invitations were sent to a number of organizations working in sectors of agricultural biological diversity other than plant genetic resources.

4. This document contains reports from the following *International non-governmental organizations*, received by 12 May 1997:

> the International Association of Plant Breeders (ASSINSEL), the International Centre for Underutilized Crops (ICUC), International Union of Forestry Research Organizations (IUFRO), Rare Breeds International (RBI), Rural Advancement Foundation International (RAFI).

5. The following *International non-governmental organizations* informed FAO that they would, for various reasons, not be able to report to this session:

> the Associated Country Women of the World (ACWW), the International Food Policy Research Institute (IFPRI), and the International Irrigation Management Institute (IIMI).

6. The Secretariat has limited itself to compiling the reports, as submitted. Each report is fully the responsibility of the organization submitting it. FAO's own activities are reported in documents CGRFA-7/97/8.1 and CGRFA-7/97/8.2.

7. Reports from United Nations and Other Inter-governmental Organizations are contained in document CGRFA-7/97/7 Part I, and reports from the International Agricultural Research Organizations of the Consultative Group on International Agricultural Research are contained in document CGRFA-7/97/7 Part II.

8. ICUC has organised several regional and international conferences. The most recent ones are: Genetic resources and Utilisation of Underutilised Crops in Southern and Eastern Africa, Nelspruit (1995) and International Conference on Domestication, Production and Utilisation of New crops: Practical approaches held in UK (1996).

9. The Centre in collaboration with CSC and under the aegis of FAO is arranging a meeting to develop a plan of action for the implementation of Agenda 12 of the Leipzig meeting. ICUC and FAO are preparing a Report for this meeting which will, hopefully provide guidelines for implementation of the Leipzig Agenda 12.

INTERNATIONAL UNION OF FORESTRY RESEARCH ORGANIZATIONS (IUFRO)

I. IUFRO's ROLE IN THE CONSERVATION OF FOREST GENETIC RESOURCES

1. As a union of forest research organizations IUFRO's role is to promote cooperation for research on methodologies that will be applicable to the conservation of genetic resources. In its Division 2 Physiology and genetics the activity of several Units is devoted to the enhancement of knowledge needed before envisaging any kind of conservation procedure. The protection and conservation is either envisaged for single species in pure natural stands under a local but possibly changing pressure of the environment (*in situ* dynamic conservation) or in *ex situ* conditions when needed (tree, seed, tissue collections : dynamic or static conservation). However, because a considerable number of species are scattered in mixed stands, an increasing effort is now devoted to studying ecosystem dynamics and biodiversity. Therefore other IUFRO Units are involved in the corresponding research coordination, for instance Research Group 8.07.00 Biodiversity.

2. Because the protection of forest resources is a political question and because it needs important technical and financial investments, the conservation per se is usually in the hands of national forest policy and management organisations. The role of national forest research institutes, with the possible involvement of international networks (like EUFORGENE in Europe), is generally limited to research on methodologies.

II. DIVERSITY

3. The first step of conservation is the acquisition of precise information on the genetic diversity of all forest trees. Although they were essentially created to cover species of high economic interest, all working parties (WP) of Research Groups (RG) 2.02.00 Conifer breeding and genetic resources and 2.08.00 Hardwood improvement, culture and genetic resources deal in essence with the description of the genetic diversity, whether in the natural range (with genetic markers and under a natural selection pressure) or in comparative tests (adaptation, resistance and yield under a variety of selection pressures). The combination of neutral and adaptive markers results in the partitioning of the natural range in to genetically homogeneous zones that may be continuous (clinal) or discontinuous (ecotypic). The zones will then be sampled for further conservation.

III. TOOLS

Two types of tools are studied in IUFRO Units :

(i) Tools for describing diversity : markers of all kinds (adaptive and resistance traits, morphometric traits, molecular markers). Most of the corresponding research is covered by the WPs of RG 2.04.00 Genetics:

- Population, ecological and conservation genetics,
- Molecular genetics of forest trees.

(ii) Tools for ex situ *static conservation* : tissue conservation (in vitro culture or cryopreservation), seed conservation.

IV. IUFRO POLICY

5. Soon after the creation of IUFRO most questions asked by foresters included the key-words adaptation to sites and natural abiotic factors, resistance to pests diseases and man-made abiotic factors, production and quality. IUFRO has played a tremendous role in describing the genetic diversity of species (international provenance and progeny comparison networks) and in promoting procedures for increasing the genetic gain on adaptive, resistance, production and quality traits. It

has also developed techniques for rapidly releasing this gain through generative (seed orchards) and vegetative methods.

6. Recently strong concern about the protection of our heritage has lead IUFRO, as most of the national and international fora, to invest in research on conservation methods. Fortunately, a large part of the previous investment is directly and immediately applicable to this question.

7. IUFRO offers its contribution and its worldwide network of scientists to cooperate with national and international organisations on the protection and conservation of our patrimony.

RARE BREEDS INTERNATIONAL (RBI)

1. RBI was formed in 1991 following an International meeting (Proceedings published as Genetic Conservation of Domestic Livestock ISBN 0-85198-669-2) at Warwick University, England, in 1989. This conference was organised by Lawrence Alderson on behalf of the Rare Breeds Survival Trust. The general mood of the 1989 conference was that much could be shared amongst non-government organisations that were interested in conserving rare breeds of domestic livestock. However, there was no organisation which could act as a coordinating and disseminating body between the increasing number of national and regional bodies that were being formed. RBI was constituted as a charitable organisation to fill that void.

2. RBI is run by a small Board of Directors representing most regions of the world. The Chair of the Board is rotated every 2 years, with the current Chair being Professor Hugh T. Blair from New Zealand. In August 1997, the Chair will be assumed by Mr. Keith Ramsay of South Africa. Membership of RBI is open to any organisation with an interest in conserving domestic livestock breeds. Cost of membership is scaled based on the relative wealth of the nation in which the organisation resides. Individuals can also become associate members of RBI.

3. Since the first conference at Warwick University, RBI has co-hosted two other international conferences; in Hungary in 1991 (Proceedings published as Genetic Conservation of Domestic Livestock, Volume 2 (ISBN 0-85198-809-1) and in Canada in 1994 (Proceedings published as Conservation of Domestic Livestock Genetic Resources, ISBN 0-9680337-0-9). A further conference is currently being planned in association with the Nepal Agricultural Research Council, to be held in Kathmandu from 17-21 August 1998.

4. The main problem confronting RBI is the lack of a full-time secretariat, and insufficient funds to promote itself. Since its inception, RBI has relied on the enthusiasm of unpaid Directors, most of whom are in alternate full-time employment. As a consequence they have limited time to devote to the promotion of the ideals of RBI. In particular, new organisations would benefit from the wealth of knowledge that exists regarding the establishment and ongoing servicing of conservation bodies.

RURAL ADVANCEMENT FOUNDATION INTERNATIONAL (RAFI)

I. RAFI ACTIVITIES SINCE THE LAST MEETING OF THE COMMISSION

1. Background: The Rural Advancement Foundation International (RAFI) is an international not-for- profit Civil Society Organization headquartered in Ottawa Canada, with a U.S. office in Pittsboro North Carolina and a Board of Trustees drawn from five continents. For twenty years, RAFI has conducted research, developed public education programmes, and undertaken policy analysis and advocacy on issues spanning agricultural biodiversity, the impacts of biotechnology, intellectual property, and the rights of Farmers and indigenous peoples. RAFI has produced many action-oriented publications on these topics. These include educational kits and eight books (in seven languages) published by such organizations as Sweden's Dag Hammarskjold Foundation, the United Nations Development Program, and the UN Food and Agriculture Organization. Since 1986, more than fifty issues of the RAFI Communique and RAFI Occasional Papers have provided up-to-the minute information for policy makers and civil society worldwide about trends in agricultural research, the life industry, and the evolution of intellectual property over life forms. Now available on the Internet, RAFI's publications are used regularly by people in 65 countries, and at many educational events. RAFI conducts national, regional, and international seminars on all of its issue areas.

2. RAFI does not stop at research and education. The organization uses its analysis in the multilateral arena, and work with NGOs from around the world to influence such decision-making bodies as the UN Food and Agricultural Organization and the Convention on Biological Diversity. They have challenged patents on crop species and human tissues, and have forced several plant and human patents to be revoked. Whether assessing the impact of biotechnology on farmers, or of bioprospecting and intellectual property regimes on indigenous peoples, RAFI analyses industry trends from a North-South and social justice perspective. As the first NGO to address these issues globally, RAFI provides timely research and leadership within a growing global network of non-governmental organizations concerned about the loss of genetic resources, monopolization of living organisms, and peoples' knowledge about them.

3. Recent Activities: In the six months since the last meeting of the Commission, RAFI has undertaken work related to genetic resources for food and agriculture focussing in the following areas.

3.1 *Leipzig Plan of Action:* RAFI supports the Global Plan of Action as adopted in Leipzig and, beginning late in 1996, began consultations with some governments, scientific institutions and Civil Society Organizations to develop programmes and projects compatible with the in situ (farmer-led) elements of the GPA. The focus of this work is primarily in sub-Saharan Africa and in Southeast Asia. In this practical work, RAFI functions as a policy and research resource in initiatives directed by grassroots CSOs. Some of the initiatives being developed involve new and creative relationships between local CSOs, farmers, and conventional research institutions.

Regrettably, RAFI has not been able to contribute to the GPA's work in developing an Early Response programme that would ensure farmers' access to their customary seeds in times of crisis. In the months ahead, RAFI hopes to work with community and institutional systems to guarantee such a programme.

3.2 *Genetic Resources and Food Security:* RAFI believes that an early response initiative for genetic resources constitutes an important contribution to food security and the World Food Summit's Plan of Action. Beyond this, however, RAFI is working with a number of colleagues and

organizations to implement other initiatives that link the work on genetic resources for food and agriculture to the Summit Plan. These areas include, in particular, the development of FIVMS (Food Insecurity and Vulnerability Information and Mapping System) that must incorporate mapping genetic diversity vulnerability. In collaboration with Cultural Survival Canada, RAFI will complete a preliminary map by mid-1997. Further, RAFI hopes to contribute to the Summit's development of the Right to Food by examining the elements of Farmers' Rights that should be incorporated into this wider right in order to safeguard the security of small producers. Finally, RAFI is working with many other CSO's in advancing the Summit's call for a Food for All Campaign which must, obviously, include concern for genetic resources. RAFI is hopeful that this Campaign can play a role in the agendas of FAO's regional biennial conferences in 1998.

3.3 Ex Situ *Collections:* Aware that the FAO-CGIAR agreement signed in 1994 must be reviewed between the time of this Commission and its next likely session, RAFI has undertaken work to evaluate the practical work of CGIAR Centres with respect to germplasm accessibility policy. Although we are convinced that the agreement should be renewed, RAFI believes that it must be strengthened to incorporate the duplicates of IARC accessions and any reformulating of assigned agreement material when it is made available to other parties. Further, RAFI has continued the work it began at Leipzig to monitor the activities of botanical gardens in order to ensure that these ex situ collections are managed in a manner compatible with the Biodiversity Convention.

3.4 *Background Studies:* Aside from its continuing publication of RAFI Communiques and Occasional Papers, RAFI staff have completed three background books on issues of importance to biodiversity. Although RAFI is not the publisher in every case, it is our understanding that each book will be freely- available and that full text copies are (or will be) available on the Internet. A brief summary of each follows:

- 1997 Human Nature: Biodiversity and Farm-based Food Security; written by RAFI for the UN Food and Agriculture Organization (FAO); for publication by FAO in 1997. The book offers an overview of genetic resources for food and agriculture including plants, livestock, marine, forest and soil resources.

- 1997 The Parts of Life, in Development Dialogue, (The Dag Hammarskjold Foundation, Uppsala, Sweden) by Pat Mooney of RAFI, for publication in 1997. This is the third in a trilogy that began with The Law of the Seed (1983) and The Laws of Life (1988) and provides an update on the political debates on genetic resources and the extension of the issues from plants to people.

- 1996 Enclosures of the Mind: Intellectual Monopolies (A Resource Kit on Community Knowledge, Biodiversity and Intellectual Property); written and published by RAFI. (Currently being translated into Spanish. Available on RAFI Website.) This is a primer for those new to intellectual property and Farmers' Rights issues. It offers extensive tables summarizing current debates and the status of the 'Life Industry'.

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PART III: INTERNATIONAL NON-GOVERNMENTAL ORGANIZATIONS

The attached page replaces ASSINSEL's report on page 3 of document CGRFA-7/97/7 Part III, where figures were missing in para 2.

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PART III: INTERNATIONAL NON-GOVERNMENTAL ORGANIZATIONS

INTERNATIONAL ASSOCIATION OF PLANT BREEDERS (ASSINSEL)

1. ASSINSEL, the International Association of Plant Breeders, and its members, representing more than 1,000 breeding companies from 26 countries in the world[1], consider that it is important to maintain plant genetic resources. Breeders were probably the first to get concerned about the necessity to maintain plant genetic resources for food and agriculture. They created the first gene banks in the 1930's.

2. A recent survey, made among ASSINSEL members in 1996, shows that:

- 88% of plant breeding companies have gene banks and are maintaining genetic resources;
- on average, plant breeding companies spend 5% of their research budget for maintaining genetic resources, which represents roughly US$ 50 million per year;
- 84% of breeding companies having germplasm maintenance programs, maintain obsolete varieties, 72% land races and 53% wild species. Wild species are in particular maintained by grass and vegetable breeders;
- 80% of plant breeding companies participate in national programs and 31% in international programs on conservation of genetic resources, either by financial assistance or technical participation or a combination thereof. The financial participation was higher than US$1.5 million in 1996.
- 50% of ASSINSEL members are participating in technology transfer, in particular toward developing countries, by training, adaptation of improved varieties and granting of licenses.

3. As already stated, ASSINSEL members are willing to participate in the Global Plan of Action adopted in Leipzig in June 1996, in particular regarding action 6, Regenerating threatened ex situ accessions, action 9, Expending the characterization, evaluation number of core collections to facilitate use and 13, Supporting seed production and distribution. ASSINSEL members can play a crucial role in the evaluation and pre-breeding of germplasm since success in these endeavours requires the expertise of plant breeders and those activities go beyond the bounds that traditional conservation can provide.

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1 ASSINSEL has members in the following countries: Argentina, Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Great Britain, India, Ireland, Israel, Italy, Japan, Kenya, Norway, Netherlands, New Zealand, Slovakia, South Africa, Sweden, Switzerland, United States of America.

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PART I: UNITED NATIONS AND OTHER INTER-GOVERNMENTAL ORGANIZATIONS

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REPORTS FROM INTERNATIONAL ORGANIZATIONS ON THEIR POLICIES, PROGRAMMES AND ACTIVITIES ON AGRICULTURAL BIOLOGICAL DIVERSITY

PART I: UNITED NATIONS AND OTHER INTER-GOVERNMENTAL ORGANIZATIONS

INTRODUCTION

1. The Commission on Genetic Resources for Food and Agriculture is the only inter-governmental body where member countries, both donors of funds and technology and users of genetic resources, discuss matters specifically related to agricultural biological diversity. The Commission, while still the Commission on Plant Genetic Resources, regularly received reports from relevant international organizations, including FAO, on their policies, programmes and activities for the for the conservation and sustainable use of plant genetic resources. It considered that such reports would be of value both to the Commission, and to those organizations which would thereby be able to better acquaint countries that are donors of germplasm and funds with their objectives and programmes, and benefit from their comments.

2. At the Commission's Sixth Session, nine United Nations and other inter-governmental organisations, twelve International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR), and four international non-governmental organizations provided reports.[1] The Commission welcomed these reports, and thanked the organizations that had presented them. It felt that they provided the Commission and its member countries with very useful information on world activities on plant genetic resources for food and agriculture. It considered that such reports also contributed to the mutual enrichment of understanding, which would lead to a greater coordination and synergy in plant genetic resource activities. The Commission also considered it important to be regularly apprised of the activities of organizations active in the field of plant genetic resources for food and agriculture, and encouraged organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture. The Commission encouraged those organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture, such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Development Programme (UNDP), the World Intellectual Property Organization (WIPO), the Conference of the Parties to the Convention on Biological Diversity, the Global Environment Facility (GEF), l'Association de coopération des Universités partiellement ou entièrement de langue française (AUPELF), the World Wide Fund for Nature (WWF), and the Rural Advancement Fund International (RAFI). It also *asked* the Secretariat to invite relevant regional forums (the Council of Europe, the Southern Common Market (MERCOSUR) and the Junta del Acuerdo de Cartegena were mentioned) to submit reports to its future sessions. The Secretariat accordingly invited this range of organizations to submit reports to the present session.

3. In requesting reports to this session, the expansion of the Commission's mandate to cover not only plant genetic resources for food and agriculture, but all components of agricultural biological diversity of interest to food and agriculture has been taken into account in two ways: firstly, all organisations were invited to report on their activities in agricultural biological diversity generally;

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and, secondly, invitations were sent to a number of organizations working in sectors of agricultural biological diversity other than plant genetic resources.

4. This document contains reports from the following *United Nations and inter-governmental organizations*, received by 12 May 1997:

> the Asian Development Bank (AsDB), the Commonwealth Secretariat (CS), the Convention on Biological Diversity (CBD), the Global Environment Facility (GEF), the Inter-American Institute for Cooperation in Agriculture (IICA), the International Atomic Energy Agency (IAEA), the International Centre for Agriculture and Biosciences (CAB International), the International Fund for Agricultural Development (IFAD), the International Office of Epizootics (OIE), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), and the United Nations Industrial Development Organization (UNIDO).

5. The following *United Nations and inter-governmental organizations* informed FAO that they would, for various reasons, not be able to report to this session:

> the African Development Bank (AfDB), the Council of Europe (CE), MERCOSUR, the United Nations Inter-agency Committee on Sustainable Development (CSD), and the World Trade Organization (WTO).

6. The Secretariat has limited itself to compiling the reports, as submitted. Each report is fully the responsibility of the organization submitting it. FAO's own activities are reported in documents CGRFA-7/97/8.1 and CGRFA-7/97/8.2.

7. Reports from the International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR) are contained in document CGRFA-7/97/7 Part II, and reports from International Non-governmental Organizations in document CGRFA-7/97/7 Part III.

THE ASIAN DEVELOPMENT BANK (AsDB)

1. In promoting agricultural growth in the Bank's developing member countries (DMCs) in Asia and the Pacific, the Bank has been active in assisting activities in genetic resources for food and agriculture through either technical assistance or investment loans. It is a Bank's policy to develop agriculture on a sustainable basis through, among other things, conservation and utilization of genetic resources. Conservation and utilization of genetic resources for food and agriculture is both insurance and an investment for future generations, since they provide a sound basis for crops' biological adaptation to changing environmental conditions and human needs.

2. Our recent activities in genetic resources for food and agriculture may be summarized as follows:

i. Under the ongoing Bank-financed Biodiversity and Conservation Project in Indonesia (Loan no. 1187-INO, approved in 1992, for $25 million), the Bank is financing in-situ conservation of plant and animal genetic resources. As a follow-up to this project, the Bank is processing project preparatory technical assistance (PPTA) in 1997 for National Biodiversity Information Network Project in Indonesia which is expected to result in an investment project of about $100 million in 1998. Under the proposed Central Sulawesi Integrated Area Development and Conservation Project, which is being processed by the Bank for approval in 1997, the Bank will finance activities designed to protect the forest and animal genetic resources in a national park in Central Sulawesi, eastern Indonesia.

ii. In December 1996, the Bank approved PPTA for the Biodiversity Conservation in the Sundarbans Forests Project in Bangladesh. Sundarbans Reserved Forest is the largest contiguous tracts of forests in the country and contains a wide range of forest, crop and animal species. The PPTA is aimed at preparing a feasibility study for an investment project designed to assist the Government of Bangladesh in the conservation and sustainable managment of the forest resources of the Sundarbans Reserved Forest. The investment that may ensue from the TA is estimated at $60 million to $70 million over seven years.

iii. In July 1994, the Bank approved a regional technical assistance grant of $800,000 to the International Plant Genetic Resources Institute (IPGRI)(RETA no. 5590) which is aimed at conservation and utilization of coconut genetic resources in Asia and the Pacific. With the expected completion of this TA in July 1997, the Bank is considering a second phase TA of about $1.2 million to further promote sustainable conservation and utilization of coconut genetic resources in the region.

iv. In the People's Republic of China, the Bank has approved two advisory technical assistance projects to conserve forest and animal genetic resources in national parks. These TAs are the Forest Ecosystem Planning and Agro-Industrial Pollution Control Project (TA No. 2119, for $600,000, approved in June 1994), and Jiangfengling Park Management and Biodiversity Conservation Project (TA No. 2394, for $600,000, approved in September 1995).

v. In Malaysia, the Bank is processing an investment project for Lower Saribas Agricultural Development Project for approval in 1997. One component of the project is to establish a national park of about 43,000 ha in Sarawak, East Malaysia, which will be aimed at the preservation of the biodiversity and genetic resources of flora and fauna of Sarawak's largest peat swamp forest.

Under the regional technical assistance for Regional Conference for Biodiversity Conservation (RETA No. 5557, for $200,000, approved in December 1993), the Bank organized a regional conference on biodiversity conservation in 1994 in Manila which was attended by representatives from Bank's DMCs and the international and regional organizations.

THE COMMONWEALTH SECRETARIAT (CS)

The Commonwealth Science Council

1. The Commonwealth Science Council, for which the Commonwealth Secretariat provides the secretariat, has a programme of activities on underutilised crops under its flagship programme on biodiversity and genetic resources. Commercial western agricultural systems have led to dependence on a decreasing number of crops, while at the same time the genetic base of these crops has narrowed. Research and commercialization has generally been restricted to crops that are of interest to developed countries. Indigenous plants that are important for social and economic welfare of developing countries are generally neglected. This disregard for the potential of the so-called minor crops, combined with the loss of their natural habitat has in many cases led to these valuable plants becoming rare.

2. The Commonwealth Science Council has collaborated with the FAO and the International Centre for Underutilised Crops to develop two networks to promote the production, processing and marketing of underutilised crops. The first network, the Underutilised Tropical Fruits for Asia Network (UTFANET) concentrates on fruits. Asia is the centre of diversity for many species of tropical fruits. The second network, the Southern and Eastern African Network for Underutilised Crops (SEANUC), concerns the countries in eastern and southern Africa, regions which harbour a wealth of plants that have great potential for development as crops. Many of these species are now becoming rare due to the erosion of their natural habitat, and because they are not exploited commercially. Local plants or fruits grown by small holders or collected from the wild often provide an important nutritional supplement and valuable additional income. However, these fruits are generally under exploited. Yields are often low due to poor planting material. Local market structures are poor or non-existent, and there is a large amount of wasted produce.

SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

Agricultural Biological Diversity under the Convention on Biological Diversity: Programmes, Policies and Activities on Genetic Resources for Food and Agriculture May 1997

Article 1 of the Convention on Biological Diversity: The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

I. Introduction

1. The Convention on Biological Diversity was adopted at the Rio Earth Summit (UNCED, June 1992) and entered into force on 29 December 1993. The first meeting of the Conference of the Parties to the Convention on Biological Diversity (COP-I, Nassau, December 1994), set in place the mechanisms provided for by the Convention. COP-II (Jakarta, November 1995), took some key programming decisions, *inter alia,* it considered its first substantive issue, marine and coastal biodiversity, agreed to address forests and biodiversity in collaboration with the Intergovernmental Panel on Forests (IPF) of the Commission on Sustainable Development and addressed the issue of plant genetic resources for food and agriculture. COP-III, through several key decisions on implementation of the Convention, including the development of a work programme on agricultural and forestry, established the biodiversity agenda for 1997-8 and agreed that inland waters biodiversity would be the thematic focus of the work programme until COP-IV.

2. To date, 167 countries and 1 regional economic integration organization have become Parties to the Convention. The fourth session of the COP scheduled for 4-15 May 1998, Bratislava, Slovakia, will provide an opportunity for review and prioritization of the CBD agenda and work programme. It will be the first occasion that Parties will report on national level implementation of the Convention.

3. In preparation for COP-4, the First Meeting of Experts on Marine and Coastal Biodiversity took place in Jakarta in March 1997. Further scheduled meetings include the *Ad-hoc* Working Group on Biosafety (Montreal, 12-16 May 1997) as well as a technical liaison group meeting on forest biological diversity (Finland, 25-28 May 1997). The third meeting of the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) will be held 1-5 September 1997 in Montreal for which the thematic focus will be the biological diversity of inland waters, in addition to forest and agricultural biodiversity. The inter-sessional workshop on Article 8(j) (Decision III/14) is scheduled for November 1997. The clearing house mechanism of the CBD will be further developed during 1997-8 to promote technical and scientific cooperation and support implementation of the work programme.

4. The work programme on agricultural biodiversity will be further developed in close conjunction with the other sectoral programmes, including forestry, marine and coastal, and, in turn, dryland, mountain and inland waters biodiversity, while taking due consideration of the different cross-cutting issues. The mechanism for drawing up the agricultural biodiversity work programme includes: an ongoing planning process with FAO, in collaboration with other relevant organizations (January-June 1997), including a two-day workshop supported by the Government of the Netherlands on Farming Systems Approaches for the Sustainable Use and Conservation of Agricultural Biodiversity and Agro-Ecosystems. Following SBSTTA-III, a technical liaison group meeting on agricultural biodiversity will be organized with key partners to establish priority issues for the work programme

and a technical workshop will also be held on the two case studies identified for immediate attention, pollinators and soil micro-organisms in agriculture.

II. Cooperation between the CBD and FAO on Agricultural Biological Diversity

5. In view of their complementary mandates and work programmes, cooperation between the CBD and FAO, and its Commission on Genetic Resources for Food and Agriculture (CGRFA), has been recognized by the COP as being of paramount importance. Serious efforts are already being made to strengthen and render more effective that collaboration in order to avoid duplication and with a view to enhancing the achievement of the objectives of the Convention. In this regard, the FAO seconded a Programme Officer for Agricultural Biodiversity to the CBD Secretariat (UNEP) for one month during COP-3 and for a further two years as from February 1997. Collaboration has been ongoing for the preparation of technical documents and the participation of the CBD Secretariat, FAO and the CGRFA in each others' meetings, where relevant. Moreover, cooperation between FAO and CBD programmes and processes is being strengthened and institutionalized through the development of a joint work programme and Memorandum of Understanding.

6. It is noteworthy, that while the CGRFA process is inter-governmental, it is sectoral and its outcome non-binding. This highlights the importance that the issues have to also be addressed within the context of the CBD, as a cross-cutting, legally-binding international regime. In this respect, under its Decision III/11, Conservation and Sustainable Utilization of Agricultural Biological Diversity, noting the various options for the legal status of a revised International Undertaking on Plant Genetic Resources, which include a voluntary agreement, binding instrument or protocol to the Convention on Biological Diversity, the COP requested the FAO to inform it of the deliberations. Moreover, the COP affirmed its willingness to consider a decision by the Conference of the FAO that the International Undertaking should take the form of a protocol to the CBD once revised in harmony with the Convention. (Paragraph 18).

7. Key issues being negotiated through the CGRFA process regarding access and benefit sharing arrangements, including the scope and availability of genetic resources and the issue of Farmers Rights, are of direct relevance to policies contained in the Convention, notably Article 15, Access to Genetic Resources; Article 16, Access to and Transfer of Technology; and Articles 6, 8, 9 and 10 General Measures for Conservation and Sustainable Use, In-Situ Conservation, Ex-Situ Conservation, and Sustainable Use of Components of Biological Diversity, respectively.

III. Relevant Activities and Achievements of the Second and Third Meetings of the COP

8. At its second session the COP adopted Decision II/15, FAO Global System for the Conservation and Utilization of Plant Genetic Resources for Food and Agriculture, and Decision II/16 requesting that the outcome of the International Technical Conference on the Conservation and Sustainable Use of Plant Genetic Resources (ITCPGR, Leipzig, June 1996) be reported to the third meeting of the COP. The details of COP-II Decision II/15, highlighting those aspects of particular relevance to the work of the CGRFA, are contained in the Progress Report on the FAO Global System for the Conservation and Utilization of Plant Genetic Resources for Food and Agriculture (UNEP/CBD/COP/3/15) that was made available to the Third Extraordinary Session of the Commission in December 1996. The CBD Secretariat in its statement to that Session, highlighted those COP-III decisions that are of particular relevance to the work of the Commission.

9. In accordance with its mandate to provide timely advice relating to CBD implementation, the SBSTTA, at its Second meeting, Montreal, September 1996, addressed the issue of agricultural

biodiversity[1], and prepared Recommendation II/7 on Agricultural Biological Diversity for consideration by the COP. Subsequently, through the assistance of an open-ended Working Group, agricultural biodiversity was addressed as a major substantive item by the COP at its Third meeting (Buenos Aires, November 1996)[2]. The negotiations led to the adoption of Decision III/11, Conservation and Sustainable Utilization of Agricultural Biological Diversity, which incorporates text on the importance of the role of farmers, traditional knowledge and public awareness, as well as on more divergent issues such as gap analysis, trade impacts and market forces, the role of the interim financial mechanism, the legal status of the International Undertaking and the Global Plan of Action. Issues regarding the status of *ex-situ* collections acquired prior to entry into force of the CBD and the relationship between intellectual property rights (IPR), legislation and sovereignty over PGRFA as well as Farmers' Rights, were addressed through their consideration under COP-3 decisions III/15, Access to Genetic Resources, and III/17, Intellectual Property Rights.

10. The COP's considerations of possible options for developing national legislative, administrative or policy measures to implement Article 15 of the CBD, Access to Genetic Resources, led to the adoption of Decision III/15[3]. This decision notes, *inter alia*, the linkages of Article 15 of the CBD with the further development and implementation of the work by FAO on the Global System. It urges governments and regional economic integration organizations to bring to a rapid conclusion the negotiation for the adaptation of the International Undertaking, in harmony with the Convention, in particular, providing solutions to access to *ex-situ* collections not acquired in accordance with the Convention.

11. The COP further requests the CBD Secretariat to cooperate closely with the World Trade Organisation (WTO) through the Committee on Trade and the Environment (CTE) to explore the extent to which there may be linkages between Article 15 and relevant articles of the Agreement on Trade-Related Aspects of Intellectual Property Rights...to coordinate closely with FAO, UNCTAD and other relevant organizations working on access to genetic resources to ensure complementary efforts.(Paragraph 8, Decision III/15) and, citing the World Food Summit Plan of Action, encourages the CTE, in collaboration with other organizations, to consider developing a better appreciation of the relationship between trade and agricultural biodiversity (Paragraph 24, Decision III/11).

12. Through its Decision III/17, Intellectual Property Rights, (IPR), while recognizing the importance of implementing IPR-related provisions of the CBD and of international agreements related to IPR in a mutually supportive way, the COP encourages Governments and relevant organizations to conduct case studies of the impact of the IPR on the achievement of the Convention's objectives. *Inter alia*, the studies could consider the role and potential of existing IPR systems, including facilitating technology transfer and access to and sharing of benefits of genetic resources or knowledge, innovations and practices of indigenous and local communities, as well as,

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1 SBSTTA-II considered: a Note by the CBD Secretariat on Agricultural Biological Diversity (UNEP/CBD/SBSTTA/2/10); the Report of the State of the World's PGRFA and submissions by the Governments of Brazil and Sweden (UNEP/CBD/ SBSTTA/2/Inf. 15, 18 and 20 respectively).

2 COP-III considered: the Note by the CBD Secretariat entitled Consideration of Agricultural Biological Diversity under the Convention on Biological Diversity, the SBSTTA recommendations, and the Report on Progress under the FAO Global System (UNEP/CBD/COP/3/14, 3, and 15 respectively). It also referred to the Global Strategy for the Management of Farm Animal Genetic Resources and the Report of the Fourth ITCPGR, including the Global Plan of Action and the State of the World's PGRFA (UNEP/COP/CBD/Inf. 16, 17, and 18).

3 The Note by the Executive Secretary on Access to Genetic Resources (UNEP/CBD/COP/3/20) provided an update to document UNEP/CBD/COP/2/13, Access to Genetic Resources and Benefit-Sharing: Legislation, Administrative and Policy Information, indicates the process by which national measures have been developed in certain countries and emphasizes national and regional interpretations of key terms used in Article 15: *genetic resources* and *access* (Art.15.1); *mutually agreed terms* (Art. 15.4); *prior-informed consent* (Art.15.5); and *benefit-sharing* (Art.15.6 & 15.7).

sharing the development of IPR, such as *sui-generis* systems/approaches, or alternative forms of protection, that could promote the achievements of the CBD.

13. Under its Decision III/11 on agricultural biodiversity, recalling Resolution 3 of the Nairobi Final Act, Decisions II/15 and II/16 of COP-II, and SBSTTA Recommendation II/7, the COP: Decides to establish a multi-year programme of activities on agricultural biological diversity aiming, first, to promote the positive effects and mitigate the negative impacts of agricultural practices on biological diversity in agro-ecosystems and their interface with other ecosystems; second, to promote the conservation and sustainable use of genetic resources of actual or potential value for food and agriculture; and third, to promote the fair and equitable sharing of benefits arising out of the utilisation of genetic resources;.... (Paragraph 1).

14. This decision provides for the CBD Secretariat, in collaboration with the FAO and other relevant organizations, and through the advice of the SBSTTA, to set work programme priorities focusing on the interface between sustainable agriculture and environmental issues. It encourages Parties to develop national strategies, programmes and policies according to 14 action-oriented goals and focusing on, *inter alia*: (a) the key elements of the Global Plan of Action..., (b) the development of inventories which consider the status of farm animal genetic resources and measures for their conservation and sustainable use and (c) micro-organisms of interest for agriculture.[1] (Paragraphs 15 and 16).

15. The COP welcomes the contribution that the Global Plan of Action provides to implement the CBD in the field of plant genetic resources for food and agriculture, and encourages Parties to actively implement the Global Plan. The decision recognizes that several issues require further work in the context of the FAO Global System, in particular: financing; the realization of Farmers' Rights as discussed in the Global Plan of Action; terms of technology transfer to developing countries and access and benefit-sharing arrangements, in accordance with relevant provisions of the Convention. In this regard, the decision calls for the effective and speedy completion of the revision of the International Undertaking and strengthening of the FAO Global System. (Paragraph 19, Decision III/11).

16. In view of the broadened mandate of the Commission to cover all components of biodiversity of relevance to food and agriculture with a view to facilitating an integrated approach to agro-biodiversity and coordination with Governments... (Resolution 3/95, FAO Conference), it is also significant that Decision III/11 further appreciates the importance of the country-based Global Strategy for the Management of Farm Animal Genetic Resources under the FAO and strongly supports its further development (Paragraph 20). Moreover, Decision III/12, Programme of Work for Forest Biological Diversity, is also of relevance. Under this decision, noting that the conservation and sustainable utilization of forests is an integral part of the conservation and sustainable use of biological diversity in general, the COP requests the CBD Secretariat to develop a work programme focusing on research, cooperation and the development of technologies necessary for the conservation and sustainable use of forest biodiversity at national, regional and global levels in accordance with the ecosystems approach.

17. Finally, the COP draws the attention of the international funding mechanism to the urgent need to support agricultural biodiversity (Paragraph 22, Decision III/11). In this regard, account should be taken of a number of other items discussed at COP-III of direct relevance to agricultural

1 Annex 1 of Decision III/11 establishes a Basis for Action by providing an overview of the impacts of biological diversity on agriculture and *vice-versa*. Annex 2 presents a wide Indicative List of Thematic Areas for the identification of issues and priorities including: land and water resources and land use pressures; plant, animal and microbial genetic resources; agroforestry and wild sources of food; wildlife (ecology); air and climate; farm inputs and marketing conditions; and traditional knowledge. Annex 3 contains the two initial Issues for Conducting Case Studies, as identified by the SBSTTA, on (1) pollinators and (2) soil micro-organisms in agriculture.

biodiversity, including: general measures for the conservation and sustainable use of biological diversity; identification, monitoring and assessment; the knowledge, innovations and practices of indigenous and local communities; access to and transfer and development of technology; incentive measures and biosafety.

ADDENDUM to the Report of the Secretariat of the Convention on Biological Diversity (CBD)

COP-II

1. Recognizing the special nature of agricultural biodiversity, its distinctive features and problems needing distinctive solutions; taking note of the Global System for the Conservation and Utilization of PGRFA developed by member countries of the FAO through the CGRFA, and the recommendation for strengthening it expressed in chapter 14 of Agenda 21; and recalling that Resolution 3 of the Nairobi Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity recognized the need to seek solutions to outstanding matters concerning plant genetic resources within the FAO Global System, in particular (a) access to *ex-situ* collections not acquired in accordance with this Convention, and (b) the question of farmers' rights; the COP under its decision II/15:

2. Considered that the outstanding matters should be resolved as soon as possible and declared its support for the process engaged in the CGRFA to comply with these recommendations, especially through: (1) the implementation of FAO Conference Resolution 7/93 for the adaptation of the International Undertaking on Plant Genetic Resources, in harmony with the CBD; and (2) convening the Fourth ITCPGR through which two important elements of the Global System, the first State of the World report on Plant Genetic Resources for Food and Agriculture and the first Global Plan of Action on the Conservation and Utilization of Plant Genetic Resources for Food and Agriculture are being developed through a country-driven process.

GLOBAL ENVIRONMENT FACILITY (GEF)

1. The GEF is a global funding mechanism for meeting the agreed incremental costs of activities to achieve global environmental benefits in four focal areas: biodiversity, climate change, international waters, and ozone. Activities addressing land degradation, primarily desertification and deforestation, as they relate to the four focal areas are also eligible for funding.

2. GEF activities related to agricultural biodiversity have to date been implemented within the context of operational programs in biodiversity, climate change and international waters. These have largely focused on land management, resource conservation, carbon sequestration, and threats to international waters.

3. The GEF has been designated, on an interim basis, as the financial mechanism of the Convention on Biological Diversity. For this purpose, the Conference of the Parties approves guidance on policies, program priorities and eligibility criteria for activities to be funded by the GEF in the area of biodiversity. At the third meeting of the Conference of the Parties held in Argentina in November 1996, the Parties requested the GEF to support efforts for the conservation and sustainable use of biological diversity important to agriculture. The Conference also urged the GEF as well as governments, regional economic integration organizations, and competent international, regional and national organizations, to support human and institutional capacity-building programs for governments, non-governmental organizations and local and indigenous communities, as appropriate, to promote the successful development and implementation of legislative, administrative and policy measures and guidance on access to genetic resources, including scientific, technical, business, legal and management skills and capacities.

4. Since the third meeting of the Conference of the Parties last November, the GEF Secretariat has been collaborating with the GEF Implementing Agencies (UNDP, UNEP and the World Bank) in developing an operational framework for implementing the guidance to the GEF approved by the Conference of the Parties - including the guidance concerning agriculture and biodiversity and capacity building on access to genetic resources. This effort is aimed at identifying what activities could be developed within the GEF operational strategy and programs and whether there is a need to expand the strategy or programs to respond to the new guidance. At present, we are in the process of consulting with the Conventions Secretariat and the GEF Scientific and Technical Advisory Panel on the suggested approach to implement the guidance. Once we have reached agreement on the approach to operationalizing the guidance, the implementing agencies will work with interested recipient governments to prepare project activities consistent with the Convention guidance.

INTER-AMERICAN INSTITUTE FOR COOPERATION IN AGRICULTURE (IICA)

IICA Action in Support of Genetic Resources

1. Latin America and the Caribbean play a strategic role in food security worldwide for numerous reasons, two of which are the fact that they are the center of origin of several crops of major socioeconomic importance, and because of the biodiversity that exists in the region. Consequently, conditions exist for the sustainable diversification of agriculture in Latin America and the Caribbean, and even to contribute to the food security of the other continents of the planet. IICA working with the institutions of the countries, and trough strategic alliances , particularly with FAO, is focusing its efforts on supporting the conservation of biodiversity and sustainable use of genetic resources for agriculture, agroindustry and food production.

2. IICA's nature. The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the inter-American System. The Institute was founded in 1942 an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture in 1980. The Institute's purpose under the new Convention are to encourage, facilitate and support cooperation among its 33 Members States, so as to better promote agricultural development and rural well-being.

3. Mandates. In 1989, the Inter-American Board of Agriculture (IABA) approved the Plan of Joint Action for Agricultural Reactivation in Latin America and the Caribbean, which, among other things, entrusted IICA with promoting a Hemispheric Program on Genetic Resources. In IICA's 1994-1998 Medium Term Plan, also approved by the IABA, work in the areas of biodiversity and genetic resources is given high priority and is carried out by Area of Concentration II Science and Technology, Natural Resources and Agricultural Production, at the national, subregional and regional levels. Also, in 1995, the IABA released the Resolution 268 requesting IICA to strength efforts of the countries for the evaluation, conservation and sustainable utilization of the Genetic Resources of the Americas.

4. Objective. To upgrade national institutional capabilities in the member countries and supporting efforts to articulate the various actors concerned with the conservation and rational use of genetic resources, with a view to contributing to sustainable agricultural development in the Americas and the Caribbean.

5. Activities include the following: a) strategies and institutional models for research and technology transfer, including networks on genetic resources. Networks result from an intense process to reach agreement on and prioritized actions for developing joint activities of the countries; b) promotion and implementation of technology transfer among countries and their relations at the international level; c) conceptual elements for technological policies design on the conservation and sustainable use of genetic resources (biosafety and intellectual property rights) in agriculture; d) support for the design and implementation of projects on the conservation and use of genetic resources, and for securing financial resources for same. Activities are carried out at the national and subregional levels by IICA's Technical Cooperation Agencies (TCAs) and Regional Centers, and at the hemispheric level, through the Directorate of Area II.

6. Clients. The clients are systems and institutions in the member countries that are involved in research, education and sustainable agricultural development and carry out activities related to genetic resources. The final beneficiaries are the producers who use improved genetic materials in their production systems, and consumers, who can obtain a wider variety of better quality foods at much lower prices.

7. Partners. IICA, given its inability to address all the problems related to genetic resources, establishes strategic alliances for technical cooperation with renowned national, regional and international institutions recognized as authorities in the field. This is the case of the collaborative actions with FAO whose Global Mandate and Regional activities are of strategic importance for the countries. Also, IICA works closely with the International Plant Genetic Resource Institute (IPGRI), with which IICA has created several existing networks, and the Tropical Agriculture Research and Training Center (CATIE), for Mesoamerica, and the GTZ, SELA, USDA, EMBRAPA, IDB, CIRAD, the University of Amsterdam, CIDA, Canada, the Government of Sweden, national institutions and universities, and reciprocal cooperation programs and networks, such as PROCIANDINO, PROCITROPICOS, PROCISUR and PROMECAFE, to mention a few.

8. Most important achievements of the 1990s. These include: a) the gathering of data and information on the situation of genetic resources (principally plant resources) in all the countries of the Americas; b) the creation of subregional horizontal reciprocal cooperation research and transfer networks among the countries: the Meso-American Network of Plant Genetic Resources (REMERFI) (Mesoamerica); the Andean Network of Phytogenetic Resources (REDARFIT) (Andean Area), and within the framework of PROCIANDINO; the Regional Technical Network of Genetic Resources (TROPIGEN) (Amazon Basin, within the framework of PROCITROPICOS); Genetic Resource Subprogram (Southern Cone, within the framework of PROCISUR); Committee for Genetic Resource Management in the Caribbean (Caribbean Region); and c) establishment of priorities for joint actions and policy frameworks for the conservation and sustainable use of animal genetic resources.

9. In the complementary field of agrobiotechnology, the following results were obtained in the period 1989-1995: 1) inventories and the dissemination of institutional capabilities in the region; 2) conceptual and methodological elements disseminated in order to formulate biotechnology and biosafety policies; 3) preparation and dissemination of base elements, and consensus on the harmonization of biosafety policies among countries; 4) preparation and dissemination of directories of biotechnology institutions in the countries of the region; and 5) study on the current situation and actions that must be taken to establish plant breeders' rights.

10. What has been done in 1995-1996. The most important activities include:

- Implementation of the Mesoamerica network REMERFI with IPGRI, CATIE and GTZ.
- Establishment of the Central American Network for Vegetable Crops, with the scientific support of the Asian Vegetable Research and Development Center (AVRDC), the government of Taiwan, and the Central American Bank for Economic Development and Investment (CABEI).
- Regional Workshop for the establishment of a Latin American and Caribbean network of Coconut Development (collaboration with IPGRI and BUROTROP).
- Publication and dissemination of the document Fundamentos para la creación de la red andina de recursos fitogenéticos.
- Regional support to the FAO International Conference and Program on Plant Genetic Resources, hold in Germany in 1996.
- Supporting the IPGRI, Spanish Cooperation Agency, CATIE meeting on the identification of the need for training in phytogenetic resources.
- The IICA/FAO proceedings of the workshop on the inter-American animal genetic resource system, with support from the USDA.

- Implementation with FAO of the consultative group for the support of Animal Genetic Resources in the Americas (COREGAN).

- Preparation of base elements, and the consultation strategy on the creation of a regional-wide mechanism to support genetic resources, and particularly the implementation of the FAO Global Action Plan. This would be a joint endeavor with FAO and national institutions and the collaboration of IPGRI, SELA, CATIE, CIAT.

11. The Institute will cooperate with its member countries in the implementation of the Global Action Plan in the Region under the framework of the IICA and FAO collaborative action program in 1997. The aim of this is to strengthen the existing genetic resources and networks in the context of the Region. Specifically, through the collaborative action agreement, both organizations will be committed to support, among others: a) The International System for Information and Early Warning System; b) Strengthening and articulation of Regionals and Subregional Cooperation Networks on Genetic Resources; c) Periodical Publication on the State of the Plant Genetic Resources; d) Promotion and implementation, at the regional level of other mechanisms and instruments of the Global System. Also a regional workshop would be organized by mid 1997 to convene with plant genetic resources national institutions, and regional and international cooperation organizations, financing mechanisms, strategies and concrete initial actions to execute the Global Plan.

THE INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

Present Activities

1. The FAO/IAEA subprogramme on Plant Breeding and Genetics is concerned in a number of instances with the conservation of biological diversity and sustainable biological use. Breeding crops and introducing new varieties to developing countries of necessity takes into account biological diversity in order to create germplasm suitable to many varied regions and climates. The program is centred on the induction, selection and transfer of desired plant characters important for increased tolerance to stresses in order to achieve crop yield stability and sustained production. Project emphasis is placed on increasing crop productivity in marginal and stress prone areas. Molecular marker and DNA fingerprinting techniques are used to measure the amounts of biological diversity in applied breeding programmes.

Induced mutation in *in vitro* culture and germplasm collections

2. The induction of mutation in breeding materials is important for creating desirable biological diversity in crop populations. Characters for improvement by mutation techniques include productivity, tolerance to drought, heat, cold, salinity, reduction in the growing duration, resistance to pathogens and insect pests, improved product quality, increased nutritional value, and improved harvest and storage. A number of new genotypes have also been produced by radiation-induced mutation of *in vitro* propagated materials. These programs have been targeted to improve local varieties and land races in different regions of the world.

3. Induced mutation programmes are currently underway in most of the affected stress-prone areas throughout the world. Sesame improvement includes work in Kenya, Korea, Thailand, Pakistan, India, Turkey, and Uganda. Germplasm collections include crops from Mali, Ghana, Congo, Bolivia, Colombia, Malaysia, Ghana, Guyana, India and Pakistan.

DNA fingerprinting of genetic variability

4. Modern DNA fingerprinting techniques recently introduced into the plant genetic and breeding areas are important for the characterization of genetic diversity. These powerful methods are being used to measure the genetic diversity of vegetatively propagated crops and cereals and other sexually propagated crops in developed and developing countries. The evaluation of genetic diversity among cultivars and wild species in germplasm banks will allow the identification of suitable strategies for fingerprinting different lines and utilizing fingerprinted lines in breeding programs. DNA fingerprinting techniques allow the rapid characterization of crops and provide a quantitative measure of biological diversity through genetic distance measurements and allow the monitoring of introgression of traits from wild relatives to cultivated crops. A program for the production of fingerprinting materials to be distributed worldwide is currently being undertaken in Germany, England, and Costa Rica.

5. DNA fingerprinting programmes for vegetatively propagated crops are currently underway in Brazil, Pakistan, India, Cuba, Nigeria as well as in the USA, Germany, Japan, France and Israel. The application of markers for the improvement of cereals and other sexually propagated species is being undertaken in Brazil, Pakistan, Mexico, Bulgaria, Korea, and well as the United Kingdom and the USA.

Identification of gaps and evolving issues

6. The narrowing of genetic diversity and disappearance of land races is a world-wide concern. The collection, preservation and cataloguing of plant genetic diversity through DNA fingerprinting should be promoted. The possibility of free exchange and availability of molecular markers on the same basis as the free exchange of plant germplasm between the developed and developing nations should be examined.

7. Fingerprinting analysis of additional local crops, especially in developing countries and the center of origin for the species, is important for insuring the maintenance of biological diversity.

8. Modern molecular techniques will increasingly play a role in assessing collections to examine their depth as well as reduce duplications of accessions.

9. Procedures for the routine and reliable detection of plant pathogens need to be developed and distributed.

Future Activities

10. Stay abreast of the progress made in international cooperation with the UNEP Convention on Biological Diversity.

11. Produce tools for fingerprinting (probes) to be made available worldwide for programmes in developing countries.

12. Analyze diversity in crops, use more diverse germplasm, and assist in active breeding programmes to reduce genetic vulnerability.

13. Look at creating additional diversity, when needed, via induced mutation as well as somaclonal variation techniques.

14. Continue to concentrate on the improvement of local adapted varieties and land races.

INTERNATIONAL CENTRE FOR AGRICULTURE AND BIOSCIENCES (CAB INTERNATIONAL)

Background

1. CAB INTERNATIONAL (CABI) is an intergovernmental organization, established in 1929, which currently has 40 member countries. CABI's remit includes the identification, characterization and sustainable utilization of biodiversity to improve food and fibre production, with an emphasis on developing countries. The organization incorporates the International Institute of Entomology (IIE), International Mycological Institute (IMI), International Institute of Parasitology (IIP) and the International Institute of Biological Control (IIBC).

Genetic resource collections

2. CABI maintains a genetic resource collection of almost 20,000 fungi and plant bacteria representing about 4,700 different species, and which is particularly rich in crop-associated organisms from tropical countries. This is the only intergovernmental collection of microbial groups in the world. In addition, some parasites and predators of arthropod pests and entomopathogenic nematodes are also maintained. The genetic resource collections are made available under arrangements adopted by CABI's member governments in July 1996 which are in the spirit of the Convention on Biological Diversity. In addition, 370,000 dried reference specimens of fungi representing some 32,000 different species are available as an authoritative source of information on the distributions and hosts of these organisms.

Applications

3. The agricultural-related genetic resources with which CABI is active are used in biocontrol of insect pests and weeds, degradation of lignocellulosic wastes and by-products, experimental studies on plant diseases, and in investigations of post-harvest losses.

Programmes

4. Projects active in 1996-97 include:
   - the characterization and use of indigenous insect-pathogenic fungi for control of grasshoppers and locusts in Asia, Africa and Latin America;
   - the characterization and use of parasitoid wasps to control the hibiscus mealy bug (=pink mealy bug) in some Caribbean countries and the juniper aphid in East and Southern Africa;
   - the development of a public-sector microbial resource collection in Indonesia;
   - the characterization and use of indigenous natural enemies of arthropod pests in IPM programmes in cotton and vegetables in Asia, vegetables and coffee in Africa, and coffee in Colombia;
   - the use of herbivorous arthropods to control water hyacinth in Malawi, leafy spurge in USA and Canada, and gorse in New Zealand;
   - the use of biodegrading fungi for the breakdown of lignocellulosic crop debris in SE Asia;
   - the identification and characterization of entomopathogenic nematodes in E Africa and their use against cutworms in peri-urban agriculture;
   - the characterization of *Ganoderma* strains attacking oil palm in SE Asia.

Capacity building

5. CABI provides 15-20 training courses each year on the identification and characterization of fungi, arthropods and nematodes of agricultural and environmental importance. The reference collections of organisms and literature are used by visiting scientists on individual study

programmes, and CABI undertakes projects to build capacity in institutions in developing countries. In addition, CABI is the host of the Technical Secretariat of BioNET-INTERNATIONAL, an intergovernmental programme involving cooperation through integrated networks, with an emphasis on the systematics of arthropods, fungi, nematodes and plant bacteria.

Information resources

6. The CAB ABSTRACTS database is a rich source of bibliographic information on genetic resources in economically important vertebrates, invertebrates, and microorganisms as well as plants. CABI compiles and publishes Plant Genetic Resource Abstracts with IPGRI, and CD-ROM bibliographic database of plant genetics, plant biotechnology and plant genetic resources (PLANTGENE-CD).

Issues to address

7. CABI shares concerns expressed at meetings related to the Convention on Biological Diversity in 1996 on the need to pay increased attention to the conservation and potential for utilization of genetic resources of co-evolved and other crop associated agrobiodiversity. In view of the scale of the problem and it's potential benefits to increased food security, CABI considers that an integrated approach is needed as a matter of urgency.

THE INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD)

1. According to Article 2 of the Agreement Establishing IFAD, as a specialized agency of the United Nations system and an International Financial Institution (IFI), the objectives of the Fund shall be to mobilize additional resources to be made available on concessional terms for agricultural development in developing Member States. In fulfilling this objective the Fund shall provide financing primarily for projects and programmes specifically designed to introduce, expand or improve food production systems and to strengthen related policies and institutions within the framework of national priorities and strategies, taking into consideration: the need to increase food production in other developing countries; and the importance of improving the nutritional level of the poorest populations in developing countries and the conditions of their lives.

2. IFAD-financed projects and programmes are geared to enhancing food production systems and to strengthening related policies and institutions within the national policy framework. Specific objectives are: food security through increased agricultural production, and improvement of nutritional levels and incomes of the poorest rural populations, the landless, marginal farmers, pastoralists, artisanal fishermen, and indigenous peoples; and, cutting across all categories, poor rural women. In the 20 years of its operations, IFAD has developed specific approaches to fulfilling its overall mandate of rural poverty alleviation and has established a role for itself in financing innovative small-scale interventions that can be replicated on a wider basis.

3. A key ingredient in IFAD projects involves harnessing the promise held by plant genetic resources for food and agriculture. They represent the raw material used in the production of new cultivars -- either through traditional plant breeding or the use of biotechnology -- and a reservoir of genetic adaptability which acts as a buffer against harmful environmental and economic changes. It has been recognized that the erosion of these resources severely threatens food security. The urgent need to conserve and utilize plant genetic resources as a safeguard against an unpredictable future is clear. The advent of new biotechnologies, able to use a wider range of plant genetic resources, has also stimulated great interest in both public and private research institutions. The prospect of dwindling plant genetic diversity, coupled with dramatically increased demands on these resources, has propelled them into the centre of global discussions on the environment and sustainable development and at IFAD increasing attention is being provided to the conservation through utilization of this genetic diversity.

4. Much genetic diversity is held in farmers' fields in the form of landraces, other traditional crop varieties, and their wild and weedy relatives. Most areas of high diversity are located in developing countries. In the biodiversity debate, tropical forests are the areas singled out for greatest protection. Undoubtedly, great diversity exists in the forests, but drier ecosystems are far more important for crop resources, yet are relatively neglected. It is generally held that the centres of origin or diversity of major crops followed the lines of the main mountain ranges both in the New and Old Worlds. It is worth noting that these very areas, semi arid and mountain areas, are where most IFAD projects are now located. These areas may be marginal and resource-poor with respect to soil fertility, water, etc., but they harbour the richest diversity of plant genetic resources.

5. Since IFAD concentrates on resource-poor farmers in areas which have not been reached by Green Revolution and other technologies, IFAD is perhaps the primary multilateral agency which impacts on the remaining areas of on-farm genetic diversity. IFAD's annual lending programme is now in the region of USD 4-450 million, and through the demonstration value of its projects and the spillover benefits of its portfolio, the impact of the Fund's activities on agricultural development is several times larger than this figure suggests.

6. Plant genetic diversity is relevant to all three areas of IFAD's mandate: poverty alleviation; increasing food production, and improving nutrition. With increased attention by IFAD on the greater productive use of the genetic potential of plants, whether by conventional plant breeding, farmer improvement, or the new biotechnologies, greater attention to plant genetic diversity is seen as an important issue for IFAD both in

the context of its investment projects and its Technical Assistance Grants Programme for Agricultural Research and Training. IFAD has financed agricultural research and technology transfer initiatives, ever since its inception in 1977. This support has mainly been in response to the technology needs of its primary target groups which include, in particular, smallholder farmers. IFAD's support to technology generation and transfer in the context of resource-poor conditions began at a time when global agricultural research output was primarily directed to commercial farmers in high potential areas, largely by-passing many of the rural poor.

7. IFAD is building on the in-situ conservation approach, by proposing to support, through is Technical Assistance Grant Programme, an initiative by the International Plant Genetic Resource Institute (IPGRI) to develop instrumentalities for IFAD interventions designed to address genetic erosion caused by diversification in the dryland ecologies of Africa. The drylands of sub-Saharan Africa are bioclimatic zones subject to harsh weather conditions, yet possess a large number of genotypes and allele complexes ideally adapted to dryland habitat conditions, having evolved over millions of years, and providing the source of some of the most important smallholder crops, e.g., sorghum, millet, wheat, barley and pulses. Traditional farming systems in these desert-prone drylands are often characterized by the rich species diversity present in traditional crop varieties, still popular, because farmers choose to maintain traditional varieties even when modern cultivars are available.

8. Another example involves supporting the International Centre for Tropical Agriculture's (CIAT) efforts toward the development of improved cassava germplasm. Cassava is one of the most important sources of food energy in many tropical and subtropical countries of Latin America and Africa. Because of its ability to thrive under unfavourable conditions, especially poor climate and soil, cassava is frequently viewed as a famine alleviation crop. For many farmers, the crop also represents a source of income and their only possibility for linkage to market economies. Cassava production in the subtropics can contribute genetic diversity to support crop improvement for large areas of Latin America and Africa, as well as genetic information relevant to other ecosystems.

9. IFAD is proposing to support through the International Plant Genetic Resource Institute (IPGRI) a Programme for the Sustainable Use of Coconut Genetic Resources to Enhance Incomes and Nutrition of Coconut Smallholders in the Asia-Pacific Region. Building on the accomplishments of the International Coconut Genetic Resources Network (COGENT) and the sub-network on Coconut Genetic Resources Network for Asia and the Pacific (CGRNAP). The objectives of the proposed three year collaborative research programme are: to support inter-disciplinary research involving coconut farmers and other end-users to identify, test, pilot and disseminate ways of increasing farm productivity, diversifying coconut products and use and conserving valuable germplasm through capacity building, collaborative research and training.

10. In all of these initiatives, IFAD's interest in plant genetic diversity is driven by the importance of this resource for the small farmers themselves, who continue to be caretakers of much of the germplasm in the form of traditional varieties and landraces. Small farmers, particularly those in marginal areas depend upon farming system based on crops and genetic diversity. Genetic diversity is vital to them, providing resistance to pests and diseases and to environmental extremes, higher yields in highly variable environments, and crop diversity improves farming system sustainability, risk minimisation and enhances income generation potential through multiple outputs which contribute to the farm budget and to household nutrition. These are the pillars of IFAD's operational strategy and are seen as a direct contribution to the goals and activities of the Global Plan for the Conservation and Sustainable Use of Plant genetic Resources for Food and Agriculture, adopted in Leipzig in June 1996.

INTERNATIONAL OFFICE OF EPIZOOTICS (OIE)

1. The OIE, the World Organisation for Animal Health, is comprised of 145 countries' official Veterinary Services. Its three main aims, established since its beginning in 1924 - the provision of information on animal health worldwide, the international coordination of research on, and control of, important animal diseases, and the harmonisation of trade regulations for animals and products - remain unchanged.

2. Although the organisation has no programmes or activities with the specific objective of conserving animal genetic resources, it is evident that most OIE activities have a significant effect on the succes of efforts in this regard. The world's Chief Veterinary Officers convene annually for an agenda which includes hearing of recent scientific developments and agreeing on matters of international importance regarding public veterinary service. They also hold conferences every two years in their regions. In the interim, they receive reports of relevant Specialist Commissions and Working Groups. Prompt disease reporting, international surveillance, research and sharing of current knowledge about diseases enable countries to prevent or minimise animal losses.

3. Two publications periodically updated with the participation and approval of the OIE International Committee contribute to the liberalisation of international movement of animals (mammals, birds and bees) and their products, including germ plasm, while protecting animal health. The *International Animal Health Code* contains internationally agreed import/export requirements for the most important animal diseases. A companion volume, the *Manual of Standards for Diagnostic Tests and Vaccines*, has the also agreed scientific support information for this trade. There are also an *International Aquatic Animal Health Code* and a *Diagnostic Manual for Aquatic Animal Diseases* which provide similar assurances for the trade and control of diseases of fish, molluscs and crustaceans. These trade harmonising volumes have led to OIE designation as the reference organisation on issues regarding animal health for the World Trade Organisation's Sanitary and Phytosanitary Agreement (SPS).

4. In order to avoid failures, it is particularly important for those considering international movement of valuable animals or germ plasm (embryos or semen) to assure the sanitary status both at origin and destination.

5. The collective efforts of the world's official veterinarians to prevent and control the most serious transmissible animal diseases evidently contributes to the conservation of both domestic breeds and wild species, including those in need of special efforts for their conservation.

6. The OIE enjoys permanent working relations with more than 20 other international organisations, including the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO). Information from the OIE, including current animal disease reports, an abstract of the previous year's epidemiological and disease control situation, and the *International Animal Health Code* are available on the World Wide Web site: WWW.OIE.INT.

THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)

1. Since the early 1970s, UNESCO has developed the biosphere reserve concept within its Man and the Biosphere (MAB) Programme devoted to improving humankind's relationship with the environment. Biosphere reserves are areas of terrestrial and coastal ecosystems which are internationally recognized as promoting the aims of MAB. Individual countries propose sites within their territories which meet a given set of criteria for this designation. Biosphere reserves serve to combine three functions: conservation; ecologically and culturally sustainable economic development; and logistic support to scientific research and education. In 1995, the UNESCO General Conference approved the Seville Strategy for Biosphere Reserves setting out a programme of action for the next few years, and adopted a Statutory Framework for the World Network of Biosphere Reserves formally setting out the definition, criteria, designation procedure and a review process for all biosphere reserves. The conservation and sustainable use of genetic resources is actively promoted in these documents. In particular, Objective 1.2.5 recommends that the national authorities for biosphere reserves Use biosphere reserves for *in situ* conservation of genetic resources, including wild relatives of cultivated and domesticated species, and consider using the biosphere reserves as rehabilitation/re-introduction sites, and link them as appropriate with *ex situ* conservation and use programmes. Today, there are 337 biosphere reserves located in 85 countries. Many of these are of special interest for the conservation of genetically important crop relatives (for example the Manatlan Biosphere Reserve in Mexico for wild perennial *teosinte/*maize*)* and traditional agricultural practices using old breeds (for example the ancient white cattle of the Hortobagy Biosphere Reserve in Hungary).

2. In collaboration with the World Wide Fund for Nature (WWF) and the Royal Botanic Gardens, Kew, UNESCO started in 1992 an initiative on People and Plants designed to promote the sustainable and equitable use of plant resources. Based on growing concern that the detailed and profound knowledge that rural communities often have of the properties and ecology of locally occurring cultivated and wild species is rapidly declining, the People and Plants Initiative promotes the application of ethnobotanical methods to jointly study and record the uses of plant resources, identify cases of over-harvesting of non-cultivated plants, find sustainable harvesting methods and investigate alternatives such as cultivation. In an attempt to maintain the diversity of traditional plant-resource management practices, field projects are being supported in Africa, Asia, Central and South America as well as the Pacific region. Through participatory methods, the cultural context of plant resource use as well as locally existing institutional mechanisms are being studied and integrated in the development of acceptable management strategies. By involving local people in devising and implementing strategies for the conservation of plant genetic resources, the rationale for seemingly short-sighted resource exploitation can be taken into account and mechanisms can be installed which provide local alternatives to over-harvesting. These include resource subsitution and integration of wild plant resources in farming, particularly agroforestry

3. With a view to maximising judicious use of plant genetic resources, support was provided (i) to the Second European Nitrogen-Fixation Conference (September 8 - 13, 1996), in Poznan, Poland, to widen the dissemination of modern research-results, contributed by over 280 participants (inclusive of 80 researchers from developing countries) from 33 Member States, in the areas of plant-microbe interaction, molecular microbial ecology, nitrogen-fixing systems, carbon and nitrogen metabolism, legume breeding, and safe applications of genetically-modified organism in the environment; (ii) to the 7th International Symposium on Nitrogen-Fixation with Non-Legumes in Faisalabad, Pakistan, which was attended by 80 international and regional participants from 30 countries for purposes of exchanging scientific results in the areas of nitrogen-fixation, biofertilizers and rice products.

4 . From September 1995 to March 1996, a total of 48 short-term fellowships in microbial, plant, aquatic and environmental biotechnologies were awarded to researchers, including 11 women, from

all regions. Modern equipment items were provided to Birzeit University for use by Palestinian scientists and to the Lebanese University in Beirut. Three researchers from Cameroon, Côte d'Ivoire and Senegal received training in nitrogen fixation in the Institute of Professor Dobereiner in Brazil. Moreover, the newly established biotechnology and education centres (BETCENs) in Hungary, South Africa, China, Mexico and Bethlehem University, organized regional training courses in plant and marine biotechnologies for about 120 young participants, including 30 women scientists.

THE UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

1. During the past two decades, UNEP has played a major role in raising global awareness on the need to protect and sustainably manage the earth's biodiversity which provides humankind with food, fuel and pharmaceuticals, among other benefits. UNEP's integrated work programme for the biennium 1996-1997 emphasizes relationships between socio-economic driving forces, which may affect food resources, biodiversity changes and impacts on human well-being. One aspect of the workprogramme is to refocus UNEP's activities to promote the sustainable use of natural resources, addressed in its publication entitled the Biodiversity Programme and Implementation Strategy (BPIS).

2. UNEP supports the development of joint collaborative programmes and projects to promote the conservation, integrated management and sustainable utilization of biodiversity with organizations within and outside the UN system. Existing partnerships with key organizations such as FAO, UNESCO, UNDP, WRI, IUCN, WWF and SCOPE are being strengthened.

3. In collaboration with the IUCN, WRI and WWF, with the support of the Swiss Agency for Development and Cooperation, UNEP organized a workshop on Economics of Biodiversity Loss, from 22-24 April 1996 at Gland, Switzerland which focused on the appropriate role for economic valuation and economic incentives in developing a framework for biodiversity impact assessment and in collaboration with the Government of Canada, the Government of Chile and the Economic Commission for Latin America and the Caribbean, also organized a Regional Workshop on Economic Valuation of Biological Diversity from 6-9 May 1996 in Santiago, Chile which focused on economic issues essential to the conservation and sustainable use of biological resources.

4. As Task Manager for Chap. 15 Agenda 21, UNEP prepared the Report of the Secretary General on the Conservation of Biological Diversity, which described significant policy changes at the national and international level that have taken place and assessed their impact. Major changes in the approaches of key economic actors in the agricultural sector among others was also addressed.

5. UNEP has continued to play its role as the Secretariat of the Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals (MMAP). UNEP has also lead efforts in support of the development of a marine mammal component within the Black Sea Environment Programme funded by the GEF, and support in Eastern Africa to the efforts to conserve marine living resources. In support of the International Coral Reef Initiative (ICRI), UNEP provided technical and financial assistance for (a) ICRI Regional Workshop for the East Asia Seas, Denpasar, Bali, 18-22 March 1996; (b) ICRI Regional Workshop for the Western Indian Ocean and Eastern African Region, Mahe, Seychelles, 29 March - 2 April 1996; (c) Support to the 8th International Coral Reef Symposium, Panama, June 24-29 1996, including the organization of an ICRI symposium/workshop on science and management, and the preparation and presentation of a plenary paper; and (d) Establishment of the (IOC/UNEP/IUCN) Global Coral Reef Monitoring Network.

6. UNEP in collaboration with the United States National Aeronautic and Space Administration (MASA) and the World Bank has initiated the preparation of a policy paper on Linking Global Environmental Issues with Human Needs: Opportunities for Strategic Intervention, covering (a) needs, life support systems and driving forces, (b) linking and mainstreaming environmental issues into development, and (c) strategic opportunities for interventions: technologies, policies and measures.

7. UNEP co-sponsored the fourth and fifth global biodiversity forums along with the World Conservation Union (IUCN), the World Resources Institute (WRI) and the African Centre for Technological Studies (ACTS) held in Montreal 31 August - 1 September 1996, and Buenos Aires, 2-3 November 1996. A wide range of issues were covered at the forums through workshops on: incentives for biodiversity; marine and coastal biodiversity; forest biodiversity; and myths concerning protected areas with people (4th forum), and investing in biodiversity; agriculture and biodiversity; integrating biodiversity and land-use planning and management; and biodiversity and indigenous peoples (at the 5th forum).

8. Biodiversity Country Studies incorporating assessment of agrobiodiversity, have been undertaken by 37 countries of which 27 received GEF support through UNEP. A complementary project, the Biodiversity Data Management (BDM) Capacitation in Developing Countries and Networking Biodiversity Information, a GEF funded project, was initiated in June 1994 by UNEP and the World Conservation Monitoring Centre (WCMC). The project will facilitate the building of national capacity for biodiversity data management and exchange as required by the Convention on Biological Diversity (CBD). To assist countries mobilize and organise the data, a Guide to Information Management; and the Electronic Resource Inventory, among other documents were produced. As part of the Global Biodiversity Assessment a complementary volume on Cultural and Spiritual Values of Biodiversity including agrobiodiversity is under preparation. This volume will outline the importance of local knowledge systems and illustrate how these are key to biodiversity conservation and its sustainable use. The first draft will be ready by July 1997.

9. For the implementation of Article 6 of the Convention on Biological Diversity, UNEP with support from GEF have launched a project entitled Assistance for the Preparation of National Biodiversity Strategies, Action Plans, and First National Reports to the Convention on Biological Diversity, in association with National Governments, UNDP, the World Bank, and other relevant organisations (WRI, IUCN). The project is now being implemented in a number of countries including: The Bahamas, Cameroon, Egypt, The Gambia, Poland, Malawi, Mozambique, Seychelles, Panama, Solomon Islands, Cuba, Estonia, Vanuatu and China.

10. In collaboration with FAO, UNDP, ITTO and other relevant organisations, UNEP continued to play its role in the articulation of issues and solutions relating to forests. The Commission on Sustainable Development Intergovernmental Panel on Forests (IPF) has called upon UNEP and FAO to continue to play a leading role on regional consultations for sustainable forest managment. UNEP formulated a strategy to address the various forest-related environmental issues. These are contained in the UNEP's Forest Policy and a Proposed Action Programme for the Period 1996-2000 published in August 1996.

11. UNEP together with FAO, UNDP, ITTO, WB and the CBD Secretariat is a member of the Interagency Task Force on Forests (ITFF). The ITFF provides and mobilizes substantive support to the work of the IPF and its Secretariat. In cooperation with FAO, UNEP also supported two regional Workshops for Africa in November 1995 and West Asia October 1996 to review criteria and indicators for Sustainable Forest Management (SFM) in drylands ecosystems, including best practices. UNEP and the World Bank jointly organised the Africa Forests Policy Forum on 29-30 August 1996 at UNEP Hqs, with about 100 participants from governments, industrial firms, academic institutions, local communities, NGOs to review the successful policy options and best practices in Africa. Another initiative on forests entitled African Hearing on Forests is being organized by the World Commission on Forests in collaboration with UNEP. The objectives of the Hearing is to draw attention to the formulation and promotion of practical strategies and mechanisms for improving management and conservation of regional forest resources with special reference to poverty alleviation and protection of local as well as global values. The Hearing will be held in Cameroon in May 1997.

12. In collaboration with the Smithsonian Institution, UNEP organized a Workshop on Biodiversity and Climate Change Linkages in April 1996 at Washington D..C. to review and identify: (a) role of various biological systems in greenhouse gases fluxes (as sources and sinks); (b) research, priorities that would contribute to the acievement of the objectives of both biodiversity and climate change conventions; and (c) jointly implemented activities (JIA) within the framework of the UN Framework Convention on Climate Change (UNFCCC) with emphasis on type of projects that would contribute to biodiversity conservation and stabilization or reduction of greenhouse gases emissions.

13. UNEP and FAO jointly collaborated in the preparation and publication of the World Watch List for Domestic Animal Diversity, both in English and French languages; as well as the Animal Genetic Resources Information Bulletins. Other UNEP produced/collaborative policy publications are: (a) UNEP's Forest Policy and a Proposed Action Programme for the period 1996-2000, (b) Collecting Plant Genetic

Diversity - Technical Guidelines, (c) UNEP International Technical Guidelines for Safety in Biotechnology (in all UN languages), and (d) Guide to in the context of Article 8g of the Convention on Biological Diversity.

14. Biotechnology will contribute sustantively to the improvement of agriculture, fisheries, forestry, industry, health care and environmental management. To promote safety in biotechnology and as a follow-up to some of the actions called for in Chap. 16 of Agenda 21 and in support of the work undertaken by the Conference of the Parties (COP) to the Convention on Biological Diversity on development of a protocol on safe transfer, handling and use of living modified organisms resulting from biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, UNEP in co-operation with the Secretariat of the Convention on Biological Diversity and relevant UN entities including UNIDO, FAO, UNDP, UNESCO, WHO, DPCSD as well as representatives from the biotechnology industry, hosted seven regional and sub-regional consultations and an apex Global consultation of government-designated experts that considered and adopted the UNEP International Technical Guidelines for Safety in Biotechnology. At its third meeting of the Conference of the Parties to the Convention on Biological Diversity, through Decision III/20 affirmed its support for a two-track approach through which the promotion of the application of the Guidelines can contribute to the development and implementation of a protocol on biosafety, without prejudicing the development and conclusion of such a protocol. This two track approach was also endorsed by the nineteenth session of the Governing Council of UNEP through the decision contained in document GC 10/L.65 on Biosafety. An International Workshop to Follow Up on UNEP's International Technical Guidelines for Safety in Biotechnology was also held in Buenos Aires, Argentina from 31 October to 1 November 1996. The workshop discussed (a) the state of the art in biotechnology products development and trade related instruments, (b) progress in the implementation of the UNEP Guidelines, (c) information supply and information exchange for safety in biotechnology, (d) regulatory frameworks and harmonization, and (e) initiatives and activities in capacity building for safety in biotechnology.

THE UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)

1. Finding the right balance between conservation and sustainable use of biological resources is a daunting task for most developing countries.

2. UNIDO's Programme on Genetic Resource Assessment and Management (GRAM) is aimed at assisting developing countries generate institutional capacities conducive to new business opportunities in:

- assessing biodiversity conservation needs as well as opportunities for the sustainable utilization of genetic resources
- exercising regulatory oversight in-line with national regulations/guidelines and international treaties (e.g. GATT/TRIPS, the Convention on Biological Diversity, etc.)
- evaluating and transferring specific technologies and mobilizing investment capital to meet conservation, production and commercialization goals
- intellectual property protection licensing and business creation.

Objective

3. The main objective of the programme is the establishment of national Focal Points for Genetic Resources Assessment and Management (GRAM Offices) intended to meet the demand for biodiversity related information and other value-added services from government agencies, research centres and private enterprises. GRAM Offices will serve government institutions, research centres and private sector enterprises by:

i. enhancing awareness on and providing assistance in the implementation of international treaties and initiatives - GATT/TRIPS, Convention on Biological Diversity, Agenda 21, biosafety guidelines, intellectual property protection, etc.

ii. functioning as a window of information on:

- new business opportunities
- investment opportunities
- etechnology transfer (public & proprietary technologies)
- trade of biological products & regulatory requirements

iii. providing advisory services in

- conservation and bioprospecting business plan development
- licensing and technology transfer negotiations
- research & material transfer agreements
- project finance
- market research/analysis/intelligence
- safety assurance/quality control requirements

4. UNIDO provides know-how for the establishment and supports the operation of GRAM Offices through:

- in-house expertise and information resources in biosafety (BINAS), technology inventories, etc.

- The International Centre of Science and High Technology (ICS). The Centre's Biodiversity Prospecting Programme provides comprehensive training schemes in conservation and bioprospecting management.

- Brokering partnerships with research centres of excellence such as the International Centre for Genetic Engineering and Biotechnology (ICGEB), the Strathclyde Institute for Drug Research (SIDR) (UK) and the Sheffield Institute of Biotechnological Law and Ethics (SIBLE, (UK).

May 1997

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Item 6 of the Provisional Agenda

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Seventh Session

Rome, 15-23 May 1997

REPORTS FROM INTERNATIONAL ORGANIZATIONS ON THEIR POLICIES, PROGRAMMES AND ACTIVITIES ON AGRICULTURAL BIOLOGICAL DIVERSITY

PART II: INTERNATIONAL AGRICULTURAL RESEARCH ORGANIZATIONS OF THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

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PART II: INTERNATIONAL AGRICULTURAL RESEARCH ORGANIZATIONS OF THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

INTRODUCTION

1. The Commission on Genetic Resources for Food and Agriculture is the only inter-governmental body where member countries, both donors of funds and technology and users of genetic resources, discuss matters specifically related to agricultural biological diversity. The Commission, while still the Commission on Plant Genetic Resources, regularly received reports from relevant international organizations, including FAO, on their policies, programmes and activities for the for the conservation and sustainable use of plant genetic resources. It considered that such reports would be of value both to the Commission, and to those organizations which would thereby be able to better acquaint countries that are donors of germplasm and funds with their objectives and programmes, and benefit from their comments.

2. At the Commission's Sixth Session, nine United Nations and other inter-governmental organisations, twelve International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR), and four international non-governmental organizations provided reports.[1] The Commission welcomed these reports, and thanked the organizations that had presented them. It felt that they provided the Commission and its member countries with very useful information on world activities on plant genetic resources for food and agriculture. It considered that such reports also contributed to the mutual enrichment of understanding, which would lead to a greater coordination and synergy in plant genetic resource activities. The Commission also considered it important to be regularly apprised of the activities of organizations active in the field of plant genetic resources for food and agriculture, and encouraged organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture. The Commission encouraged those organizations that had submitted reports to continue to do so, and the submission of reports by other organizations with relevant activities on plant genetic resources for food and agriculture, such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Development Programme (UNDP), the World Intellectual Property Organization (WIPO), the Conference of the Parties to the Convention on Biological Diversity, the Global Environment Facility (GEF), l'Association de coopération des Universités partiellement ou entièrement de langue française (AUPELF), the World Wide Fund for Nature (WWF), and the Rural Advancement Fund International (RAFI). It also *asked* the Secretariat to invite relevant regional forums (the Council of Europe, the Southern Common Market (MERCOSUR) and the Junta del Acuerdo de Cartegena were mentioned) to submit reports to its future sessions. The Secretariat accordingly invited this range of organizations to submit reports to the present session.

3. In requesting reports to this session, the expansion of the Commission's mandate to cover not only plant genetic resources for food and agriculture, but all components of agricultural biological diversity of interest to food and agriculture has been taken into account in two ways: firstly, all

[1] IFAD, UNCTAD, UNEP, UNIDO, UPOV, World Bank, WTO, AsDB, Commonwealth Secretariat; CIAT, CIFOR, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IITA, ILRI, IPGRI, IRRI, WARDA; ACWW, IUCN, GRAIN, ICUC.

organisations were invited to report on their activities in agricultural biological diversity generally; and, secondly, invitations were sent to a number of organizations working in sectors of agricultural biological diversity other than plant genetic resources.

4. This document contains reports from the following *International Agricultural Research Centres of the CGIAR*:

> El Centro Internacional de Agricultura Tropical (CIAT), the International Centre for Agricultural Research in Dry Areas (ICARDA), the International Crop Research Institute for the Semi-arid Tropics (ICRISAT), the International Centre for Living Aquatic Resources Management (ICLARM), the International Institute of Tropical Agriculture (IITA), the International Service for National Agricultural Research (ISNAR), and the West African Rice Development Association (WARDA), submitted reports, some directly to FAO, and some through IPGRI, as the convening Centre of the CGIAR's System-wide Genetic Resources Programme (SGRP). IPGRI, in consultation with the individual Centres, then consolidated reports from the International Agricultural Research Centres into the joint report contained in this document.

5. The Secretariat has limited itself to compiling the reports, as submitted. Each report is fully the responsibility of the organization submitting it. FAO's own activities are reported in documents CGRFA-7/97/8.1 and CGRFA-7/97/8.2.

6. Reports from United Nations and Other Inter-governmental Organizations are contained in document CGRFA-7/97/7 Part I, and reports from International Non-governmental Organizations are contained in document CGRFA-7/97/7 Part III.

INTERNATIONAL AGRICULTURAL RESEARCH CENTRES OF THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

INTRODUCTION

1. This report to the FAO Commission on Genetic Resources for Food and Agriculture is in two parts. Part I focuses on the measures which the CGIAR is undertaking to implement the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, and Part II provides information on the CGIAR's activities dealing with forest, animal and aquatic genetic resources, in light of the Commission's expanded scope. This is a consolidated report, reflecting input from the relevant CGIAR Centres, and was prepared in the context of the CGIAR System-Wide Genetic Resources Programme (SGRP). An Annex gives information on the recently concluded external review of CGIAR genebank operations and the response of Centres to this review. The report of the review is available to the Commission.

2. Established in 1994, the SGRP encompasses the individual Centre genetic resources programmes. Through coordination and collaboration among the Centres, the SGRP aims to enhance the efficiency, effectiveness and transparency of the CGIAR's contribution to the Convention on Biological Diversity, Agenda 21 and the evolving FAO global system for plant genetic resources. It promotes multi-Centre collaborative activities with partner organizations in areas of common concern such as *ex situ* and *in situ* management, and the use of crop, forage, agroforestry, forestry, livestock and aquatic genetic resources. The SGRP's scope includes scientific, technical and policy research, development of information systems, and institution and capacity strengthening. Strategies and plans are developed in accordance with global developments in genetic resources.

3. Two major initiatives of the SGRP are the establishment of the System-wide Information Network for Genetic Resources (SINGER) and, as noted above, the commissioning of an external review of the CGIAR genebank operations. SINGER links the genetic resources information systems of individual Centres and allows searches across databases for key information relating to the origin, characteristics and distribution of accessions in Centre genebanks, and access to further information in Centre databases. This enables the CGIAR Centres to provide partners with enhanced access to information concerning the genetic resources they hold in their genebanks. Progress on SINGER is referred to in the body of this report and in the Annex.

4. Separately, information will be made available to the Commission on guidelines for the regeneration of seed collections, and the management of field and *in vitro* collections developed by the SGRP, in association with FAO. A verbal report will be provided on the status of the Agreements signed in 1994, governing the placement of the CGIAR plant genetic resources collections under the auspices of FAO, and the designation of germplasm under these Agreements.

PART I: THE CGIAR AND THE GLOBAL PLAN OF ACTION

5. The process that led to the Fourth International Technical Conference on Plant Genetic Resources, and to its adoption of the Global Plan of Action, provided CGIAR Centres with a unique opportunity to review their programmes and priorities in light of those identified by the international community. In the course of the preparatory process leading to the Leipzig Conference, FAO conducted the first comprehensive assessment of the status of PGRFA and of the world's ability to care for these resources, and use them sustainably and equitably. The FAO assessment benefited from the participation of nearly 160 countries, numerous NGOs and many international agricultural research centres, including virtually all of the CGIAR Centres. The Report on the State of the World's Plant Genetic Resources identified a number of strengths in current genetic resources efforts. However, it also uncovered areas in which current efforts are inadequate or even misguided. In this regard, the Report served as the basis and justification for the priorities and programmes contained in the Global Plan of Action.

6. The CGIAR welcomes the adoption of the Global Plan of Action, and the recognition by the World Food Summit of the importance attached to its implementation. In particular, the CGIAR wishes to acknowledge the significant and valuable role the Global Plan will play, both now and in the future, in giving guidance and direction to the SGRP and to the work of the individual Centres. As part of the global system for plant genetic resources, the Plan will set the specific context in which this work will take place.

7. The CGIAR Centres are involved in a very broad range of activities to conserve and develop PGRFA. In addition, most Centres provide substantial support to national programmes and networks, and are heavily involved in information, training and public awareness efforts. Indeed, it could be said that virtually all the CGIAR's activities support the implementation of the Global Plan of Action.

8. As the Global Plan of Action aims to improve upon past efforts, including those of national programmes, international institutions and NGOs, the Commission might be most interested in knowing how the Plan is changing the CGIAR's work and priorities. For this reason, and due to practical and space limitations, this report does not provide an exhaustive or complete description of all of the Centre's work relating to the Global Plan of Action. Instead, examples of activities have been chosen to illustrate how the CGIAR is responding to the 20 activities listed in the Global Plan of Action. In particular, the report focuses on a number of new and innovative activities. Additional information is available from the annual reports of the various Centres and SGRP, and from other published reports and documents.

Examples of the CGIAR Centres' Response to the Global Plan of Action

GPA Activity Number 1: Surveying and Inventorying Plant Genetic Resources for Food and Agriculture

9. The CGIAR Centres have initiated a number of programmes in response to this activity. For example, IRRI plans to develop methods to survey and assess intra- and inter-species diversity in agro-ecological systems and wild species populations of rice. IPGRI is also working to develop strategies and methods for locating and measuring genetic diversity, and for estimating and monitoring genetic erosion. CIAT has used GIS to predict the location of important *Phaseolus* populations from agro-climatic data and has used molecular markers to gauge the genetic diversity of these populations. IITA is planning to apply similar methods to cowpea and wild *Vigna*. The information can be used in selecting areas for *in situ* conservation and in planning future collecting missions. CIAT also has projects underway with partners in South America to assess diversity in *Centrosema* and to determine the genepool of Lima bean. In 1997, ILRI and CIAT, in partnership with CSIRO, will work on forage databases in support of this activity.

GPA Activity Number 2: Supporting On-Farm Management and Improvement of Plant Genetic Resources for Food and Agriculture

10. In response to this activity, a number of the Centres (e.g. CIAT, CIMMYT, CIP, ICARDA, ICRISAT, IITA and IRRI) are continuing to improve their knowledge of the dynamics and implications of on-farm conservation and plant improvement. For example, IRRI conducts research aimed at understanding the socio-economic and genetic dynamics of farmer-managed systems involving rice.

11. IPGRI is undertaking projects to develop ethnobotanical and agro-ecological methods for locating genetic diversity (including in home gardens) and participatory approaches to conservation and development, and is carrying out case studies on indigenous knowledge and the differential roles of men and women in the conservation and use of PGRFA. All of the Centres are placing greater emphasis on working with farmers – including women farmers – and with NGOs, in recognition of the Plan's requirement that genetic resources programmes work more closely with these partners in the development and management of improved and locally adapted germplasm.

GPA Activity Number 3: Assisting Farmers in Disaster Situations to Restore Agricultural Systems

12. The CGIAR is ready to assist FAO and others to establish a standing capacity to support the restoration of agricultural systems in areas affected by disaster. The CGIAR has some experience in this area: a number of Centres, including CIAT, CIP, ICARDA, ICRISAT, IITA and IRRI have provided both practical assistance and germplasm in disaster situations (*e.g.* The Seeds of Hope project in Rwanda). Currently, IPGRI is working with the Kenyan National Genebank in an EU-funded project to restore traditional sorghum cultivars to Somalia. ICRISAT is placing high priority on collecting germplasm which might be useful in restoration efforts at a later date. Through SINGER, the CGIAR will be in an excellent position to assist in identifying and tracking appropriate germplasm held in CGIAR genebanks for restoration to farmers.

GPA Activity Number 4: Promoting In Situ Conservation of Wild Crop Relatives and Wild Plants for Food Production

13. In response to this activity, a number of the Centres are increasing their efforts to study and promote the conservation of genetic resources of wild crop relatives and wild plants. For example, ICARDA is working with the Syrian national programme to investigate *in situ* conservation strategies for the wild relatives of cereals and food legumes. ICRISAT is working on a project in Brazil for the *in situ* conservation of wild groundnut and IITA has initiated a study on wild yam populations. Other Centres are developing plans and techniques to improve their contribution to *in situ* conservation efforts. For example, IRRI's Medium Term Plan proposes research to develop a methodological framework for *in situ* conservation of wild rice. ILRI will soon begin a new programme to assess variation under different grazing management regimes in order to develop guidelines for the management of natural pastures under *in situ* conservation.

GPA Activity Number 5: Sustaining Existing Ex Situ Collections

14. The CGIAR has a long standing commitment to *ex situ* conservation and thus attaches great importance to the implementation of this activity. A number of Centres now assist countries by holding national collections under black box arrangements or by maintaining duplicates of national material in their genebanks. Several Centres have indicated that they could offer additional space in their genebanks for such purposes. Centres such as WARDA, IITA, and IRRI are examining ways to use core subsets for further safety duplication purposes, as a means to respond to the Plan's call for the replication and safe storage of material. All of the Centres routinely restore genetic resources, upon request, to national programmes.

15. IPGRI has helped to negotiate agreements with more than 50 national and regional genebanks to hold global or regional collections, and continues to work closely with FAO to promote the International Network of *Ex Situ* Collections. IFPRI is leading a project under the SGRP to determine the parameters for the costing of *ex situ* conservation with the goal of providing guidelines to assist genebanks attain greater cost-efficiency.

16. In association with FAO, the SGRP commissioned an external review of Centre genebank operations in furtherance of the FAO-CGIAR agreements for the holding of genetic resources in trust. The review, while generally positive, drew attention to a number of problems and constraints. Centres are now responding to the recommendations of the review with specific improvements both at Centre level and at a System-wide level through the SGRP. This subject is addressed separately in the Annex to this report.

GPA Activity Number 6: Regenerating Threatened Ex Situ Accessions

17. In response to the Global Plan and to the recommendations of its own External Review, the Centres of the CGIAR are giving significant attention to the rational regeneration of their own collections (see

Annex). In addition, the Centres are working to support the regeneration activities of their partners. In 1995, SGRP and FAO brought together national programmes and CGIAR Centres to examine regeneration procedures for seed collections. One outcome of the meeting was the development of guidelines to inform curator decision-making on regeneration. CIMMYT is coordinating a large effort involving 13 countries in Latin America and the Caribbean to regenerate national maize holdings. Upon completion of its own regeneration programme, ICRISAT plans to assist national programmes in their efforts.

GPA Activity Number 7: Supporting Planned and Targeted Collecting of Plant Genetic Resources for Food and Agriculture

18. The CGIAR has long supported the collecting of information and genetic resources of species that are under threat and/or of potential use. In recent years, the number of accessions added annually to *ex situ* collections held by the CGIAR has declined from its peak in the last decade. At least one Centre, ILRI, has suspended collecting activities, pending clarification by countries of terms and conditions of access to their genetic resources. However, in general, there has been a shift by the Centres to more targeted and prioritized collecting, in collaboration with national programmes, as a means to fill gaps in the genetic diversity of existing collections (*e.g.* by ICARDA, CIAT, CIMMYT). IRRI also strictly targets its collecting, with the exception of material gathered in the Lao DPR, where little general collecting has been done in the past. IRRI anticipates that the collecting phase for rice should be completed by the year 2000.

19. As noted under Activity 3 above, ICRISAT is using its collecting activities to strengthen its capacity to respond to restoration needs in disaster situations. All Centre collecting activities are carried out on the basis of agreements with countries of origin.

GPA Activity Number 8: Expanding Ex Situ Conservation Activities

20. The CGIAR Centres attach great importance to the development of conservation strategies using an appropriate combination of methods. This Activity of the Global Plan specifically cites botanical gardens, field genebanks and the use of new technologies, including *in vitro* conservation, for their potential to complement and expand the *ex situ* conservation of orthodox seed.

21. In response to the Global Plan, ICRISAT, in partnership with Brazil, is increasing its research on alternative storage methods (particularly cryopreservation) for wild accessions of groundnut. While IPGRI is investigating new technologies for *in vitro* conservation, especially of unorthodox/recalcitrant seeds. Improved *in vitro* and cryopreservation methods for clonal crops are under development and routinely used for the conservation of potato, sweet potato, cassava, yam and *Musa* at the Centres which have mandates for these crops. CIAT has upgraded its laboratory facilities to allow it to host duplicated *in vitro* collections for other institutions. ISNAR, through its Intermediary Biotechnology Service, is assisting national agricultural research systems in developing countries to manage biotechnology research programmes.

22. A number of the CGIAR Centres hold field collections. IITA, for example, maintains 5,500 accessions of yam, cassava and *Musa* in field genebanks. Based on consultations with national programmes and Centres in 1996, SGRP and FAO have developed guidelines for the management of field and *in vitro* genebanks as an aid to curators.

23. Relationships with botanical gardens and support to botanical gardens as recommended in this Activity are not generally well developed in the CGIAR and many Centres would question whether they are in a position to offer substantial assistance in this regard.

GPA Activity Number 9: Expanding the Characterization, Evaluation and Number of Core Collections to Facilitate Use

24. The Centres are now working to facilitate the use of conserved material by rationalizing genetic resources collections and by speeding-up the identification of useful accessions. For example, characterization and evaluation work recently undertaken at IITA resulted in the identification of 65 cassava accessions resistant to African cassava mosaic virus, some 50 accessions of virus-resistant yams, and 5 accessions of wild cowpea resistant to Maruca pod borers. These accessions can now be used by national programme researchers to enhance germplasm. A new IPGRI project emphasizes the use of characterization and evaluation of germplasm in the identification of useful traits. ICRISAT is completing the characterization of its in-trust collection and is examining the appropriateness of currently used characterization data for national collections. CIMMYT and national programmes in Latin America have generated a CD-ROM that contains information on the ecological adaptation and other traits of 12,000 maize accessions.

25. ILRI's Medium-Term Plan places increased emphasis on characterization, including the characterization of phytochemicals which relate to the use of the germplasm for livestock feeds. The Centre will expand its morphological and molecular characterization of key species this year. ICARDA's Medium Term Plan places greater emphasis on characterization and CIP is giving greater attention to characterization in its programme plans from 1997 onwards.

26. A number of the Centres are currently involved in the development of core collections. For example: ICARDA is participating in the preparation of an international core collection for barley and is preparing core collections for other mandate crops; CIAT and CIP are developing core collections for their mandate crops; ICRISAT is developing core collections of its own holdings and those of national collections; and IRRI is developing methods to establish a core collection of rice. The results of this research will be extremely useful to national programmes seeking to rationalize and promote better use of their collections.

GPA Activity Number 10: Increasing Genetic Enhancement and Base-Broadening Efforts

27. Most of the CGIAR Centres were already giving significant attention to genetic enhancement and base broadening efforts prior to the adoption of the Global Plan, recognizing the importance of such efforts to sustainable agriculture and food security worldwide. For example, many Centres have for some time supported crop networks to promote the distribution and use of improved germplasm (*e.g.* CIMMYT, IITA, IRRI). WARDA's interspecific rice hybridization programme has produced the first genetically stable and fully fertile hybrids which they are currently evaluating for adaptation and yield in 12 West African countries. The Centres find that their work in this area also helps to strengthen ties with national programmes.

28. In addition to current and ongoing activities, the Centres are likely to strengthen their work in this area in response to the Global Plan. ICARDA's Medium Term Plan includes an emphasis on pre-breeding efforts, with the focus on gene introgression from crop wild relatives. INIBAP (IPGRI) recently reformulated its *Musa* germplasm programme and recruited a scientist to head the programme.

GPA Activity Number 11: Promoting Sustainable Agriculture through Diversification of Crop Production and Broader Diversity in Crops

29. The CGIAR promotes and facilitates the use of greater diversity in breeding programmes, and in the varieties and species grown on-farm, to reduce the vulnerability and increase the stability of agricultural systems. In response to this activity of the Global Plan, most of the Centres will continue to focus their efforts on providing improved populations as opposed to finished cultivars. ICARDA, for example, is emphasizing the delivery of improved forage and pasture populations targeted to different agro-

ecological conditions in WANA. Some Centres are expanding the range of crops they are working with, although financial constraints present a barrier.

GPA Activity Number 12: Promoting Development and Commercialization of Under-Utilized Crops and Species

30. A number of the CGIAR Centres (eg. ICRISAT, IITA) actively support the conservation and use of under-utilized crops to contribute to food security and rural development, particularly in marginal areas, and to agricultural diversification. ILRI is seeking to identify forages that have not previously been used as livestock feed. CIP is promoting the *in situ* management and use of Andean root and tuber crops both within and outside the region. For a number of years, IPGRI has promoted the conservation and use of neglected and under-utilized crops, especially of Mediterranean species, and now plans to expand this work.

GPA Activity Number 13: Supporting Seed Production and Distribution

31. The CGIAR Centres are broadening their efforts to promote the availability of good quality seed of a wide range of crop varieties, in response to the Global Plan. For example, IRRI, through its work on on-farm management, promotes links between genebanks, plant breeding organizations, seed producers, and small-scale production and distribution enterprises. Some Centres, ILRI and ICARDA among them, offer training in seed production methods. ICARDA, in addition, promotes small-scale farmer and village level production of pasture and forage species seed, while ILRI provides basic seed to support national forage seed production. CIP, through three regional seed units, supports the production of high quality potato seed for farmers in the Americas, Africa and Asia. ICRISAT, which already works with the formal seed sector in southern Africa and has links with seed production and distribution efforts in West Africa, proposes to expand its work in this area.

GPA Activity Number 14: Developing New Markets for Local Varieties and Diversity-Rich Products

32. The CGIAR has not undertaken a great deal of work in this area to date and many Centres feeling they have no particular comparative advantage to offer. Nevertheless, some Centres are involved in activities to encourage farmers to grow distinct, local varieties. For example, ICARDA supports projects to study traditional foods made with local crop varieties and CIP has promoted the marketing of local Andean roots and tubers. ISNAR's series of Agricultural Biotechnology Policy Seminars, with national programmes in Asia, Africa, Latin America and WANA, have included sessions addressing needs for market development and related research for indigenous diversity and crops of local importance. IPGRI is involved in the development of new markets for local cash crops through the coconut and bamboo/rattan networks, and has plans for socioeconomic research to examine community income generation and market development.

GPA Activity Number 15: Building Strong National Programmes

33. The CGIAR has long recognized that national programmes are the key to realizing national, regional and global goals in the conservation and use of genetic resources. Consequently, all Centres contribute to the development of strong national programmes, by working directly with national partners and through networks. In direct response to the Global Plan, ISNAR will undertake a new programme on management and human resource development needs in national programmes, with relation to biotechnology and biodiversity. This programme involves eight countries in Asia. IPGRI plans to intensify its research on infrastructure, operations and policy options for national programmes.

GPA Activity Number 16: Promoting Networks for Plant Genetic Resources for Food and Agriculture

34. The CGIAR has long supported the concept of networks as a means to help countries share the responsibilities and costs of genetic resources activities. All Centres are involved in regional and crop networks, a number of them currently provide or house the secretariats of certain networks. In response to this activity of the Global Plan, new networks are now being formed with the assistance of CGIAR Centres. For example, ICARDA and IPGRI are helping to establish a network for Central Asia.

GPA Activity Number 17: Constructing Comprehensive Information Systems for Plant Genetic Resources for Food and Agriculture

35. The CGIAR System-wide Information Network on Genetic Resources (SINGER) is a genetic resources data exchange network containing information on all CGIAR Centre collections. SINGER is accessible on the Internet and will shortly be available on CD-ROM. In addition, CIMMYT leads a multi-Centre project with national programme partners to develop an international crop information system that compiles information on the nomenclature, genealogy and performance of crop germplasm. In response to this activity of the Global Plan, the Centres are exploring the possibility of expanding SINGER to include a wider range of information on global genetic resources holdings. A number of Centres, including IRRI and IPGRI, continue to work with national programmes to enhance their capacity in data management.

GPA Activity Number 18: Developing Monitoring and Early Warning Systems for Loss of Plant Genetic Resources for Food and Agriculture

36. The CGIAR recognizes the need for mechanisms to monitor the natural and human phenomena that put plant genetic resources at risk, to assemble information and to respond appropriately. Thus most Centres feel that they can work most effectively on this topic through regional networks, where such mechanisms are more likely to exist or to be established. IPGRI will continue to work with FAO on the development of its World Information and Early Warning System (WIEWS).

GPA Activity Number 19: Expanding and Improving Education and Training

37. The CGIAR has a very long history of training scientists from developing countries in disciplines related to genetic resources. The Centres will continue to fulfil their commitment to training, whether through participation in national training efforts, through annual training activities sponsored by the Centres (e.g. ICARDA's annual training course in research methods for genetic resources staff in WANA) or through individual training programmes. In addition, in response to this activity of the Global Plan, the Centres will give greater attention to rationalizing their training activities and to developing new and innovative approaches to training. For example, ILRI is convening an Inter-Centre Training Programme for Sub-Saharan Africa, which will include genetic resources training. IPGRI will continue to offer training for trainers and to develop a series of training materials.

GPA Activity Number 20: Promoting Public Awareness of the Value of Plant Genetic Resources for Food and Agriculture

38. In response to this activity of the Global Plan, the CGIAR Centres will continue their long-standing commitment to promote the role played by plant genetic resources in agricultural development. A four-part broadcast/educational video series will be released in 1997, as part of a project led by IPGRI and involving all Centres. Starting this year, a significant public awareness campaign, again involving all Centres, will promote the importance of agricultural research including genetic resources, to audiences around the globe. Public awareness efforts through the SGRP will focus on promoting the implementation of the Global Plan of Action. The CGIAR Public Awareness Association, which coordinates public awareness activities throughout the system, will expand to include representatives

from national programmes, donor agencies and NGOs at all levels. A principal goal of IPGRI's public awareness strategy is capacity building in public awareness for national genetic resources programmes.

PART II: ANIMAL, AQUATIC AND FOREST GENETIC RESOURCES ACTIVITIES IN THE CGIAR

39. The Centres with mandates for research on forestry, agroforestry, livestock and aquatic resources are lead Centres for genetic resources activities in their respective fields. Programmes focus on the *in situ* conservation of genetic resources, and have a strong emphasis on assessing genetic diversity and the threats facing it, as well as the management and sustainable use of diversity. Through the SGRP, these activities are coordinated with those of other Centres concerned with genetic resources conservation, policy research and institution strengthening and capacity development. Individually, and through the SGRP, the CGIAR Centres collaborate closely with FAO on forestry, animal and aquatic genetic resources.

Animal genetic resources

40. CGIAR research emphasizes the characterization of indigenous domestic animal diversity to facilitate the rational management of animal genetic resources. This includes the survey and documentation of the number and characteristics of local livestock breeds and their production environments, and estimates of within-species genetic diversity. The work aims to assist NARS to develop methodologies for on-farm characterization, and strategies for conservation and sustainable utilization, including exploitation of economically important unique attributes. Other priorities include adapting collecting techniques, evaluating and storing gametes and embryos for the *ex situ* preservation of endangered breeds, and investigating how existing institutions, including national artificial insemination centres, could become involved in domestic animal genetic resources conservation.

41. On-going activities take place principally at ILRI in collaboration with NARS. Activities are coordinated with FAO and undertaken in support of the development of the Global Strategy for the Management of Farm Animal Genetic Resources.

42. At present, research is being carried out, in collaboration with NARS scientists in Africa, to test alternative survey methods for collecting breed information, phenotypic characteristics (including performance) and population statistics, under field conditions. Information on indigenous breeds, including their geographic distribution, production systems, physical and performance characteristics, is also being compiled into a computerized database. Microsatellite markers and protein polymorphism, the latter in collaboration with NARS, are being used to estimate within-species diversity. In addition, the characterization of selected populations for specific genetically controlled disease adaptations is being undertaken as part of ILRI's Animal Health Programme. This includes research on resistance to endoparasites in several Sub-Saharan countries, studies on tick resistance in cattle and continuing work on trypanotolerance, including the search for trypanotolerance markers in some African cattle populations.

43. ICARDA, in its Medium Term Plan, includes work on the phenotypic characterization of small ruminants in the WANA region. Initial research will focus on between and within breed variation in the utilization of low-quality forages.

Aquatic genetic resources

44. ICLARM carries out research, training and information activities to improve the production and management of marine, coastal and inland aquatic environments. In 1996, ICLARM established a Biodiversity and Genetic Resources Programme which has responsibility for ICLARM's main activities in aquatic biodiversity and genetic resources. Activities are carried out in close collaboration with the Centre's programmes on aquatic environments, coastal aquaculture and enhanced fisheries, fisheries

resource assessment and management, germplasm enhancement and breeding, and integrated agriculture-aquaculture systems.

45. In participation with research organizations in Germany and Ghana, ICLARM has developed methods to characterize tilapia genetic resources. Genetic markers for tilapia species were identified and a manual of methods was finalized at an international workshop and later published. Proposed activities for 1997 include a case study on the genetic diversity, conservation and sustainable use in aquaculture and fisheries of the black-chinned tilapia in West African lagoons and watercourses, and the genetic diversity of the silver barb in Southeast Asia. In addition, there are proposals to develop a global information system on fish larvae and a global database of shrimps, prawns, lobsters and crabs. ICLARM, in collaboration with FAO and other organizations, has already developed ReefBase, a database on the world's coral reefs and FishBase, a database containing information on 17,000 of the worlds 25,000 extant finfish species.

46. Guidance on the development of ICLARM's programme on aquatic genetic resources and the priorities for the SGRP in this field, was provided by a consultation meeting held in December 1995, attended by experts from a number of countries, FAO and IUCN. One of the meeting's recommendations was that ICLARM should be a focal point for processing, maintaining and disseminating information on fish genetic resources, particularly through links with NARS and NGOs. The full proceedings of the meeting will be published shortly.

47. The establishment of the Biodiversity and Genetic Resources Programme will enable ICLARM to expand collaborative activities within SGRP, and facilitate interaction with other institutions and organizations involved in aquatic genetic resources, particularly FAO. ICLARM is collaborating with FAO in the planning of an international conference in 1998 on the conservation and sustainable use of aquatic genetic resources.

Forest genetic resources

48. The CGIAR's contribution to forest genetic resources management and use is primarily through CIFOR, ICRAF and IPGRI, and brings together their combined research expertise. CIFOR is mainly concerned with natural forest ecosystems and plantations, ICRAF with agroforestry and IPGRI with plant genetic resources conservation and use.

49. CIFOR's work strongly emphasizes the *in situ* conservation and use of tropical forest ecosystems, and the integration of management strategies with the needs of rural people living in or near forests. Research focuses on the interactions between processes at the landscape level that reduce genetic diversity, especially degradation (disturbance) and deforestation (fragmentation), and the genetic-level processes of geneflow, inbreeding, genetic drift, etc. Studies also aim to improve understanding of the impacts of the above on forest resources, local industry and the livelihood of local people. CIFOR and IPGRI have joined together to investigate these aspects through in country research, in partnership with NARS in Malaysia, Thailand and India, and CATIE in Costa Rica. In addition, CIFOR is developing tools to aid analysis of genetic diversity in tree species and is collaborating with the Oxford Forestry Institute, UK to develop and provide training on molecular marker techniques. CIFOR is also working with the University of Alberta, Canada to develop a computer programme to facilitate analysis of population genetics data.

50. ICRAF's activities cover the collecting, *ex situ* conservation and on-farm management of agroforestry species, and the promotion of their use and domestication. Efforts focus on priority agroforestry species determined through surveys conducted by NARS and ICRAF in different ecoregions. Studies are now underway, together with local farmers, on the natural distribution of the key species and the efficiency of different collecting strategies in capturing and identifying useful diversity. ICRAF maintains germplasm of key species, under agreements with country partners, in field genebanks or, in the case of orthodox species, as seed. Farmers are closely involved in evaluating and conserving

genetic diversity of the greatest utility. ICRAF is also expanding its efforts on molecular characterization.

51. The ICRAF programme strongly emphasizes the use of agroforestry species, particularly species that have been neglected in the past. The Centre supports seed production and is engaged in the policy, training and practical aspects of promoting farmer-based seed production. This includes paying close attention to new or expanded markets for tree products. Domestication of agroforestry species is viewed as a farmer-driven or market-led process, and ICRAF uses a range of improvement strategies, depending on the biology and use of the species. ICRAF has a strong partnership in conservation research and training with KEFRI, the Kenyan Forestry Research Institute. ILRI and IITA collaborate with ICRAF on research and in the maintenance of agroforestry germplasm.

52. IPGRI is involved in collaborative research with a range of national programme partners in the West African Sahel, the Americas and Asia, to develop methods for locating diversity and assessing genetic erosion in forest ecosystems. With partners in Asia, IPGRI is investigating strategies for the conservation and use of bamboo and rattan, including both *in situ* and *ex situ* methods. IPGRI is also managing a project with 25 country partners to develop cost-effective methods for conserving recalcitrant tropical tree seeds.

53. CIFOR, ICRAF and IPGRI were involved in the subregional meetings on forestry genetic resources, held prior to the International Technical Conference in 1996. The CGIAR also has close contacts with a number of forestry genetic resources networks. IPGRI hosts the coordinating secretariat for EUFORGEN, and ICRAF provides support to a number of tree seed networks as well as steering the miombo fruit tree network.

CONCLUSION

54. The CGIAR is committed to contributing to the global effort for the conservation and sustainable use of agricultural, forestry and aquatic genetic resources. To harness the collective strengths of the CGIAR Centres, and enhance the CGIAR's contribution to the practical implementation of the Convention of Biological Diversity, the SGRP was established in 1994.

55. The Centres of the CGIAR are prepared to play a major role in the implementation of the Global Plan of Action. They hold large and important collections of PGRFA in trust for the world community, as recognized in the Agreements signed with FAO. These Agreements acknowledge that while the Centres do not claim ownership over the materials, they accept certain responsibilities for conserving, duplicating and making the material available to users upon request. Experience with these Agreements has been uniformly positive and the CGIAR supports their renewal in 1998. To ensure their continued compliance with the International Undertaking, the CGIAR would propose a review of the Agreements once the current negotiations of the Undertaking have been completed.

56. The Global Plan of Action presents challenges to all institutions and programmes involved with plant genetic resources for food and agriculture and the CGIAR is no exception. The Global Plan promotes change by providing agreed activities and priorities. The CGIAR willingly accepts that implementation of the Plan will necessitate some changes, adjustments and improvements in existing programmes. This report highlights a few of the new, or lesser known, initiatives that Centres are undertaking in direct response to the Global Plan of Action. It also points to several areas where the CGIAR Centres might not be able to make substantial contributions.

57. The Global Plan of Action is now being widely used for planning and priority setting within the CGIAR. Explicit reference is made to it in many of the Centres' recently-formulated Medium Term Plans which reflect the pervasive influence of the Global Plan in the work of the CGIAR. They also reveal areas in which further adjustments and strengthening will be necessary in the coming months and

years. The CGIAR's Inter-Centre Working Group on Genetic Resources, which serves as the Steering Committee for the System-Wide Genetic Resources Programme, will provide one internal forum in which Centres can plan and coordinate their ongoing efforts to implement the Global Plan of Action. Future reports to the Commission will provide updates on this work.

58. An overview of the current research by the CGIAR and its partners, in contribution to the global effort on the management and sustainable use of forestry, agroforestry, livestock and aquatic genetic resources, has been given in Part II.. As in the realm of PGRFA, rapid changes are occurring in these fields at both the policy and technical levels. Through the SGRP, greater coordination of Centre activities will enable the CGIAR to respond to these changes as they occur. The Centres will continue to work in close collaboration with FAO's programmes on animal, forestry and fish genetic resources, and in support of global developments in these fields, such as the Global Strategy for the Management of Farm Animal Genetic Resources.

Annex to the CGIAR Report

EXTERNAL REVIEW OF THE CGIAR GENEBANK OPERATIONS

Introduction

A1. In 1995, the System-wide Genetic Resources Programme (SGRP) commissioned an external review of Centre genebank operations to assess the technical, scientific and financial constraints and opportunities for improving the services they provide. In doing so, the review examined compliance with the Agreements signed between FAO and eleven CGIAR Centres in October 1994, through which the Centres hold designated plant genetic resources in trust for the benefit of the international community within the International Network of *Ex situ* Collections, under the auspices of FAO. Under the terms and conditions of the Agreement, the designated germplasm is maintained by the Centres in accordance with internationally accepted standards, and made available without restriction for research, breeding, and conservation.

A2. The review was conducted in association with FAO, by a Panel composed of 20 experts from national and regional genetic resources programmes, and the FAO. The Panel was chaired by Dr. N.L. Innes. Over a period of six months, panel members visited the eleven CGIAR genebanks that hold plant genetic resources, as well as ICLARM (which holds germplasm of Nile tilapia *ex situ* under a current research project).

A3. The Panel paid particular attention to the status of the collections, the conservation facilities, standards of collection management and off-site safety duplication of the collections. It examined research related to germplasm management, training, collecting and use of the collections, and linkages with national programmes and networks, including the distribution of germplasm and opportunities for restoring duplicates to countries of origin. Individual reports were prepared for each genebank, giving specific recommendations for improving operations. In addition, the Panel produced a synthesis report with a number of overall recommendations. This report was published by the SGRP in 1996, together with the collective response of the Inter-Centre Working Group on Genetic Resources (ICWG-GR). Currently, the Panel's summary comments and specific recommendations for each genebank reviewed, together with the respective Centre's responses, are being compiled for publication as a supplementary annex to the review report. The report and a pre-publication version of the annex will be made available to the Commission.

A4. The information generated by this review was incorporated into the FAO Report on the State of the World's Plant Genetic Resources for Food and Agriculture. This annex provides an overview of the findings of the review and, through illustrative examples, of how the CGIAR is responding to its recommendations. Further information can be found in the formal Report and its annex, as well as in the Annual Reports of the SGRP and individual Centres.

Findings of, and Response to, the External Review

A5. The Panel concluded that most Centres' genebanks were operating satisfactorily and generally well managed, but voiced its concern over the problem of under-funding which was constraining some of the activities. Consequently, as recommended by the Panel, the SGRP has implemented a study of the costs of the CGIAR genebank operations that will help to determine adequate funding for the essential activities needed to adhere to the Agreements with FAO. (Centre resource allocations to their overall genetic resources programmes are contained in their Medium-Term Plans for 1998-2000, which go before the CGIAR for approval in May, 1997.)

A6. The Panel reported that most Centres were meeting the requisite international genebank standards. Individual Centres are giving priority to responding to the review's specific recommendations regarding genebank facilities and standards. For example, ILRI has installed new conservation facilities, and

WARDA, which has an agreement with IITA to maintain its base collection, is planning to modify one of its stores to meet accepted standards for medium storage. The new genebank facilities at CIMMYT are fully operational and ICRAF's new facilities will be completed by the end of 1997. CIAT has expanded its cassava *in vitro* store to allow it to host duplicate *in vitro* collections, and a new seed viability testing laboratory will be built in 1997. Also, IITA is planning to expand its tuber storage facilities for yam.

A7. The Panel noted that several Centres faced resource constraints in meeting the need for timely and comprehensive viability tests, regeneration and production of disease-free material. The Centres are addressing these and accelerating efforts, accordingly. For example, CIMMYT has grown out over 12,000 wheat accessions to ensure that they are free of Karnal bunt infection, prior to their transfer to its new genebank. IITA has multiplied more than 3,000 disease-free accessions of leguminous germplasm over the last two years and is speeding up work to complete duplication of the yam collection into *in vitro* culture. CIP has now regenerated about 63% of the wild potato collection for long-term seed storage and is increasing seed stocks of *Ipomoea* species. INIBAP/IPGRI, with three Virus Indexing Centres now in operation, expects to double capacity to virus index *Musa* germplasm in 1997. ILRI is now putting emphasis on the regeneration and germination testing of the forage collection in order to establish its long-term store according to international standards. It is currently establishing regeneration histories and regenerating more than 1000 accessions. IRRI has performed more than 170,000 individual tests in completing the viability testing of the all accessions in the base and active collection.

A8. In order to address the recommendations of this review and other recent reviews of the institute, ICRISAT has instituted fundamental changes to its genetic resources programme and genebank. These include, elevating its genetic resources activities to a status equivalent to the institute's other major programmes, as is the case at many other Centres. ICRISAT is now putting in place a comprehensive genebank management information system and developing a Procedures and Operations Manual. These initiatives follow the model of other Centres, notably IRRI, and will help ICRISAT to meet international standards and to assist in implementing the Global Plan of Action. A number of other Centres have reorganized their programmes in order to better respond to the review and the GPA. For example, ICARDA and CIP, among others, are placing more emphasis on characterization; an area highlighted by the review for further attention. From 1997, ILRI's programme will focus on the characterization of forage genetic resources for nutritional factors and other traits, to identify superior and better adapted germplasm for use in livestock feed.

A9. The Panel noted that one of the weakest and most variable of Centres' activities is the off-site duplication of the collections for safety purposes. The Centres are intensifying efforts to arrange safety duplication under formal agreements. Those in place and currently under development are noted in the Centre responses to the review. For example, in 1996 IPGRI/INIBAP concluded an agreement with CATIE, Costa Rica to host duplicates of the *in vitro Musa* collection and ICARDA completed arrangements for the safety duplication of the *Lathyrus* collection. IRRI, which has an agreement with the National Seed Storage Laboratory (USA) for the safety duplication of the entire rice collection, is investigating the establishment of core collections to facilitate the further duplication of this large collection as core subsets in different genebanks around the world. To facilitate the duplication of clonal germplasm, robust *in vitro* culture and packaging systems are under research, for example at CIAT for cultivated and wild *Manihot*.

A10. Data on more than 400,000 accessions held in CGIAR genebanks are now accessible through the System-wide Information Network for Genetic Resources (SINGER). Work is continuing to complete the data sets accessible through the system. Implementation of SINGER has led to improvements in the quality and quantity of data in Centre genetic resources databases. Through SINGER, Centres are better able to attend to the review's recommendations on determining coverage and overlap in the collections and facilitating national programme access to information about collections for purposes of restoration and use. Significant progress has been made by IPGRI/INIBAP in the development of the International

Musa Germplasm Database and this will be linked to SINGER in the near future. SINGER is accessible on the Internet World Wide Web (http://www.cgiar.org/singer) and a CD-ROM version will be available soon, for distribution to partners without an Internet connection.

A11. Work is now underway to establish a database on the microbial collections that have been assembled at Centres, primarily in association with the collections of legume species and rice. This will provide the basis for assessing the status of the collections and further development of strategies and policies for their conservation and dissemination.

A12. A number of the Panel's recommendations relate to advancing research on methods to improve the conservation, management and use of collections. Guidelines on the regeneration of seed collections and the management of field and *in vitro* genebanks have been developed by the SGRP in collaboration with FAO, through a consultative process, involving relevant Centres and many national programmes. Research efforts are also being extended to address the Panel's recommendations, for example through improving cryopreservation protocols for clonal crops such as *Musa*, yam, potato, cassava. IRRI and CIAT are addressing seed dormancy problems in conserving wild species of rice and *Manihot*, respectively. A major focus of current research at IPGRI/INIBAP is the development of new indexing methods and therapy techniques to clean material of virus diseases, the major constraint in the distribution and use of *Musa* germplasm. Increasing use is being made of geographic information systems and molecular marker techniques to determine genepool distribution and assess diversity in *ex situ* collections at several Centres (*inter alia*, ILRI, CIAT, CIP, ICARDA). Conservation research, genetic diversity assessment and the refinement of core collections are components in ICRISAT's expanded genetic resources programme. Most Centres are now engaged in establishing core collections and in research to improve the methodologies for their determination. For example, CIP is establishing core collections for potatoes and sweet potatoes and is leading a multi-Centre activity, under SGRP, on core collection development for clonal crops.

A13. The Panel commented positively on the extent of collaboration between the Centres and NARS, NGOs and networks, and noted scope for greater involvement of partners in the development of Centre policy and strategy on genetic resources. The coordination and collaborative action afforded by SGRP serves to enhance individual Centre efforts to strengthen network linkages, promote germplasm restoration and provide support to national programmes. This year, the SGRP and FAO together, will organize regional consultations in Africa and the Americas on the implementation of the GPA.

A14. The development of the SGRP strategy, currently underway, will take into account the recommendations of the review, not least their calls for a System-wide approach to research and training, and enhanced consultation with partners.