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AN OVERVIEW OF FAO'S ROLE IN STRENGTHENING NATIONAL AGRICULTURAL RESEARCH IN AFRICA

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AN OVERVIEW OF FAO'S ROLE IN STRENGTHENING NATIONAL AGRICULTURAL RESEARCH IN AFRICA

I. INTRODUCTION

1. Investment in research and extension directed toward the improvement of agricultural, fisheries and forestry production in Africa has not kept pace with the other developing regions of the world. With few exceptions, the productivity of the research effort has also been minimal especially during the last decade. Inedequate funding relative to the tasks to be performed, departure of experienced expatriate research staff after independence, lack of functional linkages between research and extension services and, in some instances, political instability, are among the factors responsible for this state of affairs. On the whole, extension has faired better than research in terms of resource allocation, though not in effectiveness.

2. A number of recent publications have identified the major constraints in National Agricultural Research in Developing Countries 1/ 2/ 3/ 4/. In Africa most research has tended to concentrate on export rather than food crops. All these shortcomings exist in a situation where the agricultural production of the Region is critically and tragically lagging behing growing demands. Furthermore, in many parts of the continent the opportunities for increasing agricultural production through area expansion are largely exhausted and new production technologies aimed at raising both land and labour productivity are urgently needed if a more dynamic production development is to be achieved.

II. OBJECTIVES, STRATEGY AND SCOPE OF FAO IN RESEARCH SUPPORT

3. FAO's main objective in stimulating and supporting Agricultural Research is to assist developing member nations to achieve self-reliance in the field of food and nutrition and strive for sustained improved economic and social welfare from the agricultural, fisheries and forestry sectors. The emphasis is on the national level which must be able either to generate results through research for the various development problems or must at least be in a position to adapt and apply such results available from other countries, regional or international research centres and to identify and formulate existing problems which need to be answered by research.

1/ FAO 1981: National Agricultural Research in Developing Countries 21st FAO Conference, Rome, Doc. C 81/26

2/ The World Bank, 1981: Agricultural Research - Sector Policy Paper

3/ CGIAR, 1978: Task Force Report on International Assistance for Strengthening National Agricultural Research, Washington D.C.

4/ FAO Rome, World Bank, Washington D.C. 1981. Forestry Research Needs in Developing Ccuntries - Time for Reappraisal.

4. There is no blue print for agricultural research development which could be applied in all countries of Africa. Each African country represents a unique situation. The national level emphasis has to take cognizance of the diversity of needs and capacities between countries. In view of the rather specific and changing situation in each country, a lot of flexibility has characterised the nature and form of assistance provided by FAO. Assistance might be requested for a specific research situation or for a combination of different levels of activity within the national research system. As such, assistance is tailored to individual country needs.5/.

5. National research, in its often limited scope in African countries, should be equipped to make full use of available research expertise. This should include results and information developed elsewhere but relevant to the problems being encountered at the national level. Therefore, the development of links of various types among countries with similar ecological and socio-economic problems, between institutions dealing with the same subjects or commodities in the form of networks on a regional and sub-regional basis and with advanced institutions in developed countries or with International Agricultural Research Centres (IARCs), of the Consultative Group on International Agricultural Research (CGIAR) are equally important objectives in the FAO strategy for research support.

6. Other important links are provided through information emanating either from the documentation on scientific and technological findings in agricultural and related subjects and on existing research institutions and their programmes or through technical publications geared to the needs of research and technical personnel in developing countries. Prominent journals on research are lacking in Africa. This would be a useful medium for TCDC in research.

7. As is evident from the Mandate of FAO and from the Objectives stated above, the Organization's activities in assisting national agricultural research in Africa have been and continue to be rather wide in scope. Strengthening of national agricultural research accounts for about 20% of FAO's regular programme activities and a sizeable portion of the field programme. At the end of April 1981, major activities, executed by FAO, to strengthen national research in agriculture and fisheries including extension services and training programmes in Africa listed more than 250 projects in progress (Annex I). Most of these activities were in the fields of crops and livestock production; soil conservation and management; on farm water management; agricultural education and training; fisheries resource assessment and conservation; socio-economic research; and technology transfer.

5/ FAO and Agricultural Research, FAO, Rome, 1978

III. SUPPORT TO AGRICULTURAL RESEARCH AND RELATED SERVICES

Investment in Agricultural Research and Extension

8. A global strategy and needs for agricultural research and development for the 1980's has already been proposed by, among others, FAO 1/ and the World Bank 2/. FAO estimates the growth in demand for agricultural production to be at least 3.6 percent annually for African countries to meet the needs of the population which is growing at a rate of 3.1 percent annually 6/.

9. According to FAO's projections in order to attain a level of investment in agricultural research that is comparable to current practice in developed countries (i.e., at least 1% of Agricultural GDP) allocations to national agricultural research programmes would have to be about US$ 448 million in 1990 for countries in Sub-Sahara Africa excluding South Africa 1/.

10. Under FAO's Technical Cooperation Programme and Special Action Programmes there are over 400 projects in Africa totalling more than US$ 175 million. The present field programme of FAO financed from extra-budgetary sources, especially UNDP, consist of some 900 projects at a total value of over US$ 500 million. The number of FAO experts in Africa, is over 1000. These work with their national counterparts. Most of these projects deal with the diffusion of agricultural technology.

11. There is no separate account of financial resources used for the various aspects of research support. However, it is estimated that out of FAO's Regular and Field Programmes, a total of about US$ 30 million was spent during 1981 on research support activities in the agricultural, fisheries and forestry sectors in Africa. As a result of a policy decision by the Director-General, FAO will devote a substantial portion of its regular programme resources to Africa during the 1982-83 biennium.

Research Planning, Organization and Management

12. An Ad Hoc Working Group organized by FAO in 1966 on "Measures for Closer Cooperation in the Provision of Aid to African Countries in Agricultural Research" recommended that"the attention of African Governments should be drawn to the need for an effective planning and policy-making organization at the national level; it was further recommended that, where an effective organization of this kind does not exist, advice and guidance on such matters should be offered by donor countries and international agencies". 7/ These recommendations are still as valid today as they were sixteen years ago. There are a number of activities currently in progress in Africa, such as the Assistance to Agricultural Research and Planning Project in Swaziland and the Project on the Re-organization and Strengthening of Agricultural Research in Togo.

1/ 2/ (ibid)

6/ Agriculture: Towards 2000, FAO, Rome, 1981

7/ Report of the Ad Hoc Working Group on Measures for Closer Cooperation in the provision of aid to African Countries in Agricultural Research, FAO, Rome, 1966.

13. FAO, in cooperation with UNDP, is conducting an Evaluation Study on National Agricultural Research in Developing Countries. A number of countries in Africa such as Libya, Kenya and Tanzania have requested FAO to widen the Terms of Reference for the evaluation teams to include the review and planning of their agricultural research systems. Other African countries involved in the evaluation study are Egypt, Ethiopia, Senegal and Nigeria.

14. The awareness among member countries of the potential contribution of agricultural research to national development has resulted in an increased number of requests for research review and planning missions. FAO has such missions at different stages of planning and implementation for Togo, Tanzania, Upper Volta, Uganda and Kenya. Priorities for agricultural research and advice on the organization of agricultural research services are part and parcel of the review and planning exercise. "The Planning and Programming of Agricultural Research" published by FAO in 1975 is still in very high demand by national research leaders in developing countries.

15. At a recent FAO Seminar on "Comparative Organization of Agricultural Research in Africa" (Rome, 7-11 December 1981), existing forms of research organization and management in eleven countries were reviewed. There was a very lively and informative discussion among the national research directors participating in the seminar. Attention was focussed on major constraints in national research and their possible solutions. Improved leadership for research planning, management and administration was identified as a key area requiring specialised training. The seminar strongly recommended that in the short term, research management training should be given emphasis. FAO is currently developing a programme for this purpose.

16. A number of FAO field projects in Africa have institution building as a major objective. In the agricultural sector, there are more than 43 projects dealing with research organization and institution building. Examples include the Institute of Agricultural Research in Ethiopia; the Agricultural Research Institute in Somalia; the National Dryland Farming Research Station at Katumani in Kenya, the Rice and Irrigated Crops Research Centre in Upper Volta; and the National Fruit and Vegetable Research Institute in Nigeria (Annex I).

Specific Research Units and Research Skills

17. The bulk of FAO's research support activities fall under this category. Usually such projects are designed to meet specific research needs of major development programmes within a country. A number of these research activities are included as research components in development projects. In the agricultural sector there are 72 such projects in progress under the field programme for Africa. The FAO/UNDP projects on development of applied research in plant protection, vegetables and pulses in Liberia; and the National Oil Seed Development Programme at Mount Makulu Research Station in Zambia,are examples of such activities (Annex I).

Linkages between Research, Extension and Farmers

18. Projects dealing with extension and production activities in FAO's Field Programme often include research and training components. A recent updating for African countries shows there are 89 projects with extension and training as the major components. Examples include the Improvement of Rice Cultivation and Extension project in Zanzibar, Tanzania and the Agricultural Research and Seed Production project in the Central African Republic (Annex I).

19. Although in the past agricultural extension in developing countries has received comparatively more attention than research 2/, there are still wide spread weaknesses in functional linkages between research, extension and farmers. This is particularly true in Africa where in addition the extension systems are often themselves very poorly organized.

Manpower Training for Research

20. The number of research scientists in Sub-Sahara Africa is estimated to have been 2,970 in 1980 8/. Africa has the lowest number of research scientists per million of total population among the developing countries 8/. FAO has assisted most of the countries in Africa in developing agricultural and forestry curricula, including teaching and research programmes at their national universities. Currently FAO has ongoing projects at seven national universities in Africa. In addition, FAO, through its fellowship training programme, seeks places and provides financial support for counterpart staff in field projects at universities in other developing regions as well as in developed countries. In a representative sample taken to evaluate FAO's training activities in 1980 comprising 48 projects, training for research accounted for 15 percent 9/

Information and Documentation

21. The International Information System for the Agricultural Sciences and Technology (AGRIS), a bibliographic data base system coordinated by FAO since 1975 is unique in that all participating countries have access to all the information compiled in exchange for their respective national input. AGRIS has a direct impact on development not only because it provides relevant information but because it initiates the creation and development, at the national level, of the infrastructures necessary for the handling and use of the data. In the field of fisheries AGRIS is supplemented by the Aquatic Sciences and Fisheries Information System (ASFIS).

22. The Current Agricultural Research Information System (CARIS) which became operational in 1978 following a successful pilot operation in 14 West African Countries, provides basic information on research in progress in most developing

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2/ (ibid)

8/ ISNAR/IFPRI, 1981: Resource Allocations to National Agricultural Research: Trends in the 1970's. A review of Third World Systems.

9/ FAO, 1980: Agricultural Training. Report of an Evaluation Study.

countries, their expertise, staffing and research programmes. In Africa efforts are being made to establish national CARIS focal points and a Regional CARIS Centre for Africa.

23. AGRIS and CARIS documentation services are part of the strong information base which FAO has developed over the years. It serves at the same time as the international centre for AGLINET, the network of agricultural libraries, and for various data banks among which the inter-linked computer storage and processing system of food and agricultural statistics (ICS) is the most prominent one constituting the core of FAO's statistical activities for agricultural research.

24. The development of data bases, systems and networks offers a more effective access to agricultural information, provided that countries have the infrastructures to handle and use this information. In view of this, FAO has been contributing through its field activities to establishing or strengthening national/regional agricultural information and documentation infrastructures. Eleven documentation centres have been established in Africa, mainly with UNDP support, and ten are in the pipeline. During 1980-81, 24 countries and 7 regional institutions in Africa benefited directly from the advisory services and technical assistance in this field. Nearly 90 man/months of FAO staff and consultants were spent for advice to governments, training, project formulation and implementation. Thirty-nine nationals received training outside their countries and 58 received in-service training. In 1982-83 all these activities are being reinforced through an FAO interregional project financed by the Interim Fund for Science and Technology.

25. FAO has been providing over the years active support and technical assistance to developing countries in their efforts towards collective self-reliance and mutual economic and technical cooperation in food and agricultural production, assessment, management and economic exploitation of fisheries and forestry resources. In pursuance of this policy FAO has been active in promoting cooperation between national research systems including the exchange of research material and information; and endeavouring to build up TCDC networks in agricultural research. For instance, research programmes in Tanzania and Mozambique have been able to benefit from FAO activities in Zambia related to sunflower improvement.

26. Close contacts and collaboration have been maintained between FAO executed field projects at the national level with similar programmes at the IARCs in the African Region and elsewhere. FAO contributed and participated actively in the discussions by the Organization of African Unity (OAU) on those aspects of the Lagos Plan of Action relating to food and agriculture 10/. In cooperation with OAU, a strategy document dealing with Famine in Africa has been prepared in which various action proposals to facilitate food self-sufficiency in Africa were made 11/. Research to improve the productivity of crops and livestock was given emphasis in the proposed action programme.

10/ OAU, 1980: Lagos Plan of Action for the Implementation of the Monrovia Strategy for Economic Development of Africa.

11/ OAU/FAO, 1980: Famine in Africa. 36th Ordinary Session of the OAU Council of Ministers, February 1981.

IV. FISHERIES RESEARCH DEVELOPMENT

27. The range of national needs and activities supported by FAO in the fisheries sector follow the same principles as those applied for the agricultural sector. There are 25 FAO executed fisheries projects with research elements at the national level in Africa (Annex I). African fisheries face all the usual problems faced by fisheries through-out the world, and need the same general questions to be answered by the various types of research (biological, technological, economic, etc.). Certains questions do, however, have particular importance in Africa.

a) Resources assessment and resource management

28. Off the desert and semi-desert coasts of northwest and southwest Africa (from Morocco to Guinea, and Angola-Namibia) the fish resources are very rich. The potential harvest is more than can be taken and used by the rather sparse local populations, and large fleets of distant-water fishing vessels have been attracted from Europe, Asia, and to a less extent the more populous countries of tropical West Africa (where the fish resources are less rich). Several of the species (sardines, mackerels)are mobile, so that several stocks are shared by two or more countries. The coastal states need biological research to know what is happening to these stocks, and how much can be taken, and economic/social research to determine what policies (e.g., number and costs of licences granted to foreign vessels to fish off their coasts) to adopt so as to obtain the greatest benefits from their resources. Towards this end a marine fisheries research institutes has been developed with FAO's assistance in Ghana.

b) Fish processing and distribution

29. Most fish in Africa are caught far from the main consumers. This is particularly true for marine fish, but also applies to the considerable quantities taken in fresh waters (rivers, lakes, flood-plains, etc). Present standards of preservation of local catches for African markets (mostly drying) mean that at best only a part of the catches reach the consumer, and then in a poor form. Research into improved methods of fish handling, processing and disbribution appropriate to local conditions is needed, not only to ensure a better distribution of existing catches, but also to take advantage of those stocks of smaller and less attractive fish (e.g. Haplichromis in Lake Victoria, anchovy off northwest Africa) which are presently under-utilized.

c) Use of inland waters

30. Fish from fresh waters are a very important source of animal protein in many parts of Africa. Many of the stocks are already fully utilized, and little increase in production can be hoped for from merely fishing harder. Increased production might come from introducing new species, or other stock enhancement programmes, but without better knowledge of the biological and other implications the results of such introductions could be disastrous. Fisheries are also threatened by the increasing use of water resources for power, irrigation, etc. Research is needed on the responses of fish populations to changes in water flow, modifications of the flood regimes, interruptions to migration, etc. Research activities have been established with FAO's assistance in connection with major reservoir and large lake projects in Ghana, Nigeria, Egypt, Zambia and Uganda.

Special Problems

31. A special problem, which recurs over virtually all Africa, except a few countries in North Africa, is the lack of trained people. While this applies to all subjects, it is particularly pressing in fisheries. In most countries the status of fisheries is low, so that few capable people stay in fisheries. Those that do generally rise rapidly to administrative positions, leaving extremely few capable people to do research. This is therefore to a large extent still carried on by expatriates. This situation is exacerbated by the fact that most African countries are small, so that even in the best of circumstances they cannot expect to run a large fishery research institute, or one that covers all aspects of fishery research of potential national interest.

V. RESEARCH SUPPORT ACTIVITIES IN FORESTRY

32. In the last two decades FAO has played a dominant role in assisting developing countries to improve their national research capabilities in forestry. This has been done mainly through the field projects programme and fellowships for advanced studies. Examples include FAO assistance to Forestry Research in the Sudan and Nigeria. Colleges and Faculties of Forestry have been established or strengthened with assistance from FAO in Nigeria, Liberia, Uganda, Gabon, Morocco etc.

33. A list of organizations engaged in Forestry Research, prepared by FAO in 1978 shows that there are 39 institutions in Africa out of a total of 109 in developing countries 12/. Although forestry research institutions have existed for decades in Africa, their history in no way parallels that of the exploitation of the forests in the tropical belt of Africa. This is due to the fact that previous concern for knowledge about the forests was largely centred on the product capabilities of timbers being extracted, research that was carried out in the importing countries. In effect, the major part of the needs for research regarding the management of the tropical forests has been met through the efforts of national research institutions of these emerging nations.

34. The main problem area, needs and priorities for research in tropical forestry as identified by FAO and the International Union of Forestry Research Organizations 13/ and also by FAO and the World Bank 14/ are particularly true for Africa.

12/ FAO, 1978: Draft Provisional List of Organizations Engaged in Forestry Research.

13/ FAO, 1978: Needs for Forestry Research in the Tropics and What International Action Can Do To Meet Them.

14/ FAO/World Bank, 1981: Forestry Research Needs in Developing Countries - Time for a Re-appraisal.

VI. THE NEED FOR FURTHER ACTION

35. Several major aspects of national research in Africa will require external support for some time to come. These relate to manpower development, supply of operational funds, research organization, review and planning. Increased external assistance is also needed for appropriate design of extension to farmers. Assistance in these areas is a pressing need in more than half of the countries in Africa south of the Sahara. The national directors of agricultural research participating in the FAO Seminar on Comparative Organization of Agriculture in Africa identified these as major obstacles to agricultural development.

36. It is obvious that more effort is necessary to provide optimum numbers, and quality of research scientists and their supporting staff for most African countries. There has been much talk in recent years on the merits of training developing country research scientists in agro-ecological zones similar to those in which they will eventually work. Some aid agencies have made commendable progress in assisting selected institutions in Africa for prefessional first degree training in Agriculture, Veterinary and Forestry. More assistance is needed to develop post graduate programmes at selected national universities. A consortium of donors or twinning arrangements with advanced universities could be established for each selected developing country institution to ensure that such training facilities have a basis for continuity over a period of at least 5-10 years.

37. A constant reminder of the inadequacy of well trained and experienced research personnel are the many poorly planned and ill-managed research programmes in Africa. Shortcourses in research planning and management, including the design and implementation of research programmes, will be necessary in order to ensure rational utilization of available resources. Such courses should be tailored to suit specific groups of countries and different levels of research capacity. Therefore there should be a judicious choice of lecturers and teaching materials. Unlike the long term professional training programmes, the location is not important.

38. Investment in agricultural research should be increased in view of the variously demonstrated high return from research in developed and the more advanced developing countries. Procurement of external funds for infrastructure development, supply of equipment and technical assistance appear to have been relatively successful. What is seriously lacking are funds for local operational expenses. Even when recipient governments have agreed in principle to make funds available for operational expenses these have not been forthcoming. In order to ensure effective utilization of external assistance, funds for operational expenses should be included in such projects.

39. African countries should be encouraged to formulate balanced research programmes which are based on a multi-disciplinary approach and take into account the relative urgency and importance of both short term and long term problems. There should be greater attention given to economic and sociological problems in future programmes.

40. The coordination of multilateral and bilateral programmes assisting national research in Africa can contribute considerably to a more efficient use of resources. The responsibility for this coordination lies of course with the recepient countries. But such efforts can be supported to facilitate strengthening of the organizational and administrative structure in a country and avoid undue duplication of external assistance.

41. Parallel to the required external support to national agricultural research, considerable resources are needed to further develop extension and agricultural services in African countries. In view of the social and cultural problems associated with extension, this is an area where endogenous capabilities must be developed at the earliest possible opportunity. Increased emphasis should be placed on obtaining a unified extension programme covering all aspects of agricultural development. There must be closer links between research and extension, with provision made for collaboration - on a two way basis - between extension and research workers.

42. Specific proposals for national research programmes requiring external assistance are available in FAO. These have arisen from joint FAO/UNDP country review and programming missions, and also from regular programme funded research review and planning missions organised by FAO on request by member governments. The on-going evaluation study on National Agricultural Research in Developing Countries is expected to identify a number of countries and specific areas where external assistance might be useful.

FAO NATIONAL RESEARCH, EXTENSION AND TRAINING PROJECTS IN AFRICA*

ANNEX 1

COUNTRY	PROJECT No	PROJECT TITLE	OBJECTIVES
ANGOLA	ANG/80/005	National Training Centre for Angolan Women	The Project aimed at providing support to the activities of the National Training Centre for Women at Huambo, for training women as agents of rural development, for producing necessary training material and for serving as a Centre for diffusion and communication in the service of women's interest.
ALGERIA	ALG/75/023	Projet de Développement des Oléagineux	Réalisation d'un programme de développement des cultures oléagineuses en Algérie au niveau de la recherche, de la vulgarisation et de la formation.
	ALG/75/025	Recherche Agronomique	Projet de renforcement de l'Institut National de la Recherche Agronomique.
	ALG/76/004	Intensification de la Protection des Cultures	Projet de renforcement d'Institut rattaché à l'Institut National de la Protection des Végétaux (INPV), Ministère de l'Agriculture (MARA). L'objet de l'Institut concerne le dépistage des déprédateurs, la recherche sur les pesticides, la règlementation et la préparation de programmes de vulgarisation.
	ALG/77/004	Amélioration de la Santé Animale en vue de l'Intensification de la Production Animale	Les objectifs immédiats du projet sont de doter l'Institut National de la Santé Animale de l'expertise et de l'équipement minimum indispensable à la création d'un laboratoire vétérinaire central et des services de diagnostic des laboratoires décentralisés dans les wilayates. Ce projet assistera aussi la création d'une capacité de recherche vétérinaire.

* The list does not include Forestry and FAO/IAEA Joint Division Projects.

Country	Project No	Project Title	Objectives
ALGERIA	UTFN/ALG/ 002/ALG	Food Control Services	Formulation des plans pour la construction d'un laboratoire de recherche et de contrôle des denrées alimentaires.
BENIN	BEN/77/002	Amélioration et Développement de la Production Animale	Le présent projet succède aux projets BEN/72/015 "Culture Attelée" et BEN/74/010 "Ferme de Kpinou". Améliorer et développer la production animale.
	BEN/78/006	Projet d'Agro-Pédologie (Phase II) (Cotonou)	Le projet participe à la mise en place d'un Service National des Sols qui s'appuiera sur une équipe de pédologues et d'agro-pédologues, et sera responsable de toutes les activités en matière d'inventaire et de recherche appliquée des sols pour les besoins de la planification des programmes du développement rural et de l'urbanisme du Bénin.
BOTSWANA	BOT/72/019	Research, Swamp and Dryland Soils of the Okovanga Delta (Maun)	Identify high potential soils for development for higher and more reliable yields, work out small scale
	BOT/74/002	Coordinating Range Research	To assess the limiting factors to productivity of the indigeneous pastures. To develop systems for their improvement and to make "pasture" management recommendations for commercial ranges as well as tribal grazing land.
	BOT/77/012	Assistance to the National Development Bank Agricultural Credit Division (OPAS).	To establish an Agricultural Credit Division of the National Dev. Bank in order to provide for a rapid expansion of the Banking Agric. Credit. Credit operation as an essential contribution to the agricultural development of Botswana.

Country	Project No	Project Title	Objectives
BURUNDI	BDI/78/006	Projet Institut Technique Agricole du Burundi (ITAB) (Gitega)	L'objectif général est de poursuivre et d'exploiter au maximum tous les facteurs de développement agricole afin de subvenir aux besoins d'une population à 90% rurale. C'est ainsi que l'ITAB, tout en cherchant à atteindre un effectif de deux cent cinquante étudiants, continuera: la formation permanente de son personnel par des sections de vulgarisation dans le cadre d'un Laboratoire social en vue d'améliorer le niveau de vie de la famille paysanne dans la Province de Gitega.
	BDI/78/020	Lutte contre les Tiques	Déterminer une politique de contrôle des tiques et des maladies qu'elles transmettent. Recueillir des données de base sur l'écologie des tiques au Burundi, déterminer les produits chimiques les plus appropriés et recueillir des données de base sur le phénomène de résistance et faire des recommandations sur l'économie de la lutte contre les tiques et les maladies qu'elles transmettent.
	BDI/81/001	Appui au Service de la Mécanisation Agricole	Etablir un atelier spécialisé dans l'entretien et la réparation du matériel agricole et des engins; - Assurer le développement, le fonctionnement et la gestion de l'Office National de la Mécanisation Agricole; - Continuer la mise en route du Centre de formation du personnel spécialisé.
	BDI/81/022	Développement de la Production Laitière	

Country	Project No	Project Title	Objectives
CAMEROON	CMR/78/002	Développement du Service des Sols de l'ONAREST (Office de la Recherche Scientifique et Technique) (2ème phase) (Ekona)	Le but à long terme du Projet est le développement d'un Service des sols de l'ONAREST comme instrument du développement agricole, afin que ses services puissent fonctionner uniquement avec des cadres et des techniciens nationaux.
CAPE VERDE	CVI/78/001	Assistance au Ministère du Développement Rural (Praia)	Ce projet concerne directement la défense et la conservation des sols et protection des cultures, et la production végétale et la protection des végétaux. En effet, le développement agricole de l'archipel du Cap-Vert dépend essentiellement de la conservation des sols et de la protection des cultures. Il est apparu nécessaire, dans un but d'efficacité accrue, de fondre dans un projet unique les projets en cours d'exécution, CVI/75/025 - Conservation des sols et CVI/75/021 - Protection des végétaux. En effet, la persistance d'une sécheresse sévère depuis huit années rend nécessaire une coordination plus étroite des actions entreprises dans les deux projets précités, des actions de reboisement et recherche hydraulique étant par ailleurs associés au projet concerné.
	TCP/CVI/0001	Multiplication des semenses de maïs	-Aider le Gouvernement à récolter et conserver les semences d'écotypes locaux de maïs et à commencer la reproduction systématique des variétés locales. -Mise en route de la production de semences améliorées et introduction d'un système cultural immédiatement adaptable aux conditions actuelles. -Former des techniciens nationaux à la production de semences et aux recherches variétales. -Promouvoir le conditionnement des semences.

Country	Project No	Project Title	Objectives
CAPE VERDE	CVI/81/006	Conservation des Sols et des Eaux	
	TCP/CVI/2201 M (d)	Intensification de la Culture du Pois Cajan (d'Angole)	
CENTRAL AFRICAN REPUBLIC	CAF/77/003	Recherche Agronomique et Production des Semences	Follow-up to CAF/72/003 and CAF/72/006. To improve quantitatively and qualitatively the good production in the country through applied agricultural research and the establishment of a well functioning seed production system for food and oleoginous crops.
CHAD	CHD/75/005) RAF/76/316)	Station Sahélienne d'Expérimentation appliquée pour l'Amélioration des Productions Vivrières (N'Djaména)	Aider la Direction de l'Agriculture dans le cadre des options de la politique agricole à améliorer cette production en vue de satisfaire les besoins alimentaires de cette zone et d'y permettre une diversification des cultures.
COMORO ISLANDS	COI/79/004	Appui au Programme de Développement Rural Phase I	Développer les productions végétales et animales. Améliorer les conditions de vie du milieu rural par un apport de matériel végétal, animal et hydrique.
EGYPT	EGY/77/001 Phase II EGY/81/040	Improved Farming Systems for the Nile Valley	To strengthen applied research and introduce economic studies on farming systems and to increase production of field crops per unit area, particularly cotton, through adoption of improved coordination of production practices.
	EGY/78/012	Beef Industry Development	To assist the Government to develop the Beef Industry by introducing improved feedings systems based on maximum use of available agro-industrial by-products and home-grown feeds and by preparing appropriate grading systems and others market incentives.

Country	Project No	Project Title	Objectives
EGYPT	EGY/78/017	Rice Technology Training Centre - Alexandria	To increase available quantity and improve quality of milled rice by reducing post-harvest losses through the rehabilitation of the uncompleted Rice Technology Training Centre and the coordination and advancement of the rice processing industry on a national basis.
	GCP/EGY/011/DEN	National Dairy Training Centre - Alexandria	To provide assistance for the establishment of a Dairy Training Centre Institution in Egypt.
ETHIOPIA	ETH/75/021	Development of Veterinary Field and Laboratory Services	Establishment and supervision of veterinary field and laboratories services in Ethiopia.
	ETH/77/005	Assistance to Soil and Water Conservation Programmes (EPID)	To build up a nation wide programme of arresting soil erosion by applying suitable soil and water retention techniques.
	ETH/77/022	Control of Grain Eating Birds	To strengthen the PPRD bird control service by organizing the operative unit, training its staff and providing the necessary equipment to enable it to advise cereal producers of bird damnage problems and how to control them.
	ETH/78/002	Cereal Seed Production and Quality Control	To implement a National Seed Programme for the production, quality control, processing and distribution of improved varieties of food grains for increased agricultural production.
	ETH/78/004	Institute of Agricultural Research (Ph.IV)	Establish a viable research organization and activity that can support a strong and progressive Ethiopian agriculture, formulate national agricultural research policies and advise Government, development agencies and farming community on relevant matters.

Country	Project No	Project Title	Objectives
ETHIOPIA	ETH/80/015	Assistance to the Planning and Implementation of Large Scale Settlement for Rural Development	To provide direct technical, planning, organizational, coordination and implementation support assistance to the Relief and Rehabilitation Commission for large scale settlement schemes and to plan and develop practical agricultural training programme for settlers.
	UTF/ETH/028/ETH	Dryland Farming Agronomist (Kobbo)	To provide the Institute of Agricultural Research with the services of a Dryland Farming Agronomist.
	ETH/81/003	Assistance to Soil and Water Conservation Programme Phase II	Strengthening the capacity of the soil and water conservation Department of the Ministry of Agriculture for implementing the expanded programme of soil and water conservation.
	TCP/ETH/8903(M)	Farm Machinary Maintenance in Support of Increased Production	Strengthening the capacity of the commission to operate maintain and repair newly introduced farm machinary by providing necessary equipment and staff training.

Country	Project No	Project Title	Objectives
GABON	GAB/75/003	Centre d'Introduction,d'Adaptation et de Multiplication de Matériel Végétal Vivrier et Fruitier (CIAN) (Libreville)	-Assurer d'une manière continue la fourniture de matériel végétal adapté et à rendement elevé aux intéressés; -Introduire des techniques modernes de production agricole et horticole; -Limiter les importations de produits vivriers et de fruits et réduire les exportations de devises.
GAMBIA	GAM/77/001	Strengthening of the Planning, Programming and Monitoring Unit of the Ministry of Agriculture and Natural Resources.	To strengthen the project management by providing manpower within areas of credit, marketing and farm management.
	TCP/GAM/0102	Rinderpest Control	Assist the Government to prevent the spread of rinderpest from the neighbouring countries.
	TCP/GAM/0105	Identification of Horticulture Projects	To formulate a plan of operation to develop horticultural production.
	TCP/GAM/0106	Sheep and Goat Development Programme Preliminary Activities	To assist in establishing a National Sheep Multiplication farm at Yundum for initiating a sheep and goat development programme in the country.
	PFL/GAM/002	Construction of Small Warehouses for Grain	Construction of five small warehouses at Divisional Headquarters to provide improved storage facilities for reduction of post-harvest losses.
	FH/GAM/007	Seed Processing and Storage (Basse and Sapu)	To supply a seed processing and storage unit at Basse having the capacity to collect 187 tons of sorghum, rice and groundnut seeds and to supply two irrigation and drainage pumps at Sapu for production of quality rice seed.

Country	Project No	Project Title	Objectives
GAMBIA	GCP/GAM/009/AUS	Seed Processing and Quality Control	To assist the Government in the establishment of a seed processing and storage unit at Sapu and a national seed testing laboratory at Yundum.
	GCP/GAM/013/BDA	Animal Disease Control and Provision of Watering Points for Livestock	To protect the cattle population from various diseases.
GHANA	GHA/72/014	Development of Sheep and Goat Production (Ejura)	To provide technical assistance for the development of sheep and goat production to achieve greater self sufficiency in goat meat and mutton.
	GHA/78/002	Assistance to the Irrigation Development Authority (Accra) Preparatory Assistance	To develop the capacity of the Engineering and Agronomy Departments of the Irrigation Development Authority to implement the on-going small and medium irrigation projects extending over some 15000 hectares.
	TCP/GHA/0001 (T) Rev.	Training Trainers for Cooperatives	To organize and implement a comprehensive training programme for male and female officers of cooperative societies to strengthen the cooperative development and to implement cooperatives projects mainly in agricultural food production and related activities.
	TCP/GHA/0004 (E)	Rinderpest Control	Prevent the spread of rinderpest from neighbouring infected countries.
GUINEA	GUI/72/004	Développement d'un Service National des Sols (Conakry)	Le but du projet est d'établir un Service National des Sols qui entreprendrait à l'échelle de la Nation tous les travaux de prospection production agricole (végétale, animale, forestière). Le service entreprendrait des travaux pour l'élaboration de la carte nationale des sols au 1,250,000. Dans ce but, des zones de référence seront choisies et prospectées sur le territoire de la Guinée.

Country	Project No	Project Title	Objectives
GUINEA	GUI/79/003	Création d'un Centre Expérimental sur les Cultures Maraîchères dans la région de Coyah.	-Développer à Coyah un centre expérimental modèle pour l'identification des variétés adaptées au contexte écologique de la région et mise au point du calendrier et des méthodes de cultures améliorées et de système de défense des cultures; -Mettre en place un réseau de démonstrations des techniques modernes en fonction des résultats obtenus par l'expérimentation du Centre; -Développer une activité de formation permanente pour les vulgarisateurs chargés de l'encadrement des agriculteurs et aussi pour les agriculteurs de la région. Dans le cadre de cette action la création d'un service audio-visuel sera envisagée.
	GUI/79/007	Centre de Sélection, Multiplication et Amélioration du Bétail N'Dama	-Etablir un centre de sélection de la race N'Dama; -Définir et établir un programme d'élevage naturel; -Servir de base de départ pour tout autre programme de développement de l'élevage à long terme qui sera élaboré ultérieurement.
	GUI/79/010	Laboratoire de Protection des Végétaux et des Denrées	-Définir et mettre au point les méthodes pratiques de surveillance, de signalisation et de lutte contre les principaux ennemis des cultures et des denrées. -Participer au renforcement du Service national de protection des végétaux. -Développer et appliquer une véritable stratégie du système de lutte en: a) étudiant les méthodes traditionnelles de production et de protection des cultures; b) formant des techniciens de l'agriculture et des cultivateurs; c) structurant un réseau de surveillance et d'observation dans chaque région naturelle; d) mettant en place des champs de démonstration.

Country	Project No	Project Title	Objectives
GUINEA BISSAU	GBS/81/009	Expérimentation et Multiplication des Semences	Mise en place de stations d'expérimentation (Contuboel et Caboxanque); capables de produire et de multiplier les semences nécessaires pour l'autosatisfaction des différents types de riziculture: riziculture de mangrove, riziculture aquatique et riziculture de plateaux. La station de Contuboel sera à même de produire et de multiplier les semences des principales autres cultures vivrières: mil, sorgho, mais, niébé, haricot, etc. Mise en place de la structure et de l'organisation nécessaires pour la création d'un service semencier national. Formation de cadres pour lesquels sont prévues des bourses et des voyages d'études dans les pays avoisinants ayant des conditions similaires à celles de Guinea Bissau.
IVORY COAST	IVC/74/012	Encadrement et Promotion des Fermes d'Elevage et Côte d'Ivoire (Bouaké)	Par ce Projet, il est visé, à partir de l'élevage traditionnel (toutes espèces animales améliorées et représentant la grosse masse de la production de produits carnés pour l'autoconsommation villageoise) de créer i) un élevage rationalisé à travers une nouvelle classe d'agriculteurs-éleveurs établis sur des exploitations polyvalentes, assurant les producteurs de viande nécessaires à l'échelon local. ii) un élevage moderne, sous forme de petites ou moyennes entreprises, ou, encore de Groupements Villageois à Vocation Coopérative pour les grandes villes du Centre et, éventuellement, approvisionnement de la capitale.
	IVC/77/005	Pédologie . Phase III (A.V.B.) (Bouaké)	La mise en place d'un Institut des Sols, disposant d'une équipe d'Ingénieurs et Techniciens Ivoiriens hautement qualifiés et fortement équipés, qui assurera l'exécution des études des sols sur tout le territoire National, en libérant le pays de toute dépendance envers l'extérieur pour la cartographie des sols et pour la classification des terres.

Country	Project No	Project Title	Objectives
IVORY COAST	IVC/79/004	Cellule d'Encadrement et de Contrôle des Actions d'Elevage du Ministère de la Production Animale (Phase II)	-Contrôler et coordonner le déroulement des opérations sur le terrain des projets en cours et assister dans les résolutions des problèmes posés; -Conduire des actions pilotes destinées à l'élaboration de projets viables à présenter aux sources de financement et aux investissements nationaux et étrangers.
	IVC/79/009	Développement des Cultures Maraîchères Expérimentation et Formation	-Assister le Gouvernement dans la formulation d'un programme et assistance technique à être financé par des fonds de dépôt. (valeur 3 millions de dollars E.-U.) -Formation de cadres pour le développement des Cultures Maraîchères.
	IVC/79/011	Complément au projet RAF/76/020 "Mise en valeur des Terres Libérées de l'Onchocarcose - Etude de l'Infestation Glossinaire en Côte d'Ivoire"	Suppléer le projet RAF/76/020 pour mener à bien les travaux déjà entamés dans le cadre de ce projet.
KENYA	KEN/74/017	Dryland Farming Research and Development (Katumani)	To develop improved farming systems for semi-arid areas to attain higher and sustained agricultural productivity and food self sufficiency and to conserve and upgrade natural resources.
	KEN/74/019	Agricultural Equipment Improvement (on small farms)	To carry out trials to identify improved hand tools, animal-drawn and engine-powered equipment for agricultural production operations.
	KEN/75/022	Sheep and Goat Development	To improve the small stock production in Kenya with major emphasis on marginal areas thus improving the rural economy and income distribution.
	KEN/75/028	Horticultural Research and Development (Thika)	To improve rural economy and rural income distribution through improvement in horticultural production on the small farms

Country	Project No	Project Title	Objectives
KENYA	KEN/77/002	Crop Protection Against Bird Damage	Development of a national scouting system to monitor the bird pest problem and introduction of new crop protection strategies to reduce bird damage.
	KEN/78/006	Marketing Development Project (Phase II)	Improve the standard of living of rural population in general and small holder in particular through the promotion of efficient public and private marketing systems and services, price policies conducive to efficient marketing and appropriate food protection.
	KEN/78/015	Irrigation in Arid Zones (Phase II)	To develop the food production potential of the arid and semi-arid regions of Kenya with a view to decreasing their food dependency on other parts of the country.
	KEN/78/016	Sorghum and Millet Development (Phase II)	To assist the Government in developing a national capacity for conducting research on sorghum and millets and implement a research and development programme to increase their production for human consumption.
	KEN/80/003	Forage Plant Development and Seed Multiplication	To promote the use of improved forages and fodder crops for farming systems in the high, medium and low potential areas of Kenya by arranging multiplication of plant and seed material and providing training in the relevant techniques.
LESOTHO	LES/75/047	Fellowship in Veterinary Science	
	LES/75/050	Lesotho Fruit and Vegetable Cannery	To achieve profitable operations of the cannery and provide diversification of horticultural crops suitable for processing an and expansion of small farmer involvement.
	LES/77/009 (TF/LES.24 IBRD/LES)	Advisor to the Director of Basic Agricultural Services Programmes (BASP)	To develop physical and institutional infrastructure for provision of agricultural services in 20 administrative units in the lowlands and foothills of Lesotho, to promote production of five major food crops.

Country	Project No	Project Title	Objectives
LESOTHO	LES/77/022	Training Veterinary Assistants	To improve the technical capacity of the Livestock and Veterinary Services Division and provide training facilities for animal health and production personnel at the Lesotho Agricultural College.
	LES/77/036	Support for Establishment of Basic Agricultural Services Programme (BASP) - Infrastructure in Blocks V and VI	To assist in the establishment of the infrastructure required by the farmers to increase their productivity by providing the necessary farming inputs and services.
	LES/79/002	Thabana Morena Rural Development	To design an integrated rural development project based on medium sized watershed area to demonstrate the feasibility of a number of methods to be used for the maximum participation of the rural population as regards rural development and local planning.
	TCP/LES/8902 (T) Rev. 2.	Training in Wheat, Bean and Potato Seed Production	To assist the Government in applied research and on farm demonstration on wheat and bean cultivars, establish seed production, processing, testing and certification facilities and training middle level personnel engaged in seed production.
	TCP/LES/0003 (Mi) Rev. 1	Establishment of a Poultry Pathology Section	To assist the Ministry of Agriculture in identification and control of poultry diseases prevailing in Lesotho, to increase production of eggs and meat of the village birds.
	UTF/LES/028	Support for establishment of BASP Infrastructure	
LIBERIA	LIR/76/003	Development of Livestock	To investigate the economic feasibility of developing a livestock industry (beef and dairy cattle and pig production).
	LIR/79/004	Development of Applied Research on Tree Crops	To establish an effective programme of research on coffee, cocoa and oilpalm to be carried out at Central Agricultural Research Institute (CARI), Suakoko.
	LIB/79/006	Development of Applied Research on Vegetable and Pulses	To establish an effective programme of experimentation, with respect to indigenous and exotic vegetables and pulses at CARI, Suakoko to provide support to the Vegetables and Pulses development programme in the country.

Country	Project No	Project Title	Objectives
LIBERIA	LIB/79/007	Development of Applied Research in Plant Protection	Establish within the structure of Central Agricultural Research Institute (CARI) effective and well staffed plant pathology and entomology units capable of identifying and controlling crop diseases and pests in the country.
	LIR/81/006	Establishment of Rice Post-Harvest	
	PFL/LIR/001	Reduction of Post-Harvest Losses in On-Farm Operations and Primary Marketing (Monrovia)	To reduce post-harvest losses of rice in on farm and in primary marketing and to increase the income of the small farmer.
LIBYA	UTFN/LIB/004/ LIB	Land and Water Investigation in Libya	Technical assistance to the Secretariat of Dams and Water Resources in ground and surface water resources studies, water planning activities, data collection and water development.
	UTFN/LIB/005/ LIB	Gefara Plain Water Development Plan	To prepare a master development and management plan using a systems approach to ensure, if possible, continued land and water resources development in a optimal manner and to maximize economic benefits.
	UTFN/LIB/006/ LIB	Strengthening of the Agricultural Research Centre (ARC)	Technical assistance to the Agricultural Research Centre in the various disciplines - Animal Production, Land and Water Uses, Crop Production.
	UTFN/LIB/010/ LIB	Range and Livestock Development Project in the Gefara Plain	Technical Assistance to the Gefara Authority (Agric. Dev. Council) to implement range and livestock development project in the Gefara Plain.
	UTFN/LIB/011/ LIB	Grazing Land and Livestock Development in the Central Wadi Zone and Gulf of Sirte.	To assist the Government to improve the pasture zones and develop sheep, goat and camel production in the Central Wadi Zone and Gulf of Sirte.
MADAGASCAR	MAG/77/006	Centre National de Recherche Appliquée du Développement Rural (CENRADERU)	-Doter la recherche appliquée au Développement rural d'une infrastructure autonome qui permet de satisfaire les demandes dans la mise en valeur des potentialités existantes, au niveau national; -Répondre aux exigences techniques occasionées par la mise en place des collectivités décentralisées.

Country	Project No	Project Title	Objectives
MALAWI	MLW/77/008	Nutrition Studies Unit (NSU) at Bunda College	To recruit an expatriate Human Nutritionist and an expatriate Biochemist/Nutritionist and a Malawian Counterpart for each of these fields for a period of two years and to equip the NSU for its teaching and research functions.
	MLW/77/009	Strengthening Bunda College of Agriculture	To strengthen teaching, research and development programmes at Bunda College of Agriculture, so that it can contribute effectively to National Rural Development Programmes.
	MLW/79/001	Establishment of Tobacco Research and Development Organization	To establish a tobacco research and development organization capable of expanding the tobacco industry with full participation of small growers through identification of production constraints and implementing a research and development programme to overcome the constraints.
	MLW/80/T01	Scientific and Technological Development in Tea Industry	To consolidate current research and development projects and provide efficient research outreach and advisory services for small holder tea growers to improve economic return to farmers and increase export earnings.
	GCP/MLW/018 (DEN)	East Coast Fever Immunization (Malawi)	To control East Coast Fever in Malawi andother countries of East and Central Africa by immunization of susceptible stock and thereby accelerate the improvement of livestock industries.
MALI	MLI/79/002	Assistance Technique au Projet de Développement de l'Elevage au Sahel Occidental	Installation et équipement de huit forages, amélioration systématique du volet santé animale, création d'une association des éleveurs pour l'organisation et la gestion des aménagements effectués, ré-aménagement agropastoral des terroirs villageois, création et mise en place d'une structure d'encadrement technique d'animation et de vulgarisation.

Country	Project No	Project Title	Objectives
MAURITANIA	MAU/77/001	Recherche Appliquée en Riziculture Irriguée (Kaédi)	Le projet vise l'autosuffisance de la Mauritanie en riz dans le cadre des aménagements hydro-agricoles de la Vallée du Sénégal entrepris par les trois Etats Riverains, le Mali, la Mauritanie et le Sénégal (OMVS). Dans l'immédiat, le projet a pour but de poursuivre des travaux de recherche en matière de riziculture.
	MAU/78/001	Assistance à l'Ecole Nationale de Formation et de Vulgarisation Agricoles de Kaédi - Phase III	L'objectif immédiat du projet consiste à consolider l'Ecole Nationale de Formation et de Vulgarisation Agricoles (ENFVA) de Kaédi, qui se trouve dans la partie la plus fertile du pays, dans la Vallée du Fleuve, et qui fait l'objet d'un projet d'assistance du PNUD et de la FAO, dont les deux premières phases se sont déroulées de 1965 à 1977. Pour atteindre cet objectif, il sera nécessaire: de renforcer les structures de l'Ecole; de perfectionner le personnel existant et actuellement en place; de former de nouveaux professeurs et assistants; de créer une exploitation rationelle adaptée aux conditions régionales.
MAURITIUS	MAR/75/004	Milk Production and Processing	Training in Animal Production and Dairy Processing
	MAR/80/003	Diversification of Agriculture (Phase II)	Advise the Government on diversification of agriculture to reduce dependence on imports and achieve greater self-sufficiency in food.
	TCP/MAR/8902	Strengthening of Extension Service	To strengthen Division of Extension Service through the supply of equipment for the production of audio-visual material and communication programmes.
	TCP/MAR/9001	Strengthening of and Training in Vegetable Seed Production	To assist Government in the implementation of its vegetable seed programme, through a vigorous variety introduction and testing programmes, strengthening the seed processing and testing facilities and providing necessary training.

Country	Project No	Project Title	Objectives
MOROCCO	MOR/78/005	Assistance à l'Enseignement à l'Institut Agronomique et Vétérinaire Hassan II	Contribuer à la formation de cadres d'enseignement supérieur, en particulier dans les domaines des sciences vétérinaires, nutrition humaine, horticulture, agronomie, halieutique.
MOZAMBIQUE	MOZ/75/008	Livestock Production and Health (Maputo)	To strengthen the livestock production and health services of Ministry of Agriculture, essential for the production of meat, milk, poultry and other livestock products.
	MOZ/75/009	Crop Production and Protection	To assist the Government to promote efficient crop production both in modern and traditional sectors, by strengthening the technical services of the Ministry of Agriculture and by assisting in their reorganization.
	MOZ/75/011	Land and Water Use Planning	To assist in the organization of a long-range development plan of the country's land and water resources aiming at a balance between available natural resources and the needs for agricultural development.
	MOZ/80/011	Wheat Development Preparatory Assistance	To provide for cultivation of 3000 ha of wheat on a pilot basis and for in-service training in wheat cultivation.
	MOZ/80/020	Soya Bean Development	
	MOZ/80/023	Agricultural Extension Services in Selected Food and Cotton Production Areas (Prep. Assistance)	To assist in establishing an efficient service for agricultural extension and rural development support communications by providing in-service training of extension workers and carrying out field pilot operations.
	TCP/MOZ/8905 (M)	Village Level Promotion of Duck and Rabbit Raising	To assist the Government in promoting duck and rabbit raising at village level in cooperatives.
	GCP/MOZ/10/ SWE (R)	Seed Production (Maputo) CR-1	To provide the whole country with high quality seed especially for five important crops (maize, rice, groundnut, potatoes and sunflowers).

Country	Project No	Project Title	Objectives
MOZAMBIQUE	GCP/MOZ/18/ SWE	Strengthening Veterinary Research Institute LI-13	Reinforce the Veterinary Research Institute as a reliable source of vaccines, diagnosis and investigation.
	GCP/MOZ/024/ SWE	National Programme of Farmer Training CO-2	To assist the Government in improving the organization and functioning of the peasant or "family" subsector so as to increase agricultural production and productivity and to establish a national programme of farmer training.
NIGER	NER/75/009	Cartographie des Sols (Inran, Niamey)	L'objectif fondamental du projet est la mise en place d'un service de cartographie des sols, disposant d'un groupe qualifié et fortement équipé de pédologues et techniciens nigériens, assurant l'exécution des études des sols sur tout le territoire National.
NIGERIA	NIR/71/545	Strengthening of the Nigerian Institute for Oil Palm Research	---
	NIR/72/007	Establishment of a National Fruit and Vegetable Research Institute	---
	NIR/74/020	Agricultural Mechanization Training	To develop teaching material and improve curricula for two years Diploma and Certificate courses and provide on-the-job training to national staff to facilitate introduction of mechanization into agriculture production.
	NIR/74/021	Farm Management Training	To develop and strengthen curriculum for training in farm management.
	NIR/74/022	Horticulture Training	To develop a curriculum for Diploma course in horticulture and assist in teaching.

Country	Project No	Project Title	Objectives
NIGERIA	NIR/75/013	Home Economics Extension	To strengthen existing home economics extension programmes in the states, thus increasing the contribution of rural women to the national development objectives of modernizing agriculture increasing food production and improving living standards in the rural areas
	NIR/75/029	Soil Laboratory (Benu Plateau State)	Advisory services and staff training
	NIR/75/043	Poultry Production and Breeding	To make Nigeria independent for the supply of parent stock; to increase the supply of chickens for human consumption and increase income of the producers.
	NIR/75/052	Streptotrichosis Research	To provide a continuing supply of competent veterinarians to Nigeria and West Africa by providing strong basic programmes at the University of Ibadan.
	PFL/NIR/001 (M)	Improvement of Storage of Rood Crops (Umudiks)	To advise the National Root Crops Research Institute on the setting up and strengthening of a research programme on storage techniques for roots and tubers.
	UTF/NIR/040/NIR	Improvement of the Production and Quality of Food Crop Seed	To assist in organization of production and processing of quality seed of food crops.
	TCP/NIR/8802 Rev. I	Mechanization of Planting and Harvesting of Yams	To assist the National Root Crops Research Institute to develop appropriate tools and equipment to mechanize the planting and harvesting of cassava and other yams.
RWANDA	RWA/78/004	Développement du Petit Elevage (Phase II) Kigali	a) améliorer l'alimentation de la population; b) améliorer le revenu des agriculteurs-éleveurs; c) exporter une partie de la production de viande et améliorer ainsi la balance commerciale du pays. (Ces trois objectifs sont parmi les quatre objectifs fondamentaux du Plan de Développement du Gouvernement).

Country	Project No	Project Title	Objectives
RWANDA	RWA/80/005	Intensification de la Production Vivrière	----
	RWA/81/001	Intensification de l'Agriculture	----
	RWA/81/002	Assistance pour la Préparation du Plan Cadre National pour l'Amélioration des Sols	Assister le Ministère de l'Agriculture et en particulier la Direction Générale du Génie Rural dans la mise en oeuvre d'un programme de lutte anti-érosive actuellement mis en route et aider à définir une méthodologie nationale de conservation des sols des collines et des bas-fonds.
SENEGAL	SEN/82/001	Centre Semencier Horticole	----
	SEN/82/002	SAED Vulgarisation	----

Country	Project No	Project Title	Objectives
SENEGAL	PFL/SEN/001	Protection des Légumineuses et Céréales contre les Insectes	-Réduire les pertes de haricots dues aux insectes dans la période après-récolte au moment du stockage dans les fermes et les villages. -Déterminer les moyens de réduire les pertes de millet, sorgho et maïs dans la période après-récolte dans les fermes et les villages.
	GCP/SEN/013/BEL	Assistance au Centre pour le Développement de l'Horticulture (Ph. III) (Dakar)	Objectives à long terme: augmenter et améliorer la production maraîchère du Sénégal et la diversifier. Satisfaire les besoins locaux en légumes. Augmenter les revenus des petits maraîchers. Améliorer le régime alimentaires des populations locales. Promouvoir les exportations de légumes. Objectifs immédiats: Construction des locaux d'extension. Création d'une section production de semences maraîchères et organisation de cette production au Centre. Création d'une cellule de prévulgarisation en liaison avec les services du Ministère du Développement Rural et les Services de l'ISRA dans la région de la Casamance et du Siné Saloum.
	GCP/SEN/019/BDA	Petits Périmètres Irrigués Villageois dans le Département de Podor	Financer les travaux d'endiguement pour l'extension des périmètres villageois existants et pour la création d'autres. Le projet se partage en cinq zones d'encadrement (Touldé Gallé, Madina, Pété, Thioubale et Data).
SEYCHELLES	TCP/SEY/0001	Promotion of Agricultural Cooperatives	Assist the Agricultural Training Centre (Marketing and Cooperative Division): a) to promote a better understanding of the cooperative principles and procedures; b) to introduce cooperatives through radio programmes; c) to devise and implement regular training programmes related to agricultural cooperatives.

Country	Project No	Project Title	Objectives
SIERRA LEONE	SIL/80/012	Reduction of Rice Post-Harvest Losses at Rural Level	To introduce improved methods of harvesting, processing and storage to reduce losses, and to assist in the marketing of graded rice and the utilization of rice by-products; to provide practical training to extension officers, field investigators and rural workers.
	SIL/80/015	Assistance to Crash Rice Programme	Strengthening the planning capacity of the Ministry of Agriculture and Forestry in the utilization of inputs for carrying out Government Crash Rice Programme for increasing rice production in the country
SIERRA LEONE	TCP/SIL/0002 (Mi)	Improved Seed for the Crash Rice Programme	To assist the Ministry of Agriculture, through the National Seed Multiplication Project in improving the quality of rice seed.
	FH/SIL/010	Adaptive Research in Paddy Storage and Processing	----
SOMALIA	SOM/72/014	Strengthening of Agricultural Research (Phase III)	To improve research facilities at Afgoi and Bonka to serve major irrigated and rainfed crop lands of Somalia, staff training, development of appropriate production practices and sorghum varieties and hybrids.
	SOM/74/007	Seed Production and Certification	To assist the Government in producing high quality seed of selected high-yielding varieties of maize, sorghum, sesame, groundnuts and rice in quantities sufficient to supply seed for half the cultivated area covered by the Project.
	SOM/78/006	Strengthening of the Animal Disease Control Services and the Veterinary Laboratory	Developing a suitable animal diseases investigation and control system in the country and strengthening of Research, diagnostic facilities and veterinary infrastructure for identification and control of animal diseases.
	SOM/81/015	Strengthening of Agricultural Research (Phase IV)	Strengthening of the agricultural research service through the upgrading of the physical facilities, staff training and the development and execution of a research programme aimed at increased crop production.

Country	Project No	Project Title	Objectives
SOMALIA	UTFN/SOM/022/SOM	Northern Rangeland Project	To assist and strengthen the efforts of the Government of Somalia to improve the pastures of the rangelands and develop sheep, goat and camel production in the area.
	GCP/SOM/029/DEN	Seed Production and Improvement	To assist the Government in producing high quality seed of selected high yielding varieties of maize, sorghum, groundnut and rice.
	NECP/SOM/501/IRQ	Development of Oilseeds and Beans Production	To develop oilseed and bean production under rainfed conditions and upgrade oil processing facilities in Somalia.
	NECP/SOM/507/MUL	Development of the Poultry Industry	To assist the Government to establish a sound poultry industry in the country based on modern lines and up to date technology, in order to provide poultry products in adequat amounts at reasonable prices.
SUDAN	SUD/78/004	Regional Dairy and Poultry Project	To train the necessary staff as envisaged by Government in their present five year plan and produce bulls and poultry to support the livestock development.
	SUD/78/016	Integrated Rural Development in Kongor District	To provide means and institutional framework within which the Dinka in the Kargor District can mobilize resources to improve their livestock, agricultural and fishing economics and develop their educational, health and social services.
	GCP/SUD/024/DEN	Tick and Tick-borne Disease Control Phase I	To develop basic and practical information to formulate national programme of tick and tick-borne disease control which will contribute to the improved and more efficient development of animal resources.
	GCP/SUD/025/NET	Development and Application of Integrated Pest Control in Cotton and Rotational Food Crops	Development/application of safer, more effective permanent pest control procedures and techniques through the combined use of all compatible methods based on ecological consideration and crop economics, to avoid environmental pollution and ensure continuing profits to the farmers.

Country	Project No	Project Title	Objectives
SUDAN	UTFN/SUD/038/ SUD	Assistance in Seed Production	Increase the production of wheat, sorghum, groundnut and sesame, through, inter alia, production of improved seeds; strengthening of established seed stations and other national institutes, and the establishment of three new stations, training of seed industry personnel.
	GCP/SUD/ /ITA	Agricultural Mechanization for Crop Production in the Khartoum Area	Introduction of agricultural mechanization to Sudan in support of increasing food production in the country through improving the productivity of major food crops such as sorghum and vegetables and expansion of land under the cultivation of these crops.
SWAZILAND	SWA/78/014	Assistance in Marketing for Rural Development - Preparatory Assistance	Provide technical and advisory support in the development and integration of the marketing process into the country's Rural Development Area Programme (RDAP).
	SWA/78/015	Assistance for Research in Rural Development - Preparatory Assistance	Preparatory Assistance for Technical support in Agricultural Research Planning to the Ministry of Agriculture, Government of Swaziland.
	SWA/78/021	Assistance to Agricultural Research and Planning	To build up and strengthen an efficient Department of Research and Planning by coordinating the activities of its four sections/divisions namely Economic Analysis and Planning, Land Use Planning, Land Evaluation and Research.
	PFL/SWA/002	Strengthening of the Food Conservation and Crop Storage Section (Phase II)	To assist the FCCS section in implementing methods to reduce food losses and advise Government on storage and marketing of food grains.
	GCP/SWA/005/ DEN	Development of Quality Seed Production	-------

Country	Project No	Project Title	Objectives
SWAZILAND	GCP/SWA/014/ SWE	Assistance to the Faculty of Agriculture (Training of Extension Workers and Research for Rural Development).	------
TANZANIA	URT/73/006 (M)	National Soil Service	To establish a National Soil Service well equipped to meet the needs of the country for soil survey, land evaluation, soil testing, soil fertility and management studies and to train national staff for its efficient operation.
	URT/73/008	Assistance to Second Livestock Development Project	To assist in ranch development and management both in the parastatal and group ranching sectors and support teaching and applied investigations activities of the Ministry of Agr.
	URT/73/024	Improvement of Rice Cultivation and Extension in Food Crop Cultivation, Zanzibar	To study the socio-economic feasibility of small scale production of irrigated rice and other crops and to develop simple and economically justifiable irrigation systems both from surface and ground water resources.
	URT/74/029	Dairy Development Services	------
	URT/77/028	Rural Finance Department, Bank of Tanzania	To advise Government and financial institutions on matters pertaining to credit for agricultural and Rural Development.
	URT/78/003	Agricultural Mechanization Development (Phase I)	To ensure that agricultural mechanization, utilizing human, animal and mechanical power for various agricultural operations makes an optimal contribution to agricultural and rural development.
	URT/78/016	Strengthening of Marketing Service (Phase III)	To provide intensive in-service training to the national staff to enable them to take over entirely the task of preparation of producer price policies and their effective application.
	URT/78/022	Strengthening of the Bird Control Unit of the Ministry of Agriculture	To increase the yield of cereal crops by introducing techniques and strategies designed to give crops maximum protection from the ravages of granivorous birds.

Country	Project No	Project Title	Objectives
TANZANIA	URT/78/028	Livestock Production, Zanzibar (Phase II)	To assist the Government in evaluating the productivity of small holders' farms with reference to milk and beef, through introduction of improved technology.
	TCP/URT/2204	Training in Integrated Crop and Livestock Development	-----
	TCP/URT/8806	Assistance to the Rufiji Basin Development Authority (Rubada)	To provide consultancy services for the improvement of fishing in the artificial lake and the regulated river and agricultural development of some 80000 ha of irrigable land downstream and 250,000/300,000 hectares upstream of the Stiegler's Gorge down on the Rufiji river.
	TCP/URT/9003 Rev. I	Training for Extension Workers and Farmers in Dairy Husbandry	To assist the Government in Organizing and Implementing refresher courses for extension workers, farm managers and leading farmers in livestock and dairy production.
	TCP/URT/9004-T	Training in Livestock Production for Extension Workers and Farmers in Zanzibar	Organizing and implementing refresher courses and workshops in A.I. methods, Pastures Establishments and Management, Fodder Crops and By-Products Utilization and Animal Husbandry for Veterinary Field Assistants.
	TCP/URT/0007 (Mi)	Aerial Applicator Training	Training of Tanzanian pilot trainees in aerial spray operation and in advanced repair, maintenance and calibration of specialized equipment.
	FPA/URT/77/P01	Population/Family Life Education, Communication and Applied Research in Integrated Rural Development	To develop a coordinated inter-sectoral population/family life education, communication and applied research programme as part of the rural development programme of the country
	GCPS/URT/047/ WET	Crop Monitoring and Early Warning System	To provide imporved advanced information on crop production and food supply.

Country	Project No	Project Title	Objectives
TANZANIA	MMP/URT/048	Experimental Credit to Ujamaa Village Women	To develop a programme to be financed through a revolving fund of $25,000 from Tanzania Rural Development Bank for involvement of Ujamaa Village Women in the production process and in cash economy at the village level.
	MMP/URT/060	Applied Nutrition Education in Tabora Region	
	GCP/URT/050/ CAN	Pilot Study for Development of the Ghejn Plain (Zanzibar) for Ground-water Irrigated Rice	Increase the country's rice production through improved irrigation techniques.
	GCPP/URT/052/ NET	Village Storage and Training (Arusha and Dodoma)	To build village stores for maize, sorghum and millets in Dodoma and Arusha regions and provide training for villagers in storage construction methods and in storage management and pest control
	GCP/URT/055/ DEN	Regional Integrated Development Plan (RIDEP) and Rural Development Project MBEYA Region	To accelerate the pace of rural development in the Mbeya Region and improve the social welfare through the implementation of an integrated rural development project.
TOGO	TOG/81/001	Assistance au Programme d'Aménagement et de Développement Intégré du Nord Togo (Tranche la Kara, Phase III de consolidation)	Assister le Gouvernement dans le renforcement du Programme d'aménagement et de développement intégré du Nord Togo, tranche La Kara, dans le domaine du développement rural. Ces opérations visent exclusivement le paysannat et ont pour but: a) l'augmentation de la production agricole dans les zones actuellement exploitées; b) la mise en valeur de ressources actuellement inexploitées ou sous-exploitées; c) le développement de l'élevage lié à l'agriculture; d) l'étude et la définition d'un système de promotion du développement technique, économique et social du secteur rural.

Country	Project No	Project Title	Objectives
TOGO	TCP/TOG/0001 (M)	Restructuration et Renforcement de la Recherche Agronomique	Aider le Ministère du Développement Rural à définir les structures institutionnelles et les modalités d'organisation d'un "Institut National de la Recherche Agronomique du Togo" (INRAT) et formuler un plan d'action à long terme pour la mise en place, le fonctionnement et le renforcement progressif de l'INRAT.
	FH/TOG/12	Modernisation des Puits par la Pose des Pompes y compris Formation de Techniciens Spécialisés et de Volontaires Locaux en Hydraulique Villageoise	Le but essentiel du présent projet est de moderniser les puits dans trois régions déshéritées du Togo et de compléter ce travail par des séries de formation du personnel spécialisé d'exécution et des volontaires villageois pour l'entretien.
TUNISIA	TUN/75/005 (R)	Assistance to the Development of Apiculture in Tunisia	Accroître la production apicole de manière à rendre la Tunisie exportatrice de miel, de cire et d'outillage apicole. Réaliser un effectif de colonies d'abeilles capables de valoriser intégralement les ressources de nectar et de pollen existantes en Tunisie.
	TUN/78/007	Assistance au Développement Régional et Pastoral du Sud Tunisien	Le projet prévoit des actions de grande envergure d'aménagement et de mise en valeur agro-pastorale de plusieurs centaines de milliers d'ha. Un des objectifs principaux est de renforcer l'Institut des Régions Arides sur le plan technologique, de la méthodologie, formation et matériel, afin de rendre cet Institut rapidement opérationnel dans le domaine du développement des parcours.
UGANDA	UGA/74/002	Assistance to the Faculty of Veterinary Medicine, Mekerere University, Kampala	-----

Country	Project No	Project Title	Objectives
UGANDA	UGA/80/013	Rehabilitation of Agricultural Marketing	To provide assistance and direct support to the Ministry of Cooperatives and Marketing in its task of rehabilitating agricultural marketing in Uganda.
UPPER VOLTA	UPV/72/035	Centre d'Expérimentation du Riz et des Cultures Irriguées (CERCI)	a) études expérimentales comprenant l'introduction ou la création des variétés des différentes espèces végétales et leur trillage. b) contrôle des résultats obtenus en station par l'implantation d'essais multilocaux dans les différentes zones du pays; c) production de la semence de base des variétés, objet de vulgarisation. d) formation du personnel technique local affecté en projet.
	UPV/75/015	Assistance Technique au"Fond de Développement Rural"	Le Gouvernement voltaïque est conscient de la nécessité d'une structure d'évaluation et de planification continue qui exige un programme tel que celui du Fond du Développement Rural pour atteindre ses objectifs. Ce projet vise essentiellement la mise en place de cette structure.
	UPV/78/003	Production Vététale et Vulgarisation dans l'O.R.D. de l'Est - Secteur de Fada	Développement de la production végétale dans le secteur de Fada. Vulgarisation agricole dans le même secteur. Etablissement d'un programme pour améliorer la production végétale et les méthodes culturales dans les villages afin d'arriver à une production adaptée aux conditions agro-économiques locales et plus rentables pour les agriculteurs.Mise au point d'un système et d'une organisation de vulgarisation agricoles pour aider les agriculteurs à adopter le programme de production végétale et les méthodes culturales mentionnés ci-dessus.
	UPV/79/009	Assistance au Ministère du Développement Rural pour le Renforcement d'un Service National de Vulgarisation (Assistance Préparatoire)	Fournir l'expertise nécessaire pour la formulation d'un document de projet dont les objectifs seront de renforcer un service national de vulgarisation agricole par un appui technique matériel et en plus commencer des activités pilotes en matière de formation. Les résultats obtenus par le projet d'assistance préparatoire doivent aboutir à un document de projet dont les actions seront financées par le PNUD.

Country	Project No	Project Title	Objectives
UPPER VOLTA	UPV/80/002	Production Végétale et Vulgarisation Agricole dans l'ORD du Sahel	-Assister le Gouvernement dans sa politique de développement économique et social de la Région. -Assurer l'animation et l'encadrement de la population en vue de sa participation effective à l'élaboration et à l'exécution du programme de développement communautaire. -Mise en place des structures d'expérimentation et de vulgarisation pour une intensification de la production agricole. -Valorisation de la production animale par une intégration agriculture-élevage.
	UPV/80/011	Assistante au Fonds d'Assistance ARCOMA/COREMMA	-Assister le Fonds d'Assistance à organiser des cours pour agents et paysans et les former aux techniques de dressage et castration des taurillons de trait; -Fournir un appui technique pour la formaiton du personnel comptable. -Assurer un appui supplémentaire dans la technique de fabrication locale de matériel de culture attelée.
	TCP/UPV/0104	Formation du Personnel de l'OFNACER au Conditionnement et au Stockage des Céréales	Former des cadres subalternes (techniciens et comptables) pour les opérations de conditionnement et stockage de céréales.
	TCP/UPV/0107	Intégration de la Jeunesse Rurale au Développement	Aider le Gouvernement à mettre en place une unité d'action expérimentale en matière d'harmonisation et de coordination des programmes en cours et en perspective en faveur de la jeunesse rurale, et en particulier préparer des groupements pilotes de jeunes qui devront servir d'éléments catalyseurs et animateurs du Programme d'envergure nationale envisagé.
	PFL/UPV/001	Amélioration des opérations après Récolte et Promotion des Structures Villageoises Correspondantes	Etude des opérations traditionnelles d'après récolte pour les produits alimentaires de base. Evaluation des pertes réelles et de leurs causes. Introduction de technologies améliorées pour la production, le battage, nettoyage et la mouture des grains. Mise en oeuvre du programme de démonstration et de vulgarisation. Construction de quatre centres précoopératifs villageois.

Country	Project No	Project Title	Objectives
UPPER VOLTA	FH/UPV/005 (Phase II)	Assistance au Centre de Formation Agricole de Dionkélé - Phase II	Le projet présente trois volets distincts mais rattachés l'un à l'autre, qui constituent des phases d'intervention: i) sensibilisation des villages environnants le Centre pour qu'ils participent à l'action; ii) formation des jeunes ménages au Centre de Dionkélé; iii) suivi des ménages après leur installation dans leurs nouvelles fermes individuelles.
	GCPS/UPV/026/ SWI	Soutien en Moyens d'Actions à l'Office National des Céréales (OFNACER) - Programme de Stockage et de Formation du Personnel	Concevoir et réaliser un programme de formation pour le personnel et les cadres de l'OFNACER (pour 150 agents commerciaux et magasiniers de l'OFNACER, 70 comptables, 15 représentants des cadres supérieurs responsables de la gestion). Construire le siège du Centre Départemental de Gestion de Dori. Proposer des méthodes d'amélioration de gestion et de structures auprès de l'OFNACER en vue de la consolidation de la politique actuelle de commercialisation et de stockage de l'Office.
	TCP/UPV/0110	Assistance au Développement de la Recherche Agronomique	------
ZAIRE	ZAI/71/015	Développement de l'Elevage du Nord Kivu (Goma)	------
	ZAI/73/008	Statistiques Agricoles (Kinshasa)	-------
	ZAI/78/002	Création d'un Office National des Intrants Agricoles (ONIA) Kinshasa	L'intensification de la production agricole par l'établissement d'un programme national d'approvisionnement du pays en moyens de production.
	ZAI/81/017	Développement Rural du Nord Kwilu	------

Country	Project No	Project Title	Objectives
ZAMBIA	ZAM/77/002	Animal Disease Control and Eradication Programme	Control and eradication of major animal diseases and to establish a programming of Tse Tse control.
	ZAM/77/003	Village Workshop Pilot Project	To increase agricultural production through the provision of engineering skills and facilities in rural communities off the "line of rail"
	ZAM/77/004	In-Service Training for Agricultural and Rural Development	To adapt existing agricultural training activities to the need of rural development and to train professional staff at national provincial and district levels.
	ZAM/77/007	Zambia Centre for Horticultural Training (Chapula)	To expand training facilities and train extension workers and other growers through short courses in horticultural crop husbandry and water management.
	ZAM/77/011	National Oilseeds Development Programme (Phase II)	To expand and diversify oilseed production of sunflower, groundnuts, cotton, soyabean with a view to meeting domestic demand in vegetable oils and oilcakes and to ultimately generate marketed surplus for export.
	ZAM/79/001	National Irrigation Research Station (Phase II) Preparatory Assistance	To forge an effective link between research activities and extension services as well as improve the extension service itself, providing it with adequate mobility, time-bound systematic programme of work, better socio-economic data etc.
	ZAM/79/002	Coffee Production (Cultivation, Processing and Research) in the Northern and North-Western Province	Development of coffee production, processing, grinding and marketing by laying a basis for small-holder coffee production and strengthening coffee research capabilities and extension services.
	ZAM/80/008	Assistance to the Pilot Project for Tse Tse Control in the Kabulwebulwe Resettlement Area	To provide insecticide and cover the cost of spraying operations.

Country	Project No	Project Title	Objectives
ZAMBIA	ZAM/82/010	Irrigated Agricultural Research and Development - Preliminary Phase	To plan and implement small scale irrigated agriculture and develop appropriate technology suitable to various conditions and develop local capabilities for maintenance and improvement of schemes developed by the Project.
	PFL/ZAM/001	Pilot Project for Improved Storage Structures - Introduction of Solid Walled Farm Storage Bin	To evaluate the acceptability and performance of the two-stage storage method, using cribs and solid-walled grain bin (Ferrumbu) at farmers level, and to develop and evaluate a soil/cement bin comparable to the Ferrumbu.
	PFL/ZAM/002	Village Grain Storage Extension	To reduce post-harvest losses in grains at farm level and maintain the quality of grain in storage; to conduct training courses and to introduce improved solid-walled grain storage bins.
	GCP/ZAM/012/NOR	Control of Maize Diseases in Zambia	To ensure security in the staple diet of Zambia by developing maize varieties which are resistant to diseases and are high yielding.
	GCPS/ZAM/016/NET	Strengthening Food Security through Assistance to the Marketing Unit in the Ministry of Agriculture and Water Development	To assist the Government in designing and developing grain marketing programmes with a view to ensuring at all times the availability of supplies of cereals adequate to meet the needs of the population.
ZIMBABWE	ZIM/80/032	Training of Veterinary Assistants	To set up and strengthen a school for training veterinary assistants to improve the capacity of Ministry of Agriculture to provide a satisfactory veterinary service to the tribal areas.
	ZIM/81/024	Benchmark Farm Household Surveys, Analysis and Farm Systems Planning for Small Farm Development	Improve the national capacity for agricultural development, planning, management, extension and problem-oriented research through the introduction of a farm management data collection and analysis system.

Country	Project No	Project Title	Objectives
Central African Republic	CAF/80/002	Fishculture Development and Autofinancement of Main Fishculture Stations.	
	GCP/CAF/007/NET	Hatchery Production and Research Centre Bangui Landjia	Establishment and operation of an hatchery to be attached to the national fish culture centre of Bangui-Landjia for propagation and semi-intensive culture of clarias lazera research activities, provision of fingerlings and training.
Rēpublique populaire du Congo	PRC/79/007	Development of Rural Fishculture	
Ivory Coast	IVC/77/003	Development of Fishculture and Inland Fisheries	Train extension workers in fishculture and inland fisheries. Develop fisheries in temporary lakes (pluvic lacustres). Develop fishculture in lakes and establish pilot fishfarms. Develop lagoon aquaculture.
Kenya	KEN/74/023	Offshore Trawling Survey	to demonstrate feasibility of commercial fishing industry and investment. Identify deepwater fishing ground to chart the fishing grounds. Train local fishermen in modern fishing techniques.
	KEN/77/014	Development of Coastal Aquaculture	
Madagascar	MAG/76/002	Development of Inland Fisheries	
	MAG/77/009	Research Survey of Small Pelagic Fish	Strengthening of the ONRO (Centre National de Recherche Océanographiques) through survey of small pelagic species in NW coastal waters.

Country	Project No	Project Title	Objectives
Malawi	MLW/75/019	Fishery Expansion Project	Expand fish stock studies and fishery development activities. Continue environmental studies. Expand fish farming activities.
Mauritania	MAU/80/004	Développement des Pêches Artisanales	
Mozambique	GCP/MOZ/006/SWE	Development of Inland and Inshore Fisheries (Phase II)	Development of artisanal coastal, inland fisheries and fishculture including biological and limnological studies.
Namibia	NAM/78/005	Analysis of Policy Options and Preparation of Contingency Plans for Fisheries	
Niger	NER/79/018	Fisheries Development	
Nigeria	NIR/74/001	Improvement of Fish Processing and Transport on Lake Chad	
	NIR/77/001	Artisanal and Inshore Fisheries Development	
Rwanda	RWA/77/010	Development of Fishing on Lake Kivu	Development of the fisheries Lake Kivu. Reorganization of fisheries studies. Preparation of programme for further fisheries development.
Senegal	SEN/76/015	Développement de la Céréaliculture (inc fishculture)	
Sudan	SUD/79/001	Suad Fisheries Development Programme	
Tanzania	URT/75/090	Development of Fisheries in Zanzibar	
Zaire	ZAI/80/003	Assistance to ONP and Improvement of Artisanal Fisheries	

Country	Project No	Project Title	Objectives
Zambia	ZAM/79/005	Pilot Project to Develop Fishculture in Zambia	
Algeria	ALG/77/001	Fishery Development (Phase II)	
Morocco	GCP/MOR/008/NOR	Acoustic Surveys Pelagic Resources	
	MOR/78/018	Estimation and On-Going Monitoring of Marine Resources	To reinforce activities of Institut Scientifique des Pêches Maritimes, provide essential material and support for the major seaborne research and monitoring programme. Provide general advice on national fisheries development strategy.
	MOR/81/002	Estimation and On-Going Monitoring of Marine Resources	
Tunisia	TUN/79/008	Development of Highseas Fisheries	

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS ROME

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Twenty-second Session

Rome, 5-24 November 1983

PLANT GENETIC RESOURCES

Report of the Director-General

CONTENTS

I. INTRODUCTION

1. At its Twenty-first Session, in November 1981, the FAO Conference adopted the following Resolution:

Resolution 6/81

PLANT GENETIC RESOURCES

THE CONFERENCE,

Recognizing that plant genetic resources are indispensable for the genetic improvement of cultivated plants, and that they are in danger of erosion and loss,

Recalling that work on plant genetic resources was begun in FAO as the result of a recommendation made by the First Session of the Advisory Committee on Agriculture in 1946,

Recalling further that in 1974 with the support of the Consultative Group on International Agricultural Research, the International Board for Plant Genetic Resources (IBPGR) was set up for which FAO provides the Secretariat,

Noting that a joint FAO/IBPGR programme is promoting the international collaboration of national, regional and international plant genetic centres in which plant genetic resources are collected, maintained, evaluated, exchanged and distributed,

Considering that there is no international agreement for ensuring the conservation, maintenance and free exchange of the genetic resources of agricultural interest contained in existing germplasm banks,

Convinced of the need for such an agreement,

Recalling the proposal made by some members during the Seventy-ninth Session of the Council in June 1981 that consideration be given to the establishment of an international bank of plant genetic resources under the auspices of FAO to ensure the free exchange of plant genetic resources between countries,

1. Requests the Director-General to examine and prepare the elements of a draft international convention, including legal provisions designed to ensure that global plant genetic resources of agricultural interest will be conserved and used for the benefit of all human beings, of this and future generations, without restrictive practices that limit their availability or exchange, whatever the source of such practices.

2. Requests the Director-General to prepare a study on the establishment of an international bank of plant genetic resources of agricultural interest under the auspices of FAO, taking into account the provisions of the proposed international convention as well as ongoing national, regional and international efforts in this field in particular those of the IBPGR.

3. Requests the Director-General to present proposals based on the studies mentioned to the Committee on Agriculture for consideration at its Seventh Session in 1983, which shall report thereon to the Council with a view to consideration by the Twenty-second Session of the FAO Conference.

2. In accordance with the Resolution, the Director-General submitted to the Committee on Agriculture, in March 1983, a Proposal for the establishment of an international gene bank and the preparation of a draft international convention for plant genetic resources. This Proposal was contained in document COAG/83/10, which has, for convenience, been reissued as document C 83/LIM/2.

3. The Committee on Agriculture was not able to reach a consensus on the Proposal. It made certain suggestions concerning a further study of aspects of the Proposal, with a view to enabling governments to reach a consensus on the matter, and concluded that the Director-General should be assisted by a working party of Member Nations to help him prepare his report to the Council so that the latter could elaborate the proposals to be submitted to the Twenty-second Session of the Conference. The relevant part of the Committee's Report is set out in paragraphs 219 to 238 of document CL 83/9.

4. The Report was considered by the Council at its Eighty-third Session in June 1983, shortly after the first meeting of the Working Party, which the Director-General had established in accordance with the recommendation of COAG. The Council welcomed the establishment of the Working Party and made various suggestions for the preparation of the Director-General's Report (see document CL 83/REP, paras. 107 to 109).

5. The Working Party met in June 1983 and again in July. It consisted of Representatives of Australia, Cameroon, Cyprus, El Salvador, India, Kenya, Libya, Malaysia, Mexico, Spain, Sweden, the United Kingdom and the United States of America. As a result of the general discussion of the Working Party at its first meeting, the Director-General prepared a draft outline of the present Report, as well as draft provisions of an international agreement on plant genetic resources. At the second meeting of the Working Party, the main aspects of both drafts were the subject of detailed suggestions and comments.

6. Since some members of the Committee on Agriculture had considered that various points had not been sufficiently covered in the Director-General's Proposal, the Director-General, at the beginning of this year, had requested Member Nations to provide him with information relating to such points, as well as to difficulties in obtaining plant genetic resources and gaps in the present system for the conservation of such resources. This request was repeated to the members of the Council and of the Working Party. Information and suggestions were subsequently received from seven Member Nations and a number of international institutions.

7. The present Report takes account as far as possible of the wide range of differing suggestions that have been made since the Twenty-first Session of the Conference, but represents the Director-General's judgement and is submitted on his sole responsibility.

8. The following Sections of this Report start (Section II) by setting out the context of Resolution 6/81 and seeking to identify the basic principles and concerns underlying it. Section II then develops those principles into a proposed international system relating to plant genetic resources. Section III and Appendix A suggest a text for an international agreement that would form the legal basis of the system proposed. Section IV examines, both from a scientific and technical and a legal and institutional point of view, the present international arrangements relating to plant genetic resource activities. The main purpose is to ascertain how far the present arrangements correspond to the principles developed in Section II. Section V discusses the various measures that could be taken, in the light of the present arrangements, to satisfy the principles and concerns underlying Resolution 6/81. Finally, Section VI sets out proposals for specific measures on which, in the Director-General's opinion, a consensus of governments could be reached.

II. PRINCIPLES AND OBJECTIVES RELEVANT TO PLANT GENETIC RESOURCES

Basic Considerations

9. The first paragraph of the Preamble to Resolution 6/81 recognizes the importance of plant genetic resources and refers to the danger of their erosion and loss. They are indispensable to plant breeding, on which the development of agriculture depends. The danger to the irreplaceable diversity of plant genetic resources is essentially presented by modern agro-technology, urbanization and changes in land use.

10. Restrictions on the availability of plant genetic resources, and inadequate measures to protect the diversity of those resources, would not merely prejudice further progress in plant breeding; it could also render plant breeding incapable of responding to serious threats to the production of food or other agricultural goods.

The nature and significance of plant genetic resources

11. The whole plant kingdom as developed through evolution on earth, on which human life depends, can be considered to represent plant genetic resources in the widest sense. However, man has used only a fraction of all the plant species, with an increasing concentration on a reduced number of particularly promising species that were suitable for domestication and cultivation. Today, the main food supply of mankind is determined by only twenty crop species, and only eight forest species provide most of the world's wood and timber. A much larger variety of plant species are used, in addition, for food, such as oil, vegetables, fruit and animal feed, and for other purposes, such as spices, beverages, pharmaceuticals and ornamentals and for various industrial processes. Many plants known to earlier generations have been lost or are no longer used, and a large part of the plant kingdom is in need of exploration (on the basis of earlier knowledge, where it exists) with a view to discovering possible future uses. The protection of important natural habitats of the world's flora is a precondition to such exploration if mankind is not to be deprived on one of the most precious resources that it depends on. A decision adopted in May 1983 by the Governing Council of the United Nations Environment Programme refers to this in situ conservation of genetic resources.

12. The plant species that are now cultivated have developed - in a large number of cases, since prehistoric times - as a result of selection by man to take advantage of specific useful characteristics, and also by reason of the environment in which they have been cultivated. They originated either from a single wild species or from natural crosses of the species, the discovery of which forms part of the scientific advances in crop plant evolution. Plant breeding, and particularly its use of the rapid scientific progress in genetics, has considerably accelerated the process of evolution of crop plants in modern times, constantly increasing their adaptation to various human needs in yield, harvest index and quality.

13. Plant breeders in modern times soon recognized that the development of crop varieties with specific characteristics, particularly high yields, called for uniformity in each variety, and that this tended to narrow the genetic base of cultivated crops. They became increasingly aware of the importance of the wide genetic variability existing in the material of land races and even in the ancestors of crop plants. They thus realized the need for systematic measures to explore, collect and preserve such material, which is of interest particularly as a source of gene combinations resulting in adaptability to adverse environmental conditions, valuable quality characteristics or resistance to pests and diseases. Systematic efforts in exploring and collecting the wide variety of crop plants dates as far back as the 1920s and 1930s; this partly explains the concentration today of some of the large collections in certain countries.

14. Since then, advances in genetics, such as the inducement of mutations, polyploidization and, recently, genetic engineering, have opened up new avenues to an increase in genetic variability. Nevertheless, the variability that has arrived from the evolutionary and selective process by natural and human forces must still be considered as the prime source for crop plant breeding at present and in the future; therefore, it is the central object of plant genetic resource activities today, especially after the United Nations Conference on the Human Environment held at Stockholm in 1972.

Micro-organisms

15. While genetic resources of the (higher) plants used for crop production are in the foreground of this Report, attention should also be given, in parallel, to the genetic resources of micro-organisms associated with crops, which may have beneficial effects or be a source of important diseases. In breeding programmes relating to leguminous plants, the variability of Rhyzobium-bacteria needs to be considered in conjunction with the genetic variability of the host legume. The same applies to the screening and evaluation of disease resistance of crop genotypes, for which a whole range of identified genetic variability in the respective disease organisms should be available. Parallel efforts should therefore be envisaged for the exploration, collection, documentation and preservation of micro-organisms of major importance to crop plants.

Use of plant genetic resources

16. In isolation from the concept of plant breeding, the term "plant genetic resources" is practically meaningless. In the absence of capability in plant breeding and plant genetics, such resources can, at the most, only be of limited use to any given country. The strength of a plant breeding programme, in terms of its human and physical assets, determines the level of importance that genetic resources can receive.

Documentation and evaluation

17. The use of plant genetic resources in plant breeding depends, in addition, on the information available concerning each sample, identifying its nature, its characteristics and ideally its genetic composition. This task of evaluation, and the related documentation work, are a formidable undertaking that remains to be performed for a large part of the genetic resources that have now been collected, let alone those that have still to be explored and collected.

Centres of genetic diversity

18. Twelve geographical areas have been recognized as primary centres of genetic diversity for individual crop plants. These centres are situated in five continents, mainly in developing countries. There are other areas that have been recognized as secondary centres of genetic diversity for various crops which have developed, through natural adaptation and subsequent selection work, in environments different from that in which they originated. A list of the regions of diversity of major crop plants and their wild relatives is contained in Appendix 8 of document COAG/83/10.

Categories of plant genetic resources

19. There are various kinds of plant genetic resources of importance for the breeding of new crop cultivars. The following categories have been recognized:

(a) Cultivated varieties (cultivars) in current use. These are varieties that are often released under a particular government scheme as varieties of recognized value and performance. Successful cultivars are widely used in plant production in a given country or in several countries having similar cropping conditions. Uniformity of characteristics is a feature of this category.

(b) Obsolete cultivars. These are varieties that were cultivated in the past, but have now been replaced by the cultivars referred to in (a). Uniformity is also, to a certain degree, a feature of this category.

(c) Primitive cultivars or land races. These are varieties that have been used for centuries in traditional agricultural systems. They were the product of selection by man, but have not undergone modern improvements by way of plant breeding. Variability in characteristics as observed in the field is a feature of this category.

(d) Wild species and weedy species closely related to cultivated varieties. These ancestors of cultivars are species of crop plants that have not been cultivated, but possess characteristics that might be usefully transferred to cultivated varieties through plant breeding. This category also covers species of direct economic value, such as forest trees.

(e) Wild species of potential value to man. These are species which are not cultivated and whose importance has not yet been assessed, but may be identified through exploration.

(f) Special genetic stocks. This is material that has normally been developed by man and is or has been used in ongoing breeding programmes. It includes mutants, "breeders' lines" and lines with identified genes or gene combinations. Material of this type is particularly useful because of the identification of special characteristics or even of genes.

20. All of the above categories of the resources of higher plant species are or may be useful, depending on the particular crop and the aims of the breeding programme concerned. Moreover, as mentioned above, other genetic resources, particularly those of micro-organisms, should also receive consideration, in parallel to those of crop plants.

The need to preserve plant genetic resources

21. Plant genetic resources are in serious danger of being lost in a rapidly developing world. Land races and primitive cultivars are condemned to replacement by higher yielding varieties that meet better the pressing need for higher outputs from agriculture. Weed control measures in support of crop production may eliminate important ancestors of crop plants. Forest clearings opening up new lands for settlement are endangering the centres of genetic diversity of important tree crops or may destroy the habitat of potentially new crops. Valuable breeding lines, mutants or other genetic stocks resulting from active plant breeding programmes may be discarded because their maintenance is a burden to plant breeding institutions occupied by the development of new varieties.

22. The aim of future plant breeding must be to preserve the genetic variability, inherited from nature and from human endeavour, of plants actually or potentially useful for mankind. A clear idea of the magnitude of this task cannot be given, nor is it possible to assess, for any given species, the number of samples that would represent the existing genetic variability. So far only estimates could be made; the estimate for rice is approximately 120 000 samples. Only further scientific work in genetics and plant exploration will provide a clearer picture of the size and form of the gene pools for each crop species which should be maintained as basic genetic resources.

23. In the case of a large number of seed propagated crops, controlled storage conditions have been developed to maintain full viability of seeds without genetic change for long periods of time, thus enabling the preservation of the genetic resources of those species. For some other species, long-term seed preservation is not possible, and vegetatively propagated crops can be preserved only as growing plants or, in more recent times, as tissue culture under controlled conditions. However, as will be seen in paragraph 46 below, both these methods of preservation present difficulties. For plant species requiring vegetative propagation or having seeds which cannot be stored, in situ preservation of genetic diversity in their natural habitats is therefore an important parallel task in plant genetic resource management.

Concluding remarks

24. The above general considerations provide the context of the statement, in the Report of the Seventh Session of the Committee on Agriculture (document CL 83/9, para. 221), that plant genetic resources are a heritage of mankind and that they should be freely exchanged between countries and their respective institutions for scientific purposes and use in crop-breeding programmes.

25. Successful plant breeding will increasingly depend on access to the full range of variability in plant genetic resources existing and developing in all countries of the world; from the resources of plants in their natural habitat to those that have undergone or are undergoing changes and selections by man. The full availability and exchange of plant genetic resources should therefore be ensured and increasing emphasis should be given to exploring and evaluating them, to safeguarding them against indiscriminate losses and to placing all nations, particularly developing countries, in a position to make full use of them through plant breeding for their agricultural development.

Principles underlying Resolution 6/81

26. In Resolution 6/81, the Conference requested the Director-General to "prepare the elements of a draft international convention, including legal provisions designed to ensure that global plant genetic resources of agricultural interest will be conserved and used for the benefit of all human beings, of this and future generations, without restrictive practices that limit their availability or exchange...". The Conference also requested the Director-General "to prepare a study on the establishment of an international bank of plant genetic resources of agricultural interest under the auspices of FAO, taking into account... ongoing national, regional and international efforts in this field in particular those of the IBPGR".

27. The general principle underlying the Conference's request, particularly as seen in the light of the discussions of COAG (see para. 3 above), is that plant genetic resources are a common heritage of mankind and should be freely available, and that such availability should be the object of a firm commitment by the international community and individual governments.

28. In the context of the principle of free exchange of plant genetic resources, the study in document COAG/83/10 noted (see paras. 22 to 32) certain cases of restrictions of a legal nature. Such restrictions did not appear significantly to affect the availability of resources, particularly those of food crops. In response to a request by FAO to governments for details of specific cases in which a government or institution has been unable to obtain material on account of restrictive practices relating to exchange, information was received from one government. The latter referred to difficulties in obtaining, for research purposes, samples of modern varieties covered by plant breeders' legislation in other countries, particularly those of horticultural species, but also field crop cultivars.

29. In the discussions during the follow-up to Resolution 6/81, a number of governments stated that they would not be able to commit themselves to providing material in violation of their national legislation on plant breeders' rights. This legislation confers on a breeder exclusive rights limited in time and related to the commercialization of cultivars originating from his breeding programmes and meeting specific conditions. The legislation does not restrict the exchange and use of samples of a cultivar for which legal protection has been granted, if they are to be used as a genetic source in other breeding programmes, even in the countries of protection (the rights conferred do not in any event extend to other countries). Such samples can, in addition, be purchased on the market.

30. The problem of availability may be greater with respect to material that is not in itself eligible for legal protection, but from which one or more plant varieties that are eligible could be developed with comparative ease: for example, advanced breeders' lines produced in active breeding programmes or the inbred parent lines used in hybrid breeding. Material of this kind may considerably facilitate the breeding work in developing countries with agro-ecological conditions similar to those of the country where the material was developed, particularly as the former countries do not generally have sufficient technology and facilities to breed the material from its original parent lines. However, enterprises run for commercial purposes may be reluctant to release the material, which they may have developed and tested at considerable cost, for fear that it would reach the hands of competitors.

31. It should be noted, however, that advanced breeding lines are often exchanged among breeders, and are made available in cooperative breeding programmes, particularly those of the international agricultural research centres (IARCs) and the countries wishing to join the programme concerned. The exchange covers both the material developed by the IARCs and that developed by the participating countries. However, outside the context of programmes of this kind, it may be difficult to obtain general acceptance of the principle of free availability of advanced breeding material.

32. Whether or not restrictions on the availability of plant genetic resources are more widespread than has so far become apparent, the fact remains that there has been no general commitment on the part of governments or relevant institutions to apply the principle of free exchange and to ensure that this principle is adequately reflected in basic legal texts.

33. Similarly, the Conference in Resolution 6/81 noted both the ongoing activities with respect to plant genetic resources, and the absence of any international commitment in this context. It requested studies on the elements of a convention and on the establishment of a bank for such resources, considering "that there is no international agreement for ensuring the conservation, maintenance and free exchange of the genetic resources of agricultural interest contained in existing germplasm banks".

34. With respect to the international bank for plant genetic resources, the Committee on Agriculture (para. 231 of document CL 83/9) suggested that the bank "should be considered as an international concept and not a single physical entity; it could be formed of a network of storage facilities." COAG also considered (para. 227) that account should be taken of ongoing activities. In addition, emphasis was placed (para. 233) on the predominant need to strengthen the national capabilities of developing countries in plant genetic resources, plant breeding and seed multiplication.

35. In the light of the discussions of the Committee on Agriculture, the remaining paragraphs of this Section outline an international system which would reflect the principles and meet the requirements underlying the Conference's Resolution. They essentially indicate the specific activities that should be carried out, the way in which those activities could be coordinated and the commitments that would be necessary to guarantee the effective operation of the system.

Activities relating to Plant Genetic Resources

Priority for exploration and collection

36. In the face of the magnitude of the task of exploring and making available all valuable or potentially valuable plant genetic resources, the approach can only be progressive, and depends on worldwide scientific collaboration in many disciplines. An international system relating to those resources has therefore to be based on priorities by plant species and geographical areas taking into account the achievements made so far. The IBPGR, in collaboration with FAO, has developed such priorities for international action, which will need to be updated in the course of future developments. The need for major food crops, the threat to genetic resources in particular geographical areas and the size of the genetic base of present plant breeding are among the important criteria used.

37. The world expertise of scientific knowledge has to be mobilized, on a crop-by-crop basis supported by cytogenetics, phytogeography and taxonomy, to orient and update priorities for plant genetic exploration and collection. Further eco-geographical surveys will be needed in some major centres of crop diversity so that more activities can be planned. Scientifically established priorities should be subject to periodical intergovernmental review to ensure government acceptance and commitment.

The conservation of plant genetic resources

38. There are basically two ways of conserving plant genetic resources: one is by leaving them in their natural habitat (in situ conservation). This allows a natural evolution of the plants without any intervention from man. The other way is by the (ex situ) conservation of plants or parts of plants (for example, seeds, seedlings, trees, tissues or organs) outside their natural habitat.

39. For in situ conservation, the establishment of nature reserves is of utmost importance. Within an international system the development of such reserves in relation to plant genetic resources should be pursued in close collaboration with UNEP and the International Union for the Conservation of Nature (IUCN).

40. Ex situ conservation takes the form of living collections of plants, or gene banks holding tissue cultures of vegetatively reproduced plants or seed of many categories of sexually reproduced plants. A gene bank, depending on its purpose, comprises "base collections" or "active collections", or preferably both.

41. Base collections hold samples of plant genetic resources for long-term storage. In the case of seed, the samples must be kept at a temperature of approximately 20°C below zero in air-tight containers that are normally only opened when tests of the continued viability of the seed are necessary (at an average of about ten-yearly intervals, depending upon the type of plant). A reliable continuous supply of electricity is an essential requirement for guaranteeing the quality of the samples.

42. Many food crops can only be vegetatively propagated. They include root and tuber crops, such as cassava, potato, sweet potato, taro, yam and cocoyam, and also the herbaceous and woody perennials such as banana, cocoa, date palm and breadfruit. They are often important sources of food and are widely grown in developing countries. The techniques for conserving such material, for example through tissue cultures and low temperature storage, are relatively new and are demanding in resources (especially skilled labour).

43. International action should concentrate primarily on base collections: In those collections, the treasure of genetic variability of many crop plants should be maintained for the future in cases where in situ conservation is not possible. The deterioration or destruction of base collections would mean the extinction of invaluable genetic resources, which could never be recovered in many cases. Moreover, for both seed and vegetatively propagated plants, international recognition of base collections should be restricted to those containing the most comprehensive collections of one or several crops, and are thus capable of replacing any material that is lost or is no longer maintained in active collections.

The maintenance of plant genetic resources

44. The maintenance of plant genetic resources requires careful handling to avoid losses in viability, genetic shifts or changes, reduction of a given sample below a minimum size and contamination or even loss through pests and diseases. In the case of seed conservation, the minimization of seed moisture is a prerequisite to maintaining viability. Another requirement is constant storage conditions.

45. A particularly demanding task for base collections is the rejuvenation of the samples. This is determined by their physiological characteristics, by the need for periodic checking, or by the reduction of the samples to the minimum amount needed, as a result of requests for the material where it cannot readily be obtained elsewhere.

46. The maintenance of vegetatively propagated material is even more demanding. Material which has to be grown in the field is subject to the vagaries of weather conditions and, even more important, to infection or infestation. There are many ways of minimizing these risks, but there is always a danger of failure. Tissue culture propagation and maintenance, where possible, reduces the risks as there is the possibility of cleaning infected plants or even putting their storage under completely controlled conditions. However, the maintenance of base collections in the form of tissue culture requires well-designed special laboratories and well-developed logistics. For medium-term storage, shoots might need to be transferred to fresh culture media only once a year. For long-term storage, cryopreservation is necessary. This method has so far been developed only for a few plant species. Cryopreservation can be applied for the long-term storage of cell cultures, which will become of increasing importance to genetic resources with the progress made in genetic engineering.

The documentation and evaluation of plant genetic resources

47. An essential component of conservation activities (without which efforts would be almost purposeless) is the preparation and dissemination of information enabling the retrieval of material kept in a collection. For all plant genetic resources, information starts with the observations made at the point of collection and the taxonomic identification of the material. But only the further evaluation of the material for cytogenetic, agronomic and breeding characteristics, for resistance to particular diseases and for quality characteristics will provide the information which is of essential interest to plant breeders. Ideally a genetic "passport" is established, containing information on particular genes and gene combinations.

48. The preparation and assembly of such information is the most extensive task in all genetic resource activities and has begun only in a limited way. It can be done only through the well-organized collaboration between gene banks and a number of specialized institutions and groups of scientists, often going well beyond national boundaries.

49. The systematic collection of such information requires internationally agreed systems of "descriptors" in order to facilitate information exchange and retrieval.

50. Each base collection should be the focal point for the systematic collection of information on the plant genetic resources for which it is responsible, and for the constant updating and accumulation of information, received from various sources, that results from the evaluation of material, where this takes place.

Security precautions

51. The introduction of plant genetic resources into gene banks presents a risk of plant pests and diseases. This is especially true where, in the various exploration missions, material is collected from the field and taken for storage, and also where material is transferred from one ecological zone to another. Stringent quarantine rules (including the periodic checking of material in storage) must therefore be followed to prevent contamination and the creation of a breeding ground for diseases and pests. A sufficiently equipped seed pathology laboratory for the inspection and treatment of plant material is a minimum requirement for a gene bank, in addition to its active cooperation with the plant quarantine authorities of the country of its location.

52. Account must also be taken of the possible loss of material through natural or man-made disasters. The material in base collections should therefore be duplicated or, if possible, triplicated in base collections located elsewhere.

The use of plant genetic resources

53. The maintenance of gene banks responding to the requirements set out above will ensure that plant genetic resources are preserved and are available for use. However, unless a country has well-qualified plant breeders, the great potential of the material conserved will be wasted. It is therefore vital that national capabilities in plant breeding be developed hand in hand with other activities relating to plant genetic resources, so as to ensure that a country may derive the maximum benefit from the resources available on its territory and elsewhere.

International Network of Base Collections

The conservation of material

54. A central component of a global system for the collection, preservation and exchange of plant genetic resources would be an internationally coordinated network of base collections. Each collection should be responsible for the maintenance of particular crops, account being taken of the need for some duplication (see para. 52 above). The activities of the network should be carried out in accordance with internationally agreed scientific and technical standards. The network should evolve in line with priorities accepted at the international level. The priorities relating to major food crops should be considered first.

55. Each base collection should be linked with an active collection, which would arrange for the exchange of material and organize the rejuvenation (see para. 45 above) of the material for which the base collection is responsible.

The coordination and distribution of information

56. As the exchange and utilization of plant genetic resources depends to a large extent on the availability of information concerning their characteristics (see para. 47 above), this information should be collected and distributed by each base collection in the network. The base collections should also be the focal point for the accumulation and dissemination of information generated in the evaluation of the resources. The information

available to the base collections should be linked to a global information system operated at the international level.

57. Other sources of information and information systems on plant genetic resources established at the national or international level, outside the ambit of the base collections, should be interlinked with the global system, where feasible.

Legal and institutional requirements

58. The various activities of the network - the designation of its components, the operations of the latter and agreement on international standards and priorities - would need to be carried out within a firm legal and institutional framework.

59. In the first place, a State or institution which agrees to participate in the international network should enter into binding commitments. Such a legal guarantee is necessary since the base collection operated by the State or institution would be a component of a structure on which the international community would rely for the fulfillment of the present and future needs with respect to plant genetic resources.

60. The State or institution should agree to maintain the base collection, in accordance with internationally agreed standards. It should also agree that, while the base collection would continue to serve the purposes for which it was established, its activities would also be oriented to the fulfillment of the needs of the international community, including the supply of samples for the purpose of plant breeding or scientific research. Finally, the State or institution should guarantee that it will maintain the base collection on a permanent basis, providing the necessary funds and facilities or, if at any time it finds it is unable to do so, that it will give the international community sufficient notice to enable the material in the base collection to be transferred elsewhere.

61. The preservation of plant genetic resources, for the present and the future, would depend upon a constant source of funding. There should be a mechanism for a guarantee in this respect if the international community is to have any security concerning the permanence of the network and the material kept in it.

62. The international network would also require procedures for coordinating the activities of the various components, for establishing the standards and priorities and for reaching agreement on the specific crops that would be covered by each base collection. Procedures would be needed to enable the operations of the network to be monitored and for recommendations to be made to its components. There should also be an international forum in which the coordination of the system and its progress, including problems encountered, could be discussed.

63. A fundamental principle of the network would be that the material in the base collections, if it is not readily obtainable elsewhere, should be made freely available for use in plant breeding or scientific or technical research. Ideally, such material should be held, by the State or institution concerned, at the disposal of the international community. This would give full application to the principle that plant genetic resources are the common heritage of mankind.

International Cooperation

64. An international system covering the various activities outlined above, based on the principle of the full availability of plant genetic resources, and having as a central component a network of base collections, would require the interacting cooperation of the scientific community and the community of nations. In addition, the emphasis of international cooperation should be on ensuring that all nations are in a position to exploit the benefits of plant genetic resources.

Scientific cooperation

65. As indicated above a comprehensive system for plant genetic resource activities would need to evolve on many fronts: exploration and collection, conservation and maintenance, evaluation and documentation, security precautions and, finally, the full utilization of

the resources in plant breeding programmes. As many of the activities are of a scientific nature, their success depends upon the work and guidance of scientists and scientific institutions.

66. Reliance must therefore be placed on the scientific community, at the national and international levels, to recommend priorities and organize exploration and collection missions, to develop scientific and technical standards, including those for documentation, and to provide the necessary advice concerning the designation of the components of the network of base collections, and on the activities and development of the network. There should be strong links between the base collections and the scientific networks engaged in the evaluation of plant genetic resources, so that in time the required information to characterize the resources in base collections will be available for utilization by plant breeders.

Intergovernmental cooperation

67. As has been seen above, an international system for the collection, conservation, maintenance and free availability of plant genetic resources would cover a whole range of activities, demanding substantial inputs. If any government is to adopt a policy under which it will use the financial and other resources available to take part in such a system, in the interest of the international community as a whole, it would be realistic for it to require a guarantee that other governments and prepared to assume the same responsibilities. A similar guarantee might be required in return for the free availability of the plant genetic resources under a government's jurisdiction or control.

68. A country with scarce financial resources assuming responsibilities with respect to plant genetic resources, for the benefit of the international community, would also expect some guarantee of support from that community in funds, technology and equipment.

69. The basis of international cooperation should therefore be a commitment, reflected in a legal instrument or instruments, by each State or relevant international institution to participate in, or support, the international network, and the various other activities carried out at the international level, within the limits of its capabilities.

70. At the same time, this commitment should be matched by the involvement of governments in the general operation of the network and the coordination of the other activities. It should be noted that international cooperation would, to a large extent, particularly in the case of developing countries, depend upon activities carried out by governments and on the financial and other resources that they are prepared to make available for that purpose. Governments should be placed in the position of full participants in an international system for the exploration, preservation and exchange of plant genetic resources.

71. There should therefore be an intergovernmental forum through which governments could collectively exercise their responsibilities with respect to plant genetic resources, including the review of scientific and technical progress, the final approval of the standards and priorities developed on scientific and technical considerations, and the mobilization of financial and other support for plant genetic resource activities.

Strengthening of national capabilities concerning plant genetic resources

72. As has been seen, most of the land races and wild relatives of cultivated crop species are found in the less developed countries where agricultural progress has been slow. These countries should, if they receive the necessary assistance, play an important role in the international network outlined above. They are, moreover, generally countries that are in serious need of expertise and equipment in order to enable them to exploit the broad range of genetic variations that exist on their territory and those that are available elsewhere.

73. Intergovernmental cooperation and support from intergovernmental organizations and financing agencies should ensure increased assistance to developing countries, to strengthen or establish their plant breeding and seed production capabilities, their expertise in exploration and evaluation work, with the related training, and the establishment of gene banks for their plant breeding programmes, in the first instance, and for their participation in the network of base collections.

III. DRAFT INTERNATIONAL AGREEMENT

Purpose of the Agreement

74. The agreement would essentially be the legal basis of the international system, outlined in paragraphs 54 to 73 of the preceding Section. It would develop the general principle that plant genetic resources are the heritage of mankind and that they should be preserved and made available without restriction, into a set of more specific principles covering the commitments and role of governments and relevant institutions with respect to plant genetic resources.

75. It should be noted that there are already multilateral and bilateral agreements that are relevant to plant genetic resources. Many of them have been concluded under the auspices of the United Nations, or organizations in the UN system, in particular UNEP and Unesco. In this connection, mention might be made of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973, the African Convention on the Conservation of Nature and Natural Resources, 1968, the Convention on the Conservation of Nature in the South Pacific, 1976, the Treaty for Amazonian Co-operation, 1978, and - with respect to plant genetic resources in marine areas - the recent Protocol concerning Mediterranean Specially Protected Areas, 1982, to the Convention for the Protection of the Mediterranean Sea against Pollution.

76. However, the scope of these agreements is essentially restricted to the aspect of preservation as far as plant genetic resources are concerned. The draft agreement proposed in this Report would cover all aspects, and its emphasis would be on the essential objective of plant genetic resources, namely plant breeding.

Form of the Agreement

77. At its Seventh Session, the Committee on Agriculture agreed (para. 227 of its Report - document CL 83/9) that "in the spirit of Conference Resolution 6/81 further discussions on the question of a proposed convention must relate to the drafting of elements which would meet and respect the concerns of the majority of governments both members and non-members of FAO, so that the convention would be truly universal". The consensus of the discussions was that further study should be given to a convention or other form of international agreement.

78. In considering the form of the instrument that would embody the principles in the agreement, account has been taken of the need for the wide acceptability and rapid entry into effect of the principles and, at the same time, for an instrument that would establish specific commitments. The basic alternatives in this respect are outlined below.

79. In the first place, the principles could be incorporated in an international convention or agreement in the strict sense. The essential advantage of this solution is that, after its entry into force, the instrument would be legally binding on the States that had accepted it. One of the main disadvantages is the time that would be needed to bring the instrument into force for a significant number of States. The first step would be the adoption of the instrument: this could take the form of approval of the text by the FAO Conference, if the instrument was to be adopted within the framework of FAO in accordance with Article XIV of the Constitution; or the instrument could be adopted by a plenipotentiary conference consisting of interested governments. After adoption, the instrument would be transmitted to States for their consideration with a view to acceptance. This acceptance normally takes the form of ratification (by governments that have signed the instrument) or accession. The process of acceptance may take a long time especially as, in many countries, the approval of the national Parliaments would be required. The convention or agreement would not enter into force until the number of States specified in its provisions had deposited instruments of ratification or accession, and it would not be binding on any State which did not deposit such an instrument.

80. Another factor to be considered is that the convention or agreement would lay down binding obligations for the parties. This could be a disadvantage if the instrument is to achieve the widest possible acceptability. States may have difficulties in joining in a consensus on the text of a legally binding instrument and in committing themselves to [illegible] of its provisions.

81. Another alternative would be an instrument on the lines of the International Undertaking on World Food Security, adopted by the FAO governing bodies in 1974. Such an instrument would have a strong moral force, rather than a legally binding character. It could be adopted in a resolution of the FAO Conference, which could invite governments to notify FAO of their agreement with its provisions. Apart from the fact that the procedures involved would be considerably quicker, this solution has, to a lesser degree, the advantages and disadvantages of a convention or agreement. States, especially those which had notified their agreement to the Undertaking, would be making commitments similar to those of a convention, the main difference being that they would not be bound by those commitments as a matter of law.

82. Finally, the principles could be incorporated in a more general instrument, such as a Code of Conduct, which again could form part of a Conference resolution. The Code of Conduct would reflect an international consensus on the principles. Moreover, governments could be invited in the Code to report to FAO on the measures that they have taken or intend to take to give effect to its provisions.

83. The alternative of a draft International Undertaking on Plant Genetic Resources would appear to be the most appropriate solution. Unlike a convention, it could be adhered to by relevant international institutions, in addition to governments. It would represent a strong formal commitment (rather than a set of agreed principles in a Code of Conduct), without having the legally binding character of a convention, which could be an obstacle to acceptance and would certainly entail a delay in its entry into effect for a significant number of governments.

Content of the Agreement

84. The text of a draft resolution containing an International Undertaking, which would be open to adherence by governments, as well as by autonomous international institutions engaged in plant genetic resource activities, is set out in Appendix A hereto. The draft Undertaking begins with a general part (Part I), defining the coverage of the Undertaking and setting out the responsibilities of governments and institutions, essentially at the national level, with respect to the various plant genetic resource activities outlined in paragraphs 36 to 53 above.

85. Part II relates to international cooperation, and provides an outline of the arrangements for an international network of base collections, including an international information system, referred to in paragraphs 56 and 57 above. It would be built on the existing arrangements, in the manner that is proposed below in Section V. Within the network, there would be an international gene bank, under the auspices of FAO, consisting of the base collections that participating governments or institutions had agreed to place at FAO's disposal.

86. Part III stresses the importance of phytosanitary measures in the context of plant genetic resources. It also contains provision for adhering governments and institutions to provide FAO with reports on progress in the implementation of the principles of the Undertaking.

87. It is believed that the general principles in the Undertaking would be largely acceptable to all governments and international institutions. There may, however, be details (such as the principle of availability of all categories of plant genetic resources - see para. 31 above) on which it may not be possible to achieve universal acceptance. For this reason, the second operative paragraph of the Resolution makes it clear that governments and institutions would be able to adhere to the Undertaking subject to any limitations that they may specify.

IV. REVIEW OF EXISTING ARRANGEMENTS

Historical Development

88. The major developments leading to the present arrangements for global plant genetic resource activities are summarized in paragraphs 3 to 7 of the document presented to the Committee on Agriculture (COAG/83/10).

Existing Collections of Plant Genetic Resources

89. Appendix 7 of document COAG/83/10 gives a list of the major collections of plant genetic resources, and indicates the crops covered by each of them. A vast number of collected plant genetic resources (referred to as "accessions") are distributed among 90 countries. Many of the collections are active collections, maintained by plant breeding institutions for use in current breeding programmes. The crops most frequently included in global programmes are cereals and food legumes (see document COAG/83/10, Appendices 4 and 7). This indicates the importance that has been given to these staple food crops, to the preservation of their variability and to the amount of breeding work for their improvement.

90. A total of more than 293 000 accessions of cereal crops are held in three countries: the Soviet Union (106 000 accessions covering wheat, barley, sorghum and millet); the United States of America (124 000 accessions covering wheat, maize, barley and rice); and the Philippines (with 63 000 accessions of rice). Various other institutions (in particular, in Australia, Canada, China, Iran, Israel and Italy) hold appreciable amounts of wheat and barley collections (more than 19 000 accessions each). Most of the major collections of food legumes (totalling about 125 000 accessions) are found in China, Colombia, India, the Soviet Union, Syria, and the United States of America.

91. These figures should, however, be treated as indicative only, for the following reasons: In the first place, there has been no full assessment of the genetic variation represented by the accessions. In addition, a small collection of well-evaluated samples may be more significant than a larger collection of an institution that has not yet fully documented and evaluated the material it holds (see para. 17 above). Furthermore, the information available shows, for example, that of some 30 000 lines of wheat held at the Germplasm Institute in Bari, Italy, and the 37 000 at Beltsville, USA, 21 000 are common to both institutions. If one takes account of the extensive exchange of material between all the major institutions, one must conclude that duplication at the global level is far greater than that necessary for security (see para. 52 above).

92. Although global documentation is at present insufficient to give an accurate picture of the contents of the collections, it would seem, from an analysis carried out by the IBPGR, that land races make up the greater part of accessions in the global collections. The remaining part comprises breeders' material or plant varieties, and a few samples of wild species. There are also indications that the genetic variation in the collections is inadequate.

93. The conditions under which seed is stored in the various institutions are relatively good. There would, however, seem to be room for improvement with respect to the rejuvenation of material.

International Activities

94. International activities relating to all the various aspects of plant genetic resources are mainly carried out by the IBPGR (in collaboration with FAO), with respect to the resources of crops, and by FAO with respect to forest resources.

Activities of the IBPGR

95. The basic function of the International Board for Plant Genetic Resources (IBPGR) is to promote and support the collection, conservation, documentation, evaluation, utilization and exchange of plant genetic resources, at the global level, in order to ensure the sustained supply of useful material for national and international breeding programmes. The [illegible] of the IBPGR to date are summarized below.

96. Priorities for action. The first few years of operation of the Board were mainly devoted to the rescue of threatened germ plasm, on the basis of well-defined criteria in relation to crops and geographical areas, that were drawn up having regard to the urgent needs as highlighted by FAO. For this purpose, expert advice was obtained from the Board's advisory committees and working groups and individual specialists, and a large IBPGR field programme was developed. Emphasis was placed on major staple food crops. Since 1980, action has been taken to cover other crops, including major vegetatively propagated plants. There are now 50 priority crops, with respect to collection and conservation, in the 14 regions into which countries are grouped for the purposes of the IBPGR system. The crops include staple food crops and other species of worldwide or regional economic importance.

97. Collecting missions. The Board carries out, organizes or supports about 65 collecting missions each year. In general, the missions are headed by a scientist from the host country; samples of the material collected are always deposited with the host country, and local expertise is used. The missions are carried out in accordance with proposals to which the governments or government institutions concerned have previously agreed. More than 100 000 seed samples of priority species have been collected in the 250 missions carried out over the last few years. The cost of collecting one sample varies considerably: it may be as low as US$10 or as high as US$300. The IBPGR, which does not itself maintain collections, makes arrangements before the mission for the conservation of the collected material, under the most suitable scientific and technical conditions.

98. Conservation. The most important achievement of the IBPGR has been the promotion of a global network of base collections. This aspect is dealt with in more detail in paragraphs 101 to 104 below.

99. Documentation. The IBPGR has, in particular, prepared "descriptor lists", setting out the botanical characteristics of material, for 37 crops. Forty-five more lists are under preparation. It has a two-pronged approach to documentation: the preparation of directories providing information on existing collections and the establishment of data bases, and the mobilization of funds for documentation work. The directories for 1980 to 1983 cover rice, wheat, barley, sorghum, millet, maize, food legumes, root crops, some cash crops and vegetables. Information on fruit is at an advanced stage of preparation. The data will be kept under review and computerized. Detailed inventories on a crop-by-crop worldwide basis are being developed by specialized institutes and coordinated through the IBPGR. The emphasis of the data bases being developed by the IBPGR is on information enabling the comprehensiveness of existing collections to be assessed.

100. Training. Training under the auspices of the IBPGR is available on all major aspects of genetic resource activities. About 160 trainees have attended a one-year post-graduate course, initiated in 1969 at the suggestion of FAO, on the conservation and use of plant genetic resources, at the University of Birmingham in the United Kingdom. The courses have received financial support from the IBPGR and the United Nations Environment Programme, during the past eight years. Five hundred trainees from developing countries have attended short technical courses, at a number of agricultural research institutes, on various subjects, including exploration techniques and seed technology for gene banks. Study tours have been arranged for about 100 scientists from different parts of the world. In addition, the Board has organized or co-sponsored regional workshops and technical conferences.

The IBPGR conservation network

101. With the cooperation of the institutions maintaining collections of plant genetic resources, the IBPGR has promoted a network of base collections. It has at present designated 38 institutions in 29 countries to hold collections covering 33 crops (see document COAG/83/10, Appendix 4). The institutions bear the cost of operating the base collections, and release material to centres holding active collections, for the purpose of exchange. Repositories for the resources of vegetatively propagated crops have, since 1981, been designated by the IBPGR for certain crops.

102. As has previously been explained, base collections are intended essentially for the long-term storage of resources, and thus for their preservation rather than their exchange, for plant breeding and similar purposes. It is planned to expand the IBPGR network to cover 100 centres, two thirds of which would hold active collections.

103. An examination of information concerning important crop resources held in collections, including those of the major staple cereals, legumes, vegetables, annual oil seeds, root crops, banana and plaintain, has shown that, in addition to the gene banks in the IBPGR conservation network, significant collections exist in 100 countries.

104. The centres holding these collections are distributed over seven regions: 26 in Europe, 23 in Africa, 19 in Latin America, 14 in Asia and the Far East, 12 in North Africa and the Near East, 3 in the Pacific, and 2 in North America. Seventy-seven are in developing countries, several of which (for example, Brazil, China, India and Peru) have a relatively large number of accessions covering various kinds of crops. However, 15 of the 100 countries do not yet have an adequate gene bank.

Activities relating to Forest Resources

105. For more than 15 years, FAO has been coordinating the activities of national institutes, supporting ongoing work relating to forest resources, and highlighting global, regional and national priorities. The seed and other propagating material collected by countries under this global seed programme is temporarily stored, if possible, in the country of collection. The centre holding the material then distributes it, in accordance with requests by FAO, for the purpose of evaluation, conservation and seed production or selection stands of species of value to the region, country or area concerned.

106. For conservation, the seed is rarely put into long-term storage; the emphasis has been on living collections in situ or ex situ. Genetic improvement work is always performed with respect to populations of plants that are specially created for that purpose, leaving the wild species with maximum variation. Collection, exploration and evaluation work is left to the countries themselves; this maximizes local interest and knowledge in the resources.

107. The programme benefits from advice provided by an FAO Panel of Experts on Forest Gene Resources (consisting of specialists acting in a personal capacity), established in 1968.

Problems of a Scientific and Technical Nature

108. A major constraint on the establishment of collections of seed and other plant genetic resources in developing countries is their inadequate infrastructure for the maintenance and use of those resources. In many national gene banks, inadequate seed storage facilities and the lack of land and skilled labour place severe limitations on the number of samples in a collection and on the frequency of rejuvenation of the material conserved. Equipment for the maintenance of an acceptable level of hygiene is also lacking. Facilities for the collection of resources in remote areas (such as vehicles, camping equipment and field instruments) are not always available. Essential activities, such as the collection and multiplication of genetic resources, are often in jeopardy due to insufficient funds. Of these constraints, the inadequacy or lack of storage facilities would seem to be the most serious. The provision of such equipment involves large inputs in terms of installation and maintenance costs. The amount of material to be stored, its safety, and the frequency of rejuvenation and the flow of samples for evaluation and exchange are dependent on the quality and size of the storage facilities available. Equipment to maintain a miniature plant quarantine system is also needed, especially as, in many developing countries, the national quarantine programmes are not sufficiently developed.

109. The lack of funds and qualified plant breeders also place serious constraints on the creation of essential links between gene banks and breeding programmes. Breeders frequently do not make use of primitive material. The general tendency is to take advantage of modern cultivars, often with less potential for plant breeding, since primitive lines, which usually represent a major part of the collections of gene banks, have no immediate value as varieties and are difficult to use in breeding work.

110. Cooperative links of the kind referred to depend upon the adequate evaluation of the material in gene banks. Progress in the characterization and evaluation of material has been slow in many national gene banks. This is due to the much greater priority that is often given to collection and conservation activities, and to the lack of funds and qualified personnel. The present cost of growing out one sample for characterization varies from about US$10 to 50, in the case of most food crops.

111. The non-availability of data, at least in a usable form, is a general problem. Whereas data are generated at all stages of genetic resource activities from collecting in the field to evaluation, their assembly and storage, and the retrieval procedures, are often insufficient to enable their use in the most efficient way. Moreover, especially in the case of the older existing gene banks the data may not have been properly gathered at the time of collection; material unaccompanied by data may have been obtained through exchange; and the greater part of the samples in the gene bank may not have been characterized and evaluated.

112. There also appear to be problems concerning the duplication of material in collections: there are indications not only of an excessive duplication, referred to in para. 91 above, but also of insufficient duplication of certain significant genetic resources.

113. Finally, a constraint on the achievement on maximum genetic variation is the tendency of many gene banks to restrict the material conserved to that which is of direct use to current breeding programmes.

Legal and Institutional Aspects of the IBPGR System

114. The following paragraphs of this Section examine how the present network, and the related activities, are coordinated, how far governments are involved in such activities at the international level; the extent to which those activities are the subject of a commitment; and how the activities are financed.

The components of the network

115. The IBPGR network consists, on the one hand, of national and regional institutions and, on the other, of the international agricultural research centres (IARCs) in the system of the Consultative Group on International Agricultural Research (CGIAR).

National and regional institutions

116. These institutions, or the governments responsible for them, have retained full autonomy with respect to plant genetic resource activities. Decisions as to the mandate of the institutions, including the crops that they will cover and their policy concerning the release of material, and to the standards to be observed in the performance of their mandate, thus rest with the governments or institutions concerned.

The CGIAR system

117. The CGIAR has been described (in the Report of the Second Review of the CGIAR, 1981, para. 3.10) as "an informal association of countries, international organizations and private institutions with a common understanding that they will consult and agree on ways in which they will support international agricultural research". It was initiated in 1971 under the co-sponsorship of FAO, the World Bank and the United Nations Development Programme (UNDP). Apart from the sponsors, the members are in two categories: the donors, and representatives of developing Member Nations of FAO elected biennially by the countries in the five FAO regions concerned. The CGIAR has no constitution, no legal personality and no rules of procedure. Decisions are taken by consensus. The basic objective of the CGIAR is to support international agricultural research for the improvement of food production in developing countries. In addition to the Secretariat, provided by the World Bank, the CGIAR has a Technical Advisory Committee (TAC), which inter alia advises the CGIAR on the main gaps and priorities in agricultural research related to the problems of developing countries. TAC consists of a chairman and 12 members, appointed by the co-sponsors and serving in their personal capacity, half of whom are from developing countries. The Secretariat of TAC is provided by FAO.

118. The donor members of the CGIAR provide financial support to 13 international institutions, many of which have been established to carry out multidisciplinary agricultural research. For convenience, they are all (apart from the IBPGR - see below) referred to here as the International Agricultural Research Centres. Plant genetic resources is one of the aspects of the work of nine of the IARCs; six of them hold base collections of such resources and three are establishing them. The IARCs have legal personality, either as internationally-oriented institutions incorporated under a national law or (in one case) as an intergovernmental organization. The IARCs are autonomous, working (except in the case of the intergovernmental organization) under the overall direction and supervision of a Board of Trustees, whose members act in a personal capacity. In the case of many of the institutions, some of the members of the Boards are designated by the CGIAR.

119. The IBPGR is also an institution in the CGIAR system. It was established in 1974, on the recommendation of the CGIAR, as an autonomous international, philanthropic, non-profit organization. The IBPGR does not have legal personality. The only legal instrument relevant to its establishment is a letter of agreement concluded between FAO and donor members of the CGIAR to set up a trust fund to finance the IBPGR's activities. The text of this agreement is reproduced in Appendix B hereto. The IBPGR is managed by its 15 members, serving in their personal capacity, of whom not less than half are to be nationals of developing countries. Thirteen members are elected by the CGIAR, on the recommendation of the IBPGR. FAO and the United Nations Environment Programme (UNEP) each appoint one ex-officio non-voting member. The Executive Secretary of IBPGR also acts as an ex-officio member. The Chairman of the IBPGR is elected by the Board in consultation with the Director-General of FAO. The IBPGR has an Executive Committee, with power to act on behalf of the Board, comprising the Chairman, Vice-Chairman and three other elected members. The member designated by FAO and the Executive Secretary (an FAO official) also participate. Two of the members are to be from developing countries. FAO provides the Executive Secretariat. The IBPGR has set up a number of advisory committees and working groups, whose members serve in a personal capacity.

120. The Board has, with the approval of the CGIAR, adopted terms of reference. The most recent version is reproduced in Appendix C hereto. However, the IBPGR's main function, described above, concerning the promotion of coordination of the international conservation network, is not immediately apparent from that version.

The decision-making process with respect to IBPGR activities

121. In establishing its global priorities for action, including the choice of priority crops and geographical areas (see para. 36 above), the IBPGR seeks the opinions of experts of international repute. These priorities are regarded as flexible guidelines for action and are revised from time to time. For the establishment of priorities at the regional nd national levels, the IBPGR organizes international consultations, at which it invites the participants to report on progress with respect to plant genetic resource activities and to inform it of the needs of the countries concerned.

122. The proposed programmes of the IBPGR are presented annually to the TAC for analysis. They are then considered by the CGIAR, whose members may make comments or suggest changes and approve the budget for the IBPGR. Reports on the IBPGR's activities are received by FAO as a member of the CGIAR, and reports on regional activities are submitted to the governments concerned through FAO. Moreover, FAO's Sub-Programme 2.1.2.1.(Genetic Resources), which covers activities performed in the context of the IBPGR, is reviewed, with respect to its implementation and future planning, by the relevant FAO governing bodies - COAG, the Programme Committee, the Council and the Conference.

123. With respect to the funding of activities by the IBPGR, decisions are taken by the Board itself and, within the limit of US$75 thousand, by its Executive Committee. The Executive Secretary may also take decisions on funding within the Programme approved by the Board up to an amount of US$10 thousand.

The involvement of governments in international activities

124. As has been seen, the IBPGR is managed by experts acting in their personal capacity. Its programme is presented through TAC, whose members also act in their personal capacity, to the CGIAR, which is in essence an informal association, although representatives of

States and intergovernmental organizations take part in its discussions. There is a further intergovernmental element in that FAO is represented in the IBPGR and provides the Secretariat of the IBPGR and the TAC. The day-to-day work of the IBPGR is therefore carried out by FAO officials. Because of the links between the activities of FAO and the IBPGR, the activities of the latter in effect come to some extent within the scope of the review by the FAO governing bodies.

125. At the regional and sub-regional levels, there has been an increasing governmental involvement in the coordination of plant genetic resource activities, which had previously been largely dependent on the initiatives of scientific institutions. In 1976, a Working Group, consisting of representatives of governments in the Southeast Asia Region and sponsored by the IBPGR, adopted a proposed organizational framework for a Regional Cooperative Programme for the exploration, conservation, evaluation and documentation of plant genetic resources of significance to the region. The Programme was to be administered, under the auspices of IBPGR, by a Regional Committee representative of the participating countries. The Regional Committee held its first meeting in 1978, and has been an important forum for presenting to the IBPGR the views and priorities of governments in the Southeast Asia Region.

126. In Europe, on the suggestion of FAO and some countries in the Region, and with financial assistance from UNDP, a European Cooperative Programme was established in order to support and strengthen the inter-institutional cooperation, relating to plant genetic resource activities, that had been promoted by some governments and private organizations, in particular the European Association for Research on Plant Breeding (EUCARPIA), and individual scientists. The Programme is coordinated by a Governing Board, consisting of government representatives, which receives advice from a Scientific Advisory Committee, composed of experts in their personal capacity. Each participating government appoints a national coordinator to facilitate the day-to-day implementation of the Programme at the national level. The first two objectives of the Programme are to further the activities of national and sub-regional institutions for plant genetic resources in Europe, by supplementing and strengthening cooperation through the establishment of intergovernmental links, and to constitute the European part of the global network in the IBPGR system. The other objectives cover a wide range of plant genetic resource activities, including the furtherance of the exchange of material, both within Europe and between Europe and other regions.

127. Of the sub-regional initiatives of a governmental nature in Europe, mention might be made of the Nordic Gene Bank, established in 1979, and the network of genetic resources established by the countries of the Council for Mutual Economic Assistance (CMEA).

128. An organizational framework of the kind established for Southeast Asia and Europe was proposed last year at a meeting of Liaison Officers for the IBPGR Mediterranean Programme, and also at an IBPGR sponsored regional meeting, of government representatives, on plant genetic resources in the Andean Region. It should be noted, with respect to the international consultations referred to in paragraph 121 above, that the IBPGR in most cases invites governments to designate two participants, one of whom is to be the spokesman of the government. The IBPGR has also invited governments to appoint liaison officers to provide a link with the Board, as well as national coordinators with respect to IBPGR activities.

129. A form of global forum for the general discussion of plant genetic resource activities is also provided to some extent by international conferences, sponsored by FAO and the International Biological Programme of the International Council of Scientific Unions, and, for the last such conference in 1981, by FAO, UNEP and the IBPGR. These conferences are held at about six-yearly intervals.

Commitments relating to plant genetic resource activities

130. In Section III above, reference was made to conventions establishing national and collective commitments that are relevant to the subject matter of Resolution 6/81. The participation of States in the Southeast Asia and European Cooperative Programmes represents collective commitments corresponding to those envisaged in Resolution 6/81, but essentially do not entail individual commitments for the participating governments.

131. With respect to the IBPGR conservation network, the question arises as to how far the governments and institutions participating in it have entered into a binding commitment of the kind recommended in Section II (paras. 59 and 60 above). The practice has been for the Executive Secretary of the IBPGR to write a letter to a potential cooperating institution inviting it to accept designation for maintaining a specified base collection or collections. The relevant extract from a typical letter is reproduced in Appendix D hereto. The general substance of the letter corresponds to a great extent to the requirements stated in para. 60 above.

132. The wording of the letter could be improved, since it merely states that "The Board's policy...is to require the following commitments:...", and adds that "On this basis, the IBPGR invites the (institution) to accept designation". Nevertheless, the acceptance of a designation would probably be construed also as an implied acceptance of the commitments. To have a firm legal basis, however, a commitment should be established in an agreement between two (or more) legal persons. The IBPGR and, perhaps in some cases, the cooperating institution do not have legal personality.

133. A formal commitment to carry out certain activities in the interest of the international community is clearly important in the case of national cooperating institutions. This may also be true, to a certain extent, with respect to international institutions: in the report of the TAC quinquennial review of the IBPGR, 1980, it is stated (page 26): "The IARCs are independent bodies, each having generally a strong interest in assembling the germ plasm it needs for its own work but with no necessary commitment to (genetic resource conservation) activity beyond those limits." However, in a recent statement to FAO (of 1 July 1983), the Directors of the IARCs participating in the network "pledge their total support to the conservation and effective utilization of crop genetic resources".

Funding of plant genetic resource activities

134. As stated above, the IBPGR conservation network comprises national and regional institutions, and IARCs holding base collections. The financing of the former institutions is largely a matter for the governments concerned. The IARCs and the IBPGR mainly depend for their financial support on the CGIAR system. The CGIAR itself does not provide contributions; it approves its programme and the budget levels of the activities it supports. Each donor member annually pledges a specific amount (one member contributes on a pro rata basis of 25 percent of total contributions) for activities selected by it within the system. No more permanent commitment is made by donors. However, there would appear (from the Report of the Second Review of the CGIAR, November 1981, para. 3.7) to be an understanding that, on becoming a member of the Group, donors accept a long-term - but unquantified - responsibility in this respect.

135. In 1983, the CGIAR agreed to set up a stabilization mechanism in funding, for which, as a final step, the World Bank will make available the equivalent of 2.5 percent of total contributions by the CGIAR system. This would be in addition to the 10 percent of total contributions which the Bank is already providing and which can serve to fill any gaps in the support to the various IARCs.

136. As far as the planning of funding is concerned, the IARCs submit to the CGIAR through TAC an outline of their proposed budget for the two following years, as well as budget projections for an additional three years.

Conclusion

137. The essential characteristic of the present system for the coordination of international activities relating to plant genetic resources is its lack of institutionalization. It derives from the CGIAR, an association without legal personality or legal structure, though with intergovernmental participation. The coordination is promoted by the IBPGR, an entity without legal personality. The activities are performed by institutions which have retained the authority to decide on their programmes, although - in the case of the IARCs - an overall review is carried out by TAC and the CGIAR. Certain essential guarantees with respect to plant genetic resource activities in the IBPGR system are contained in a letter of commitment for which, however, there is no firm legal basis. Furthermore,

the IARCs depend, for their financial support, to a large extent on voluntary contributions from CGIAR donors, which do not make longer-term commitments in this respect.

138. The orientation of the activities is largely influenced by the advice of experts, who - while they are nationals of a broad range of countries - do not in most cases represent their governments. Although the IBPGR has encouraged links with governments, in the appointment of liaison officers, for example, as well as intergovernmental links, in the form of the regional organizational frameworks, those links cannot be considered part of a general institutional structure, particularly as there is no institutional apex.

139. Furthermore, there is no established mechanism for the global coordination of plant genetic resource activities. While the IBPGR's work in the promotion of coordination is of considerable value, the IBPGR has limited resources (about US$4 million annually) and many other responsibilities.

140. However, the informal and scientific approach of the IBPGR ensures that the orientation of activities, which mainly depends upon scientific considerations, is carried out with scientific professionalism. Moreover, the voluntary donations of the members of the CGIAR, and the decentralization of the various activities, have resulted in the mobilization of substantial financial support (the contribution in 1983 for plant genetic resource conservation amounted to about US$14.5 million) and in an expanding network of gene banks.

141. At the same time, the responsibility for ensuring that the needs relating to plant genetic resources are satisfied ultimately rests on governments, individually and collectively. This does not necessarily mean that all activities must be carried out under their direction and control. For the fulfillment of their responsibility, they can rely on initiatives outside their direct control provided that they are satisfied that the activities fully respond to present and future needs. However, reliance cannot reasonably be placed on a system, however effective, if it offers no firm guarantee of permanence. At present, there is no such guarantee, either on the part of the CGIAR system as a whole or on the part of its individual components.

142. In addition, the IBPGR system has been criticized by some countries as working unfairly with respect to developing countries: reference has been made to a significant concentration of plant genetic resources in the gene banks of industrialized countries; to an orientation of activities to resources of cultivars valuable to the agriculture and industry of industrialized countries, to the detriment of resources of great importance to developing countries, such as breeders' lines; and to a lack of guarantee concerning the free availability of resources.

143. While other countries hold an opposing view, the fact that such criticism has been made at least highlights an important lacuna in the present situation: namely, the absence - apart from some indirect influence that can be exerted through FAO - of an established mechanism, at least at the global level, through which States can collectively monitor plant genetic resource activities, and express their views and concerns.

V. MEASURES THAT COULD BE ADOPTED IN THE LIGHT OF THE BASIC PRINCIPLES, OBJECTIVES AND REQUIREMENTS

International Bank for Plant Genetic Resources

144. In line with Resolution 6/81, the starting point in the examination of possible measures to improve the present arrangements relating to plant genetic resources was a study of the feasibility of establishing an international bank for plant genetic resources of agricultural interest under the auspices of FAO. This study is contained in paragraphs 61 to 119 of the Proposal presented to the Committee on Agriculture (document COAG/83/10).

145. It was noted, however, that, for the establishment of such a bank, considered as a single physical entity, a number of difficult problems would have to be faced and that the cost involved in the construction and in the operation and (permanent) maintenance of the bank would be large, even if the capacity of the bank were reduced to a minimum. Indeed,

there was a consensus in the Committee on Agriculture that the indicative figures, given in the study with respect to the costs, were in all probability underestimated (see document CL 83/9, para. 229).

146. In the light of the above, a government has suggested that consideration could be given to the establishment of a pioneer gene bank under the auspices of FAO, which would make use of facilities and material that some governments would be prepared to offer. While it is not possible to estimate the cost involved for FAO in the absence of detailed information on the support and facilities that might be available from governments, solutions of this kind should be borne in mind, especially if it does not prove possible to realize the concept of the international gene bank, as suggested by the Committee on Agriculture.

147. As stated in paragraph 34 above, the suggestion of the Committee on Agriculture was that the international gene bank should be considered as an international concept, rather than as a single physical entity, and that account should be taken of relevant ongoing activities.

148. Paragraphs 54 to 63 of Section II have described an international network of base collections that could be established in line with Resolution 6/81. Section IV has examined the existing conservation network. It has been suggested by some governments that, in view of the discussions of COAG, an international network of base collections, founded on the present network, could be considered as constituting in practice an international gene bank. Further scientific and technical aspects of such a gene bank are discussed immediately below. The additional element in the Conference's Resolution - namely, an international gene bank that would operate under the auspices of FAO - is the subject of the subsequent paragraphs relating to legal and institutional aspects.

149. In view of the present state of development with respect to the exploration and conservation of plant genetic resources, the concept of the network should be an evolving one, starting from a realistic base and envisaging a minimum comprehensive coverage by a certain date.

150. The network would, subject to the agreement of the governments and institutions concerned, comprise the base collections that have already been designated by the IBPGR for 32 crops, or groups of crops, in 38 institutions situated in 29 countries. Additional collections are planned, account being taken of priorities developed by the IBPGR. These priorities would be reviewed and further developed, with the participation of governments, with the aim of establishing a comprehensive system for major crops, which would, in time, satisfy the main needs relating to plant breeding, conservation and geographical coverage.

151. Within the legal framework outlined below, the IBPGR would advise and be consulted on the further expansion of the network, through the designation of existing national or international institutions as base collections. As the coverage of the network evolved, it might be necessary to establish completely new facilities for base collections of particular crops. The national, regional or international authority that would be responsible for the administration of such collections would be decided by the participating governments.

152. The material in the base collections of the network, and the availability of that material, would in principle cover all categories of plant genetic resources. However, subject to the agreement of FAO in particular cases (see para. 167 below), qualifications of that principle would be possible.

153. As base collections must function as long-term depositories of world genetic resources, they should, as explained in paragraph 55 above, be linked with active collections. Most of the exchange of genetic resources would take place between the numerous active collections and plant breeding and other scientific institutions. Requests for material from the

base collections would be made only where active collections were not able to supply samples of it.

154. The financial implications of an international gene bank, established as a network of base collections can be estimated from various sources. The calculations of expenditure in Appendix 8 of document COAG 83/10 can be used as one source of reference. The views of administrators of gene banks, and estimates of expenditures provided by IARCs, indicate that actual costs are probably about 50 percent higher than the estimates in document COAG 83/10. Appendix E to this Report summarizes, as a second source of reference, the budget estimates provided by IARCs.

155. The most complete information on expenditures for a genetic resources centre has been given with respect to the International Rice Research Institute (IRRI), in which base collections are linked to active collections and have been systematically evaluated over the last ten years. IRRI's collection was initiated 20 years ago. It includes wild material as well as advanced breeding lines, with a total of 63 000 samples, and it is adjacent to experimental fields and laboratory facilities. The investment cost of the building has been US$4 million and the cost of other facilities, including a seed health unit, has been over US$1 million. The operational costs, including overheads, training and collecting, are in the order of US$1 million per annum. Further details are provided in Appendix F hereto.

156. IRRI's operational costs seem to be basically in agreement with those of other IARCs, as can be seen in Appendix E, which indicates that nine centres together spend an annual amount of US$10 million on plant genetic resource activities. Expenditures for the annual maintenance of small collections are much below the average in the Centro Internacional de Mejoramiento de Maís y Trigo (CIMMYT) (US$350 000), while for the Centro Internacional de la Papa (CIP) the annual operational costs of maintaining germ plasm of a vegetatively propagated crop (potato) are much higher (US$2.5 million). The maintenance of living plant collections generally results in higher expenditures per sample unit and are demanding on land and labour. It should be recalled that 3 000 coconut samples occupy 300 hectares in Java, an overpopulated island where the average holding is less than one hectare per family, entailing therefore a very high annual rent. In addition, the cost of maintaining a plantation healthy and clean, without any commercial return, has to be met.

157. Expenditures for the evaluation of plant genetic resources have to be considered in addition to the cost estimates provided for a genetic resources centre, which include expenditures only for the most basic evaluation of a descriptive nature. Considerable additional costs are involved, depending upon the crop to be evaluated, in the systematic screening of genetic resources for resistance to particular diseases, quality characteristics such as amino-acid composition of proteins and crossing ability, for example.

158. The establishment of an international gene bank as a network of base collections can be achieved only on the assumption that the present financing of the participating base collections, by the national or international agencies supporting them, would continue. Moreover, this financing should be based on commitments, even increased beyond the present level, so as to avoid any weakening of the base collections and their related genetic resources activities, and, if possible, to strengthen them.

Strengthening of National Capabilities

159. An important component of an international system covering plant genetic resource activities, would be action to assist countries with limited facilities in strengthening their capabilities with respect to such activities, both within and outside the context of the international network of base collections proposed above.

160. The difficulties outlined in paragraph 108 above, relating to the establishment and maintenance of gene banks, are only a few examples of the constraints facing many developing countries. However, international action should first concentrate on the strengthening of national plant breeding capabilities. Without such capabilities, the establishment of a national gene bank, and the international network of base collections, would be ineffective.

161. In this connexion technical cooperation - in addition to assistance by countries with advanced breeding techniques - is an important element. National capabilities can be

strengthened through cooperative links between developing countries, and between the latter and countries or institutions with advanced breeding programmes. In the first place, such links would be useful in order to distribute the work involved in the storage and rejuvenation of plant genetic resources, thus sharing the costs which might otherwise unduly burden the financial resources available for other activities at the national level. Encouragement should also be given to joint activities carried out by institutions conserving the same kinds of crops or experiencing similar problems. Such activities would reduce the costs for both institutions. Collaborative research work would be helpful in strengthening breeding programmes in countries with limited manpower and facilities, and would, at the same time, serve as a mechanism for the transfer of technology.

Legal and Institutional Aspects

162. The preceding paragraphs of this Section have suggested that an international bank for plant genetic resources could consist of an international network of base collections, built to the extent possible on the existing IBPGR conservation network, and that an international system, comprising the International Gene Bank, should provide other services, in particular those related to the strengthening of the capabilities of developing countries. The following paragraphs suggest possible measures, of a legal and institutional nature, that could be taken to improve the present system for the conservation network and related activities.

163. The main lacunae in the present system were identified, in Section IV, as the lack of a longer-term commitment concerning the operation and performance of the system, and the absence of any mechanism for significant governmental participation. One way of filling these lacunae would be the introduction into the CGIAR system of a greater degree of institutionalization and governmental participation. A solution of this kind was considered in the Second Review of the CGIAR, 1981, and the conclusion was, in effect, that it would run counter to the basic philosophy of the CGIAR. The following paragraphs explore an alternative solution, which would seem to be capable of satisfying the main concerns expressed by some countries, without essentially affecting the CGIAR/IBPGR system. Moreover, if significant changes in that system were later considered necessary, the solution outlined below would provide a procedure for giving the matter in-depth consideration.

An FAO legal framework

164. It is suggested that the present activities of the IBPGR would not be prejudiced, and would indeed be strengthened, if they were carried out within a legal framework under which FAO would take charge of the legal aspects of the conservation network and which would also enable States to exercise their collective responsibilities with respect to plant genetic resources.

The legal aspects of the IBPGR's activities

165. One such legal aspect covers agreements relating to assistance provided by the IBPGR to governments. In the Report of the TAC Quinquennial Review of the IBPGR, 1980, it was noted (para. 4.5.4) that the IBPGR's de facto association with FAO "has immeasurably aided the international activities of the Board". The agreements referred to could be placed on a firm legal basis, and the association with FAO would become clearer, if the agreements were concluded between the governments concerned and FAO. The substance of the agreements would not be affected. The latter would still relate to assistance that would be provided by FAO officials in the context of IBPGR.

166. As far as the conservation network is concerned, the most important activities having legal aspects are the designation by IBPGR of the components of the network, and the related commitments made by the latter. This designation could be made by FAO (after consultation with the IBPGR), and the commitments could be made to FAO. In connexion with the commitments, the main defect is that they are at present made to an institution that has no legal personality (see para. 132 above). The commitments would be placed on a firm legal basis if they were made in an agreement concluded between the institution concerned, or preferably (where applicable) the government or governments responsible for that institution, and FAO.

167. The first step would, therefore, be for FAO to invite governments and institutions that are at present participating in the IBPGR conservation network to continue their activities, within the legal framework referred to above, under an agreement with FAO, which would basically specify the crops that would be conserved by the government or institution, and set out the latter's commitments. If a government or institution were unable to accept all the commitments proposed by FAO, its reservations should be stated clearly, so that FAO could decide whether or not they were of such a nature as to preclude designation.

168. Under these arrangements, the material in the base collections would be held in the context of the international network, but would continue to be under the ownership and control of the governments or institutions concerned.

169. A further important step would be for FAO to invite governments or institutions that had accepted the commitments proposed, particularly those relating to the full availability of samples, to place the material in their collections at the disposal of FAO. They would continue to administer the collections, but would provide material that had been requested by FAO (requests would be limited to material that could not easily be obtained elsewhere), and would allow FAO access to the collections in order to ensure that they were being administered in accordance with internationally agreed standards. In these circumstances, such base collections could be considered as forming part of an International Gene Bank under the auspices of FAO, in line with Resolution 6/81. An offer to hold a base collection available in this way was made by Spain (see Appendix G) to the Committee on Agriculture at its Seventh Session. It is likely that other governments or institutions would also be willing to participate in such an International Gene Bank.

170. The same kind of arrangements would be made by FAO with respect to new centres agreeing to participate in the network.

171. Finally, this FAO legal framework would be the context for the necessary intergovernmental participation in the global coordination of the network as well as of plant genetic resource activities in general. This aspect is elaborated below.

Governmental participation

172. As has been noted in Section IV (see paras. 125 to 128 above), there has in the relatively recent past been an increase in governmental participation in international plant genetic resource activities, particularly in the case of the organizational frameworks that have so far been established in Southeast Asia and Europe, side by side with the IBPGR system. At the national level, the regional committees are complemented by national committees established by the participating governments, or national coordinators appointed by them. FAO and the IBPGR should continue to encourage and facilitate these developments.

173. The main lacuna at present is the absence of any similar organizational framework at the global level. This lacuna could be filled through the establishment, within the framework of FAO, of an intergovernmental committee or other body open to all interested States. The main functions of such a body could be:

(a) a review of the operation of the conservation network, including the international information system proposed below (paragraphs 181 to 189) as well as of plant genetic resource activities in general, including the examination of the reports of the IBPGR which are received by FAO as a member of the CGIAR and reports which the regional committees might be invited to provide to FAO;

(b) the discussion of questions of particular concern to governments, and the formulation of related recommendations to be made, through FAO, to the CGIAR and the IBPGR;

(c) the adoption by governments of the priorities and standards developed under the auspices of the IBPGR; and

(d) the coordination of the support that States may, individually or collectively, be able to provide to overcome problems encountered, especially those related to the conservation network and to conservation and plant breeding activities in developing countries.

174. The above functions could be carried out by the Committee on Agriculture, in the context of its review of the biennial programmes of work of the Organization and their implementation (under Rule XXXII.6(c) of the General Rules of the Organization (GRO), regard also being had to para. 6(d) of the same Rule). The Committee on Agriculture may in exceptional cases establish subsidiary bodies under the conditions set out in GRO XXXII.12. With respect to the biennial review relating to plant genetic resource activities, it would be desirable that COAG should set up such a subsidiary body for two reasons:

(a) to avoid an increase in the already heavy workload of COAG itself, and

(b) to enable all potentially interested States to participate as full members of the body: under GRO, Rule XXXII.13, the Committee may include Member Nations that are not members of COAG in the membership of subsidiary bodies (subpara. (a)); and the Council may admit to membership of such bodies non-members of FAO which are members of other organizations in the UN system (subpara. (b)). In this context, it should be noted that two countries that are not Member Nations of FAO (the Soviet Union and the German Democratic Republic) hold significant collections of plant genetic resources.

175. With respect to secretariat services for the subsidiary body, reliance could be placed on the FAO unit which is at present also engaged in activities relating to the IBPGR. Since the subsidiary body would meet only biennially, the workload on that unit should not be unduly increased. The main financial implications for the Organization would be the increased cost of interpretation and other facilities for the meetings.

Financial security

176. The present lack of financial security, especially on a long-term basis (see para. 134 above), is a problem that will require detailed consideration, and could be one of the essential questions to be discussed in the context of the subsidiary body referred to above.

177. A suggestion has been made by the Government of the Netherlands in a letter to the FAO Secretariat dated 10 June 1983: "In the case of more funds becoming available, the establishment may be considered of a 'World Gene Fund', to be administered by an international agency, such as FAO. The IBPGR could act as an advisory body, or alternatively as a sub-contractor taking responsibility for the conservation of the major food crops worked upon by the CGIAR institutes." A fund of this kind could be administered by FAO as a trust fund or a reserve fund, or it could be established under the sponsorship of FAO but outside its framework.

178. Even small annual contributions made by governments and financing agencies to a fund which would only be used to meet emergency cases arising in the operation of the conservation network (or to complement other sources of assistance in such cases), would be a desirable first step. It would also be of assistance if donors, particularly those of the CGIAR system, could give the international community an advance indication of the amounts that they would be making available for plant genetic resource activities, in order to facilitate forward planning.

179. Furthermore, while governments and funding agencies may be faced with competing priorities, many of which may be considered as important as plant genetic resource conservation, it can in general be said that there is one essential difference in the case of conservation work. Whereas a budgetary reduction could lead to a delay in the implementation of other activities, a reduction in the funds necessary for conservation work could result in the irretrievable loss to humanity of valuable material. This point should be borne in mind when funding priorities are assigned.

180. Irrespective of the amount of funds that can be made available for plant genetic resource conservation in the future, financial security could be improved if conservation was treated separately from other activities: it would be desirable that institutions with responsibilities covering plant genetic resources should prepare separate programmes relating to conservation work, with their own budget and budgetary projections for the longer term, that governments should allocate funds to the institutions specifically

for such work, and that donors should assign their contributions to a special fund to be used exclusively to finance conservation activities.

International Information System for Plant Genetic Resources

181. As explained above (see paras. 56 and 57), the international network of base collections must be complemented by information systems at the national, regional and international levels. While valuable work is being promoted by the IBPGR in this connexion the lack of information, in a readily retrievable form, is perhaps the most serious weakness of the present system from a scientific and technical point of view.

182. The data available for individual gene banks, as well as the ways in which they are kept, show a great diversity, ranging from the simple filling in of cards with the most elementary information, such as the place and date of collection of a sample, to computerized data, including the location of individual genes along each of the chromosomes of certain species. Considerable efforts have already been made by the IBPGR to assist individual genetic resources collections to improve their information systems, including computerization.

183. Experience has demonstrated that progress in plant genetic resources information has to be pursued on a crop-by-crop basis, and the IBPGR has issued, in collaboration with its advisory committees, the IARCs and regional programmes, lists of crop descriptors in order to standardize information collection and exchange. The wide acceptance and application of those standardized descriptors should be further pursued, and institutions holding base collections should take the lead in these efforts, as already under way through IRRI for rice, IBPGR for wheat, ICRISAT for sorghum and millet and CIP for potatoes, to give only a few examples.

184. It is necessary to ensure that the data from the evaluation of plant genetic resources flows back to the base collections.

185. With increasing information becoming available and the evolution of the international network of base collections, a central focus for plant genetic resources information would be essential. Earlier attempts to concentrate all available information in one centralized data bank, initiated by FAO in 1973 and pursued by the IBPGR during 1974/75, demonstrated that this is an impractical and difficult solution.

186. It is therefore suggested that an International Information System on Plant Genetic Resources should be established, and should take advantage of the previous experience and of collaboration with the IBPGR. It should be developed so as to interlink the main existing crop-based information systems in base collections and to incorporate new ones, in order to enable the retrieval, from a central point, of the information existing in each institution participating in the international network of base collections. The system should be designed in such a way as to ensure the compatibility of the information systems developed in individual centres with respect to computer hardware and software.

187. The system should also include information from relevant institutions outside the proposed international network of base collections.

188. In order to place the international information system within the legal framework described above, and in view of FAO's experience in successful information systems, such as AGRIS and CARIS, FAO would seem to be the most appropriate organization to administer the system, in collaboration with the IBPGR, concluding the necessary agreements with cooperating institutions.

189. The establishment of an International Information System on Plant Genetic Resources, administered by FAO, would require the provision of additional funds to FAO. Without a more concrete assessment of the form of the system and its requirements, it is not possible to give a precise estimate of the amount involved.

VI. CONCLUSIONS

190. This Report demonstrates the tasks that must be carried out in order fully to ensure the exploration, collection, conservation, documentation, evaluation, availability and utilization of plant genetic resources, including the dependence of the extent to which plant genetic resources can be utilized, for the benefit of the agricultural development of each country, upon the strength of the capabilities in that country for plant breeding.

191. The Report recognizes the achievements of international cooperation to date, while demonstrating that many scientific and technical aspects of plant genetic resources are in need of further development, which will require increasing support from all interested countries and strengthened international collaboration.

192. This Report, in Section IV, identifies certain major constraints in the context of the present international arrangements, which can be summarized as follows:

(a) the lack of the necessary personnel and facilities in many developing countries, and their pressing needs for assistance in training and equipment, for satisfactory participation in plant genetic resource activities, and for deriving the full benefits of those activities;

(b) shortcomings of a scientific and technical nature - in particular insufficient evaluation and the lack of readily retrievable information, especially at the global level, which is an essential component of a system for the preservation and use of plant genetic resources;

(c) the absence in general of a firm commitment, on the part of governments and of relevant institutions, with respect to plant genetic resource activities, particularly the conservation of nature reserves in areas of important genetic diversity, the maintenance of base collections and the free availability of plant genetic resources for exchange;

(d) the insufficient means through which governments can collectively exercise their responsibilities with respect to the preservation and use of plant genetic resources;

(e) the absence of any long-term guarantee concerning the financing of essential activities related to plant genetic resources.

193. The measures proposed in this Report to improve the situation are essentially as follows:

(a) the adoption of an International Undertaking on Plant Genetic Resources, open to adherence by all interested governments and relevant institutions (Section III of this Report);

(b) the establishment of a network of base collections of plant genetic resources, which could be considered as an international gene bank and would -

  (i) make full use of the present expanding network (paragraphs 147 to 158 of this Report);

  (ii) operate within an FAO legal framework (paragraphs 164 to 168);

  (iii) provide cooperating governments and institutions with an opportunity to hold the material in their base collections at the full disposal of FAO (paragraph 169);

(c) the encouragement of governmental participation in plant genetic resource activities, at the regional, sub-regional and national levels, and the global intergovernmental review - by a subsidiary body of the Committee on Agriculture - of such activities, including the operation of the network of base collections, mechanisms for increasing financial security, the action taken by countries with limited facilities to increase their plant breeding capabilities, and the assistance provided to the latter to meet their training and other needs (paragraphs 172 to 175);

(d) the consideration of ways of strengthening financial security, and the improvement of existing funding arrangements through the allocation of funds specifically for conservation activities (paragraphs 176 to 180);

(e) the establishment of a global information system, to be administered by FAO in collaboration with the IBPGR (paragraphs 181 to 189).

194. Thus, in the context of the proposed network, full advantage would be taken of the offer made by the Government of Spain (see Appendix G) and of similar offers from governments or institutions, to hold base collections at the disposal of FAO. Offers of this kind could, in addition, be the starting point in the exploration of alternative measures if the coverage provided by the proposed network should prove to be insufficient in terms of species or geographical distribution (see paragraph 146).

195. In the light of the above, the Director-General proposes:

(a) that the Conference consider, with a view to adoption at its forthcoming Twenty-second Session, the draft Resolution containing an International Undertaking on Plant Genetic Resources, set out in Appendix A to this Report;

(b) that the Director-General should, in consultation with the IBPGR, invite relevant governments and institutions to participate in an international network of base collections within an FAO legal framework, placing - if they so desire - their base collections fully at the disposal of FAO;

(c) that, as soon as a significant number of governments and relevant institutions have notified him of their intention to give effect to the Undertaking as adopted -

(i) the Committee on Agriculture should establish the above-mentioned subsidiary body on plant genetic resources, which would meet at the time of the Committee's regular sessions and would include interested governments both members and non-members of the Committee (GRO, Rule XXXII.13(a)), and

(ii) the Council should admit to membership of that body, interested non-Member Nations of FAO that are members of the United Nations, a specialized agency or IAEA (GRO, Rule XXXII.13(b));

(d) that the Director-General should seek the views of donor governments and financing agencies with respect to strengthening the present funding mechanisms or to establishing new mechanisms;

(e) that the Director-General should prepare a study on the feasibility of establishing the aforesaid global information system, including the latter's financial implications; and

(f) that the Director-General should present a report to the Council at its Eighty-sixth Session, on progress achieved in the implementation of the Conference's recommendations and decisions relevant to this Report.

Appendix A

DRAFT RESOLUTION AND INTERNATIONAL UNDERTAKING
ON PLANT GENETIC RESOURCES

(see Section III of this Report)

OUTLINE

THE RESOLUTION

The Resolution essentially summarizes the rationale of the Undertaking. The various aspects are developed in the text of the Undertaking.

THE INTERNATIONAL UNDERTAKING

I. GENERAL

Article 1 is a concise statement of the objective that the other provisions of the Undertaking are intended to achieve.

Article 2 gives definitions of terms used in the Undertaking, including the categories of plant genetic resources covered by it. The coverage is comprehensive, but should be seen in the context of the second operative paragraph of the Resolution, which invites Governments and institutions to inform FAO of the extent to which they can give effect to the principles in the Undertaking.

Articles 3 to 5 state the principles that should apply, essentially at the national level, with respect to the exploration, preservation and exchange of plant genetic resources.

II. INTERNATIONAL COOPERATION

Article 6 indicates the general lines of international cooperation: (a) strengthening plant genetic resource capabilities in developing countries; (b) intensifying existing international activities; (c) collaboration in the network referred to in Art. 7; (d) studying the feasibility of additional arrangements, including gene banks under FAO administration, if the network referred to in Art. 7 proves to be insufficiently comprehensive; (e) considering institutional measures to finance activities relating to plant genetic resources.

Article 7 sets out the legal framework for a network of base collections founded, to the extent possible, on existing international arrangements. The network would comprise the collections of governments or institutions that agree to carry out, within an FAO legal framework, the activities whose coordination is promoted by the IBPGR (Art. 7.1), and governments or institutions that, in addition, arrange for their base collections to be recognized as part of an International Gene Bank (Art. 7.2). The network would also include a global information system (Art. 7.1(d)).

Article 8 suggests principles designed to ensure financial and other support for activities, in particular to meet difficulties encountered in the operation of the network.

Article 9 relates to the role of FAO, which would have the responsibility of monitoring international cooperation relating to plant genetic resources, and taking all necessary measures with respect to the network of base collections, including the conclusion of agreements with participating governments and institutions. FAO would carry out its responsibility in consultation with Governments supporting the network (Article 9.4);

III. OTHER PROVISIONS

Article 10 stresses the importance of phytosanitary measures with respect to plant genetic resource activities.

Under Article 11, adhering Governments and institutions would be invited to provide FAO with progress reports concerning the achievement of the objective of the Undertaking.

Resolution /83

INTERNATIONAL UNDERTAKING ON PLANT GENETIC RESOURCES

THE CONFERENCE

Recalling its Resolution 6/81 on plant genetic resources;

Recognizing that:

(a) plant genetic resources are indispensable for the genetic improvement of cultivated plants, but have been insufficiently explored and are in danger of erosion and loss;

(b) plant genetic resources are a heritage of mankind to be preserved, and to be freely available for use, for the benefit of present and future generations;

(c) full advantage can be derived from plant genetic resources only through an effective programme of plant breeding, and that, while most such resources in the form of wild plants and old land races are to be found in developing countries, training and facilities for plant breeding are insufficient or even not available in many of those countries;

Considering that:

(a) the international community should adopt a concrete set of principles designed to promote the exploration, preservation, availability and full exploitation of relevant plant genetic resources for plant breeding essential to agricultural development;

(b) it is the responsibility of governments to undertake such activities as are needed to ensure the exploration, collection, conservation, maintenance, evaluation and exchange of plant genetic resources in the interest of all mankind; to provide financial and technological support to institutions engaged in such activities; and to ensure the equitable and unrestricted distribution of the benefits of plant breeding;

(c) progress in plant breeding is essential to the present and future development of agriculture; and the establishment or strengthening of plant breeding and seed production capabilities, at the national, sub-regional and regional levels, is a prerequisite to making efficient use of international cooperation in the exploration, collection, conservation, maintenance, evaluation and exchange of plant genetic resources;

1. Adopts the International Undertaking on Plant Genetic Resources attached hereto;

2. Requests the Director-General to transmit this Resolution and the attached International Undertaking to Member Nations of FAO, to non-Member Nations which are members of the United Nations, any of its Specialized Agencies or the International Atomic Energy Agency, and to autonomous international institutions having responsibilities with respect to plant genetic resources, and to invite them to inform him by (date) of the extent to which they are in a position to give effect to the principles contained in the Undertaking, especially Articles 3 to 5 thereof;

3. Urges Governments and the aforesaid institutions to give effect to the principles of the Undertaking and to support the international arrangements outlined therein, and - where appropriate and feasible - to participate in such arrangements.

Annex

INTERNATIONAL UNDERTAKING ON PLANT GENETIC RESOURCES

I. GENERAL

Article 1 - Objective

1. The objective of this Undertaking is to ensure that plant genetic resources of agricultural interest will be explored, preserved, evaluated and made available for plant breeding, for the benefit of all human beings of the present and future generations.

Article 2 - Definitions and Scope

2.1 In this Undertaking, unless the context otherwise requires:

(a) "plant genetic resources" means the reproductive or vegetative propagating material of the following categories of plants:

(i) cultivated varieties (cultivars) in current use and newly developed varieties;

(ii) obsolete cultivars;

(iii) primitive cultivars (land races);

(iv) wild and weed species, near relatives of cultivated varieties;

(v) special genetic stocks (including elite and current breeders' lines and mutants);

(b) "base collection of plant genetic resources" means a collection of seed stock or vegetative propagating material (ranging from tissue cultures to whole plants) held for long term security in order to preserve the genetic variation for scientific purposes and as a basis for plant breeding;

(c) "institution" means an entity established at the international or national level, with or without legal personality, for purposes related to the exploration, collection, conservation, maintenance, evaluation or exchange of plant genetic resources;

(d) "centre" means an instituion holding a base collection of plant genetic resources, as described in Article 7.

2.2 This Undertaking relates to the plant genetic resources of all species of interest to agriculture at present or in the future, and has particular reference to food crops.

Article 3 - Exploration of Plant Genetic Resources

3.1 Governments adhering to this Undertaking will organize or arrange for missions of exploration, conducted in accordance with recognized scientific standards, to identify potentially valuable plant genetic resources that are in danger of becoming extinct in the country concerned, as well as other plant genetic resources in the country which may be useful for agricultural development but whose existence or essential characteristics are at present unknown, in particular:

(a) known land races or cultivars in danger of becoming extinct due to their abandonment in favour of the cultivation of new cultivars;

(b) the wild relatives of cultivated plants in areas identified as centres of genetic diversity or natural distribution;

(c) species which are not actually cultivated but may be used for the benefit of mankind as a source of food or raw materials (such as fibres, chemical compounds, medicine or timber).

3.2 Special efforts will be made, in the context of Article 3.1, where the danger of extinction of plant species is certain, or is likely, having regard to circumstances such as the clearance of vegetation from tropical rain forests and semi-arid lands with a view to the expansion of cultivated areas.

Article 4 - Preservation of Plant Genetic Resources

4.1 Appropriate legislative and other measures will be maintained and, where necessary, developed and adopted to protect and preserve the plant genetic resources of plants growing in areas of their natural habitat in the major centres of genetic diversity.

4.2 Measures will be taken, if necessary through international cooperation, to ensure the scientific collection and safeguarding of material in areas where important plant genetic resources are in danger of becoming extinct on account of agricultural or other development.

4.3 Appropriate measures will also be taken with respect to plant genetic resources held, outside their natural habitats, in gene banks or living collections of plants. Governments and institutions adhering to this Undertaking will, in particular, ensure that the said resources are conserved and maintained in such a way as to preserve their valuable characteristics for use in scientific research and plant breeding.

Article 5 - Availability of Plant Genetic Resources

5. It will be the policy of adhering Governments and institutions having plant genetic resources under their control to allow access to samples of such resources, and to permit their export, where the resources have been requested for the purposes of scientific research, plant breeding or genetic resource conservation. The samples will be made available free of charge, on the basis of mutual exchange, or on the most favourable terms having regard to the costs related to the provision of the material and having regard to the person or entity requesting it.

II. INTERNATIONAL COOPERATION

Article 6 - General

6. International cooperation will, in particular, be directed to:

(a) establishing or strengthening the capabilities of developing countries, where appropriate on a sub-regional basis, with respect to plant genetic resource activities, including plant breeding and seed multiplication and distribution, with the aim of enabling all countries to make full use of plant genetic resources for the benefit of their agricultural development;

(b) intensifying international activities in plant exploration, plant breeding and germ plasm maintenance, including those carried out by FAO in collaboration with the institutions supported by the CGIAR, as well as the FAO Panel of Experts on Forest Genetic Resources, with the aim of progressively covering all plant species that are important for agriculture and other sectors of the economy, in the present and for the future;

(c) supporting the arrangements outlined in Article 7, including the participation in such arrangements of governments and institutions, where appropriate and feasible;

(d) studying the feasibility of arrangements, additional to those outlined in Article 7, including the establishment and administration by FAO of base collections to form part of the International Gene Bank, referred to in Article 7.2, if it appears that the facilities provided by Governments and institutions would be insufficient fully to achieve the objective of this Undertaking;

(e) considering institutional measures, such as the strengthening or establishment of funding mechanisms, to finance activities relating to plant genetic resources.

Article 7 - International Arrangements

7. The present international arrangements, being carried out under the auspices of FAO and other organizations in the United Nations system, by national and regional institutions and institutions supported by the CGIAR, in particular the IBPGR, for the exploration, collection, conservation, maintenance, evaluation, exchange and use of plant genetic resources will be further developed and, where necessary, complemented so as to ensure that:

(a) there exists an internationally coordinated network of national, regional and international centres that have assumed the responsibility to hold, for the benefit of the international community and on the principle of free exchange, base collections of the plant genetic resources of particular plant species;

(b) the number of such centres will be progressively increased so as to achieve as complete a coverage as necessary, in terms of species and geographical distribution, account also being taken of the need for duplication, of the resources to be safeguarded and preserved;

(c) the activities of the centres that are related to the exploration, collection, conservation, maintenance, rejuvenation, evaluation and exchange of plant genetic resources will be carried out with due account being taken of scientific standards adopted from time to time under the auspices of FAO;

(d) sufficient support in funds and facilities will be provided, at the national and international levels, to enable the centres to carry out their tasks;

(e) a global information system, under the auspices of FAO, relating to plant genetic resources maintained in the aforementioned base collections and - to the extent feasible - elsewhere, and linked to systems established at the national, sub-regional and regional levels, will be developed on the basis of relevant arrangements that already exist;

(f) early warning will be given to FAO, or to any institution designated by FAO, of any hazards that threaten the efficient maintenance and operation of a centre, with a view to prompt international action to safeguard the material maintained by the centre.

7.2 Any Governments or institutions that agree to participate in the network referred to in Article 7.1 may, furthermore, notify the Director-General of FAO that they wish the base collection or collections for which they are responsible to be recognized as part of an International Gene Bank under the auspices of FAO. The centre concerned will, whenever so requested by FAO, make material in the base collection available to FAO and will permit FAO to have access to the premises and facilities of the collection.

Article 8 - Financial Security

8.1 Adhering Governments, and financing agencies, will, individually and collectively, consider adopting measures that would place activities relevant to the objective of this Undertaking on a firmer financial basis.

8.2 Adhering Governments, and financing agencies, will, in particular, explore the possibility of establishing mechanisms which would guarantee the availability of funds that could be immediately mobilized to meet situations of the kind referred to in Article 7.1(f).

8.3 Adhering Governments and institutions, and financing agencies, will give special consideration to requests from FAO for funds, equipment or services needed to meet situations of the kind referred to in Article 7.1(f).

Article 9 - Monitoring of Activities and Related Action by FAO

9.1 FAO will keep under continuous review the further development of international cooperation in the exploration, collection, conservation, documentation, exchange and use of plant genetic resources.

9.2 FAO will, in particular, monitor the operation of the arrangements referred to in Article 7. It will take, or recommend to Governments or institutions participating in the arrangements, measures that are necessary or desirable in order to ensure the comprehensiveness and efficiency of operations in line with the objective of this Undertaking.

9.3 The measures adopted by FAO will include:

(a) invitations to Governments and international institutions to support the arrangements;

(b) the designation, with the consent of the Government or institution concerned and after consultation with the IBPGR or other scientific advisory body, of suitable national or international institutions to act as the centres referred to in Article 7.1;

(c) invitations to Governments or institutions to agree to hold their base collections as part of the International Gene Bank referred to in Article 7.2;

(d) the conclusion of agreements, with the Governments or institutions concerned to confirm their commitment to the principles of this Undertaking and to the responsibilities indicated in Article 7.1 and, where applicable, Article 7.2;

(e) measures to overcome any difficulties or shortcomings identified;

(f) participation, where applicable, in any arrangements adopted by Governments in addition to those referred to in Article 7;

(g) the solicitation of funds, services or facilities referred to in Article 8.

9.4 In the performance of its responsibilities outlined in Part II of this Undertaking, FAO will act in consultation with those Governments that have indicated to FAO their intention to support the arrangements referred to in Article 7.

III. OTHER PROVISIONS

Article 10 - Phytosanitary Measures

10. This Undertaking is without prejudice to any measures taken by Governments - in line with the provisions of the International Plant Protection Convention, adopted in Rome on 6 December 1951 - to regulate the entry of plant genetic resources with the aim of preventing the introduction or spread of plant pests.

Article 11 - Information on the Implementation of this Undertaking

11. Adhering Governments and institutions will, at yearly intervals, provide the Director-General of FAO with information on the measures that they have taken or propose to take to achieve the objective of this Undertaking.

Appendix B

LETTER OF AGREEMENT BETWEEN CGIAR MEMBERS AND FAO
(June 1974)

(see para. 119 of this Report)

LETTER OF AGREEMENT

between

The undersigned, members of the Consultative Group on International Agricultural Research (hereinafter referred to as the Donors)	and	The Food and Agriculture Organization of the United Nations (hereinafter referred to as FAO)

Whereas various members of the Consultative Group on International Agricultural Research (hereinafter referred to as "the Donors") wish to make funds available to the Food and Agriculture Organization of the United Nations (hereinafter referred to as "FAO"), as provided in this Agreement for the purpose of creating a Central Fund to finance the activities of the International Board for Plant Genetic Resources (hereinafter referred to as "the International Board") described in Annex I attached hereto:

Whereas the Director-General of FAO may under FAO Financial Regulation 6.7, receive voluntary contributions for this purpose;

Now therefore the Donors and FAO agree as follows:

ARTICLE I

1. The Donors undertake, as provided in this Agreement, to contribute to FAO funds for the purpose of creating a Central Fund to finance activities as described in Annex I.

2. The above funds will be deposited with FAO as Funds in Trust to be administered and accounted for in accordance with the Financial Regulations of FAO. For 1974 the charge to cover FAO's technical and administrative costs has been waived. The decision as to whether any charge will be made for subsequent periods, and if so, the appropriate rate of the charge, will be made at an appropriate later date. It is understood that FAO will not incur any financial liabilities in excess of the amounts actually received.

3. The Funds in Trust will be used exclusively to finance the activities of the International Board to which FAO will submit a statement of account at the end of every calendar year.

4. In accordance with the Financial Regulations of FAO, all costs incurred by the Organization for these activities of the International Board described in Annex I are to be borne by the Trust Fund. The costs chargeable to the Trust Fund may include unforeseen expenditure incurred in accordance with the Regulations of FAO.

ARTICLE II

1. FAO's obligations under this Agreement are subject to the constitutional rules and Financial Regulations of FAO.

2. This Agreement, including Annex I, may be modified by mutual consent between FAO and the International Board, each of which shall give full and sympathetic consideration to any proposal for such amendment.

ARTICLE III

The Agreement shall remain in effect for a period of one year unless terminated soon by FAO or the International Board by notice in writing given to the other, of not less than thirty days (30) in advance of the effective date of termination; any balance of funds remaining unspent in such case will be handed over to the Chairman of the International Board who will receive them on behalf of all Donors. Upon the mutual agreement of both FAO and the International Board, the effective period of the Agreement may be extended. This Agreement shall enter into force upon signature by FAO and another three of the Donors.

Appendix C

TERMS OF REFERENCE OF THE IBPGR

(see para. 120 of this Report)

Status

The Board is an autonomous scientific, international, philanthropic, non-profitmaking organization under the aegis of the CGIAR.

Terms of Reference

The Board will have responsibility, under the authority of the CGIAR, for recommending policies and developing programmes in close collaboration with and with the help and advice of FAO to meet the following objectives:

(i) To plan, initiate and coordinate wherever possible a worldwide programme through the promotion of genetic resources concepts at government and scientific level;

(ii) To identify general and specific needs for exploration, collection, conservation and evaluation of plant genetic resources with particular reference to species of major economic importance and their wild and cultivated relatives, to determine priorities among them, and to ensure to the fullest possible extent that the materials conserved are made available for plant breeding and other scientific activities as required;

(iii) To see the collection of genetic resources is carried out according to the established priority needs;

(iv) To arrange for the replicated maintenance of both seed and vegetative collections and the duplication of materials between collections;

(v) To implement appropriate data storage and retrieval systems;

(vi) To arrange for the characterization of collections, and to incorporate relevant data in data storage and retrieval systems; to promote fuller evaluation by breeders; and to see that relevant data are exchanged along with materials;

(vii) To promote training at all levels;

(viii) To promote technical meetings to further the foregoing objectives and to issue technical publications relating to standards, methods and procedures and other matters;

(ix) To support research activities into problems the solving of which are essential to the operation of the Board's activities.

Membership of the Board

The Board consists of 15 members, of whom not less than four are to be nationals of developing countries, and not less than six are to be scientists. Thirteen members of the Board are elected by the CGIAR, on the recommendation of the IBPGR. FAO and UNEP each appoint one ex officio, non-voting member of the Board. The Executive Secretary also acts as ex officio member. Elected members serve in their personal capacities irrespective of their professional or official affiliation. The Board shall have the power to co-opt additional members if the need should arise.

Executive and other Committees

The Executive Committee comprises the Chairman and Vice Chairman of the Board and at least three other elected Board members. The member of the Board designated by FAO shall participate in all the deliberations of the Executive Committee. At least two of the members of the Executive Committee will be from developing countries.

Executive Secretariat of the Board

FAO provides the Executive Secretariat for the Board.

Other Relationships with FAO

The priorities recommended by the Board will be observed to the maximum praticable extent in formulating the programmes of the Crop Genetic Resources Centre of FAO.

Financial Support

The central fund, established by a Letter of Agreement between certain donor members of the CGIAR and FAO, will be administered by FAO as a Trust Fund.

Appendix J

LETTER OF INVITATION TO PARTICIPATE IN
IBPGR CONSERVATION NETWORK

(see para. 131 of this Report)

The following extract, taken from a typical letter addressed by the Executive Secretary of the IBPGR to a potential cooperating institution, relates to the commitments required by the IBPGR, and contains an invitation to the institution to accept designation for maintaining a specified base collection or collections:

"...

The Board's policy for base collection is to require the following commitments:

(a) that the collection will continue to receive adequate operating funds and personnel and that if, at some future time, this is not possible, FAO/IBPGR will be alerted promptly;

(b) that if the material stored is not available from an active collection, it will be made freely available from the base collection to any professionally qualified institution or individual seriously interested in using it;

(c) that material will be accepted for storage on a global basis;

(d) that appropriate arrangements will be made (if necessary with suitable institutes) for regeneration of the material; and

(e) that arrangements will be made to duplicate the material for safety (preferably in another IBPGR designated gene bank).

On this basis the IBPGR invites the (Institution) to accept designation for maintaining base collections of (specification of the crops concerned).

..."

Appendix E

ACTIVITIES OF THE IARCs ON PLANT GENETIC RESOURCES
AND THEIR PRESENT COST
(see para. 154 of this Report)

SUMMARY TABLE

Centre	Present Annual Expenditure	Projected for 5 years hence 1983
	US$	
CIAT	1 358 000	1 809 000
CIP	2 530 000	3 000 000
CIMMYT	350 000	1 000 000
Germ plasm enhancement not itemized	1 000 000	1 000 000
ICARDA	1 043 000	1 356 000
ICRISAT	1 028 500	1 145 800
IITA	850 000	2 500 000
ILCA	148 000	336 000
IRRI	1 001 550	1 000 000
Germ plasm enhancement not itemized	1 000 000	1 000 000
WARDA	100 000	500 000
	10 409 050	14 646 800
IBPGR	4 117 000	5 131 000
	14 526 050	19 777 800

ESTIMATED BUDGET FOR GENETIC RESOURCES WORK (1983-1985)
OF THE INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI)
(see para. 155 of this Report)

(at 1983 Prices)
(in US$)

Operational Budget	1983	1984	1985
		US$	
A. Direct Costs for International Rice Germ plasm Centre (includes Seed Health Unit) a/			
Salaries and Benefits Senior Staff (1) Junior Researchers (12) Labourers and others (35) Post Doctoral Fellows (2)	249 773	254 373	254 373
Supplies	41 600	41 600	41 600
Equipment	56 000 b/	20 000	20 000
Maintenance of Motor Vehicles	3 000	3 000	3 000
International Travel	5 900	5 900	5 900
Travel within the Philippines	3 000	3 000	3 000
Sub-total	359 273	327 873	327 873
B. Adjusting Factor c/			
Light and Power	36 000	36 000	36 000
Postage	10 000	10 000	10 000
Maintenance of Building	24 000	24 000	24 000
Depreciation of Facilities	81 560	81 560	81 560
	151 560	151 560	151 560
C. Contingencies	10 217	9 587	9 587
D. Administrative Costs	109 600	100 000	100 000
Sub-total	630 650	589 020	589 020
Direct Costs for Field Collections	20 000	20 000	20 000
Training (5 scholars/5 man-years)	50 900	50 900	50 900
TOTAL	701 550	659 920	659 920

a/ Includes multiplication and regeneration.

b/ Includes initial equipment for the Seed Health Unit.

c/ This is in addition to the normal distribution of administrative costs and represents extraordinary charges that would apply to the Germ Plasm Centre.

Capital Expenditures - IRRI	US$
Cost of Facilities (Buildings and Equipment)	4 000 000
Farm Development	500 000
Green Houses	200 000
Transfer of Collection	250 000
Training of Staff 1/	
Complete back-up of electrical utilities	300 000

1/ No basis for estimating budget which has to depend on the number of trainees, duration and kind of training.

Genetic Resources Laboratory at IRRI (Germ plasm Bank Complex)	US$
1976	323 000
1977	1 516 000
Total Cost of Laboratory	2 039 000

Appendix G

GENE BANK OF SPAIN

Substance of the Offer by the Government of Spain

(see para. 169 of this Report)

Offer to FAO to place the Gene Bank of Spain at the service of the international community as a safe deposit for base collections of plant genetic resources.

This offer would mean that:

1. FAO could designate species for long-term storage by the bank at global level. It is suggested that these should be seed legumes and fodder plants from rangelands, propagated by genuine seeds.

2. The cost of conserving these seeds would remain the responsibility of the Government of Spain, and working samples could be provided on request through FAO.

3. A service of active collection could not be provided without international financing, since this service would involve a constant increase in the number of samples, plus packing and dispatch of many specimens.

Technical information

The Gene Bank of Spain has available:

(a) A storehouse at a temperature of 15°C below zero, of 7 x 3 x 3 m = 63 m^3.

(b) A seed storehouse at temperatures of 0 to 2°C below zero, of 3 x 10 x 3 m = 90 m^3.

(c) There are in the country 80 people working for the Gene Bank, who are responsible for reproducing the samples in the most suitable place, making use of INIA experimental stations.

(d) The size of the samples and the method of collecting them, to ensure that they represent the proper variability, follow IBPGR standards.

(e) Germination trials are made when the samples are deposited. Viability trials are made only when they are going to be rejuvenated.

(f) Material at present stored has been classified by computer, and the first volume of the catalogue has already been published. It is hoped that the second volume will appear toward the end of 1983.