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**FAO ACTIVITIES AND FUTURE PROGRAMME ON
PLANT GENETIC RESOURCES**

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**FAO ACTIVITIES AND FUTURE PROGRAMME ON
PLANT GENETIC RESOURCES**

INTRODUCTION

1. FAO is the United Nations specialized agency for food and agriculture. The productive and sustainable management of genetic resources is a key to agricultural development. As part of its statutory function, defined in paragraphs 1, 2, and 3 of Article I of its Constitution, FAO has always promoted and recommended national, regional and international action with respect to agricultural research, aimed at the improvement of agricultural production and the conservation of natural resources, including plant genetic resources. An active concern for the conservation and utilization of crop, pasture, forestry, as well as animal genetic resources has therefore been part of FAO programmes since its founding in 1945.

2. The First FAO Technical meeting on Plant Exploration and Introduction was held in 1961, and Technical Conferences were subsequently held in 1967, 1973, and 1981. The FAO Expert Panel on Plant Exploration and Introduction was established in 1965 and held six meetings up to 1974, when the International Board for Plant Genetic Resources (IBPGR) was established. (The linkages with IBPGR are described in CPGR/91/11). The panel set priorities for exploration, drafted proposals for an international network of genetic resource centres, and drafted guidelines for international co-operation in seed conservation. FAO established its Crop Ecology and Genetic Resources Unit in 1968. In the same year, the organization strengthened its forestry genetic resources programme by establishing a Panel of Experts on Forest Gene Resources. The Panel has held seven meetings to date.

3. FAO, since 1983, has been developing a Global System on Plant Genetic Resources, covering both agriculture and forestry, to coordinate actions that promote safe conservation, sustainable use and unrestricted availability of genetic diversity. FAO, through the Plant Production and Protection Division (AGP) provides the Secretariat for the Commission on Plant Genetic Resources (CPGR). In addition, other Divisions, especially the Forest Resources Division and the Legal Counsel, assist the Secretariat of the Commission in the implementation of recommendations of the Commission.

4. According to its Terms of Reference, the Commission will review the policy, programmes and activities of FAO in the field of plant genetic resources, and give advice to the Committees on Agriculture and Forestry. In line with this, the FAO Secretariat has been periodically presenting an overall review of FAO work on plant genetic resources to the Commission.

5. The first three Sessions of the Commission reached consensus on a number of issues, which, according to the FAO Council, are likely to influence for many years to come, the policies, programmes and activities of FAO and other relevant organizations in plant genetic

resources. The purpose of this document is to review past and present FAO activities on plant genetic resources in the light of decisions and recommendations of the Commission; to review FAO support to the CPGR through its Secretariat; and indicate future plans to strengthen the Regular and Field Programmes inputs on plant genetic resources especially within the Agriculture and the Forestry Departments.

PROGRAMME FOCUS

6. FAO programmes on the environment and sustainable development are based on, and complemented by, action on the conservation and utilization of plant genetic resources. Moreover, FAO continues to place major emphasis on the socio-economic aspects of genetic resources, i.e. their sustainable utilization and the further development of both natural and man-made biological diversity for increased and diversified agricultural production.

7. The philosophy of the FAO programme on crop genetic resources is based on a "farmers to farmers" approach which starts from the collection of landraces and primitive cultivars, domesticated and developed by farming communities over millennia - through conservation, genetic improvement, seed production - and ends up with the distribution of newly-developed and improved varieties to farmers. In forestry, the main aim is to help make countries self-sufficient in reproductive materials of high physiological and genetic quality. A strength of FAO activities in plant genetic resources is that they are integrated into a broader framework of programmes to address the needs of member countries for research and sustainable development.

8. FAO recognizes that conserved germplasm is mainly useful for those countries and institutions which have the technical, economic and human capability to utilize it through plant breeding and seed production, including the use of new biotechnologies. Conservation without utilization may become a burden, especially for developing countries. It is therefore a basic objective of FAO to strengthen these capabilities in less-developed member Nations. In order to achieve this objective, FAO has been collaborating, as appropriate, with other organizations. Cooperating institutions include: IBPGR for ex situ conservation; International Agricultural Research Centres (IARCs) and National Institutes in developing countries for a full range of germplasm management and utilization for development activities on crop and pasture species; and the United Nations Environment Programme (UNEP), United Nations Educational Scientific and Cultural Organization (UNESCO), and the World Conservation Union (IUCN), in work related to in situ conservation, biological diversity, and ecosystem management.

9. Over the past four decades FAO has carried out a series of activities related to the conservation and sustainable utilization of genetic diversity of interest to agriculture and forestry. These activities have been mainly focused on disseminating information on

germplasm, on facilitating exchange of material amongst Member Nations, and in supporting member countries in their plant improvement capabilities to utilize genetic diversity within the framework of their national development needs. An early emphasis was placed on the need to collect and conserve genetic diversity, especially from threatened areas. Special attention has been given to plant breeding activities on crops not covered by the IARCs of the Consultative Group on International Agricultural Research (CGIAR).

10. Regular Programme and Field Projects are the most direct means for FAO to assist developing countries to achieve their development goals and objectives. Over the years, FAO, using its Regular funds and extra-budgetary resources, has undertaken specific activities for the conservation and use of various components of biological/genetic diversity. To give an estimate, over the past decade (1980-1989), about US\$ 249 million (see Table 1) has been utilized for policies, programmes and activities related to the conservation and sustainable use of plant genetic resources, mainly through collaboration with national and regional/sub-regional institutes and infrastructures.

CURRENT ACTIVITIES

Support to the Commission

11. The overall objective of the FAO genetic resources programme, in line with the International Undertaking, is to ensure conservation, rational utilization and unrestricted availability of plant genetic diversity for enhanced and sustainable plant improvement and crop production. The programme of genetic resources includes the servicing of the Commission on Plant Genetic Resources (CPGR) and its Working Group and follow-up and implementation of its recommendations and decisions.

Regular and Field Programme Activities

12. FAO has been involved in a series of activities and programmes related to political, legal, policy and technical issues of plant genetic resources, and in the implementation of the principles and recommendations contained in the International Undertaking. Position papers were prepared on several aspects of biodiversity conservation and utilization for food and agriculture; on 'Sustainable Agriculture and Rural Development'; and on 'Biotechnology and its Application to the Conservation and Utilization of Biological diversity'. FAO has also prepared 'Guidelines for National Genetic Resource Programmes'.

13. During 1989-90, using FAO Regular Programme budget, funds from the Technical Cooperation programme, and extra-budgetary resources - especially United Nations Development Programme (UNDP) and Trust Funds - AGP provided technical support to over 850 field projects in about 120

countries. Of these projects, nearly 500 are related to plant genetic resources conservation and utilization, including crop improvement and management, crop diversification, seed production, plant quarantine and development and distribution of seed and planting materials. The Forestry Department supported 300 projects in some 100 countries and over 100 of these projects were related to genetic resource conservation and management.

Agriculture

14. For FAO, the conservation of plant genetic resources cannot be regarded as an end in itself. It is part of an integrated process which has the objectives of improved and sustained agricultural production. In the 'farmers to farmers' approach, genetic resources from farmers are collected, evaluated, and improved in national and regional plant breeding programmes with the aim of developing high-yielding, disease-resistant cultivars which could meet consumers' requirements in terms of nutritional value and quality. Improved varieties are multiplied in seed production projects, and are available to farmers, completing the cycle.

15. The cycle of genetic improvement of germplasm, leading to new varieties in farmers' fields, addresses only part of the needs of sustainable production. If the potential of new varieties is to be fully realized, the release of new varieties has to be planned for, and supported by, appropriate crop management practices. FAO activities related to crop management have a focus on the generation of appropriate technologies for enhanced and sustainable agricultural production systems, and the assessment and transfer of available technologies, including new biotechnologies. Emphasis is given to integrated crop management, including pest management. There is specific support to diversification of crops and cropping systems, and to the development of under-utilized crops. FAO aims at sustained development and stability of crop production systems in various agro-ecological areas and under prevailing socio-economic conditions. With this approach, the genetic potential of plant resources can be exploited in appropriate cropping systems. Many projects have a strong training component to meet future core manpower needs of national programmes.

16. A further strength of the FAO approach to the management of plant genetic resources is that it allows the agricultural development needs of member countries to be placed within an integrated, and technically sound, framework for crop and pasture development. In this context, FAO has always placed special emphasis on the needs of developing countries and resource-poor farmers. This is especially appropriate, as these countries and farmers have been the major source of the plant genetic resources on which modern varieties are based.

17. Conservation of Germplasm: FAO continues to support member countries in strengthening national capabilities for the conservation and use of plant genetic resources. During 1989-90, using Regular

Programme and extra-budgetary resources, activities were under way in Asia and Pacific, Africa, Latin America and the Caribbean and Near East. Examples include collection and conservation of the germplasm of local crops (Benin); strengthening of national genetic resources programmes (Republic of Korea, Turkey, Viet Nam, Yemen and Yugoslavia); advice on genetic resource programme development (Cape Verde); advice on a field genebank for cocoa (Nicaragua); and a range of projects in more than ten countries.

18. Crop Improvement: FAO advises and supports member Nations, particularly developing countries, in their crop improvement programmes through manpower and infrastructure development. This includes collaborative research among developing countries (through regional networks) and between developing and developed countries and where possible with the IARCs and private institutions. The FAO programme on plant improvement and crop production includes both food and non-food crops. During 1989-90, AGP provided technical support to numerous projects in many of the developing countries with a component of crop improvement. For example, improvement of soyabean production (Cameroon, Côte d'Ivoire, Ghana and Nigeria); hybrid rice development (Indonesia, Democratic Republic of Korea and Vietnam); root and tuber crops in parts of Western Africa and Caribbean; vegetables and tropical fruit crops improvement in several Asian countries.

19. Plant Biotechnology: The FAO Conference in 1989 gave priority to biotechnology as a tool to improve crop productivity. Currently, there are a number of projects supported by FAO specifically on plant biotechnology. For example, two projects in India on food legumes and on oil crops, a rice project in the Democratic Republic of Korea, and a project in Viet Nam. The Asian Plant Biotechnology Network, with some emphasis on genetic resources, is expected to be operational this year. There is also a new network of biotechnology research laboratories established under the FAO Regional Office for Latin America and the Caribbean. Similar networks are planned for Africa and the Near East. Document CPGR/91/12 describes FAO involvement in the preparation of a Code of Conduct on Biotechnology as it affects the conservation and utilization of plant genetic resources.

20. A joint FAO/International Atomic Energy Authority Programme (AGE) supports research for mutation breeding using nuclear and related biotechnical methods. Training of scientists from developing countries is part of the programme. The Plant Breeding and Genetics section's programme centres on the provision of genetic resources for plant breeding supplementary to existing cultivars and to germplasm derived from natural evolution. Current research includes somaclonal and mutagen induced variation in in vitro systems, mutation induction and breeding technology for banana and plantain, and for tropical root and tuber crops.

21. Crop Diversification: Access to appropriate plant genetic resources is a key to diversification programmes, which include activities such as the introduction of new crops into situations

dominated by single crops, the promotion of underutilized crops, and the identification of local socio-economically important species. AGP has worked with the Forestry Department, to identify leguminous trees, shrubs and annuals that can be used for agroforestry and rangeland improvement in the semi-arid tropics. FAO is implementing a major programme to improve fruit and vegetable production by the identification and multiplication of planting material best adapted to local conditions. FAO involvement in rice and rice-based cropping systems is another example of the coordinated utilization of genetic resources, and includes the introduction of grain legumes into rice-based cropping systems. FAO provides the Secretariat of the International Rice Commission, which recently held its 17th Session. This session had a significant genetic resources component, including elements for developing hybrid rice to increase productivity and sustainability of this most important food crop.

22. Networking: FAO, as part of its technical assistance programme, also established regional research and development networks on several crops, viz. oilseed crops, coarse grains, legumes, vegetables, root and tubers, plantains and bananas, forages and fruit trees, aimed at providing cooperation and sharing responsibilities on different aspects related to crop improvement. Networks have also been established in different regions covering aspects of plant biotechnology and of integrated crop management.

23. Seed Production: Since the use of quality seed is the cheapest and most effective way to increase crop production and productivity, FAO continues to serve as a major vehicle for provision of, technical assistance to member nations in the formulation of specific programmes on seed improvement and production, including development of national seed policies and on-farm seed production. During, 1989-90 over 100 field projects in 60 member countries, concerning different aspects of seed improvement and production were implemented. The third edition of the FAO 'Seed Review', which includes information on plant breeding, variety release and registration, seed quality control, and seed production, marketing and promotion is in preparation.

24. Exchange of Germplasm: FAO, through its Seed Exchange and Information Unit continues to procure and supply seeds and planting materials of crop species of economic importance to countries and also to projects executed by FAO. During 1990, the seed unit dispatched ca. 20,000 seed samples of over 300 species to 82 Member Nations. Quarantine facilities and capabilities are being strengthened to allow the safe transfer and exchange of germplasm, in a number of countries, including Cameroon, Ethiopia, Republic of Korea, Iraq, Madagascar, Malaysia and Uganda.

25. Training: During 1989-90, FAO organized and/or co-sponsored a series of specialized regional and national training courses and workshops related to plant genetic resources conservation, evaluation,

utilization, crop production and management, seed production, . seed processing, seed quality control, germplasm exchange and plant quarantine, plant biotechnology and disease diagnostics, and in vitro conservation for over 500 participants from different countries. Besides the short-term training courses, study tours, in-service training, and fellowships leading to post-graduate diplomas and degrees, were provided through numerous field projects.

26. Publications: FAO, jointly with IBPGR, continues to publish regularly the 'Plant Genetic Resources Newsletter'. A further newsletter on Rice is published by the International Rice Commission. A Plant Production and Protection Paper on 'Utilization of Genetic Resources: Suitable Approaches, Agronomical Evaluation and Use' was issued in 1989. A series of 'Guidelines for the Safe Movement of Germplasm' were issued jointly with IBPGR. The proceedings of the FAO/CTA Symposium on Plant Biotechnology for Developing Countries was published in 1990. Major publications on 'Tropical Grasses', on 'Prosopis juliflora: the Current State of Knowledge', and on 'Lucerne' and 'Annual Medic Pasture', with sizeable coverage of genetic resources, have recently been issued. FAO Regional offices also issued several publications related to plant genetic resources.

27. Special Project Support: Since the establishment of the International Fund for Plant Genetic Resources (IF/PGR), contributions have been received from the Government of Spain, UNEP, the Technical Centre of Agriculture and Rural Cooperation of the EEC (CTA), and some Non-Governmental Organizations (NGOs), private foundations and numerous individuals. The funds were used for several projects and activities including evaluation of germplasm of an important local crop, teff, in Ethiopia; three training workshops on evaluation and utilization of genetic resources of local crops of agricultural importance in Africa, Central America and South America; and a regional training course on the use of germplasm, seed production, seed storage and distribution, in Bolivia. The Communauté Economique de l'Afrique de l'Ouest (CEAO) provided funds through IF/PGR in February, 1991, for a preparatory phase to formulate a regional project for conservation and use of plant genetic resources in the Sahelian region of Western Africa countries. Negotiations are currently under way with the Government of the Netherlands to provide funding for a project on conservation and utilization of Andean Crops in Bolivia, Ecuador and Peru.

Forestry

28. The Forestry Department is in a key position to help ensure the conservation and wise use of species/ecosystems and their genetic variation. Forests and woodlands contain not only woody species and wild animals but, especially in the moist and seasonal tropics and in some parts of the sub-tropics, a wealth of other plant and animal species of actual or potential socio-economic importance at the global, national and local levels, including wild relatives of important crop species.

29. The work programme in forest genetic resources, within the framework of the FAO Commission on Plant Genetic Resources, is guided by the FAO Panel of Experts on Forest Gene Resources (a Statutory Body which is the only existing body dealing with the subject at global level). The work of the Panel includes drawing up a list of priority species by region and operation (exploration, collection, conservation, evaluation and utilization, including selection and breeding), which should get attention. Recommendation for action is not only for FAO, but for all national and international institutions concerned. The Panel thus has an important role in harmonizing international cooperation in this field. The Secretariat of the Panel is located in the Forest Resources Division, which supports activities in response to needs identified by the Panel (mainly through support to national institutes already active in the genetic resources field).

30. The elaboration of national and sub-regional/regional Tropical Forestry Action Programmes, helps to establish national priorities and to develop ideas and apply known methodologies in the field of genetic resource conservation, harmonizing such activities with related forestry and overall development programmes. Tropical Forestry Action Plans are presently formulated and executed in more than 80 countries. Furthermore, FAO is helping to elaborate a worldwide convention on forests.

31. Conservation: ex situ and in situ conservation strategies are considered complementary. At the recommendation of the FAO Panel of Experts on Forest Gene Resources, a study is presently underway on the use of ex situ conservation for seed, pollen or tissue, in long-lived woody perennials, including also conservation of recalcitrant seeds. Advice is regularly provided to countries on storage methodologies, as well as collection methods, documentation and seed handling. An annual newsletter, 'Forest Genetic Resources Information', disseminates information on all aspects of forest genetic resources, to some 3500 addressees, worldwide.

32. In situ Management: The Forestry Department is responsible for action on in situ conservation of plant genetic resources in general. While encouraging and advising countries to include conservation aspects in plantation and tree planting programmes, FAO also encourages and recommends the inclusion of in situ conservation activities as an integral part of programmes aimed at the management and utilization of forests. A study was started in 1990 on the compatibility of sustainable forest management and in situ conservation of species being harvested, as well as associates species. Some pilot in situ conservation areas have also been established in collaboration on with national institutes in the tropics (Brazil, Malaysia, Cameroon, Peru and Yemen), aimed at the in situ conservation of a number of woody perennial species, including also related research activities. Work to date has concentrated on dissemination of information and on the elaboration of methodologies. Publications to date include three Miscellaneous Papers at the level of the technician/professional, in 1984; Practical Booklet

and leaflet on in situ conservation for the general public and decision making level, iii 1989; an 'Operations Manual for a Protected Areas System' for professionals and decision makers, in 1984; and a 'Planning Manual for a National Protected Areas System', for professionals and decision makers, with special reference to Latin America, in 1988.

33. Seed Procurement and Tree Improvement: In this field, presently on-going programmes include collaboration with national institutes in two informal networks, one for the humid and one for the dry tropics, in the collection, exchange and field evaluation of genetic resources of woody species, with special attention being given to multipurpose species used in the improvement of rural living. Advice is regularly provided to Member Nations on species and provenance selection, availability of seed and other reproductive materials, and on the development of tree improvement and breeding strategies.

34. Networking: The FAO Project on Genetic Resources of Sahelian and North Sudanian Zone woody species, which includes 17 countries, is an example of networking. Activities cover exploration, conservation, collection and evaluation of a number of species mainly in the genus Acacia; interchange of genetic materials between countries; training courses, manuals and technical guides in seed collection, handling and genetic conservation; and study tours and visits between countries for the exchange of information and know-how. The project has been operational since 1988, and is already showing results in the field. It has also helped generate funding on bilateral and multi-bilateral basis, for the strengthening of national institutions and seed centres in participating countries.

Legal

35. Work on the legal aspects of the conservation and utilization of plant genetic resources at both the international and national levels forms an important part of the FAO programme. This work is carried out on a multidisciplinary basis by the Legal Office in cooperation with the Agriculture and Forestry Departments.

36. At the international level, elements of the programme include the refining of the International undertaking on Plant Genetic Resources through the agreed interpretation of its provisions, with particular respect to the recognition of Farmers' Rights and the elaboration of mechanisms for giving effect to those rights. The programme also includes codes of conduct for Plant Germplasm Collection and Transfer (CPGR/91/10), Biotechnology and Plant Genetic Resources (CPGR/91/12), formulating the legal framework and mechanisms for the establishment of an International Network of Base Collections, including the negotiation of agreements with participating governments and institutions, and the establishment of an International Genebank in permafrost storage at Svalbard. FAO is also playing an active part in the preparation of the

draft International Convention on Biodiversity being developed within the framework of UNEP (CPGR/91/9), and has been promoting the concept of an international instrument on the conservation and development of forests, both of which will have great implications for plant genetic resources. It is also participating in meetings of International Union for the Protection of New Varieties of Plants (UPOV), where far-reaching changes in the nature of plant varietal rights protection are currently being debated.

37. At the national level, FAO provides advice to countries in the formulation of national strategies, policies, and legislation in the area of plant genetic resources and related matters. As an example related to plant genetic resources, following a request from the Government of India, FAO provided legal and technical advice on the implications of the introduction of Plant Breeders' Rights legislation in India. Emphasis was given to the effect of such legislation on the diversity and exchange of genetic resources. A large number of countries have also been assisted in developing draft seed legislation, and more generally in the preparation of forest, wildlife and national seed legislation.

FUTURE PROGRAMME AND ACTIVITIES

38. In order to strengthen global activities on the conservation and utilization of plant genetic resources, the programmes and activities of the FAO will emphasize the following:

- At regional and global levels: the promotion of collaboration with regional and international organizations including other UN agencies, CGIAR institutes (especially IBPGR), and NGOs, in order to ensure the conservation and rational utilization of genetic resources; and the setting-up of global and regional networks.
- At country level: the establishment, or the strengthening of, national capabilities and capacities to conserve, manage, enhance and utilize plant genetic diversity, including crop diversification and the promotion and use of under-utilized species, multi-purpose species, and orphan crops, (especially those species which are not covered by CGIAR mandates) for enhanced and sustainable production.

39. FAO is preparing a rolling medium-term plan. The concerns of sustainable development and plant genetic resources conservation and utilization have been fully taken into account in this planning process.

Support to the Commission

40. In line with the principles outlined in the International Undertaking, the FAO programme on Plant Genetic Resources will:

- (i) provide the Secretariat for the Commission;
- (ii) continue to develop mechanisms and means for the implementation of the Farmers' Rights concept;
- (iii) promote the further development and completion of the Global System;
- (iv) assist in the preparation of a Plan of Action and International Technical Conference (should these be recommended by the Commission and endorsed by Council and/or Conference);
- (v) periodically prepare the State of the World's Plant Genetic Resources; and
- (vi) promote regional cooperation.

Further details of these various support activities are provided in CPGR/91/5.

41. In addition to support to the Commission, and following the recommendations of the Commission, the Regular and Field Programme activities will continue to address conservation and sustainable use; information and documentation; implications of biotechnology; support for national programmes in their utilization of genetic resources; and the establishment of collaborative networks.

Conservation

42. The background and proposals for the establishment of an FAO network of ex situ base collections of genetic resources, the merger of FAO and IBPGR base collection networks, and security storage in permafrost in Svalbard are covered by CPGR/91/14. There are plans for strengthening ex situ conservation in fruit trees, especially locally important species, in Thailand; ex situ facilities for in vitro conservation, and the establishment of field genebanks for fruits in Yugoslavia; and integrating plant genetic resource activities within the Botanic Garden in St. Vincent and the Grenadines (and many others).

43. In the field of forest genetic resources, studies will be continued on the compatibility of in situ conservation and management for the sustainable use of wood and non-wood products, complemented by pilot and demonstration areas established on the ground, covering a range of ecosystems and utilization regimes. Research and monitoring of these will be a necessary complement. Studies will be continued and intensified in collaboration with other institutes active in this field, on the ex situ conservation of long-lived perennial species.

44. Action should be taken to establish a small number of in situ networks to serve as pilot studies and to help develop methodologies more wide-ranging action. Such action should be accompanied by efforts in related research, carried out through national institutes in the area of the occurrence of the species included. Efforts should be made to develop or strengthen national genetic resources units in individual countries, dealing with both ex situ and in situ genetic conservation, and to improve information flow between such centres.

Information and Documentation

45. The planned AGP activities on Information and Exchange of Plant Genetic Resources, Conservation and Utilization will be strengthened by grouping of activities related to information and database management. This will allow an integration of available information on plant genetic resources. At the request of the Commission, a 'Global Information and Early Warning System on Plant Genetic Resources' will be established (see CPGR/91/7). The FAO Seed Information System, the FAO seed and plant material introduction and exchange, and the FAO Plant Quarantine database will continue to provide information essential to the international exchange of germplasm. Full use will be made of existing databases, including the Current Agricultural Research Information System (CARIS), the International Information System for the Agricultural Sciences and Technology (AGRIS), and, under terms of the Memorandum of Understanding with IBPGR, through access to the various IBPGR databases. Periodical publication of the Seed Review, FAO/IBPGR Plant Genetic Resources Newsletter, and the Forest Department Newsletter, 'Forest Genetic Resources Information' will be continued. These publications will also include information on now developments in biotechnology and their possible impact.

46. At its Seventh Session in 1989, the FAO Panel of Experts on Forest Gene Resources recommended that FAO help elaborate a list on the status of forest genetic resources (including also vulnerable ecosystems), in addition to the priority lists elaborated over the years. This complements the recommendation of the Commission on Plant Genetic Resources regarding the report on the State of the World's Plant Genetic Resources and activities have been initiated accordingly.

Biotechnology and Plant Genetic Resources

47. Following the FAO/CTA Symposium on Plant Biotechnologies for Developing Countries (June, 1989) and the recommendations of the FAO Conference in 1989, AGP initiated the process of formulating a comprehensive policy towards plant biotechnology. FAO is also in the process of issuing a comprehensive policy paper on biotechnology. The development of modern techniques such as recombinant DNA technology, protoplast fusion, and cell and tissue culture, have wide implications for the conservation, propagation and utilization of genetic resources. The emphasis will be to promote the use of new biotechnologies to best accomplish sustainable and enhanced agricultural production.

48. The Forestry Department keeps abreast of new developments in genetics and breeding, including biotechnologies with a potential in forestry development. An André Meyer fellowship on the application of biotechnologies in forestry, will be sponsored and guided by the Department in 1991.

Strengthening National and Regional Programmes

49. Close contacts will be maintained in all fields with countries for the identification of priorities and formulation and implementation of projects in the area of genetic resource collection, conservation, evaluation and utilization through plant breeding (conventional and through biotechnology), and seed production. With an increased awareness of the importance of genetic resources, there is an increase in requests from member countries for support. The many emerging national genetic resource conservation and utilization programmes need an increased level of support, and FAO has the mandate and broad experience to carry out this task.

50. The Forestry Department's field programme related to the conservation and sustainable use of forest genetic resources, has greatly expanded over the past few years, and lays emphasis on (i) strengthening of national institutions, including national seed centres; and (ii) sub-regional or ecological networking and the promotion of Technical Cooperation among Developing Countries (TCDC) for countries with similar environmental conditions and socio-economic needs, which can be furthered through sustainable use of natural renewable resources compatible with in situ conservation, as well as through selection and improvement of tree genetic materials they contain.

51. Other projects currently under consideration include: assistance in setting-up a seed storage facility for genetic resources in Tanzania and an in vitro conservation of sugar cane germplasm in Cuba. Germplasm utilization projects include: root and tuber multiplication in the Caribbean; a global project for seed production of pasture and fodder plants; a global tropical soybean project; date palm research in the Near East and North Africa and germplasm introduction of oil palm in Africa. At the request of Member Nations, there are very many other similar projects in the planning phase.

COLLABORATION WITH OTHER ORGANIZATIONS

52. In the fields of genetic resources and biodiversity FAO will continue to collaborate with a wide range of intergovernmental, governmental and non-governmental organizations, UNDP, UNESCO, UNEP, World Bank, IUCN, the World Wide Fund for Nature (WWF), and CGIAR (with IBPGR). FAO has cooperated with both the Secretariat and the Preparatory Committee of the United Nations Conference on

Environment and Development (UNCED) on matters concerning biological diversity and will continue to take an active part in matters related to the biological diversity component of UNCED. Duplication of effort is minimized both through formal contacts (reciprocal membership in task forces, Panels and Working Groups), and informal, working-level contacts and joint activities.

53. There are plans to strengthen technical collaboration between FAO and the IARCs. FAO main contribution to cooperative effort would be through development projects, but where appropriate, FAO would follow its mandate to promote research. Emphasis will be on problem and opportunity identification, research and technology generation, and better technology transfer. The IARCs with crop and pasture mandates hold and utilize major germplasm collections. In particular, FAO will seek to enhance complementarity of effort with IBPGR (See CPGR/91/11).

54. The importance of assigning conservation priorities to species of value for food and forestry is now being widely recognized by many agencies, including NGO's, IARCs and a wide range of conservation organizations. There is a growing recognition of the need to identify populations, provenances and species for conservation, with the clear objective of their sustainable utilization for food and agriculture. This recognition provides a new role for FAO in addressing the needs of Member States as they identify the need to include food and forestry concerns into their conservation policies.

Table 1

Estimated Level of Funds Used by FAO for the
Conservation and Use of Plant Genetic Resources 1980-1989

Element	Regular Programme (US\$ 000)	Extra Budgetary (US\$ 000)
<u>Forest Genetic Resources Conservation and use</u>		
a. Exploration, collection, exchange	392	5.570
b. Conservation in/ex situ	192	4908
c. Information collection and dissemination	388	450
d. Country requests and meetings	247	7.150
SUB TOTAL	1.219	18.078
<u>Legal and Regulatory Assistance</u>		
a. Drafting of legal texts on (wildlife, parks, forests and seed)	720	240
b. International Undertaking on Plant Genetic Resources and Legal Backstopping of work of Commission on Plant Genetic Resources	96	
SUB TOTAL	816	240
<u>Crop Genetic Resources conservation and Use</u>		
a. Conservation of Plant Genetic Resources	3.014	1.500
b. Plant breeding for crop production	7.009	105.904
c. Improvement seed production	9.847	82.460
d. Plant breeding for disease and pest resistance	3.200	15.738
SUB TOTAL	23.070	205.602
GRAND TOTAL	25.105	223.920