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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

CONSULTATIVE GROUP ON
INTERNATIONAL
AGRICULTURAL RESEARCH

ANNUAL REPORT 1980

ROME

The International Board for Plant Genetic Resources received major financial support/pledges in 1980 from the following governments and agencies

Australia	Japan
Belgium	Netherlands
Canada	Norway
Denmark	Sweden
France	United Kingdom
Germany, Federal Republic of	UNEP
Italy	United States of America

World Bank

AGP:IBPGR/81/24
April 1981

The International Board for Plant Genetic Resources (IBPGR) is an autonomous, international, scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR was established by the CGIAR in 1974 and its Executive Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR, as defined by the Consultative Group, is to promote an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

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PREFACE

The format and the order of the text of this Annual Report of the International Board for Plant Genetic Resources (IBPGR) follow those of the Annual Report for 1979. Since the primary objective of the IBPGR is to develop a global network of crop genetic resources centres with the major concern of safeguarding the genetic material of crops, the report stresses the activities carried out on crops during 1980 rather than other work, e.g. that in the regions, although this is reported on.

Although we now assume that the need for genetic conservation is generally accepted, it is nevertheless impossible to be all-inclusive and to collect and conserve representative variability of the whole spectrum of germplasm of every crop. A strategy has to be developed with utilization as the major objective - whether now or in the future. To define and accelerate its programme the Board would be assisted if more quantitative information were available concerning the amount and rates of genetic erosion and data on the places to be explored (depending upon knowledge of the crop, its evolution and variability, what exists in collections and what work has already been carried out); far more technology developed concerning methods of maintenance and techniques for collecting and regenerating material depending on the reproductive biology of the crop; and greater implementation of standard information recording were provided.

As part of its strategy, the Board has defined priorities for action on crops and these have been used as guidelines for the support and initiation of programmes by the Board. Attention has been primarily focused on the major food crops. These crops will, of course, continue to receive the Board's primary attention but in addition, in conformance with the policy decision taken in 1979, the Board intends to add a few new major crops each year to its workload.

The IBPGR has necessarily paid, and will continue to pay, less attention to crops with low global priorities. Nonetheless collecting of some of these crops will be done on an ad hoc basis when they are of importance in a regional context. Priorities will be assigned by the IBPGR to crops or groups of crops which still do not have priorities defined, so that collections of those which are important can begin. The IBPGR also continues to be ready to respond in emergency situations.

The approach to plant exploration will continue to be:

1. the assignment of priorities on a global and regional basis;
2. the convening, where necessary, of ad hoc working groups or advisory committees to examine existing collections, including known duplications and gaps, and to identify areas for collecting in order to fill the geographical/species gaps; and
3. exploration and collection, as far as possible by local personnel, to obtain representative genetic variability, followed by conservation, characterization, preliminary evaluation and documentation, so that materials collected may be widely and freely available to the community of breeders.

In 1980 the Board has once again been extremely active in organizing and supporting the collection of crop germplasm in many parts of the world. The results of these activities are discussed in the body of this report. Collecting missions have been fielded in a variety of ways but the organization of all of them involves the negotiation of collaborative arrangements with institutes and governments, the mobilization of local manpower and, in many cases, obtaining the assistance of specialists from other parts of the world.

The Board has also been concerned with promoting the documentation of important collections and took a major policy decision on characterization and evaluation of genetic resources material. In addition the conservation network, initiated in 1978, has been expanded and the Board looks forward to the time in the mid-1980s when this should be more or less complete for base collections of the major crops.

It was stressed above that this report emphasizes crops rather than regions even though the Board established priorities for both crops and regions as the two dimensions of the global network. Recently it has been felt that maybe undue emphasis has been placed on regions - chiefly because of the past theories on centres of diversity which built upon the idea of De Candolle in the previous century, and Vavilov earlier in this one. Their ideas were based upon the geography of crop evolution. Nevertheless the patterns of domestication, the diverse origins of crops, and crop migrations with man have meant that, for genetic conservation purposes, the regions are much broader than those originally envisaged as centres.

The Board defined its regions for priority action largely on the basis of logistic considerations. Although it might be valuable to organize field programmes on a phytogeographical basis, in practice most regions include a wide range of ecological zones. The Board's priority regions consist of nations sharing broad geographical situations and since the Board's aim is for collection by or in cooperation with national governments, the priority regions are essential for operational purposes.

In view of the multi-dimensional character of the Board's activities, the urgency of much of the work - especially collecting, and the limited financial resources available, the Board started in 1980 to develop a strategy and long-term plan. This has been based on the experience of six years of operations, the considerable cooperation from the crop centres of the Consultative Group on International Agricultural Research (CGIAR), other regional and national centres, and the many breeders and scientists who have actively participated in the Board's work in all parts of the world.

J. T. Williams
Executive Secretary

HIGHLIGHTS OF THE YEAR

- The five crop advisory committees (for wheat, maize, rice, sorghum and millets and Phaseolus beans), operating in cooperation with the appropriate IARC, serve as a bridge between the Board and the global community of scientists working on these crops. In 1980 they advised the Board on proposals for collecting missions; and the Maize and Phaseolus Committees met and reviewed ongoing work.

- Significant progress was made in 1980 in compiling lists of accessions at the principal genetic resources centres for the major crops, leading to the publication of directories of holdings for food legumes, root crops, wheat and maize.

- In 1980 a number of expert working groups were formed and consultations were held to advise the Board on global action for sweet potato, cassava, cocoa and cruciferous crops. This progress was partly in accordance with a decision of the IBPGR to pay more attention to clonally propagated crops.

- Expert working groups and crop advisory committees have previously agreed on lists of descriptors for a number of priority crops. In 1980 lists were produced for apricots, beets, coffee, cotton, mung bean, rice (in collaboration with IRRI), taro, sorghum (in collaboration with ICRISAT), and yams; revised lists were produced for maize and tropical fruits.

- The Board supported and organized a series of collections in the following regions: Mediterranean, Southwest Asia, South Asia, Southeast Asia, East Africa, West Africa and Central and South America.

- The Board agreed in 1980 to expand its regional activities by the appointment of regional officers in East Africa, West Africa and Latin America in 1981.

- A new initiative was taken on tropical fruits and the Board's programme on vegetables was accelerated in 1980.

- A world survey of wheat genetic resources was completed in 1980 and considerable progress made on a survey of forage collections.

- The Board has designated, in consultation with the centres concerned, a network of institutions responsible for maintaining the world's major base collections of seeds of the principal food crops. This network was expanded in 1980 and the Board funded a number of storage facilities.

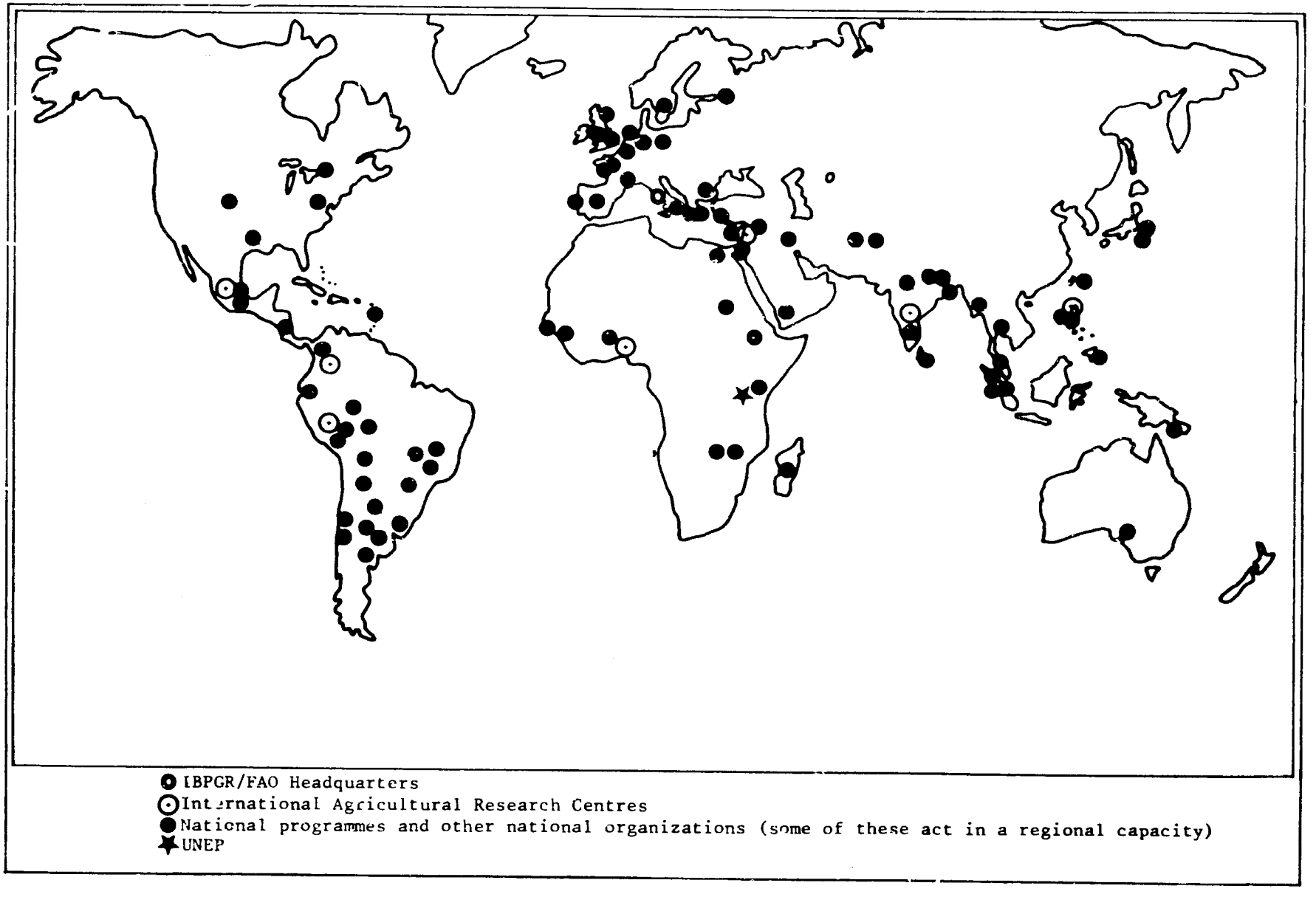
- The Board assisted in the development and installation of appropriate documentation systems in several countries for the storage and retrieval of information concerning major crop genetic resources holdings.

- In 1980 the Board continued to support training at the technical and post-graduate level in an attempt to expand the numbers of personnel in the developing world trained for genetic resources work. Several short courses were organized and the IBPGR provided fellowships for training.

- In 1980 the Board started the preparation of a long-term plan of action which will be issued as a strategy and planning report in 1981.

- Additionally the Board agreed, as a matter of policy, to support limited research in areas where the results would accelerate the practical work of the Board.

ORGANIZATIONS WHICH COOPERATED WITH IBPGR DURING 1980
FOR COLLECTING, CONSERVATION, DOCUMENTATION AND TRAINING



CROPS

INTRODUCTION

When the Board identified its priorities for action on crops in 1976 they were based on global requirements using a series of criteria which included the risk that material would be lost due to changes and development in agriculture, the economic and social importance of the crops and their potential contribution in breeding, the requirements of breeders and the size, scope and quality of existing collections held by genetic resources centres and breeders.

The identification of these crop priorities enabled the Board to accelerate the collection of diversity in the field. In the first six years of the Board's activities, priority areas for collecting were clarified for wheat, sorghum, Pennisetum millet, rice, Phaseolus beans, potato, bananas, coconut, beet, groundnut, grape, coffee and cotton. In 1980 action plans were developed for two additional major food crops, cassava and sweet potato, as well as for cocoa.

In addition, during 1980, the Board continued to develop a major world programme on vegetables, including brassicas, Capsicum, Allium, tomato, okra, amaranth, eggplant, Momordica and cucurbits. In the first instance, emphasis was placed on germplasm of interest in the tropical regions but it became apparent with nearly all groups of species that the total genepools required attention. Moreover, with species of Brassica used as vegetables, it was decided that oilseed Brassica species must also be included as well as some other cruciferous genera and in 1980 a consultation was held on cruciferous crops.

When the global priorities were decided there were several groups of crops which required further studies before clear decisions could be reached. Apart from vegetables, considerable progress on these groups of crops is reported for 1980 because the Board agreed to commission a major study on tropical fruits and nut trees and considered the report of a fact-finding mission carried out in 1979 on tree species of interest for fuel wood and environmental stabilization. In addition, a survey of existing collections of forage plants was initiated.

In the next few years working groups will identify priority areas for collecting barley, cowpea, Asiatic Vigna spp., sugarcane, chickpea, soyabean, citrus and rubber. These, along with on-going action, will form the basis of the Board's indicative global plan for collection which is revised annually.

On five major crops the Board co-sponsors five crop advisory committees in cooperation with the appropriate International Agricultural Research Centre (IARC). They consist of a Rice Committee, co-sponsored by the International Rice Research Institute (IRRI); a Maize

Committee, co-sponsored by the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT); a Sorghum and Millets Committee, co-sponsored by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); a Phaseolus Committee, co-sponsored by the Centro Internacional de Agricultura Tropical (CIAT); and a Wheat Committee, co-sponsored by CIMMYT with the participation of the International Center for Agricultural Research in Dry Areas (ICARDA). Each of these crop advisory committees held its first meeting in 1976 and has already had a third meeting. The Maize Committee held its third meeting at CIMMYT in September 1980; the Phaseolus Committee held its third meeting in Mexico in November 1980 and the Wheat Committee's third meeting was planned for December 1980 but was postponed to January 1981. These crop committees are an invaluable aid to the IBPGR in obtaining the views of the scientific community working on each of the major crops concerning action necessary to collect, conserve, document and make available for use the genetic diversity of these crops. The IARCs have all continued to be extremely cooperative with the IBPGR and they continue to act as important centres in the global genetic resources network.

The foregoing comments relate to crops of high global priority. Less attention has been given to crops with low global priorities but collecting of some of these will continue on an ad hoc basis and those identified for high priority within a regional context have received attention within the framework of regional activities, e.g. some tropical fruits in Southeast Asia. The Board now has regional crop priorities for Central America, Southwest Asia, South Asia, Southeast Asia, East Asia and the Pacific Islands: the two latter being determined during an IBPGR Symposium held in Japan in October 1980.

For several years the Board has been concerned with promoting the documentation of important collections and ensuring that material collected is adequately conserved, characterized and documented. By the end of 1980 the Board had published international lists of descriptors for 15 crops and had initiated action on 27 others. Also, the first four directories of genetic resources collections were printed, while the groundwork was completed for most of the major crops. The lack of readily available data concerning the existing collections had been a major gap in the information network.

The directories have, in particular, highlighted the fact that while some data exist concerning the accessions in existing genebanks, many of these accessions have never been properly evaluated. In 1980 the Board took a major policy decision in that the categories of information required by curators and also for exchange purposes were defined as:

passport data (accession identifiers and information recorded by collectors);

characterization (data on characters which are highly heritable, can be easily seen by the eye and are expressed in all environments); and

preliminary evaluation (a limited number of additional agronomic traits thought desirable by a consensus of users of the particular crop).

Characterization and preliminary evaluation are recognized to be the responsibility of genetic resources centres where such data are recorded during multiplication or regeneration.

Further evaluation will be carried out by the plant breeders and other plant scientists such as pathologists, chemists, etc. because it is an open-ended task depending largely upon current breeding strategy. It is, therefore, primarily a task for which users,

not the Board, are responsible. However the Board wishes to see that appropriate links are forged between the curators of the collections and the evaluators so that their results are fed back for inclusion in data banks, thereby becoming available to future users.

This year's report once again emphasizes collecting activities. They will remain a primary interest of the IBPGR owing to the urgent nature of much of the collecting. However, the Board realizes that collection, conservation and utilization are inextricably connected and must advance together. In future years this is likely to mean that more resources will have to be devoted to proper maintenance and effective distribution of the germplasm collected.

CEREALS

In view of the fact that for most of the world cereals are the most important staple food, from the outset the IBPGR has laid heavy emphasis on the major cereals: wheat, rice, maize, sorghum and millets. Due to the virtual extinction of the endemic genetic diversity of these crops in some regions, the IBPGR has continued to mobilize collecting missions in critical problem areas (see Fig. 1). The Board's crop committees have advised on action and the Board has continued to receive considerable help from many institutions around the world, and in particular IRRI, CIMMYT and ICRISAT.

The genetic resources of rice are well covered by the IRRI programme and the IBPGR has only had to supplement this to a limited extent.

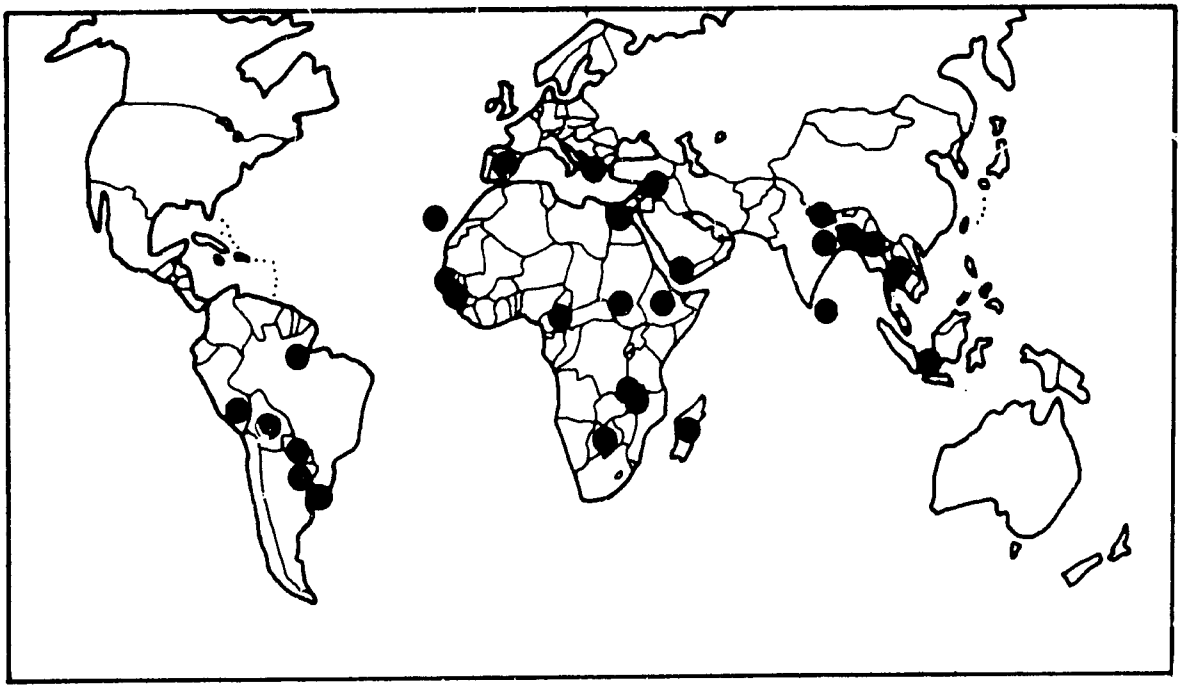
The IBPGR has allocated more resources for the collection of maize than for the collection of any other cereal. This has occurred because of the rapid diffusion of improved varieties and hybrids with the resultant loss of many pre-existing ecotypes. In addition, many collections made in the 1950s had not been well maintained and a number of race complexes were poorly represented in the existing genebanks. Nonetheless, by the end of 1980 the IBPGR is pleased to report that a large part of the collecting work on maize has been completed.

For wheat a different picture emerged during 1980. Despite substantial collections around the world it became evident that a great deal of work still remains to be done.

For sorghum and millets the IBPGR recognizes that the time is approaching when representative collections will be amassed; ICRISAT will continue to take a leadership role.

The Board intends to move ahead with other important cereals and a start will be made on barley in association with ICARDA in 1981. Some collecting of this crop has been carried out in the context of regional and national activities but it is expected that new work can be started. Those cereals with a lower global priority, e.g. rye and oats, will receive IBPGR attention only in the context of regional activities in view of the overwhelming need to safeguard material of the major cereals.

Figure 1. Countries where the IBPGR organized or collaborated in collecting cereals during 1980



Wheat and Barley	Rice	Maize	Sorghum and Millet	Andean Cereals
Egypt	Bangladesh	Argentina	Botswana	Argentina
Ethiopia	Burma	Bolivia	Cameroon	Bolivia
Greece	Guinea	Brazil	Gambia	Peru
Nepal	India	Malawi	India	
Syria	Indonesia	Paraguay	Madagascar	
Yemen A.R.	Malawi	Peru	Malawi	
	Nepal	Spain/	Nepal	
	Sri Lanka	Canary Is.	Sudan	
	Sudan	Sudan	Yemen A.R.	
	Thailand	Uruguay	Zambia	
	Zambia	Zambia		

Wheat and Barley

Collecting continued in areas of high priority and some important gaps were filled during the year. In the following countries the IBPGR worked in liaison with governments and other agencies in organizing exploration and collection: Egypt, Ethiopia, Greece, Syria and the Yemen Arab Republic.

In particular, an important collection of wild wheats and landraces of cultivated wheats was made in Syria. This included 115 accessions of *Aegilops* spp., 21 wild *Triticum* spp. and 15 primitive cultivars. Material from Greece was collected in Thrace and Samothrace. In Africa exploratory missions covered Wollo, Shoa and Gemo Gofa in Ethiopia and the Nile delta in Egypt.

Two missions took place in the Yemen Arab Republic and approximately 70 accessions of wheat were collected along with other crops. Included in this material were seven samples of *T. dicoccon*, a crop which is rapidly becoming extinct in the country.

When the Wheat Committee met for the first time in 1976, it recommended

that a survey be made of all major wheat collections so that priority areas for collecting could be correctly identified in order to fill the taxonomic and geographic gaps. At that time it was estimated that there were approximately 250,000 samples in collections but these included a large number of duplications. Unfortunately, only a limited number of collections of wheat are adequately documented and hence a survey was difficult to carry out. Despite this, in 1980 the Secretariat was able to produce a technical report for submission to the third meeting of the Wheat Committee. This report will be published early in 1981. It shows that there are, in fact, only ca. 130,000 samples in the major collections (including many duplications) and that the collections contain poor representation of the species of Triticum and Aegilops except for cultivars and landraces of the major cultivated species. There are thus serious gaps to be filled despite the intensified collecting stimulated by the IBPGR in the past five years.

Besides carrying out the survey, the Secretariat also compiled and published a directory of centres holding wheat genetic resources.

In 1978 the IBPGR initiated a pilot evaluation project for samples of wheat held in major collections. The aims of this project were two-fold: firstly to obtain data characterizing the accessions because these data were mostly non-existent, and secondly to identify any practical problems associated with the methodology of such an experiment. During 1980 a summary of the project was drawn up. The exercise proved to have been useful because it showed that multi-site evaluation for agronomic characteristics, which are environmentally influenced, is not practical for genebank curators and that it would be far more useful to characterize accessions at single sites for the highly heritable features. In addition, the exercise demonstrated the need for clearly defined descriptors and that the IBPGR wheat descriptor list needs some revision.

Following the relocation of the IBPGR Technical Advisor for Southwest Asia at ICARDA (see p. 42), the IBPGR and ICARDA jointly organized a training course on wheat and barley germplasm collection, evaluation and management 13-25 April 1980. Trainees attended from many of the countries covered by the ICARDA programme and of priority interest for wheat exploration.

Finally progress was made in moving samples into the designated base collections. One noteworthy collection of 500 sub-samples of the collection in Afghanistan was transferred for safe duplication to the genebank at Bari, Italy.

Triticum diococcon, YAR

Rice

Collection of rice germplasm and its full evaluation was initiated by the Genetic Resources Program of IRRI in the early 1960s and, in 1971, IRRI launched a coordinated collection of local landraces of rice in tropical Asia. A five-year collection plan was developed in 1977 at an IRRI/IBPGR Workshop on Genetic Conservation of Rice (see Annual Report, 1977).

Since 1978 the rice research workers of many countries in Asia have collaborated with IRRI in field collecting. In seven of the countries IRRI has participated directly in exploration missions, and collection campaigns were launched in others with IRRI's technical assistance. During 1979 the IBPGR provided IRRI with funds specifically to cover in-country costs in Bangladesh, Burma, India, Indonesia, Nepal, Sri Lanka and Thailand. In 1980 the IBPGR continued the grant to assist the collaborative efforts in the countries of South and Southeast Asia and China. Under the IRRI project, assistance is being provided to the participating countries to assemble uncollected indigenous genetic resources through the implementation of collection plans, the provision of essential seed storage equipment and the shipping of samples of the collected materials to the IRRI genebank for long-term conservation.

For African rice the IBPGR has continued to coordinate collecting activities. The Genetic Resources Unit of the International Institute of Tropical Agriculture (IITA) has fielded expeditions in Cameroon, Kenya and Madagascar and collected both glaberrima and sativa rices. In association with IITA the IBPGR sent exploration missions to Malawi and Zambia in 1980 and collected 142 and 72 samples respectively. A joint IITA/IBPGR mission explored southern Sudan in September 1980, chiefly for sorghum and millets, but also obtained a limited number of rice samples, including the wild perennial O. longistaminata. The IBPGR provided funds to the Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT) to continue work on rice germplasm collection in the Guineas in West Africa. In November-December 1979, IRAT, in association with ORSTOM, collected O. glaberrima and O. sativa as well as O. longistaminata and O. breviligulata, the two latter from parts of upper and lower Guinea.

Following the decisions of its Southeast Asia Regional Committee, the IBPGR also funded the national programme of Thailand to collect high altitude rice in 1980. This collecting will continue in 1981.

The descriptor list for Oryza sativa developed by the IBPGR/IRRI Rice Advisory Committee was published by IRRI in 1980 and has been distributed to all interested workers. In addition, the IBPGR compiled information on all important rice germplasm holdings at various national and international institutes and a directory of such collections will be printed early in 1981.

Maize

The third meeting of the IBPGR Maize Advisory Committee co-sponsored by CIMMYT, took place in September 1980 at CIMMYT headquarters, Mexico, and it was reported that most of the objectives for collecting which had previously been listed had been reached. Latin America has been covered generally and a systematic collecting activity has just been initiated in the Iberian peninsula. It was agreed that although most of the collecting had been done, further collecting is still necessary in northeast Brazil, Venezuela and the Guyanas. In addition, the Himalayan region (including Nepal and Bhutan) needs further collection.

Since 1977, almost entirely with IBPGR support, more than 4,000 samples have been collected by national insti-

tutions in Latin America. These include 1,600 in Argentina, 1,350 in Bolivia, 420 in Brazil, 230 in Paraguay, more than 400 in Peru and 850 in Uruguay. The programmes carried out in 1980 are itemized below.

In Brazil, the Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), through the Centro Nacional de Recursos Genéticos (CENARGEN) and the Centro Nacional de Pesquisa de Milho e Sorgo (CNPMS), collected maize in the Amazon region. Areas covered include the states of Amazon (along the Rio Negro), Parà (along the Transamazon highway) and Mato Grosso (in the vicinity of the Xingu National Park, including several Indian reservations). A total of 152 samples was collected. The field work in 1980 was the third mission and represented part of a continuing IBPGR-supported programme.

In Paraguay the collection of maize was initiated in 1979 by the IBPGR and this was continued in 1980. The project is phased to cover the northeastern, east-central and southeastern regions of the country, as well as the area bordering Brazil.

In Peru, the Universidad Nacional Agraria, La Molina (UNA) has an IBPGR-supported collecting programme in the jungle region of the country. Two hundred and ten samples were collected during 1980 in the areas of San Martin, Ucayali, Huanuco, Madre de Dios, Junin, Cerro de Pasco, Cajamarca, Loreto and Cusco. Collecting will continue in 1981 in the Cusco area.

In 1980 the IBPGR also provided funds to the Instituto Nacional de Investigaciones Agropecuarias (INIA) of Chile to collect in the areas of Norte Grande, Atacama, Aconcagua, Santiago, Nuble, Bio-Bio and Llanquihue.

In Spain, the Instituto Nacional de Investigaciones Agrarias (INIA), supported by the IBPGR, has organized 11 short missions to cover the following areas in 1980 and 1981: Galicia, Asturias, Santander, Vascongadas, Navarra, Aragón, Cataluña, Baleares, Meseta del Duero, Castilla la Nueva, Mancha, Extremadura, Levante, Murcia, Andalucía and the Canarias.

Several IBPGR multi-crop missions in Africa also collected maize. These were in Malawi (83 samples), Sudan (30 samples) and Zambia (74 samples).

The Maize Committee has also recommended the making of inter-racial composites for maize. The countries of the Southern Cone of South America have started this work following the recommendations of an IBPGR meeting at the Instituto Nacional de Tecnología Agropecuaria (INTA), Pergamino, Argentina in 1979 to consider evaluation and conservation of maize. The IBPGR is co-sponsoring a three-year regional co-operative project together with national institutes in Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay through which collected material will be characterized and the inter-racial composites made.

The IBPGR now intends to monitor the movement of the Latin American material to the designated base centre, the National Seed Storage Laboratory (NSSL), Fort Collins, USA, and to see that information obtained by the regional project is also incorporated into the data banks of NSSL and CIMMYT. CIMMYT maintains 13,850 samples and within a few years all the material will have been duplicated in NSSL.

The technical assistance programme of the IBPGR on information has continued to help national programmes in Latin America to put the data into machine-readable form, and considerable progress has been made for the maize collections using the descriptors agreed by the IBPGR. When the Maize Committee met in September 1980, it refined the previously-agreed list, which will be published early in 1981.

A directory of maize germplasm collections was published in 1980 by the IBPGR including information on the major collections, itemizing their geographical

representation and listing what evaluation has been carried out.

Sorghum and Millets

The major priority region for the collection of sorghum and pearl millet is Africa south of the Sahara. The Sorghum and Millets Committee, at its third meeting in September 1979, reviewed priorities established previously in the light of action carried out in previous years and recommended the continuation of efforts to collect germplasm from the following areas: southeastern Sudan, Zambia, parts of Tanzania and Ethiopia, Botswana, Burundi, Rwanda, Mozambique, Sierra Leone, Ghana, Ivory Coast and the low rainfall areas of the Sahel region. The other priority regions include the Yemen Arab Republic, China and parts of India and Nepal.

A programme for the collection of the germplasm had been agreed between ICRISAT and the IBPGR and this continued actively during 1980. The Genetic Resources Unit of ICRISAT visited Botswana, Gambia, the Sudan, Nepal and parts of India. A joint ICRISAT/IBPGR team collected in Zambia (237 sorghum, 110 finger millet and 24 Pennisetum millet); and joint IITA/IBPGR teams collected in Malawi (78 sorghum and 22 pearl millet) and Sudan (48 sorghum). In addition, IITA, as part of its collecting activities, gathered sorghum and millet germplasm in Cameroon and Madagascar. The IBPGR sent two teams to the Yemen Arab Republic in May-June and November-December 1980, and collected a wide range of variability of sorghum and millets (205 and 48 respectively).

The minor millets, primarily finger millet, were collected together with sorghum and pearl millet in all the missions fielded during 1979-80.

At ICRISAT headquarters, Patancheru, Hyderabad, India, a number of the accessions of sorghum, pearl millet and minor millets in the collection have been evaluated for various morpho-agronomic traits. ICRISAT also organized evaluation at Ouagadougou, Upper Volta, of a portion of the pearl millet germplasm which had previously been collected in West Africa.

Sorghum diversity in equatorial Sudan

The Ethiopian Sorghum Improvement Project and the Plant Genetic Resources Center of Ethiopia (PGRC), have jointly rejuvenated ca. 5,000 accessions of sorghum, which have been put into long-term storage at PGRC. During the rejuvenation, observations were recorded on a number of morpho-agronomic characteristics.

Following a recommendation of the Sorghum and Millets Committee, the IBPGR convened a sub-committee in Rome (March 1980) to finalize the list of millet descriptors. This list was circ-

ulated to the members for final comments and was ready for printing at the end of 1980. Earlier in the year the descriptors for sorghum were published.

During 1980 the IBPGR information and documentation programme compiled information on the genetic resources holdings of sorghum and various millets from the most important centres. A directory of the holdings will be published early in 1981.

Andean Cereal Crops (other than maize)

The IBPGR has supported a programme to collect indigenous Andean crops used as cereals. These include quinua (Chenopodium quinoa) widely cultivated in the Andes; canihua (C. pallidicaule) cultivated in the Altiplano of Peru and Bolivia as a minor grain; and Inca wheat or coimi (Amaranthus caudatus) cultivated as a grain in Peru, Bolivia and northeastern Argentina. The programme is organized by the Instituto Interamericano de Ciencías Agrícolas (IICA) in association with national institutes. The material is currently being maintained in Peru at the Universities of Cusco and Puno, and in Bolivia at the Instituto Boliviano de Tecnología Agropecuaria (IBTA), Belen and Patacamaya. By the end of 1980 the following material had been collected and conserved:

Chenopodium quinoa

1,200 at IBTA, Belen

1,200 at IBTA, Patacamaya

1,500 at the Universidad Nacional Tecnica del Altiplano, Puno

500 at the Universidad Nacional San Antonio Abad, Cusco

Chenopodium pallidicaule

430 at IBTA, Patacamaya

440 at the Universidad Nacional San Antonio Abad, Cusco

The conservation facilities at Cusco and Puno had been improved with funds from the IBPGR and in 1980 help was also provided to IBTA.

During 1980 the IBPGR requested Dr. M. Tapia of IICA to prepare a descriptor list for Chenopodium quinoa, which will be published in 1981. In the meantime, IBTA is producing a catalogue of the material held in Bolivia.

FOOD LEGUMES

Legumes are second only to cereals as a source of human and animal food. Nutritional values of most legumes in terms of protein, calories, vitamins and minerals are excellent and plant sources contribute about 70 percent of the world's protein needs. Some, like soya-beans, groundnuts and winged beans are also rich in oil.

The cultivation of legumes is ancient; some species have been domesticated for as long as the major cereals. Today they remain as the major food in Latin America (especially

the common bean, Phaseolus vulgaris), in Southwest Asia and the Indian subcontinent (e.g. pigeonpea, Cajanus cajan; chickpea, Cicer arietinum; lentil, Lens culinaris and Asiatic Vigna spp.), East Asia (especially soyabean), and Africa (particularly cowpea, Vigna unguiculata).

Leguminous plants show wide distribution in the tropics and sub-tropics. They inhabit a wide range of environments and their growth on poor soils without supplemental nitrogen is particularly advantageous in subsistence agriculture.

Four IARCs, viz. CIAT, ICARDA, ICRISAT and IITA, are concerned with food legumes and their research efforts are directed towards the improvement of the quantity and quality of common bean, faba bean, lentil, chickpea, pigeonpea, groundnut and cowpea crops. The IBPGR has continued to receive excellent cooperation from IARCs and is collaborating in many aspects of the conservation of the crops in which they have research responsibility.

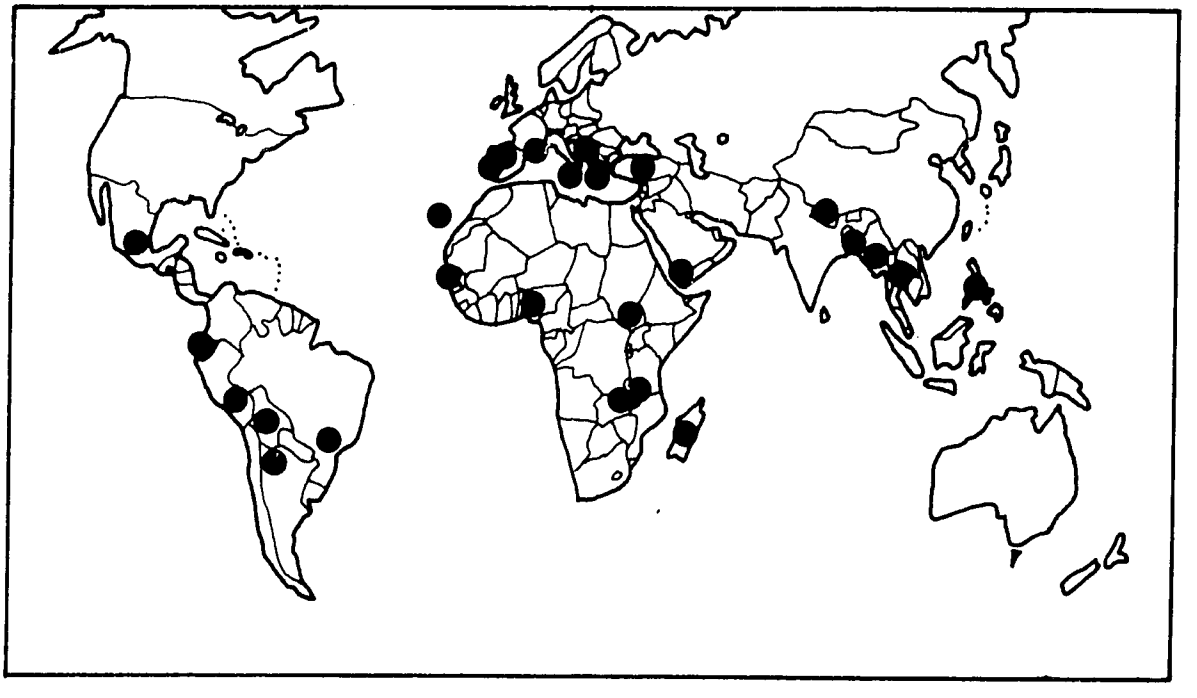
Following a planning meeting held at ICRISAT in 1978, the IARCs - individually or jointly with the IBPGR - have mounted expeditions in various parts of Africa, Asia, Europe and Latin America (see Fig. 2). During 1980, the IBPGR provided funds to various international and national institutes to collect Phaseolus bean, pigeonpea, lupin and winged bean. Besides these, the IBPGR collected legumes during multicrop collecting missions in Malawi, Zambia, the Sudan and the Yemen Arab Republic.

Last but not least, the IBPGR Sec-

Table 1. Phaseolus Collecting Priorities

Priority 1.	
Mexico	Northwest and north-central (mainly for P. acutifolius)
	South, including Yucatan (mainly for P. lunatus)
	From Sinaloa to Chapas (mainly for wild species, particularly P. coccineus)
	Highlands (mainly for P. coccineus)
	Lowlands (mainly for P. lunatus)
Cuba, Dominican Republic & Haiti	(mainly for P. vulgaris, P. lunatus and P. polyanthus)
Brazil & Peru	(mainly for P. lunatus)
Northwest Argentina, northeast Chile & southwest Bolivia	(for P. vulgaris, P. lunatus, P. arborigineus and P. augustii)
Iberian peninsula	(mainly for P. vulgaris)
Priority 2.	
Chile, Ecuador & Galapagos Islands	(mainly for climbing types of P. vulgaris)

Figure 2. Countries where the IBPGR organized or collaborated in collecting food legumes



Phaseolus	*Arachis*	Lupin	Winged Bean	Pigeon Pea	Others
Brazil	Argentina	Bolivia	Bangladesh	Burma	France
Mexico	Bolivia	Ecuador	Philippines	Nepal	Greece
	Gambia	Peru	Thailand	Thailand	Italy
	Madagascar	Portugal			Madagascar
	Peru	Spain			Malawi
					Nigeria
					Spain
					Sudan
					Turkey
					Yemen A.R.
					Yugoslavia
					Zambia

retariat published a directory of germplasm collections for food legumes in 1980. This includes information on existing major collections, geographical representation, evaluation and documentation carried out, and the storage facilities used for conservation.

Phaseolus

The Phaseolus Committee held its third meeting in October 1980 at INIA, Mexico City and reviewed the collecting work initiated by the IBPGR. As a result, the priority areas for collecting were revised as per Table 1.

In addition it was agreed that more information is required with regard to possible needs for collecting in China, Mozambique and Angola.

For the years 1978-81, the IBPGR provided CIAT with $61,000 to organize

and coordinate, in association with national institutions, the collection of **Phaseolus** germplasm in Latin America. The programme covers the following countries: Argentina, Brazil, Guatemala, Honduras, Mexico and Peru. To date, major missions have already been fielded in Mexico and Brazil. In Mexico, through INIA, 417 samples of 18 taxa were collected in the following areas: Altiplanicie Norteña, Llanos de Fresnillo, Valle de Mezquital, the Pacific coast up to 500 m, the Jalisco coastal area between 500 and 1,500 m, the Jalisco mountains higher than 1,500 m. and north of Campeche in the Yucatan peninsula. In Brazil, 267 accessions were collected in June by a joint CENARGEN/ CNPAF expedition to the north of Minas Gerais, the southeast of Bahia and the east of Espirito Santo.

The IBPGR, in association with IITA and ICRISAT, also collected **Phaseolus** germplasm in the following countries of East Africa: Madagascar, Malawi, Sudan and Zambia. Over 300 samples were collected.

The Phaseolus Committee made progress on expanding the list of descriptors previously agreed for **Phaseolus vulgaris** and agreed that more work needs to be done to finalize lists for the other species. The descriptors for **P. vulgaris** will be available in 1981.

The global base collection is held in CIAT and the NSSL has agreed to hold duplicates of cultivated **Phaseolus** for long-term storage. The University of Gembloux, Belgium has also agreed to be a major repository of wild species and their hybrids. INIA, Mexico, will multiply this material when required.

In the directory of food legumes germplasm published in 1980 by the IBPGR, information on major existing **Phaseolus** collections was provided.

Groundnut

All Arachis species, including the cultivated groundnut, are native to South America. Since the beginning of 1976, the IBPGR has been supporting the collection of A. hypogaea and related species from the major centres of origin and diversity in South America. This important programme has been under the excellent leadership of Prof. W. Gregory of North Carolina State University, Raleigh, USA, in close association with Prof. A. Krapovickas from Corrientes, Argentina. In 1980 Prof. Gregory retired and the IBPGR moved the coordination to Dr. C. Simpson at the Texas Experiment Station. During the past two years, ICRISAT has been closely involved with the work and has agreed to assume the leadership role in the future.

In 1980 an expedition was carried out in northwestern Argentina, eastern Bolivia and north and southeastern Peru. One hundred and twenty-nine samples, including both seeds and vegetative material of Arachis were collected. Wild material was collected in Argentina and Bolivia and cultivated types in Bolivia and Peru. As in previous years, herbarium material of wild Arachis was collected and deposited in Corrientes, Argentina. From all living Arachis collections, **Rhizobium** nodules were collected and deposited with the North Carolina State University.

In addition to the exploration missions in South America, groundnut germplasm was also gathered from its secondary centre of diversity in Africa. The IBPGR, IITA and ICRISAT expeditions in Gambia, Madagascar, Cameroon, the Sudan and Zambia resulted in the collection of a wide range of material.

The IBPGR made funds available to EMBRAPA/CENARGEN, Brazil, to collect both wild and cultivated Arachis from the states of Goiás, Mato Grosso, Minas Gerais, Espirito Santo, Bahia, Pernambuco, Alagoas, Sergipe, eastern Parà, Maranhao, Piaui, Ceará, Rio Grande do Norte and Paraíba over a period of 24 months beginning January 1981.

At the request of the IBPGR, EMBRAPA/CENARGEN has also agreed to

maintain a world centre for a collection of perennial species in Brazil.

In July 1980 the IBPGR convened a Working Group which met at Richmond, Virginia, USA, during a meeting of American groundnut breeders, to finalize the descriptor list for cultivated and wild Arachis. After the meeting, the draft list was circulated by ICRISAT to major groundnut breeders for their comments and the list of descriptors was finalized by the end of the year. It will be published early in 1981.

Lupin

Lupinus is a large genus of 300-400 species with two centres of diversity, one in Latin America and the other in the Mediterranean region. Lupins are used both for human consumption and animal feed, although use as food has been somewhat frustrated by its alkaloid content. Nevertheless, lupins remain a very important source of protein in the Andes and a potentially important crop in other parts of the world.

The IBPGR, as a part of its Latin American programme, provided funds to IICA for the collection of Andean crops, and Lupinus mutabilis is one of the priority crops in the project (see p. 54). During 1980, exploration was in progress in Bolivia, Ecuador and Peru.

In Spain and Portugal, Lupinus germplasm was collected with support from the IBPGR. Scientists from Portugal and Spain explored the Algarve, Alentejo and Beira Baixa regions of Portugal in June 1980 and a total of 239 samples was gathered. A joint Spanish/Portuguese/Peruvian mission, also funded by the IBPGR in 1980, collected lupins in west and northwest Spain.

In view of the potential importance of this crop and the need to evaluate samples, the IBPGR convened a meeting at INIA, Madrid, Spain, in July 1980 to finalize the list of descriptors for Lupin species. This list will be published in 1981 in both English and Spanish.

Winged Bean

This crop is grown both for its young pods and tubers and is becoming increasingly important in South and Southeast Asia. With support from the IBPGR, the national programmes in the Philippines and Thailand have continued to collect winged bean germplasm in previously unexplored areas. Probably the largest collection of winged bean is maintained at the Thailand Institute of Scientific and Technological Research in Bangkok and the evaluation of the existing germplasm, based on the descriptor list issued by the IBPGR, is in progress. Following a meeting of winged bean experts, a revised list will be published in 1981. The Bangladesh Agricultural Research Institute (BARI), with IBPGR support, continued to collect pulse germplasm, including winged bean, from the central and northwestern parts of the country.

Pigeon pea

OTHER FOOD LEGUMES

The IBPGR Secretariat organized multi-crop exploration missions in Malawi, Sudan, Yemen Arab Republic and Zambia in association with the participating national governments and ICRISAT and/or IITA. In these countries, various food legume species were collected. These included cowpea and other Vignas, lentil, Bambara groundnut, Vicia faba, pea and pigeonpea.

In December 1980, the IBPGR provided funds to ICRISAT specifically to collect pigeonpea and groundnut germplasm in East Africa and this will be reported on in 1981. IITA continued to collect in Nigeria, Madagascar and the Sudan. The majority of the samples collected were cowpea and Bambara groundnut but some accessions of pigeonpea and winged bean were included.

Towards the end of 1980, the IBPGR provided funds to the National Biological Institute, Indonesia to collect soyabean germplasm from the eastern parts of Indonesia since this crop rates a high global priority.

The Hebrew University of Israel, in association with the IBPGR, explored several countries in the Mediterranean region to search for the wild species of lentil, especially Lens nigricans and L. ervoides. The areas of collection were: Greece (including Crete), Yugoslavia, Italy, southern France and Spain (including the Canary Islands).

The Israeli programme further collaborated with the IBPGR towards the end of 1980 to start the collection of the local species of leguminous plants. These include both food and forage legumes (280 species) and are important because wild relatives of several crops, e.g. chickpea, pea and lentil, are found in this region.

The Germplasm Institute, Bari, Italy, in association with the Academy of Sciences of the German Democratic Republic, collected a total of 221 samples of legumes, including Vicia faba, Lens ervoides and L. nigricans in southern Italy.

The Board intends to accelerate its work on food legumes in 1981-82, both to collect material and to define descriptor lists. Crops to be considered in the first instance will be Vigna spp. (including cowpea). A list of descriptors for pigeonpea was finalized in collaboration with ICRISAT during an international workshop in December 1980 and it will be available in 1981.

Pigeonpea germplasm was collected by ICRISAT in Burma, Nepal and Thailand.

VEGETABLES

The conclusions of an IBPGR expert consultation held 24-25 January 1979, hosted by the National Vegetable Research Station (NVRS), Wellesbourne, UK, were reported in the Annual Report of 1979. The consultation was asked to identify and discuss possible action for those priority species of vegetables which are useful for rural development and are of economic value for farmers in the tropics.

When the IBPGR met in March 1979, it agreed to take action on those species of highest priority and designated insti-

tutions to coordinate and prepare action-oriented reports. These reports were to include: identification of, and data on, existing collections, including known duplications and gaps in the collections; identification of priorities for collecting to fill the geographical/species gaps; the requirements for long-term conservation; suggestions for coordinated action on characterization and preliminary evaluation of germplasm; and suggestions for a list of descriptors which could be used both to characterize accessions and in the exchange of material.

As the vegetable genetic resources programme has developed, a considerable amount of information on collections has been obtained. It is anticipated that a directory of vegetable germplasm will be published early in 1982. Collecting for 1980 is shown in Fig. 3.

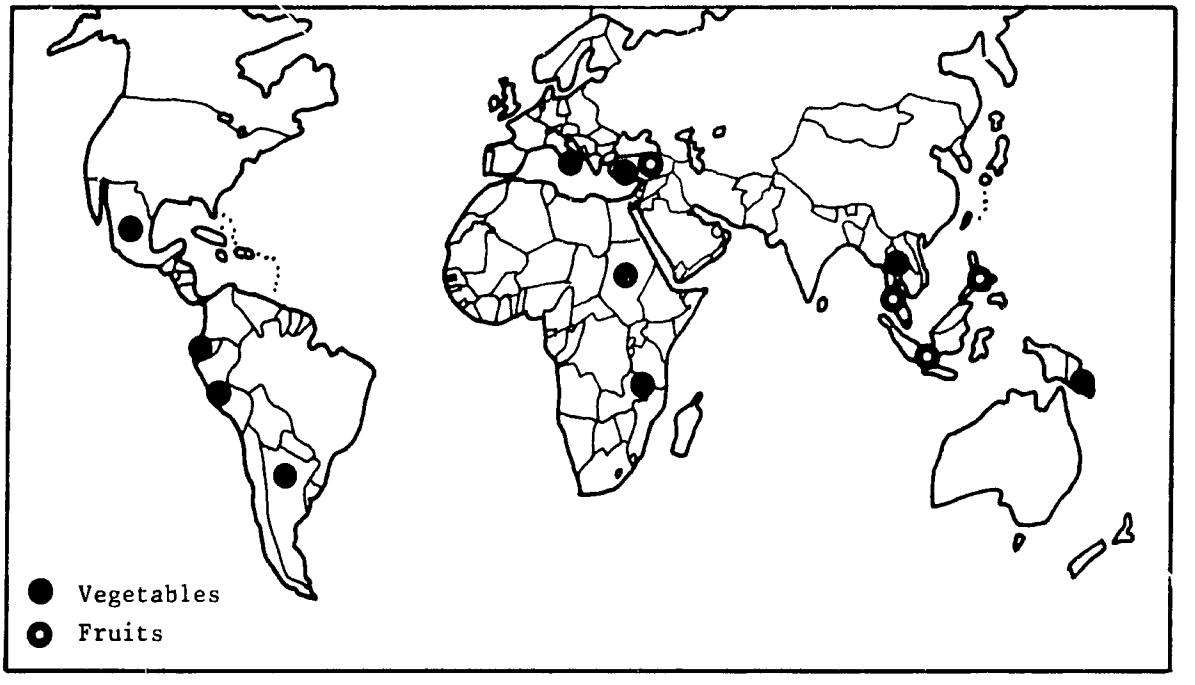
FIRST PRIORITY VEGETABLES

Abelmoschus esculentus and related species

The Office de la Recherche Scientifique et Technique d'Outre Mer (ORSTOM), France agreed to organize and coordinate a plan of action on the genetic resources of these species. Contacts are to be established with the National Bureau of Plant Genetic Resources (NBPGR), India; the University of Ghana, Legon; and the National Horticultural Research Institute (NIHORT), and IITA in Nigeria. A descriptor list for aibika (Abelmoschus manihot) has been developed in Papua New Guinea. It is anticipated that the global plan of action will be ready by the end of 1981.

Important collections of okra are presently being built up, especially in

Figure 3. Countries where the IBPGR organized or collaborated in collecting vegetables and fruits



Vegetables		Fruits	
Argentina	Mexico	Thailand	Indonesia
Ecuador	Papua New Guinea	Turkey	Philippines
Italy	Peru	Zambia	Thailand
Malawi	Sudan		Turkey

Africa, through the collecting activities of NIHORT and IITA in Nigeria and Benin, through ORSTOM (Centre Néerlandais) in the Ivory Coast and through an IBPGR-sponsored collecting mission in Zambia and Malawi.

Allium spp.

The NVRS accepted the invitation to organize and coordinate a plan of action on the genetic resources of Allium spp. In this connection, close links have been established with the Institute for Horticultural Plant Breeding (IVT), Wageningen, the Netherlands, and onion breeders in Egypt, France, India, Japan Nigeria, the USA and USSR. The IBPGR Secretariat commissioned a provisional list of descriptors and descriptor states from Dr. H.D. Rabinowitch, Faculty of Agriculture of the Hebrew University of Jerusalem, Israel. This will be circulated among world experts and, when finalized, included in the NVRS report. This will be available towards the end of 1981.

Amaranthus spp.

The Royal Tropical Institute (RTI), Amsterdam, the Netherlands, was requested to coordinate a report including a plan of action for amaranths. The RTI took advantage of the second Amaranth Conference held in September 1979 at Kutztown, USA to discuss the collection, conservation and exchange of amaranth germplasm with world experts. In addition, a consultant from RTI visited several institutes in India to obtain up-to-date information. A draft report was submitted by the end of 1979 and the major recommendations endorsed by the Board in 1980 are as follows:

(a) Cereal and vegetable amaranths will be treated as a single subject of study and the genus Celosia will be included in the plan of action. Adequate data about samples will indicate whether their use is as a vegetable, a cereal, or both.

(b) The Rodale amaranth collection in the USA (ca. 650 accessions in 1980) is well kept and registered. Duplicates are sent for long-term conservation to the NSSL, Fort Collins, Colorado. In addition, other important collections of amaranths were identified in India, Nigeria and Taiwan.

(c) High priority should be given to collecting missions in India, Nepal, Bangladesh and Africa. In addition, material needs to be collected in north Mexico, Guatemala, the Andean zone, Southeast Asia (e.g. Thailand and Indonesia, in particular, Irian Jaya) and China.

(d) Amaranth germplasm should be stored, evaluated and maintained in the following four centres:

(i) The National Seed Storage Laboratory (NSSL), Fort Collins, Colorado, USA

The NSSL has agreed to the request of the IBPGR to hold a global base collection. Several institutes in the USA will cooperate for evaluation and maintenance of this collection.

(ii) The National Bureau of Plant Genetic Resources (NBPGR), New Delhi, India

The NBPGR will be invited by the IBPGR to hold a base collection of Asian material, as soon as long-term storage facilities are available.

(iii) The National Horticultural Research Institute (IHORT), Ibadan, Nigeria

NIHORT will be invited by the IBPGR to hold a base collection of African material as soon as long-term storage facilities are available.

(iv) Instituto Nacional de Investigaciones Agrícolas (INIA), Mexico

INIA will be invited by the IBPGR to hold a base collection of New World material as soon as long-term storage facilities are available.

(e) A provisional list of descriptors has been prepared by Dr. S.K. Jain, Agronomy and Range Science Department, University of California, Davis, USA. The descriptor list will be published as part of the amaranth report in 1981.

(f) A taxonomic key for the identification of edible species of **Amaranthus** and **Celosia** has been published in the proceedings of the second Amaranth Conference and permission has been obtained to incorporate this key into the final consultancy report.

Brassica spp.

The Asian Vegetable Research and Development Center (AVRDC), accepted the invitation of the IBPGR to coordinate and prepare a plan of action for first priority **Brassica** spp. in cooperation with NVRS, Wellesbourne, UK, and the Vegetable and Ornamental Crops Research Station (VOCRS), Tsu, Japan. This report was prepared during an expert consultation held on 30 March 1980 in Japan. The IBPGR, after considering a proposal from the European Association for Research on Plant Breeding (EUCARPIA) - Cruciferous Genetic Conservation Group - indicated that although the major cruciferous crops, including vegetables, root crops, forages, mustards and oil seeds, might well be treated as a single subject of study, further information was required. Therefore, several experts on both agricultural and horticultural cruciferous crops were requested by the IBPGR Secretariat to produce status reports on the genetic resources of the major genera and species. Final recommendations on collecting, conservation, documentation and evaluation have been prepared during an IBPGR Secretariat Consultation, 17-19 November 1980, Rome, Italy. The report of this Consultation will be published after being discussed by the IBPGR in 1981.

Capsicum spp.

The Genetic Resources Center of the Centro Agronómico Tropical de Investi-

Capsicum annuum

gación y Enseñanza (CATIE), Turrialba, Costa Rica, agreed to assume a leading role in formulating a plan of action report with the cooperation of INIA, Mexico, the Chilli Research Station in Andhra Pradesh, India, and EUCARPIA. A report, including a global plan of action, has been formulated during an expert meeting in August 1980. The IBPGR Secretariat is attempting to compile more information from India and Southeast Asia, and it is expected that the final report will be available by mid-1981. However, since the report provides clearly defined priority areas for collecting, a proposal in 1980 from the Centro de Investigaciones Agrícolas del El Bajio (CIAB), INIA, Mexico was supported by the IBPGR to collect Capsicum in Nayarit, Nuevo León, Chiapas, Yucatan and Tabasco in 1981. CATIE will cooperate with INIA in the accomplishment of this mission.

Also in 1980, the IBPGR sponsored a collecting mission for Lycopersicon in Peru and Ecuador, which collected 43 samples of Capsicum spp., mainly from Peru.

Cucurbita spp.

Drs. T.W. Whitaker and F.W. Martin, both of the United States Department of Agriculture (USDA), have accepted responsibility to prepare a plan of action for these species. CATIE will also be involved in this work and has already finalized a descriptor list. The report and plan of action will be ready in 1981. In the IBPGR partially-funded mission to collect Cucurbita germplasm in the northern provinces of Argentina during October 1980, 105 samples were obtained (82 C. maxima and the rest C. mixta and C. andreana).

Lycopersicon esculentum

Tomato (and its related wild species) rates as the agreed IBPGR first priority vegetable for global action; but since the species appear to be sufficiently well covered by existing collections and breeding programmes, a desk study, carried out by Dr. Esquinas-Alcazar of the Secretariat, was felt to be adequate. It includes recommendations for the collecting needed to supplement the existing collections and for other genetic resources activities on the crop. This report, after being discussed by the IBPGR, will be published during the course of 1981.

An extensive collecting mission was sponsored by the IBPGR during 1980 in Peru and Ecuador. In north-central and eastern Peru 188 samples were collected by UNA, Peru. These included L. hirsutum, L. parviflorum, L. pimpinellifolium, L. peruvianum, the feral and wild form of L. esculentum and Solanum ochranthum. In Ecuador, Dr. C. Rick of the University of California, Davis collected 54 accessions of L. parviflorum, L. hirsutum,

L. pimpinellifolium, L. esculentum, Solanum juglandifolium and S. ochranthum.

Momordica charantia and related species

A collecting and evaluation programme, funded by the IBPGR, is being carried out (1979-1981) in Thailand under the guidance of Dr. M.L. Anothai Choomsai, Kasetsart University, Bangkok. In 1981 a report and plan of action for this vegetable will be prepared. As part of the project, 91 accessions of Momordica, (consisting of M. charantia, M. cochinchinensis and M. subangulata) were collected from November 1979 to March 1980. To date, 72 accessions have been evaluated.

Solanum melongena

Dr. B. Choudhury from the Department of Vegetable Crops, Indian Agricultural Research Institute (IARI), accepted responsibility to prepare a plan of action for Asian and African species of eggplant. Contacts were established with the Institut National de la Recherche Agronomique (INRA), France and other institutes in Japan, Africa, the Philippines and the Netherlands. Following research on the origin and evolution of S. melongena, the Department of Plant Biology, University of Birmingham, UK, produced a comprehensive list of descriptors for both the Asian and African species to be considered for inclusion in the final report. The report will be published by mid-1981.

The IBPGR is funding collecting missions in Thailand as part of the Southeast Asia Regional Programme. Collecting of Solanum melongena, S. torvum and S. ferox will be undertaken during 1981-82.

SECOND PRIORITY VEGETABLES

Vegetable species showing genetic erosion which are of local importance, or which rank second in priority on a global scale, are listed in Table 2. Action will not be initiated immediately on these crops, but collection and conservation of germplasm will continue on an ad hoc basis when opportunities arise or if the species are of high importance in any regional activity (for current collecting activities see footnotes to Table 2). The green pods of Phaseolus and cowpea are not included because CIAT and IITA are involved with these crops and the collections will include some germplasm of vegetable types.

As reported above, Celosia argentea and Raphanus sativus, both second priority species, have been included in the programmes for amaranths and cruciferous crops. Activities on other species are reported under food legumes (p. 13) and roots and tubers (p. 27).

FRUIT AND TREE NUTS

Most of the IBPGR activities on fruits have been in the context of support to regional activities. Meetings of scientists convened by the IBPGR for East Asia and the Pacific Islands, Southeast Asia, Southwest Asia and in Mexico, Central America and the Caribbean regions, as well as a meeting of African scientists in 1978, all listed specific tropical fruits meriting high regional priorities. However, fruits must generally be conserved in plan-

Table 2. Second Priority Vegetables

Basella alba 1/	(Indian or Ceylon spinach)
Celosia argentea 1/ 5/	(Sokoyokoto)
Citrullus lanatus	(Watermelon)
Cnidoscolus chayamansa	(Chaya)
Cucumis melo	(Musk-melon, Cantaloup)
Cucumis sativus	(Cucumber, gherkin)
Colocasia 2/ 5/ and Alocasia	(Taro)
Corchorus olitorius 1/	(Jute mallow)
Daucus carota	(Carrot)
Dioscorea 2/ 3/ 5/	(Yam)
Dolichos lablab	(Lablab)
Ipomoea aquatica 2/	(Kangkong)
Ipomoea batatas 2/ 3/ 5/	(Sweet potato)
Lactuca sativa	(Lettuce)
Lagenaria	(Bottle gourd)
Manihot esculenta 3/ 4/	(Cassava)
Pisum sativum	(Pea)
Psophocarpus tetragonolobus 2/ 5/	(Winged bean)
Raphanus sativus	(Radish)
Sechium edule	(Chayote)
Telfairia 1/	(Fluted pumpkin)
Vicia faba	(Broad bean)
Vigna radiata 5/	(Mung, Greengram)
Vigna unguiculata subsp. sesquipedalis 2/	(Yardlong bean)

1/ Currently being collected by NIHORT, Nigeria

2/ Currently being collected as part of the IBPGR Southeast Asian Programme

3/ Currently being collected by IITA Genetic Resources Unit, Nigeria

4/ Currently being collected by CIAT, Colombia

5/ IBPGR descriptor lists available

tations, and as a result, the development of collections has been slow, although it is hoped that such work will be accelerated in the forthcoming years. Details of activities during 1980 are to be found on p. 45 for Southeast Asia and on p. 51 for Latin America, while collecting activities are shown in Fig. 3.

In order to strengthen the action on tropical and sub-tropical fruits and tree nuts, in March 1980 the IBPGR commissioned a consultant report from RTI, Amsterdam, the Netherlands. The report will contain specific information on the species and their germplasm resources and details of their relative importance (production and consumption). Both major crops (Citrus, mango, pineapple, avocado, papaya, date, cashew nut and fig) and minor crops will be dealt with according to a list developed by the IBPGR Secretariat covering 55 species of 33 genera in 22 families. The report is expected to be published by mid-1982.

A preliminary list of descriptors for apricot was developed by Prof. Dr. Ruhinaz Gülcan of Ege University, Turkey at the request of the IBPGR. During a EUCARPIA meeting on Tree Fruit Breeding held at Angiers, France, 3-7 September 1979, an **ad hoc** working group met to discuss the preliminary list and Prof. Gülcan prepared a second draft incorporating the suggestions of the experts attending this meeting. The final descriptor list was published during 1980.

An almond descriptor list was prepared during a GREMPA (Groupe de Recherches et d'Etudes Méditerranéen Pour l'Amandier) Symposium in Izmir, Turkey, 16-22 June 1980. A draft list for discussion was submitted to the Symposium by Prof. M. Dokuzoguz and Prof. R. Gülcan. The final descriptor list will be published by the IBPGR in 1981.

Working Group on Tropical Fruits

The IBPGR Southeast Asia Regional Committee organized a Working Group on Tropical Fruits which met in Bangkok, Thailand 14-15 July 1980. This Working Group was convened to discuss the progress which had been made in the past two years in collection and evaluation of germplasm of tropical tree fruits in the region. The descriptors which were agreed upon in 1978 for the five major fruits in the region (mango, durian, rambutan, Lansium and jackfruit) were reviewed because their value could be assessed only after they had been in use. The revised descriptors were re-issued by the IBPGR in 1980. In addition, priorities for collection and evaluation were discussed and recommendations made on sampling strategy in order to intensify and expand the work on tropical fruits.

A sampling strategy and procedures for tropical fruits was agreed; this differs for wild and cultivated species, and a factor to be taken into account is the amount of space available for conservation. The agreed sampling strategy and procedures (Table 3) will be adopted for clonally propagated tree fruits and nuts.

The majority of the tropical tree fruits possess seeds which are short-lived and cannot withstand either drying or low temperatures or both ("recalcitrant" seeds). Therefore, genetic resources collections of vegetatively propagated crops and those with recalcitrant seeds will have to be maintained in clonal repositories. The Working Group emphasized that the conservation of tropical fruits as living material is essential for their evaluation and utilization. Research on recalcitrant seed physiology in Costa Rica, Indonesia, Malaysia and the United Kingdom and on **in vitro** culture techniques may lead to

Table 3. Sampling Strategy and Procedures

1. Wild related species	Sampling procedure
1.1 Representative collection	no bias (= random)
1.2 Collection for parental material	no bias?
1.3 Collection for direct use	bias
Sample size: should not be less than three trees from one community in any one species	
Collected material: preferably scion/budwood, but collecting seed is permissible	
2. Cultivated species	
2.1 Primitive material (Breeding material for seedling selection and/or cross-breeding)	
2.1.1 Seedlings (ex home gardens)	bias
2.1.2 Clones (ex orchards)	complete representation 1/
2.2 Improved cultivars	complete representation 1/
Collected material: one sample providing sufficient scion/budwood to establish three trees in the collection	

1/ 2.1.2 and 2.2 to be maintained permanently

new methods for the conservation of vegetatively propagated crops and those with recalcitrant seeds. The IBPGR supported some relevant research in 1980 (see p. 36). Nonetheless, new methods will be supplemental to the need for plantations and not complete substitutes for them.

Bananas

An IBPGR working group submitted a report on the genetic resources of bananas and plantains in 1977 and since then the Board has supported a substantial amount of work on this crop because of its global importance.

During 1979 and 1980 the IBPGR supported collecting missions for exploration of banana genetic resources in Thailand. Banana is one of the most important crops in Thailand and there is considerable diversity amongst local cultivars and wild species. Between February and June 1979, 105 accessions (including 84 cultivars) were collected from nine provinces. Between July 1979 and February 1980, 153 accessions from the northeast and central provinces were collected. All samples were collected as

suckers and are being maintained as part of a national banana collection at Pak Chong where they are being evaluated.

In Indonesia, an extensive collection programme of wild banana germplasm was initiated in 1979, supported by the IBPGR. In 1981-82, collections of diploid bananas in West Sumatra and the Lesser Sunda Islands, Irian Jaya and the Moluccas will be made.

The IBPGR has designated, in agreement with the Philippine Government, a collection at Davao, the Philippines, as a regional banana collection for Southeast Asia. In 1978, the collection at Los Baños was duplicated at Davao and this transfer was completed during 1979. In 1980, 29 distinct types were transferred from the Malaysian Agricultural Research and Development Institute (MARDI) to Davao, and the banana collection from Thailand will be duplicated at Davao by the beginning of 1981. Both the establishment and maintenance of the Davao collection, as well as the transfer of material from other Southeast Asian countries, have been supported by the IBPGR.

ROOTS AND TUBERS

Data on the major root and tuber genetic resources collections were included in a survey of collections of vegetatively propagated crops initiated by the Board in 1979. A directory of germplasm collections dealing with several major root crops (aroids, cassava, potato, sweet potato and yams) was published in 1980. Emphasis was given, in the first instance, to those crops of importance in tropical regions. As information is gathered, other root crops, especially temperate ones, will be dealt with.

During 1980 the Board continued to take note of tissue culture research in relation to the conservation of root and tuber germplasm, particularly at the Centro Internacional de la Papa (CIP) and the University of Birmingham, UK

for potato; CIAT for cassava; IITA for sweet potato, yam and cocoyam and the Agricultural University, Wageningen, the Netherlands for aroids. This work is also of great interest as a method for overcoming the quarantine constraints impeding the movement of vegetative materials because the possibilities of spreading diseases, e.g. viruses in potato, sweet potato, yam and aroids and the mosaic and bacterial blight of cassava, can be largely avoided. This was stressed by an International Union of Biological Sciences (IUBS) workshop on recalcitrant seed and in vitro culture techniques in relation to genetic conservation held at Reading, UK in September 1980 (see p. 61).

A training course on evaluation and utilization of root and tuber crops germplasm resources was held in Baybay, Leyte, the Philippines, 24 November to 12 December 1980. This course was jointly sponsored by the Philippine Council for Agriculture and Resources Research (PCARR), the Philippine Root Crops Research and Training Center (PRCRTC) and the IBPGR as part of the IBPGR Regional Programme for Southeast Asia. Two scientists from each of the participating countries in the regional programme, a number of scientists from the Philippines and five scientists from various Pacific islands attended the training course (see p. 72).

Collecting activities continued in 1980 (see Fig. 4).

Potato

The IBPGR has not had the need to convene an advisory committee on potato genetic resources because of the leadership of CIP in this field. CIP convened a planning conference in October 1979 to review plans and policies for potato germplasm exploration. Recommendations were made for specific taxonomic studies, maintenance of collections and their documentation, data management and plant health and quarantine. The up-dated priorities for collecting, taking into account the work already accomplished, were published in the 1979 Annual Report of the IBPGR.

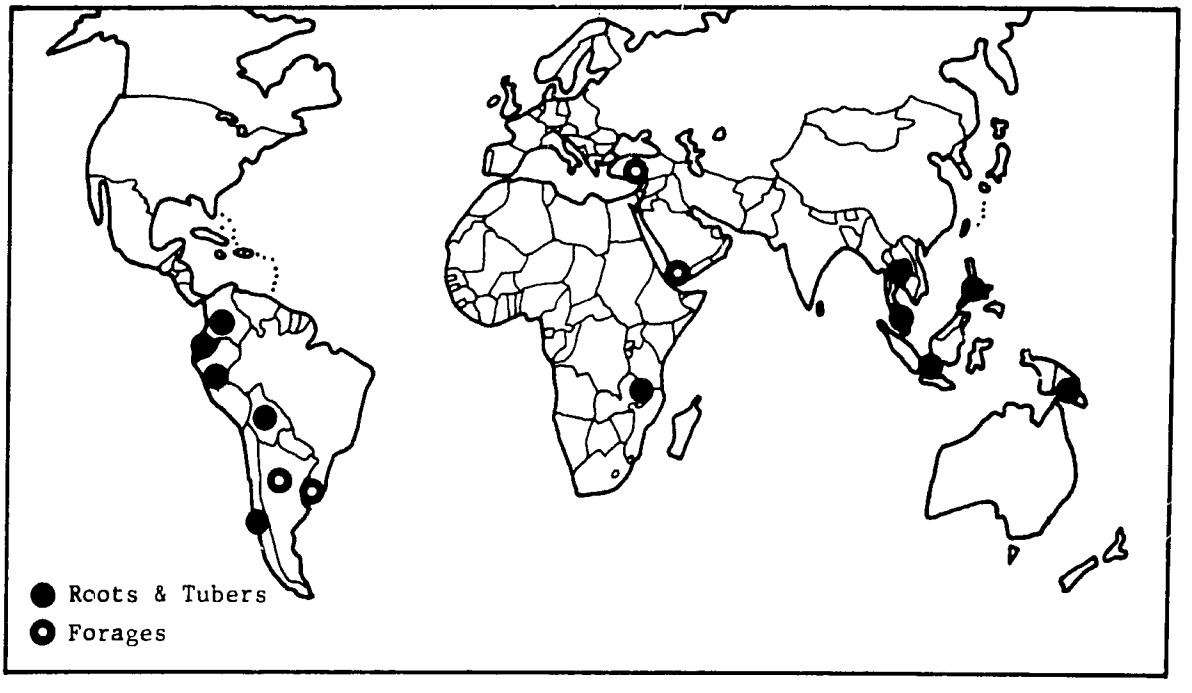
The IBPGR indicated to CIP its willingness to assist with the collecting programmes, and during 1980 funds were provided by the IBPGR to the Instituto Colombiano Agropecuario (ICA) in order to collect wild relatives of potato in Colombia in the Departments of North and South Santander, Boyacá, Cundinamarca, Caldas, Valle, Quindío and Nariño. The work will continue in 1981. This centre works closely with CIP, with the Potato Introduction Center, Sturgeon Bay, USA, and with the world community of potato breeders.

In addition, the collection of potato germplasm in southern Chile continued in 1980 with IBPGR support. This was carried out by the Universidad Austral de Chile with advice provided when necessary by CIP. The collecting has concentrated on wild and semi-cultivated ecotypes of tuber-bearing species, particularly Solanum tuberosum, growing under long-day conditions. The project includes the preliminary evaluation of the material.

Potato exploration in Bolivia, February-March 1980, was organized by the University of Birmingham, UK, and the German/Dutch Potato Genebank (situated at the Institute of Crop Science and Plant Breeding of the Federal Agricultural Research Centre (FAL), at Braunschweig-Völkenrode, Federal Republic of Germany). This expedition was planned and executed in close collaboration with CIP, the Consortium for International Development and the Government of Bolivia. A total of 809 accessions was collected as true seed, tubers, living plants and herbarium specimens.

Subsamples of the collections have been offered to the Bolivian Government and to CIP. Materials for research and storage have been deposited at the German/Dutch Potato Genebank at Braunchsweig, and research material has

Figure 4. Countries where the IBPGR organized or collaborated in collecting roots, tubers and forages



Sweet Potato	Potato	Cassava	Andean Roots and Tubers	Yam	Other Roots and Tubers	Forages
Indonesia	Chile	Malawi	Bolivia	Thailand	Indonesia	Argentina
Malaysia	Colombia	Zambia	Ecuador			Turkey
Papua New Guinea			Peru			Uruguay
Philippines						Yemen A.R.

also be sent to Birmingham and Copenhagen.

Sweet Potato

The IBPGR organized a Working Group on the Genetic Resources of Sweet Potato in collaboration with the US Vegetable Laboratory in Charleston, South Carolina, USA. The meeting was held 5-7 August 1980 and the report, after discussion by the Board, will be published in March 1981.

The reasons necessitating an international sweet potato germplasm programme (including collection, maintenance and distribution) are as follows:

(i) it is an important crop, ranking seventh in terms of worldwide production with an average annual production of about 100 million mt,

(ii) based on calorie yields, nutritive value, adaptability, versatility, its tropical origin and vegetative reproduction, the sweet potato could potentially make a greater contribution to world agriculture in the future;

(iii) the risk of losing significant amounts of germplasm is presently high and is expected to in-

crease; and

(iv) the establishment of international repositories for sweet potato germplasm would greatly speed the realization of the potential for this crop.

The meeting indicated that collecting missions should be organized in the crop's centre of origin (Guatemala, Ecuador, Colombia and Peru) so that samples could be preserved, as fully as possible, of the cultigen and its related wild species. Of second, but also important priority are the varietal populations of sweet potato in the centres of diversity. The important regions are East Africa, China and Southeast Asia (especially the Philippines, Indonesia and Papua New Guinea).

The meeting also emphasized the need for quarantine, both during collection and conservation. It was noted that there should be:

(i) trained collectors at the site of collection who can eliminate many potential pests and diseases through visual observation and pesticide treatment;

(ii) cleaning-up of clonal material by meristem-tip culture at competent centres and that research on meristem culture should be encouraged; and

(iii) use and improvement of a virus-indexing system (currently in the initial stages of development by sweet potato repositories) as a permanent part of the maintenance programmes.

Sweet potato is recognized as a high priority crop in the Southeast Asian region. Consequently, collecting has been undertaken in Indonesia, Malaysia, Papua New Guinea and the Philippines, under the sponsorship of the IBPGR. Further collecting is scheduled for 1981 in Indonesia, Thailand, the Philippines and Malaysia. These collecting missions have been agreed by the IBPGR Regional Committee.

Cassava

A Working Group on the Genetic Resources of Cassava was organized by the IBPGR in collaboration with CIAT, Colombia. The meeting took place at CIAT, 9-11 December 1980 and the report will be discussed by the Board in 1981.

Andean Roots and Tubers

As reported in the 1979 Annual Report, IICA, in association with the Faculties of Agronomy in Riobamba, Ecuador and the Universidad Técnica del Altiplano, Cusco, Peru, carried out extensive collection missions in the Andean Highlands during May-August 1979 with IBPGR support. These missions were organized to collect indigenous crops in the Andean zone of Bolivia, Ecuador and Peru. One thousand accessions were collected of the most important indigenous tuber-bearing crops, oca (*Oxalis tuberosa*), olluco (*Ullucus tuberosus*) and isaño (*Tropaeolum tuberosum*).

OTHER ROOTS AND TUBERS

During 1980, as in previous years, the IBPGR sponsored the collection of a range of root and tuber crops in Southeast Asia, particularly in Indonesia. The species collected have been of the following genera: *Dioscorea*, *Colocasia*, *Alocasia*, *Amorphophallus*, *Curcuma* and *Zingiber*. In 1980-81 the following will be collected: taro in Indonesia; taro and yam in Malaysia; taro, yam, *Curcuma* and *Zingiber* in the Philippines and yam in Thailand.

The descriptors for yam and taro were finalized in 1979 and were published early in 1980.

FORAGES

Following the submission of the report of an IBPGR Working Group on Forages, hosted by the Commonwealth Scientific and Industrial Research Organization (CSIRO) and held at Townsville, Australia in May 1979, and comments received from FAO, the IBPGR felt that there was insufficient information on the present collections of forage germplasm to determine what important gaps needed to be filled. The Board requested the Secretariat to gather information on the existing collections. Computerized procedures were developed to handle information from literature searches and from responses to circulated questionnaires. By the end of 1980 completed questionnaires were still being returned to the Secretariat. Some data were received in machine-readable form on both magnetic tape and diskette.

During 1980, the IBPGR agreed to assign a high priority to forage plants in arid and semi-arid zones. Nonetheless problems arise from attempting to treat forage crops in the same way as other groups of crops in planning genetic conservation. Such problems are caused by the fact that:

(1) there are literally hundreds of species;

(2) our knowledge of most of the species is very limited - in some cases, non-existent;

(3) there may be many other valuable forage species whose value has not been recognized;

(4) for most of the species, cultivated forms differ little, if at all, from the wild forms; and

(5) breeding and management of many forage species is at a relatively primitive stage.

In such cases, genebanks can hope to conserve only a minute proportion of the available genetic resources. Given the wild or semi-wild nature of many forage species, it could be much more effective and economical to conserve genetic resources in situ.

While in situ conservation could be the main and most effective means of conserving forage germplasm resources, collecting must be given priority in several circumstances:

(1) in emergencies, when unavoidable developments pose an immediate threat to vegetation, collecting is essential;

(2) where no in situ conservation can be set-up, and valuable genetic resources do exist, collecting will be the only possible way of conserving those resources. Priorities for such collecting missions can be agreed after the in situ conservation sites have been decided;

(3) for species at an advanced stage of breeding, in situ conservation will not be adequate and collections of landraces and primitive cultivars must be made. This applies to only a very few forage species; and

(4) to study and improve species of proven value as forages, further genetic resources must be made available, evaluated and used.

Although the major IBPGR effort on forages in 1980 concentrated on survey, assistance was given to the National Agricultural Research Station, Kitale, Kenya for the purchase of two compressors for its cold store. This project has assembled and evaluated a large collection of grasses, legumes and forage shrubs. In addition, in collaboration with the Yemen Arab Republic Ministry of Agriculture, two IBPGR collecting missions in that country collected forages during 1980 (see Fig. 4).

In Latin America the IBPGR supported two activities:

(1) The experimental station of Mercedes, INTA, Argentina collected native sub-tropical leguminous forage germplasm (mainly Phaseolus adenanthus). Four hundred and fifty samples of 21 species were collected in several provinces of the country.

(2) During 1980 the Facultad de Agronomía of the Universidad de la República, continued a project started in 1979 to collect native forage grasses and legumes from different regions of Uruguay.

TREES

An exploratory survey on the genetic resources of trees for the improvement of rural living in semi-arid and arid areas of Africa, India, Southwest Asia and Latin America was carried out, with IBPGR support, by the FAO Forestry Department in 1979. The report of this survey was pubished in 1980.

The report recommended the establishment of an action-oriented second phase, wherein priority was given to the collection and conservation of Acacia, Prosopis, Atriplex, Capparis, Euphorbia, Quillaja, Simmondsia and Eucalyptus species. The IBPGR endorsed the report in 1980 and agreed to support field projects on forest gene resources starting in January 1981 under the auspices of a joint FAO/IBPGR project.

INDUSTRIAL CROPS

Beet

At the suggestion of the Breeding and Genetics Group of the Institut International de Recherches Betteraves (IIRB), the IBPGR held a joint meeting in 1979 on the genetic resources of beet. The meeting clearly informed the Board that there are no good collections of beet germplasm in genebanks at present and

that many of the primitive landraces which should be conserved are held by plant breeders. It was recognized that these should be collected together and that wild material should also be gathered.

The priority taxa and geographical areas were listed in the 1979 Annual Report. Since the highest emphasis has to be given to European countries, the IBPGR commissioned a consultant to visit breeders and centres to mobilize the movement of seed into the designated base collection at the genebank, Institute of Crop Science and Plant Breeding of FAL, Braunschweig-Völkenrode, Federal Republic of Germany; to see that small samples are multiplied for this purpose; and to implement the recording of data about samples following the IBPGR descriptor list. The list tentatively agreed upon by the IIRB/IBPGR in 1979 was refined and published in 1980.

In addition to this work, the IBPGR continued the collection of Beta germplasm in Greece in the following islands: Zakinthos, Cephalonia, Meganisi, Ithaca, Levkas; and in part of the southwest mainland and the Peloponnese. Most of the samples obtained were maritima, including a number of biennial forms.

Finally, following a recommendation of the IIRB/IBPGR consultation, a search was made in the mountainous areas to locate populations of B. nana. A report was provided and will be finalized early in 1981.

Cocoa

In July 1980 the IBPGR, in association with the International Office of Cocoa and Chocolate (IOCC) and the American Cocoa Research Institute (ACRI), convened a working group at Arlington, Virginia, USA to advise on action needed on cocoa genetic resources. The working group noted that:

(a) the genetic base of parents used for the production of hybrid cocoa varieties is very limited;

(b) there is severe genetic erosion of cocoa germplasm resources in Latin America; Criollo types are particularly endangered in Central America;

(c) there have been hitherto uncoordinated collecting missions;

(d) some indigenous germplasm in the Amazon Basin has already been lost because of oil exploration and other developments;

(e) immediate attention should be given to collections of Theobroma bicolor, T. gileri, T. angustifolium, T. mammosum, T. grandiflorum as well as Herrania spp.

(f) there is germplasm available in collections that are apparently not known to the cocoa community as to where they are or what they contain; a large proportion of existing material has never been evaluated or utilized and, moreover, there are known major gaps in the collections;

(g) cocoa is highly important as a cash crop in developing countries; there is a great demand for planting material, prompted in part by the role of cocoa in subsistence farming systems for the small farmer (e.g. it takes the place of bush fallow); and

(h) progress with control of major diseases is limited by the lack of diverse germplasm.

The major existing collections in Latin America and the Caribbean were listed, and all other collections, i.e. in Africa and Asia, are to be regarded as secondary collections. The major collections were noted to be not representative of the genepool of cocoa and collecting is urgent in many regions. Also, to date, cocoa breeders have been unable to transfer genetic material from wild species; hence the genetic base of the wild species is not part of the present genetic base of Theobroma cacao. The working group recognized that collections should be expanded to include more wild material in the expectation that difficult crossing barriers can be overcome. In addition, the interest currently being shown in the food oil-producing species will necessitate the screening and use of more wild species. Of the many Theobroma and Herrania species, the following merit attention and should be better represented in collections: Theobroma bicolor, T. speciosum, T. simiarum, T. mammosum, T. angustifolium, T. gileri and T. grandiflorum.

Detailed discussion and the examination of the existing literature led the working group to identify the priority areas for collection as follows:

Criollos

Mexico:	Lacandona area (wild or semi-wild) Chontalpa and Tapachula districts (cultivars)
Guatemala:	Suchitepéquez (relict cultivation) Border area between Guatemala and Belize
Honduras:	Cuyamel and Bajo Aguàn (Criollo types in the jungle)
Nicaragua:	San Jorgé and Valle Menier (plantation material) Nandaime, Masatepe regions and the Chinandega river (relict Criollos)
Costa Rica:	Plains of Los Guatusos
Colombia:	Tuluá, Buga and Cartago in the Cauca valley, Huila district Chinschiná (Caldas) Dibuya (Magdalena)
Venezuela:	Santa Bárbara Catatumbo river Chama valley North of the State of Aragua

Other parts of the genepool

Bolivia:	Mamoré and Alto Beni rivers
Peru:	Ucayali, Huallaga, Marañon and Madre de Dios rivers
Ecuador:	South, bordering Peru (Morona river)
Colombia:	Lower and Putumayo rivers
Brazil:	Obidos area Jari area
Venezuela:	Orinoco river system Guyana border area

Finally, recommendations were made to the IBPGR concerning a proposed framework for action including a collection programme and a conservation network based on a number of national programmes.

The report will be considered by the IBPGR at its meeting in 1981.

Coconut

Following an IBPGR Expert Consultation on Coconut Genetic Resources in

1978, the Board has supported the survey and collection of coconut germplasm in priority areas of Southeast Asia. During 1980, the IBPGR provided funds to the National Plant Genetic Resources Committee of Indonesia to organize the collection of coconuts from the Indonesian archipelago in association with the Industrial Crops Institute. The Board also provided funds to the Philippine Coconut Authority for the establishment of a Coconut Genetic Resources Centre in the Philippines. The Centre will arrange for the collection and preservation of genetic material on a national, regional and international basis.

Towards the end of 1980, the IBPGR provided funds to the Indian Council of Agricultural Research (ICAR) Central Plantation Crops Research Institute to survey and collect coconut germplasm in the Pacific region.

Coffee

A Working Group on the Genetic Resources of Coffea arabica met in Rome 11-13 December 1979 following a survey on coffee germplasm collections conducted by FAO. The report of the meeting together with a list of descriptors, was published by the IBPGR in March 1980.

The report identified the major gaps in the existing collections. These are Ethiopian types, particularly those from semi-wild habitats, and cultivars from India. The Board discussed the report at its seventh meeting in March 1980 and concluded that exploration should be stimulated for Coffea arabica in southwest Ethiopia and the Sudan on a first priority basis, and the Yemens, Uganda, Mozambique and West and Central Africa on a second priority basis.

Following the Working Group meeting, the Ethiopian Government also moved towards identifying the semi-wild habitats of Arabica coffee and to designate important areas as natural reserves.

Cotton

Cotton has been designated as a priority 2 crop for action by the IBPGR and the Board intends to extend its cooperation in germplasm work with Cotton Development International (CDI).

The IBPGR convened a working group in October 1979 to produce a minimum list of descriptors for cotton. The final list was published in 1980 and was made available to all interested scientists and curators. The group felt that there was an urgent need to collect material, particularly the remaining Sea Island cotton from Antigua and Montserrat and old living collections once held by the Empire Cotton Corporation in the Sudan and along the ancient trade route in East Africa. The group also recommended systematic expeditions to collect the range of species.

Following the above recommendations the IBPGR provided a grant to the Institut de Recherches du Coton et des Textiles exotiques (IRCT) to collect cotton germplasm in the Caribbean region. During January-February 1980, the IRCT team explored Antigua, Barbados, Dominica, the Dominican Republic, Guadeloupe (including La Désirade, Marie Galante and Les Saintes), French Guyana, Haiti, Martinique, Montserrat, Nevis, St. Barthélémy, St. Lucia, St. Martin and the St. Vincent Islands and collected ca. 250 samples. The material has been deposited in Guadeloupe where the samples will be multiplied before being put into long-term storage at Montpellier, France.

The samples collected consisted of 80 percent Gossypium hirsutum and 20 percent G. barbadense. Populations of the species showed wide variation in several morphological characteristics. In the Dominican Republic, the team collected a sample from a spontaneous cotton plant which could be a new race of G. hirsutum.

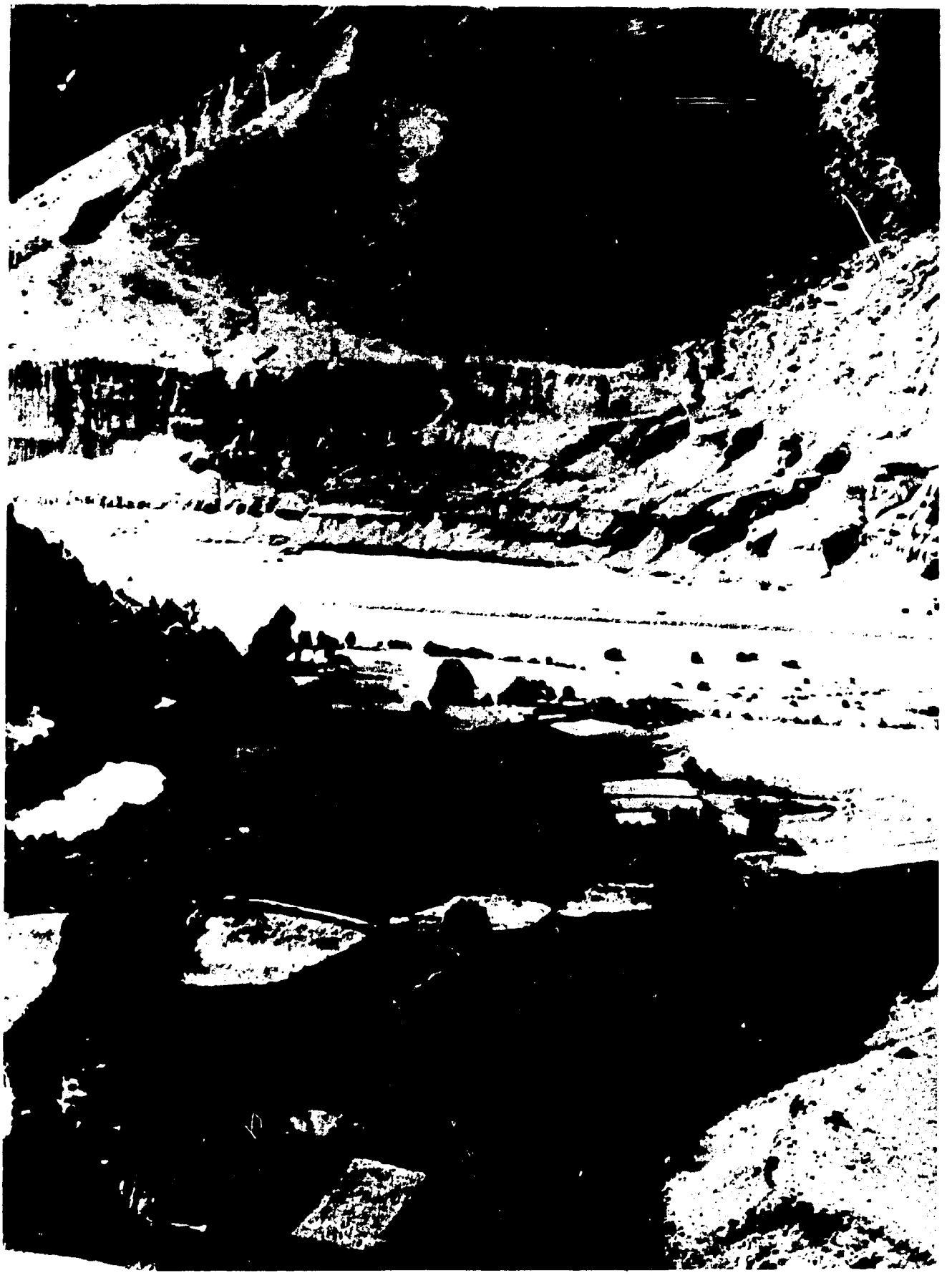
At the end of 1980, the IBPGR made another grant to IRCT for further collec-

ting of cotton in Colombia, Ecuador, French Guyana, Peru and Venezuela in 1981.

Grape

At the invitation of the IBPGR, a Working Group on Descriptors for Grape met in Rome in early September 1979. The descriptor list developed by this Working Group, together with those prepared by the International Union for the Protection of New Varieties of Plants (UPOV) and the Office International de la Vigne et du Vin (OIV), were used to develop a descriptor list acceptable for those concerned. Prof. G. Alleweldt, Bundesforschungsanstalt für Rebenzüchtung, Geilweilerhof, Federal Republic of Germany, is coordinating this effort and it is expected that the descriptor list will be finalized during an expert meeting in February 1981.

As a result of the recommendation of the Working Group to stimulate research into alternative storage methods, the IBPGR agreed to support a two-year project for the maintenance of proliferating grapevine shoots *in vitro* at low temperatures, close to but above freezing. This project started in June 1980 and is being carried out at the CSIRO Division of Horticultural Research, Adelaide, Australia.



REGIONAL ACTIVITIES

EUROPE

In the 1979 Annual Report it was mentioned that a Government Consultation had given unanimous approval to a proposed United Nations Development Programme/FAO European Cooperative Programme for the Conservation and Exchange of Genetic Resources for Plant Breeding (ECP). The IBPGR's Executive Secretary has provided technical backstopping for the European Programme, and in 1980 an ECP Executive Secretary (the Vice-Chairman of the IBPGR) was appointed to coordinate the work. Close links have been maintained in 1980 between the institutions participating in the ECP and those in the developing world which are part of the IBPGR's network.

The programme was declared operational in 1980 and a majority of the countries signed a project document. In December 1980 the first meeting of the Governing Board took place in Geneva and it was marked by tremendous enthusiasm for cooperative action. Since a great deal of germplasm is maintained by European institutions, improvement in the cooperation among these institutions with respect to the exchange of germplasm is likely to lead to improvements in plant breeding with resulting benefits not only to the European nations but to developing countries as well.

The Governing Board approved the designation of a Scientific Advisory Committee, based on the EUCARPIA Genebank Committee with the addition of three more members; the designation of centres to coordinate work on specific crops; and generally agreed on the principles to be adopted in documentation procedures.

Within the context of the ECP, subregional activities will form important parts of the programme. Those include the IBPGR Mediterranean Programme, the Nordic Genebank (covering the five Nordic countries), the Council for Mutual Economic Assistance (CMEA) Programme for the Socialist countries and the EEC Programme on Better Use of Genebanks and Disease Resistance.

MEDITERRANEAN

A programme in the Mediterranean has been in operation since 1975. With United Nations Environment Programme (UNEP) funding originally, and subsequently with IBPGR funds, the programme concentrated in the initial phases on the exploration and collection of priority crops in this region that were threatened by genetic erosion. Recently, increasing attention has been paid to the need on the one hand to create trained manpower, and on the other to conserve and evaluate collected germplasm.

In June 1980 operational oversight and coordination of the programme was delegated to the Germplasm Institute of the Italian National Research Council (CNR), Bari and national coordinators of participating countries informed. This development resulted from a regional meeting held in March 1979 attended by representatives from Algeria, Cyprus, Egypt, Greece, Italy, Portugal, Spain, Tunisia and Yugoslavia. This meeting pointed to the advanced nature of the work at Bari and the IBPGR has provided funds to the Institute to provide a small secretariat for the programme.

Apart from those countries listed above Libya and Morocco have also been

involved in the programme. The whole of the region is important as a centre of origin and genetic diversity of many groups of cultivated plants. The most important are cereals and grain legumes and as a result special attention has been devoted to the collection of these crops. The IBPGR wishes to extend the range of crops covered and in 1981 will discuss a plan including the priorities for the different crops. Practical action has been underway on beet since 1978 (see p. 32).

The IBPGR has suggested that seed conservation centres divide the responsibilities for holding regional material of the crops. In addition to the excellent facilities at Bari, the IBPGR has assisted in the construction of genebanks in Spain (near Madrid) and in northern Portugal (at Braga) although the construction of the latter has been delayed. These genebanks will assume regional responsibility for grain legumes and maize respectively. The Germplasm Institute at Bari assumes world responsibility for wheat and regional responsibility for other cereals; it also holds material of crops for which responsibility has not been designated. During 1980 the IBPGR agreed to provide funds to the Cereals Institute, Salonika, Greece for the equipment of a national genebank. It is felt that these four seed stores should provide adequate conservation facilities for the region.

At present the Institute at Bari is the only centre fully equipped for data management, and Bari has provided information when required by programmes in other countries. The IBPGR, at the request of the Greek Government in 1980, provided technical assistance to initiate documentation activities for the genetic resources collections in Greece (see p. 64).

Four major collecting missions were organized in 1980 for the Mediterranean region as follows:

Southern Italy:

A joint Italian/GDR team visited northeastern and southern Puglia, eastern and northeastern Basilicata and eastern Campania to collect grain legumes, vegetables and some oil and medicinal plants. A total of 461 samples were obtained.

Egypt:

The Bari Institute collected wheat in the Nile delta.

Spain and Portugal:

A Spanish/Portuguese/Peruvian team explored western and northwestern Spain and southern and southeastern Portugal for lupins and rye.

Greece:

Beet collecting continued (see p. 33).

Concerning the IBPGR's ongoing training efforts, both of the trainees supported as part of the Mediterranean programme in 1980 were from Greece; one participated in the post-graduate course at the University of Birmingham, UK and the other attended a short technical course also at Birmingham.

SOUTHWEST AND CENTRAL ASIA

The Board has directed its support for the collection and conservation of the plant genetic resources of Southwest and Central Asia through an FAO project (TF:REM 31/IBPGR) executed by the Agricultural Operations Division of FAO with considerable technical collaboration by the Board's Secretariat.

In 1980 the Board also financed and organized collecting in the Yemen Arab Republic, field work that is quite independent of REM/31 which concerns only the following six countries:

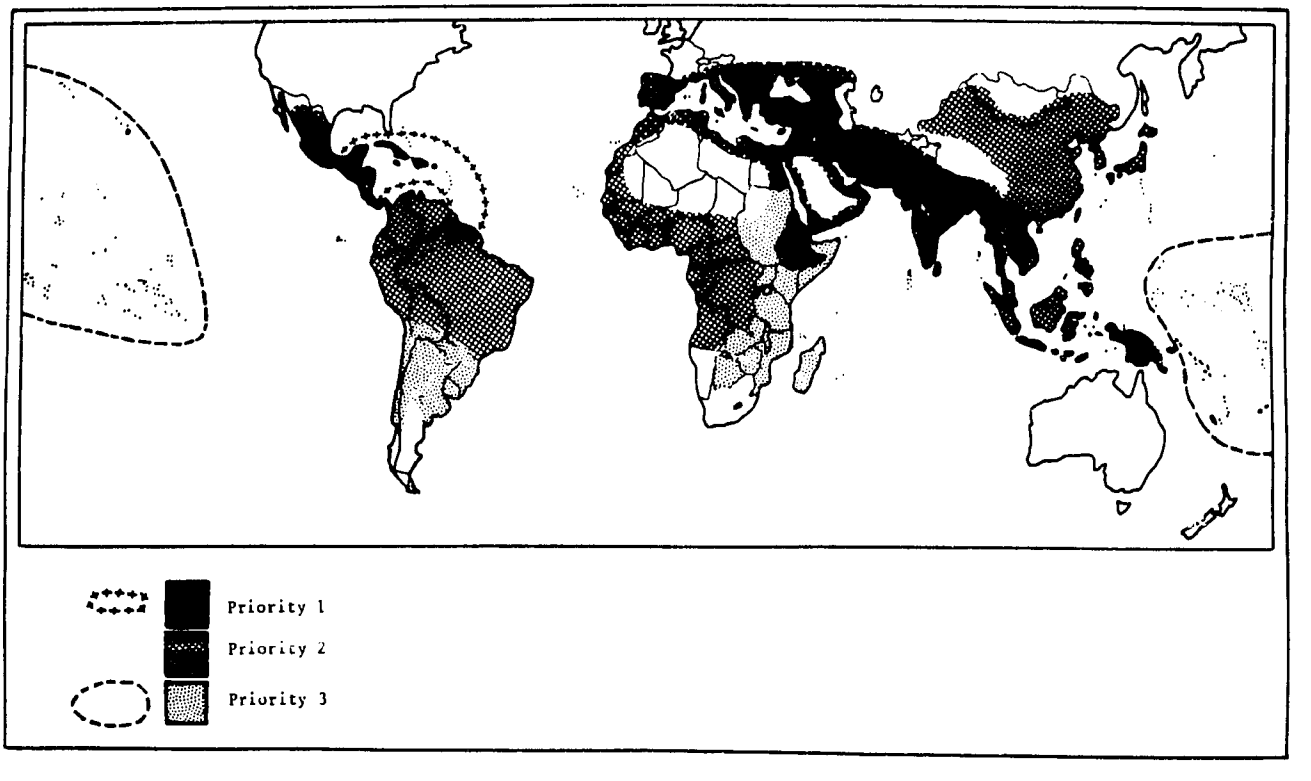
Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey.

The Board accepted responsibility for the project three years ago. Since then it has suffered many setbacks as a result of political and social upheavals in several of the host countries. These, and other circumstances related to the history of the project, point to the need to review the situation in 1981 to consider what course to adopt in the immediate future.

A survey of the situation in the first half of 1977 by Dr. K.S. Dodds, on behalf of the Board, showed that while the national programme in Turkey was well established and progressing well, there was little to show for the time and funds that were devoted to the previous project in the other countries - Afghanistan, Iran, Iraq, Pakistan and Syria.

These findings confirmed the Board's view that its programme in the region should consist essentially of support for national programmes, with regional aspects held somewhat in abeyance pending future developments.

By the end of 1978, considerable progress could be reported. Two FAO experts (Drs. Perrino and Witcombe) were posted in Iran to further the interests of the project: coldstores for medium-term storage of seeds were in operation in Afghanistan, Iran, Iraq and Syria; and in each of these countries the seed processing equipment supplied under REM/5 had been brought into use. Pakistan was the only country without facilities, largely owing to complications caused by the development of a new field station under the aegis of the United States Aid for International Deve-



The IBPGR Regional Priorities (updated 1981)

lopment (USAID). Each country had at least one graduate in its national programme who had been to Birmingham University for training; some had two i.e. Afghanistan, Iran, Pakistan and Turkey. Active collecting programmes were suitably underway in Afghanistan under Mr. Rashid and colleagues and in Iran under the guidance of the two FAO experts. Indeed, thanks to their efforts, the Iranian genetic resources unit was well on the way to becoming a thriving genebank.

In January 1979 the two experts were evacuated from Iran and, as far as can be judged, the genetic resources unit was disbanded. Certainly the coldstore is no longer operable. Whether or not the collections are still extant is not known since lines of communication are completely severed.

In mid-1979 field activities in Afghanistan were brought to a standstill following political changes. Only very limited contacts with the genetic resources unit have been possible since then.

Despite political and severe economic restraints, the Turkish programme moves along at a fairly steady pace and Pakistan's programme is beginning to flourish after a slow start.

The current situation

Afghanistan

During a very short visit to the unit in July 1980, the project coordinator found that it was still in existence although collecting is at a standstill. Work in Afghanistan must inevitably be mainly in the field owing to a complete lack of properly equipped laboratories. There is little likelihood of any significant change in the near future.

Pakistan

A start was made early in 1979 to provide laboratory and storage facilities for a plant genetic resources unit; and by mid-1980 the modification of a field store to provide a small set of laboratories and a coldstore for medium-term seed storage was completed. The Agricultural Research Council had met all the costs except that of the three cooling units supplied by REM/31. Germplasm conservation and utilization now enjoys high priority in the programme of work.

Plans for further collecting are well in hand. An expedition supported by the Board, in which two specialists from the Foundation for Agricultural Plant Breeding (SVP), Wageningen, the Netherlands will participate, expects to work in Baluchistan in 1981.

Syria

Early in 1980, the Director General of the Agricultural Research Directorate, Douma, agreed that IBPGR officer Dr. Witcombe could be outposted to ICARDA, Aleppo from where he is well placed to serve the Syrian national programme on genetic resources, collaborate with staff of ICARDA on all aspects of germplasm management and assist other national programmes when so called upon. Dr. Witcombe moved to his new duty station (Aleppo) in May 1980.

A collection of wild material was made in 1980 in Syria. Two hundred and six samples of *Aegilops* and wild *Triticum*, 27 *Hordeum vulgare*, 40 *H. spontaneum*, 22 *Triticum aestivum/turgidum* and 3 *Avena* spp. were collected.

Turkey

A full programme of field surveys and collecting was completed in 1980 despite difficulties with transport.

Crops are being dealt with at the Aegean Regional Agricultural Research Institute (ARARI) in eight groups - cereals, food legumes, industrial crops, fruit crops, vegetables, forage crops, medicinal plants and ornamentals. Although collecting expeditions range over most of Turkey, attention is now concen-

trated on districts in which little or no collecting has been done previously. The only plant group which was not collected in 1980 were cereals. Emphasis is now being placed on food legumes (other than Phaseolus which is well collected) and fruit trees.

Although two new compressors supplied by the project, one for an 0°C room and the other for the -15°C chamber, have been fitted, the latter chamber is still not being used. The Board has offered to give financial support towards a thorough overhaul of the suite of cold chambers.

A notable development occurred in May when, through IBPGR technical assistance, Executive Information Retrieval (EXIR) became operational for the 1970-78 genebank data (see p. 64).

The Board has expressed concern that duplicate sets of collections should be sent elsewhere for long-term storage so that the valuable material of Turkey can be safeguarded.

SOUTH ASIA

South Asia is recognized as one of the regions with immense diversity of crops of national, regional and global importance. The latter include: rice, sugarcane, citrus, mango, banana, jute, eggplant and many millets, oilseeds and legumes. The increasing use of modern high-yielding cultivars is leading to the rapid disappearance of the local genetic wealth.

An IBPGR workshop on the genetic resources of the region, held in May 1978 at New Delhi, led to important recommendations being accepted by the Governments of Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka. In order to implement cooperative activities, country liaison officers were designated in 1980.

In accordance with the wishes of the countries, the Board has been encouraging the establishment of genetic resources units, has assisted in the exploration and collection of crop germplasm, and provided fellowships for training to increase the numbers of trained personnel.

India possesses a comprehensive national genetic resources programme. A National Bureau of Plant Genetic Resources (NBPGR) was established in August 1976 at New Delhi to coordinate a system for the collection, introduction, distribution and storage of all crops. The Bureau has assembled more than 40,000 indigenous accessions and is gradually evaluating these for use in plant improvement programmes. The NBPGR uses a number of regional stations for rejuvenation and evaluation. In 1980 the NBPGR organized multi-crop collecting missions to various parts of the country. In addition, agricultural research institutes and universities have been involved in collecting and evaluation.

At the request of the IBPGR the Government of India organized a National Workshop on Documentation of Plant Genetic Resources at the NBPGR, New Delhi, in November 1980. At this meeting, curators and breeders discussed their documentation problems and a number of important decisions were made regarding a national system (see p. 65).

The NBPGR organized a "Summer Institute" on techniques for collection, maintenance and conservation of germplasm of agricultural and horticultural plants in May-June 1980. Twenty-six participants from various universities and agricultural research institutes attended. In September 1980, with IBPGR support, the NBPGR organized the second South Asian training course on Plant Exploration and Collection Techniques. Participants from Bangladesh (2), India (5), Indonesia (1), Sri Lanka (1) and Thailand (1) attended the course.

The Bangladesh Agricultural Research Institute (BARI) has established a plant genetic resources unit and has formulated a national committee consist-

ing of members from BARI and other research centres and universities. The Committee met in July 1980 under the Chairmanship of Dr. K.M. Badruddoza and agreed to establish a seed storage facility in Dacca. At the end of 1980 the Board agreed to provide funds for the purchase and installation of refrigeration equipment and internal shelving.

In February-March 1980, BARI continued the collection of food legume germplasm in Rajashahi, Bogra, Rangpur, Tatulia and along the border areas of Bangladesh and India with IBPGR support.

In Bhutan, Burma, Nepal and Sri Lanka efforts are being continued for the establishment of genetic resources programmes.

In 1980 the Board awarded IBPGR/UNEP and IBPGR fellowships to nominees from the Governments of Bhutan, India, Nepal and Sri Lanka for post-graduate training at the University of Birmingham, UK. Fellowships were also provided to an Indian participant to attend a short course at Birmingham and participants from Bangladesh, Burma, India, Nepal and Sri Lanka attended the IBPGR technical training course on Collection and Conservation of Perennial Crops held in Thailand (see p. 71).

SOUTHEAST ASIA

The Board considers the IBPGR Southeast Asia Programme to be a model of its kind for cooperation within a region. Each project follows a pattern of organization suitable to the requirements of the country concerned and all projects assisted by IBPGR funds are approved by the Regional Committee.

The Regional Programme has a base seed storage facility in the Philippines, which is now operational, and a medium-term seed storage facility was built in Indonesia in 1979. The Board also agreed in 1979 to fund equipment for a small, medium-term seed storage facility in Thailand, which was completed in 1980. Along with the national storage facilities in the Philippines and Malaysia, these will ensure the safe conservation of seed material.

A regional collection of bananas has been established in Davao, Philippines, and the Regional Committee has undertaken to clarify the responsibilities of the various participating countries and institutions for other collections of vegetatively propagated material.

During 1979 Prof. R.B. Singh took up his post as the IBPGR Genetic Resources Regional Officer, with headquarters in the FAO Regional Office in Bangkok, Thailand. Dr. N. Chomchalow of Thailand, a member of the IBPGR, chaired the IBPGR Regional Committee for Southeast Asia during 1980. The Committee held its third meeting at Chiang Mai, Thailand, 10-12 July 1980.

Recognizing the need to keep priorities under continuing review, the Committee reviewed those which had previously been assigned to the crops of the region and agreed that the following should be given high priority for action:

- High altitude rainfed rice in Thailand;
- Durian in Indonesia, Malaysia and the Philippines;
- Rambutan in Indonesia, Malaysia and the Philippines;
- Soyabean in Indonesia;
- Coconut in all countries, except Papua New Guinea;
- Mango in Malaysia and the Philippines;
- Banana in Indonesia and Malaysia;
- Vegetables in all countries except Papua New Guinea, especially:

  Amaranth (Amaranthus spp.), Bitter gourd (Momordica charantia), Eggplant (Solanum melongena and related species), Ipomoea aquatica and Yardlong

bean (Vigna unguiculata subsp. sesquipedalis)

- Indigenous leafy vegetables in Papua New Guinea and Thailand;
- Tuber crops, especially:
  (i) throughout the region: Cassava, Sweet Potato, Dioscoreaceae and Araceae; and
  (ii) Zingiberaceae in Indonesia; and
- Winged bean in Papua New Guinea and the Philippines.

In addition to the above high priority crops, the Regional Committee noted that the following have great economic importance in the region: rubber, oil palm, coffee, tea, cocoa, sugarcane, pepper, Citrus, pineapple, maize, tomato and cabbage. Of these only sugarcane, pepper and Citrus originated in the Southeast Asia region; all others have been introduced. However, the germplasm of these crops is important to the countries and it needs to be collected, maintained and made available. The Malaysian member of the Committee indicated that arrangements for an international expedition to collect rubber germplasm were fairly advanced, and it was anticipated that collecting will commence in 1981. Other plants which the Regional Committee advised member countries to keep under review include orchids, rattans and medicinal plants.

As recommended by the second meeting of the Regional Committee in 1979, Prof. Singh prepared a background report for the region on the genetic resources of pasture and forage legumes. It was recommended that an ad hoc working group be formed within the region with the objectives of defining the species of potential value and the degree of erosion, and to suggest procedures for action on forage legumes. This working group will include both genetic resources workers and users, and each country will designate one or two competent scientists. The CSIRO Division of Tropical Crops and Pastures and CIAT will also be invited to participate.

The Committee stressed that forest genetic resources, other than those of interest for timber, are often neglected. The eighth World Forestry Congress in Jakarta, 1978, had recommended that genetic resources, especially in the Southeast Asian countries, should be conserved. The importance of in situ conservation has been recognized in the region by the formation of biosphere reserves in cooperation with Man and the Biosphere Programme of Unesco (MAB); the Committee would support efforts to obtain inventories of species of economic significance within them.

A number of collecting missions were fielded by several Southeast Asian institutes during 1980 and received assistance from the IBPGR. The following countries were explored for the crops listed.

Indonesia:	-	wild and cultivated bananas
	-	root and tuber crops
	-	coconut
Papua New Guinea:	-	Abelmoschus manihot (aibika)
Philippines:	-	tropical fruits
	-	coconut
Thailand:	-	wild and cultivated bananas
	-	tropical fruits (mainly durian, rambutan and mango)
	-	food legumes
	-	Momordica spp.
	-	indigenous vegetables
	-	amaranths
	-	yam
	-	upland rice

Whilst exploration and conservation activities received most attention during 1980, evaluation and utilization of the existing collections need further action. Closer relationships between breeders and related scientists, and the curators of the germplasm collections is an important step in this direction. Special efforts are needed to bring information on germplasm collections to the cognizance of breeders who are not directly associated with collections, and to enlist their co-operation in the evaluation of working collections under their control. In order to facilitate closer links between genetic resources workers and users, it was suggested that a one-day workshop, preceding the Society for the Advancement of Breeding Researches in Asia and Oceania (SABRAO) Conference in May 1981, be convened to discuss better utilization of existing genetic resources. The workshop will be jointly sponsored by the Regional Committee and SABRAO.

The Regional Committee convened a working group to agree on a minimum list of descriptors for mung bean. This met in March 1980 in Bangkok, Thailand and the list of descriptors was published by the IBPGR later in 1980.

Descriptor lists on tropical fruits, winged bean, taro, yam and mung bean have now been produced. The value of the tropical fruit descriptors was discussed by a working group in Bangkok, 14-15 July 1980 (see p. 25). It was suggested that in the immediate future all the descriptor lists in use should be evaluated for their validity and practicability and, if need be, revised. No new descriptor lists will be prepared in the region until this exercise has been completed. It was agreed that all collection and evaluation activities should use the IBPGR descriptor lists, whenever these are available.

The Thai National Plant Genetic Resources Coordinating Sub-Committee, through its member institution, the Thailand Institute of Scientific and Technological Research (TISTR), has started a programme to document genetic resources. The IBPGR Secretariat provided technical assistance during 1980 to start the operation by filing the evaluation data on magnetic tape in machine readable format. Such a system has now been installed at TISTR for winged bean and tropical fruits. It is hoped that this work will continue, including the other genetic resources collections in Thailand, especially those crops that have been collected with IBPGR support. This will complete the centralized documentation of genetic resources collections in Thailand and provide a valuable and time-saving source of information for field workers. The other countries in the region are presently assembling information on existing collections manually.

In order to increase the dissemination of information about collections, the IBPGR Regional Officer will obtain detailed lists of holdings and information on their size, scope and representation.

The Thai National Plant Genetic Resources Coordinating Sub-Committee, together with TISTR and the Northern Region Agricultural Development Center, organized a regional training course on Collection and Conservation of Perennial Crops 30 June to 25 July 1980 under the sponsorship of IBPGR. Twenty participants from 10 countries attended, including some from five South Asian countries as well as some from the five Southeast Asian ones (see p. 71).

A regional training course on Evaluation and Utilization of Root and Tuber Crops Germplasm, with special emphasis on yam and taro, was held in the Philippines in November-December 1980. The course was organized by PCARR and PRCRTC in the Philippines and sponsored by the IBPGR (see p.72). Besides scientists from Southeast Asian countries, additional participants from the Pacific attended.

Two students, one from Indonesia and the other from the Philippines, successfully completed post-graduate training in genetic resources at the University of Birmingham in 1980.

EAST ASIA AND THE PACIFIC

The IBPGR proposed in 1977 that negotiations be held with Japanese scientists and administrators to hold a regional meeting in Japan. Dr. M. Iizuka, Dr. K. Sakai and Dr. Y. Takahashi were especially helpful in these negotiations. Japanese scientists were already active in IBPGR programmes and a strong genetic resources system coordinated by the Ministry of Agriculture, Forestry and Fisheries (MAFF) had been created. The IBPGR charged Dr. J.L. Creech to make the arrangements. Following planning meetings held in Japan in 1978 and 1979, it was agreed that the IBPGR would sponsor a symposium on genetic resources in East Asia and the Pacific Islands with the support of the Government of Japan through the Agriculture, Forestry and Fisheries Council of MAFF. It was recognized that the participation of scientists from the People's Republic of China was indispensable to the success of the symposium. Furthermore, those major users of genetic resources of East Asia and the Pacific, namely Canada, Australia and the United States, were essential participants.

The Symposium was held at Tsukuba New Town 21-24 October 1980 and was attended by scientists from Australia, Canada, China, Fiji, Japan, the Republic of Korea, the Solomon Islands, Tuvalu, USA, the Republic of Vanuatu and Western Samoa. International and regional organizations participating included ORSTOM, the International Soybean Program (INTSOY), IRRI, SABRAO, the South Pacific Commission (SPC), the IBPGR Regional Genebank for Southeast Asia, AVRDC, the IBPGR Southeast Asia Regional Programme and the IBPGR. All countries and organizations provided reports on ongoing programmes.

The objectives of the Symposium were to:

(a) bring together scientists from countries in East Asia and the Pacific Islands to report on the status of genetic resources in their respective countries;

(b) determine what kind of cooperation might be developed among partici-

Sweet potato: a high priority in the Pacific

pating countries to further genetic resources conservation in the regions;

(c) develop plans for the collection, preservation and use of genetic resources of priority interest;

(d) recommend a plan of action that IBPGR could pursue with participating countries; and

(e) recommend what role the IBPGR might undertake in the programmes to be developed within the regions.

The Symposium identified the priority crops for action as follows:

East Asia:

- rice in China
- barley in China
- Pennisetum spp. in China
- foxtail millet (Setaria italica) in China and Korea
- sorghum in China and Korea
- maize in Korea
- oleiferous brassicas in China
- Chinese cabbage and other edible brassicas in China
- soyabean in China and Korea
- mungbean in Korea
- buckwheat in China
- leek and other Allium spp. in Japan
- deciduous fruits in China
- forage legumes in Korea
- tea in China
- mulberry in China

Pacific:

- rice
- aroids
- sweet potato
- cassava
- yam
- winged bean
- aibika
- coconut
- banana
- sugarcane
- Pandanus spp.

The Symposium agreed that two regions should be recognized and action plans should be developed for both. The IBPGR will consider the proposals at its meeting in 1981.

AFRICA

Africa south of the Sahara includes three important centres of diversity: Ethiopia, tropical West Africa and East Africa. Crops which originated or have been domesticated in Africa include sorghum, pearl millet, African rice, Digitaria spp., cowpea, Bambara groundnut, sesame, castor, Elaeis guineensis, yam, watermelon, Coffea spp., Gossypium herbaceum, okra, roselle and many others.

Following the widespread drought in the Sahel, UNEP funds were mobilized for the collection of millets in 1975. This continued in 1976-80 with IBPGR/UNEP funding in several parts of Africa for the collection of sorghum, millets, African rice, cowpea and other crops.

As in previous years, the Board has maintained close links with the work being undertaken by IARCs - IITA and ICRISAT -, by regional organizations - IRAT, the Organization of African Unity (OAU), ORSTOM and the West African Rice Development Association (WARDA) - and by national programmes for the collection and maintenance of plant germplasm. The following activities were accomplished in 1980.

Guinea

IRAT and ORSTOM jointly carried out the collection of African rice in the Revolutionary People's Republic of Guinea with support from IBPGR and UNEP in November-December 1979. Guinea consists of four main natural regions: maritime or lower Guinea, middle Guinea, upper Guinea and forest Guinea. In all the regions, Oryza glaberrima and O. sativa were collected. A few samples of O. longistaminata and O. brevilligulata were sampled in parts of upper and lower Guinea.

Malawi

In April-May 1980 the IBPGR organized a collecting mission in close collaboration with the Department of Agriculture. This was a continuation of the work started in 1979 and was undertaken at the request of IITA. The principal diversity collected included African rice (142), maize (83), sorghum (78), finger millet (72), pearl millet (22), French bean (126), cowpea (108), Bambara groundnut (63), okra (30), Lima bean (19), cassava (17) and other crops (43).

Zambia

The eastern and northern provinces of Zambia were surveyed in June-July 1980 in association with ICRISAT. The mission was funded by the IBPGR and IITA and organized in close collaboration with the Ministry of Agriculture, Zambia. The objective was multi-crop collecting, and as a result widely varied agro-ecological terrains were covered. A total of 997 samples were collected: sorghum (259), African rice (72), finger millet (110), maize (74), pearl millet (24), French beans (119), cowpea (75), Bambara groundnut (67), groundnut (82), Lima bean (14), pigeonpea (21), cassava (24), okra (16) and other crops (40). Considering the large area involved and the distribution of crop diversity, the IBPGR plans to continue the work in Zambia in May-July 1981.

Sudan

During September 1980 an IITA/IBPGR team explored the equatorial provinces of Sudan. The expedition was organized in close collaboration with the Sudanese Ministry of Agriculture. The southern regions of Sudan have received relatively little attention in the past. In this region sorghum, millets, groundnut, cowpea and a few other crops rate a high priority. The material collected included cowpea (57), wild Vigna spp. (13), groundnut (27), green gram (23), Phaseolus spp. (11), Bambara groundnut (15), sorghum (48), maize (30), finger millet (20), Oryza sativa (11), O. longistaminata (9), Amaranthus spp. (29), okra (22), sesame (19) and various vegetables (24).

In addition, in 1980 the IBPGR also provided funds to the Agricultural Research Corporation, Wad Medani, Sudan for the collection of wheat germplasm in the Jebel Marra region, and the Genetic Resources Unit of ICRISAT collected sorghum and millets in the southeast.

Botswana

In May 1980 ICRISAT, in cooperation with the Government of Botswana, collected photo-insensitive sorghums (Durra-Kafirs) as well as pearl and finger millet.

Ethiopia

Since Ethiopia represents an important centre of diversity, in the past scientists and/or organizations have visited Ethiopia to collect useful material. Ethiopia still remains a high priority area for many plant species.

The Plant Genetic Resources Center

in Ethiopia was established in 1976 in Addis Ababa under a bilateral agreement between the German Agency for Technical Cooperation (GTZ) of the Federal Republic of Germany and the Government of Ethiopia. The storage facilities became fully operational in 1979. The Center has fielded a number of missions in different parts of the country and collected germplasm of various crops. In 1980 the IBPGR assisted the Center in Ethiopia to collect wheat, barley and legume germplasm in the highlands in June-July, and in the Gojam and Gondar regions in November-December. The IBPGR has also cooperated with GTZ and the Genetic Resources Center in Ethiopia to decide upon an appropriate documentation system.

Germplasm collecting in East Africa

Madagascar

The Genetic Resources Unit of IITA explored Madagascar in August-September 1980 in association with national counterparts. Samples of African rice, Bambara groundnut, cowpea, Phaseolus, groundnut and winged bean were collected.

Kenya

An FAO/Kenya project (financed by Norway) on the exploration and evaluation of forages has assembled a large collection of grasses, legumes and forage shrubs; their evaluation was continued in 1980. The seeds are being stored in a medium-term store at Kitale.

Gambia

An ICRISAT mission visited Gambia and collected samples of sorghum, millet and groundnut during November 1980.

During 1980 the Board also established contacts with the Governments of Ghana, the Ivory Coast, Senegal and Upper Volta and the acceleration of work in this zone is being planned.

During 1979-80 the IBPGR awarded fellowships to two scientists from Kenya to undergo post-graduate training in genetic resources at the University of Birmingham, UK. For the 1980-81 session, the IBPGR awarded an IBPGR/UNEP fellowship to a scientist from Ghana and another scientist from Uganda was awarded an IBPGR fellowship.

IITA organized a short training course on crop genetic resources conservation in February-March 1980, for Anglophone Africans. This was funded by IBPGR and was held at IITA headquarters. Thirteen participants from six countries - Ghana (2), Kenya (1), Liberia (1), Nigeria (6), Sierra Leone (1), and Uganda (2) - attended the course (see p. 71).

LATIN AMERICA

Numerous crops of world importance have their centre of origin in various parts of Latin America: maize, Phaseolus, Capsicum, upland cotton, squash and pumpkins in Mexico and Central America; tomato, sweet potato, potato, papaya, Lima bean and cotton in the Andean zone; cacao, rubber, pineapple, ground-

nut and cassava in the Amazon zone and a number of important forage plants in the Southern Cone. Many other crops which originated in the region only have local importance, although they are the major, sometimes unique, source of protein and calories for large indigenous populations (quinua, tarwi, kañiwa, oca, olluco, isaño, pejibaye, etc.).

Only very recently has real concern for genetic resources, and active programmes to preserve them, begun in Latin America, and then only in some countries. In Costa Rica a regional centre for genetic resources is already very active; in Brazil, Mexico and Colombia official national centres for genetic resources have recently been created; but in many cases the concern and enthusiasm shown at a technical and scientific level have not yet had the necessary official support. The Genetic Resources Centre at CATIE, Turrialba, Costa Rica, funded bilaterally by GTZ, Federal Republic of Germany, is continuing to play a major role in the coordination of genetic resources activities in Central America. In addition, during the last two year, IICA of the Organization of American States (OAS), which has representatives in most Latin American countries, has increased its interest in genetic resources and has cooperated with the IBPGR in a number of regional activities.

The degree of collaboration among the Latin American countries on genetic resources matters varies greatly, depending to a large extent upon the crops and countries involved. Great differences in local ecological, social, economic and political conditions make systematic cooperation across borders difficult. Cooperative activities are usually initiated by breeders for specific important crops, with the goal of creating new, better adapted varieties.

The IARCs located in Latin America are closely involved with the IBPGR programme for the genetic resources of their mandate crops: both CIP and CIAT are designated by the IBPGR as base storage centres (for potato and Phaseolus respectively) and both CIAT and CIMMYT cosponsor three of the IBPGR Crop Committees viz. Phaseolus, wheat and maize.

The IBPGR supported international, regional and national organizations to carry out genetic resources activities in Latin America during 1980. Those activities executed in two or more countries are listed first and those of major interest in a single country follow in the report below.

Regional activities

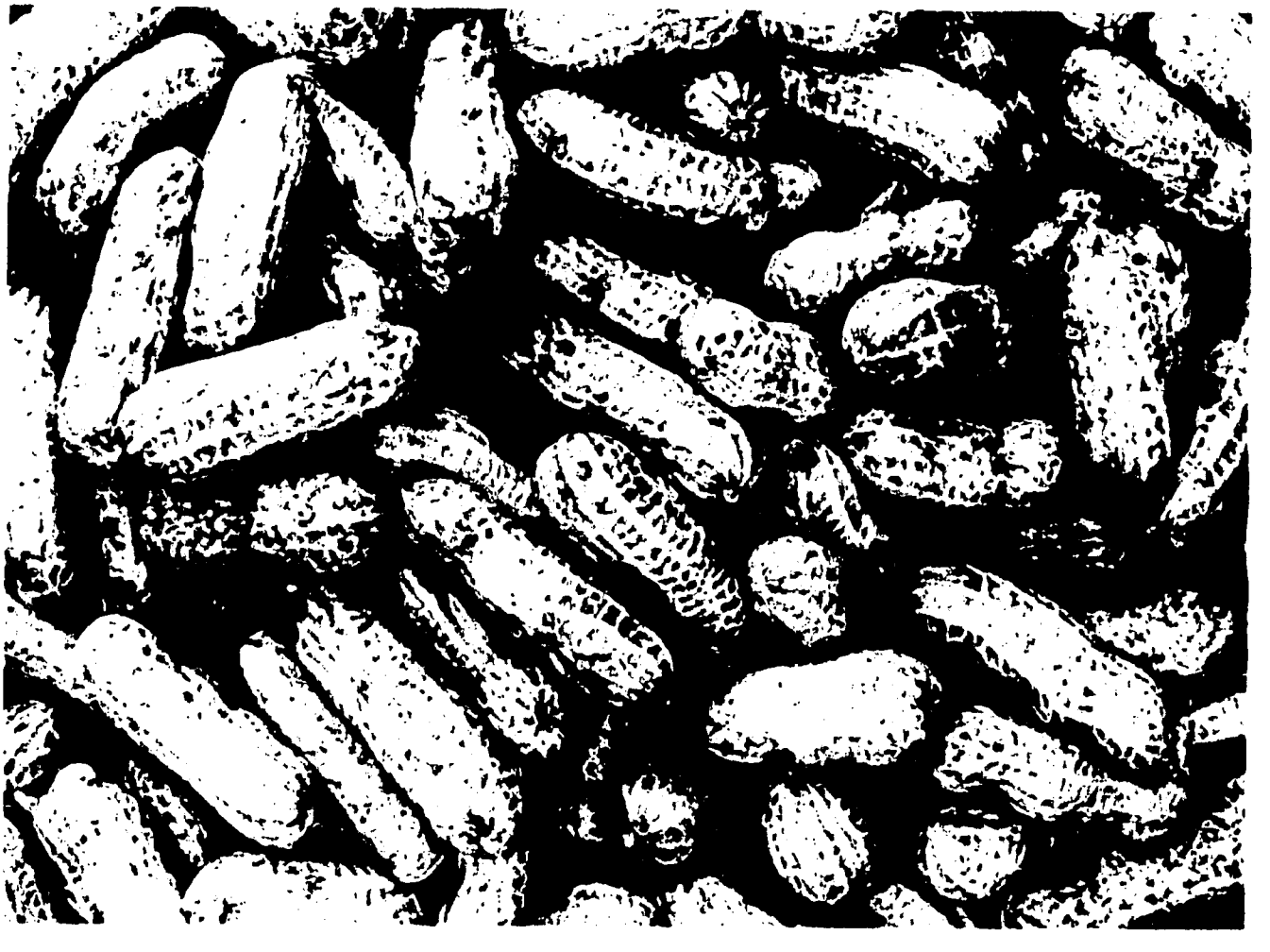
An IBPGR/IICA Workshop on Plant Genetic Resources in the Caribbean, 9 May 1980, was hosted by INRA, Guadeloupe. The aim of the Workshop was to obtain information on the current situation in the Caribbean as regards plant genetic resources activities. The major conclusions from this meeting were:

- In most of the islands there are only small collections of local cultivars. Notable exceptions are the sugarcane collection in Barbados, cacao and yam collections at the University of the West Indies in Trinidad and the cotton and yam collection at INRA in Guadeloupe.
- Existing regional organizations coming into contact with genetic resources projects are: IICA which includes most Caribbean islands, the Caribbean Agricultural Research and Development Institute (CARDI) which includes the English-speaking Caribbean islands and INRA which includes the French-speaking Caribbean provinces.
- Shortage of funds, trained personnel and facilities are factors that limit expansion of activities.
- A particular problem in the area is a preponderance of vegetatively propagated crops, all of which must be kept as living collections.

A meeting on the crop genetic resources of the Andean zone organized by IICA and IBPGR, hosted by the Junta del Acuerdo de Cartagena (JAC), Peru and financed by the IBPGR will take place in Lima, Peru in 1981 with the participation of delegates from Bolivia, Colombia, Ecuador, Peru and Venezuela and observers from a number of countries and IARCs. The major objectives of this meeting will be to discuss current activities on crop genetic resources in the Andean countries and to advise the Board on regional priorities, needs and strategies.

Other regional activities included training and documentation. An IBPGR Training Course on Crop Genetic Resources with major emphasis on collecting techniques was organized by INTA, Pergamino, Argentina in April-May 1980 for the Southern Cone countries (see p. 71). CATIE also organized a training course in October 1980 and scientists attended from Colombia, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama and Peru. In this Course major emphasis was placed on vegetatively propagated crops.

On documentation the IBPGR programme continued to provide technical assistance to several institutes in five Latin American countries (see p. 65).



The collection of groundnut from Latin America has received IBPGR attention for the past few years

During 1980 the IBPGR supported a number of regional and inter-regional collecting and associated activities. These are listed below.

Phaseolus: IBPGR continued to support the programme co-ordinated by CIAT (see p. 15).

Cotton: IBPGR supported IRCT missions in the eastern islands of the Caribbean and also French Guyana (see p. 35).

Andean crops: The Universidad Nacional de San Antonio Abad, Cusco, Peru; the Universidad Nacional Tecnica del Altiplano, Puno, Peru; the Universidad de San Cristobal de Huamanga, Ayacucho, Peru; the experimental stations of Belen and Patacamaya, IBTA, Bolivia; and the Escuela Superior Politecnica de Chimborazo, Riobamba, Ecuador, coordinated by IICA, are implementing a programme, funded by the IBPGR, to collect Andean grains and tubers (see p. 13 and p. 30).

Arachis: The IBPGR collecting programme on Arachis hypogea and wild relatives is reported on page 16.

Maize: The IBPGR commenced support in 1980 to a three-year regional cooperative project to characterize and classify maize germplasm from Peru and the Southern Cone countries of Latin America. The project is organized in association with national institutes of Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay (see p. 10).

Support to national programmes

The IBPGR also provided assistance in 1980 to national institutions. Details are provided below.

Argentina

The experimental station of Salta, INTA, Argentina, supported by IBPGR, carried out a collection of native subtropical forage Leguminosae and Gramineae. The collection took place in the Argentinian provinces of Salta, Jujuy, Tucuman and Santiago del Estero and the Bolivian provinces of Yamibe, Tarija and Santa Cruz de la Sierra. Major genera represented include: Centrosema, Phaseolus, Gouinia, Setaria, Chloris, and Digitaria.

The experimental station of Mercedes, INTA, Argentina, also supported by IBPGR, carried out a collection of native sub-tropical forages, mainly Phaseolus adenanthus and other Leguminosae. Four hundred and fifty samples of 21 species were collected in several Argentinian provinces (see p.32).

The Commission of Scientific Research of the province of Buenos Aires and the IBPGR supported Dr. T. Whitaker, USDA, and some Argentinian experts to collect Cucurbita in the provinces of Corrientes, Mendoza, Buenos Aires and La Consulta. A total of 105 samples have been collected, among which 82 are of Cucurbita maxima and the remaining C. mixta and C. andreana.

Bolivia

IBTA recently published a catalogue of the Andean tubers held at the Institute, and the IBPGR provided funds to publish a similar catalogue for major Andean grains (tarwi, quinua and kañiwa).

IBTA has also improved its storage facilities for its Andean crops, mainly for tubers (oca, olluco and isaño) with financial support from IBPGR in 1980.

Brazil

Following the recommendations of the Maize Committee, the IBPGR has provided funds to CENARGEN/EMBRAPA to collect maize in several areas of the Amazon region. This is the last of a series of three missions supported by the IBPGR to collect in those areas of Brazil where maize germplasm is endangered (see p. 11).

The IBPGR agreed in 1980 to pro-

vide funds to EMBRAPA to support the maintenance of a living collection of perennial **Arachis** at the Instituto Agronomico in Campinas (see p. 16).

Chile

INIA is collecting maize in four areas ranging from 18° - 42° latitude south, supported by IBPGR (see p. 11).

Colombia

In 1980 the IBPGR provided funds to ICA to collect and classify wild potato species in the areas of Santander, Boyacá, Cundinamarca, Caldas, Valle, Quindío and Nariño. The field work, led by Dr. L. Lopez, started in the second half of 1980 and will continue in 1981 (see p. 28).

Ecuador

In August 1980 the IBPGR Secretariat, in cooperation with the FAO in Ecuador and Dr. C. Rick of the University of California, organized a mission to collect **Lycopersicon** species in Ecuador (see p. 22). The collecting team included national scientists as well as Dr. Rick.

Mexico

The Genetic Resources Unit of INIA coordinates national activities on genetic resources in Mexico. This Unit is located in Mexico City and a number of sub-units which have responsibility for certain crops have also been established across the country.

CIAB of INIA received funds from IBPGR in 1980 to collect **Capsicum** spp. in Nayarit, Nuevo León, Chiapas, Yucatan and Tabasco in 1981. INIA will cooperate with CATIE (Costa Rica) in the accomplishment of this work (see p. 22).

Paraguay

The major organization dealing with genetic resources in Paraguay is the Instituto Agronomico Nacional (IAN). A post-graduate student from this institute participated in an IBPGR training course in 1980.

A collection of landraces of maize carried out by IAN and supported by IBPGR was initiated in 1979 and continued during 1980 (see p. 11).

Peru

A project to collect maize in the jungle was supported by the IBPGR in 1980 and was carried out by UNA (see p. 11).

In September 1980 IBPGR provided assistance to UNA to collect **Lycopersicon** germplasm in north-central and eastern Peru with major emphasis on the Marañon valley. One hundred and eighty-eight samples of **Lycopersicon** spp. have been collected plus 40 accessions of **Capsicum** spp. (see p. 22).

Uruguay

During 1980 the Facultad de Agronomia of the Universidad de la Republica, supported by IBPGR, continued a project started in 1979 to collect native forage grasses and legumes from different regions of Uruguay.

Other activities

In 1980 the Genetic Resources Center of CATIE convened two meetings with IBPGR support. The first meeting, on **Capsicum** germplasm, took place in August with the participation of experts in this subject to assess the current global status of this germplasm and to propose a plan of action to safeguard it in the future (see p. 22). The second meeting took place in September and had a similar scope for **Bactris gasipaes** (pejibaye, chontaduro or peach palm). **Bactris gasipaes** is a palm tree of great interest and high potential in many tropical and subtropical areas of Latin America. The reports from both meetings will be discussed by the Board in 1981.

CONSERVATION

Seed storage

During 1980 the Board provided support for seed storage facilities in Bangladesh and Greece. Both will act as national facilities but will also store material on a regional basis. In addition the Board responded to an emergency situation in Kenya where the equipment at the seed store for forage germplasm at Kitale needed replacement.

Throughout the year the Board encouraged, wherever possible, the upgrading of existing storage facilities to meet the agreed standards for medium- and long-term storage. Advice was also provided when requested on design and engineering aspects and the Board was involved with discussions of the ICARDA Board to develop a genebank for its mandate crops.

Although it is important that adequate facilities for seed storage be available at centres near to where the seed is collected (because such facilities are best suited for evaluation and for the necessary periodic regeneration and increase of seed stocks), long-term storage of duplicate samples of material can be undertaken satisfactorily far from the original sources of the material. The Board continued to ensure that all material collected under its auspices was deposited into suitable long-term storage facilities.

The IBPGR has requested certain important conservation centres to accept responsibility to serve as 'world' or 'regional' repositories for major base collections of specific crops. Five international centres - CIAT, CIP, ICRISAT, IITA and IRRI - and 14 national or regional centres had accepted such designations up to the end of 1980, but the list is continually kept under review and will be expanded when necessary. In 1979 there were 11 national or regional centres designated. Table 4 shows the Board's network of base centres to date but it will be noted that duplicate collections have not always been designated; this is because suitable stores are not available or are only in the planning stages.

Seed storage is, of course, not the full answer to the maintenance and conservation of genetic stocks. Many crops must be maintained as living collections in plantations or in short-term stores as roots and tubers. This is because many of these plants produce what are called 'recalcitrant' seeds which do not survive drying and the freezing temperatures which are standard for the storage of 'orthodox' seeds. In tropical areas, such species present problems which have not been solved. In addition, the longevity of different orthodox seeds in cold stores needs to be more predictable.

Investigations on seed physiology

In 1980 two projects were supported by the IBPGR at Reading. The first project was the determination of regeneration intervals in orthodox seeds (a continuation of the work initiated by the Board in October 1977); and the second was experimental investigations into the storage of recalcitrant seeds (the project being initiated by the Board in August 1979).

Table 4. IBPGR Network of Base Centres for Seed Crops
(as of 31-12-80)

CEREALS			
Rice	Oryza sativa	indica	IRRI, Los Baños, Philippines
		javanica	IRRI, Los Baños, Philippines
		japonica	NIAS, Tsukuba, Japan
	Mediterranean forms, temperate South American forms and intermediate types from the USA		NSSL, Fort Collins, USA
	Wild species		IRRI, Los Baños, Philippines
	African forms		IITA, Ibadan, Nigeria
Wheat	Cultivated species		VIR, Leningrad, USSR; CNR Germplasm Institute, Bari, Italy; NSSL, Fort Collins, USA (each institute's collection duplicated at one of the others)
	Wild species of Triticum and Aegilops		Plant Germplasm Institute, University of Kyoto, Japan (duplicated in one of the above institutions)
Maize	New World material		NSSL, Fort Collins, USA
	Asiatic material		NIAS, Tsukuba, Japan
	European material		VIR, Leningrad, USSR
			Braga, Portugal (for Mediterranean material)
Sorghum	Cultivated and wild		NSSL, Fort Collins, USA
Millets	Cultivated and wild Pennisetum spp. (pearl millets)		NSSL, Fort Collins, USA Canadian Genebank, Ottawa
	Eleusine spp.		ICRISAT, Hyderabad, India
	Minor Indian millets		ICAR, New Delhi, India
	Eragrostis spp.		PGRC, Addis Ababa, Ethiopia
	Panicum miliaceum		ICRISAT, Hyderabad, India

Table 4. (Continued)

CEREALS (Cont.)		
	Setaria italica	ICRISAT, Hyderabad, India
Barley	Cultivated and wild	PGRC, Addis Ababa, Ethiopia (regional collection)
Oats	Cultivated and wild	Canadian Genebank, Ottawa
INDUSTRIAL CROPS		
Sugar beet - other beets		Genebank, FAL, Braunschweig-Völkenrode, FRG
LEGUMES		
Phaseolus	New World material (All species, but emphasis on *P. vulgaris*, *P. coccineus*, *P. lunatus* and *P. acutifolius*)	CIAT, Cali, Colombia (duplicated in NSSL, Fort Collins, USA)
	European material	Genebank, FAL, Braunschweig-Völkenrode, FRG
	Wild species	University of Gembloux, Belgium
Pigeon pea		ICRISAT, Hyderabad, India
Groundnut		ICRISAT, Hyderabad, India INTA, Pergamino, Argentina
Chickpea		ICRISAT, Hyderabad, India
Cowpea		IITA, Ibadan, Nigeria
Pea		Nordic Genebank, Lund, Sweden
ROOT CROPS		
Potato	Wild and cultivated species	CIP, La Molina, Peru
VEGETABLES		
Southeast Asian species		Institute of Plant Breeding, Los Baños, Philippines
Amaranthus		NSSL, Fort Collins, USA

The purpose of the first project is to provide information on the expected regeneration intervals of accessions in long-term seed storage so that IBPGR can provide advice to genetic resources centres of the most suitable frequency for germination tests designed to monitor the loss of viability of accessions in store.

Monitoring tests have, in the past, been a source of loss in seed from established genebanks, and the programme at Reading has devised a strategy which could use a reduced number of seeds than required by existing procedures. A discussion paper was published in the FAO/IBPGR Plant Genetic Resources Newsletter, 41.

The crops investigated include rice, wheat, maize, sorghum, pearl millet, kodo millet, tef, finger millet and foxtail millet; chickpea soyabean, cowpea and winged bean; cassava, beet and sugar cane.

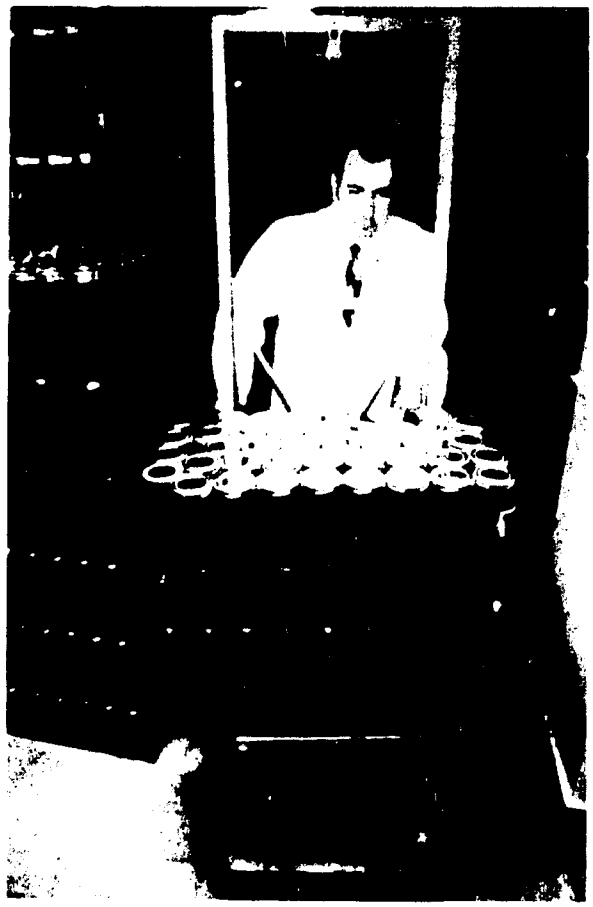
Problems can be encountered when grain legumes (and possibly a few other species) are desiccated below five percent moisture content. The project has investigated four grain legume species and has determined that such damage is not caused by desiccation, but is the result of rapid imbibition when the seeds are subsequently set to germinate. Furthermore, it has been shown that damage can be avoided by rehumidification prior to germination, and consequently IBPGR-recommended long-term storage conditions are still preferable for grain legumes, provided appropriate techniques are adopted following storage.

In the second project, efforts to develop improved methods for storing recalcitrant seeds involved a three-fold strategy.

(1) Dry storage. It is by no means certain that all seeds which are reported to be recalcitrant are actually damaged by desiccation. In some cases, it is known that drying affects the seed so that the time taken to germinate after it has dried is much greater than it would have taken before drying. This is the case in both lemon and lime seeds. This delay is simly the result of slow rates of water uptake following drying. Once the problem is recognized it becomes possible to dry seeds of these species to low moisture contents and then store them at sub-zero temperatures. Thus it now appears that these seeds are not truly recalcitrant and their behaviour under conventional storage conditions is being investigated with a view to making recommendations concerning their long-term storage. The team at Reading is also investigating ways of accelerating germination following drying in order to recommend more suitable germination tests for use in seed banks. In contrast to lemon and lime, seeds of sour orange (Citrus aurantium) are presenting some difficulties. Preliminary experiments on seeds of the royal palm (Oreodoxa regia) suggest that seeds of this species may behave in a similar way to lemon and lime seeds but that the delayed germination is even more marked. Oreodoxa itself is not of great importance but it is more convenient to work with it than with many other palm seeds.

In other reportedly recalcitrant seeds, it is possible that desiccation damage is not inevitable but is a result of the drying technique used, or that the damage occurs not on drying but on reimbibition from low moisture contents (as can occur in some orthodox seeds). Thus, controlled rates of drying and imbibition are being examined.

(2) Cryogenic storage. For those seeds which clearly are irreversibly damaged by drying (i.e. true recalcitrants), it would seem that a more likely way of achieving long-term storage would be by the use of cryogenic techniques. Moist cells are normally killed when cooled to sub-zero temperatures as a result of ice formation. In certain cells and tissues, however, fatal freezing stresses can be



Moving containers into the NSSL seed store

avoided by a judicious selection of cooling rate, thawing rate, and cryoprotectant treatment. In these instances the tissues may be maintained for considerable periods at the temperature of liquid nitrogen (-196 °C). Appropriate regimes for moist recalcitrant seeds are being sought. However so far no moist seed has survived exposure to temperatures below -5°C.

(3) Storage of fully hydrated or near fully hydrated seeds at ambient or sub-ambient temperatures. The Reading team has investigated the use of controlled high relative humidities or polyethylene glycol in order to reduce water potential slightly and it has been found necessary to pay particular attention to oxygen starvation and microbial attack. Although minor improvements have been obtained, so far there are no promising results to report.

Workshop on plant genetic conservation

In September 1980 an international workshop was held at Reading University, UK, on Plant Genetic Conservation - Recalcitrant Seed and Tissue Culture. It was sponsored by the International Union of Biological Sciences, the International Genetics Federation, and the IBPGR. The Board was involved with the planning of the workshop through Dr. Williams, the Executive Secretary, being a member of the Planning Committee, and both he and Prof. de Langhe represented the Board during the workshop. The Board also covered the expenses for several scientists from developing countries to attend.

The object of the meeting was to discuss certain specific aspects of genetic resources conservation work, namely: the present knowledge and possible future developments in relation to the physiology of short-lived (recalcitrant) seeds; in vitro culture methods; and cryobiological techniques. It was an interdisciplinary and international gathering.

The main conclusions were as follows:

(a) research on short-lived seeds, on shoot-tip cultures and on genetic stability of in vitro cultures should be vigorously encouraged; and

b) research on cell and tissue cultures and on cryogenic techniques was of much less immediate importance (though probably of long-term significance);

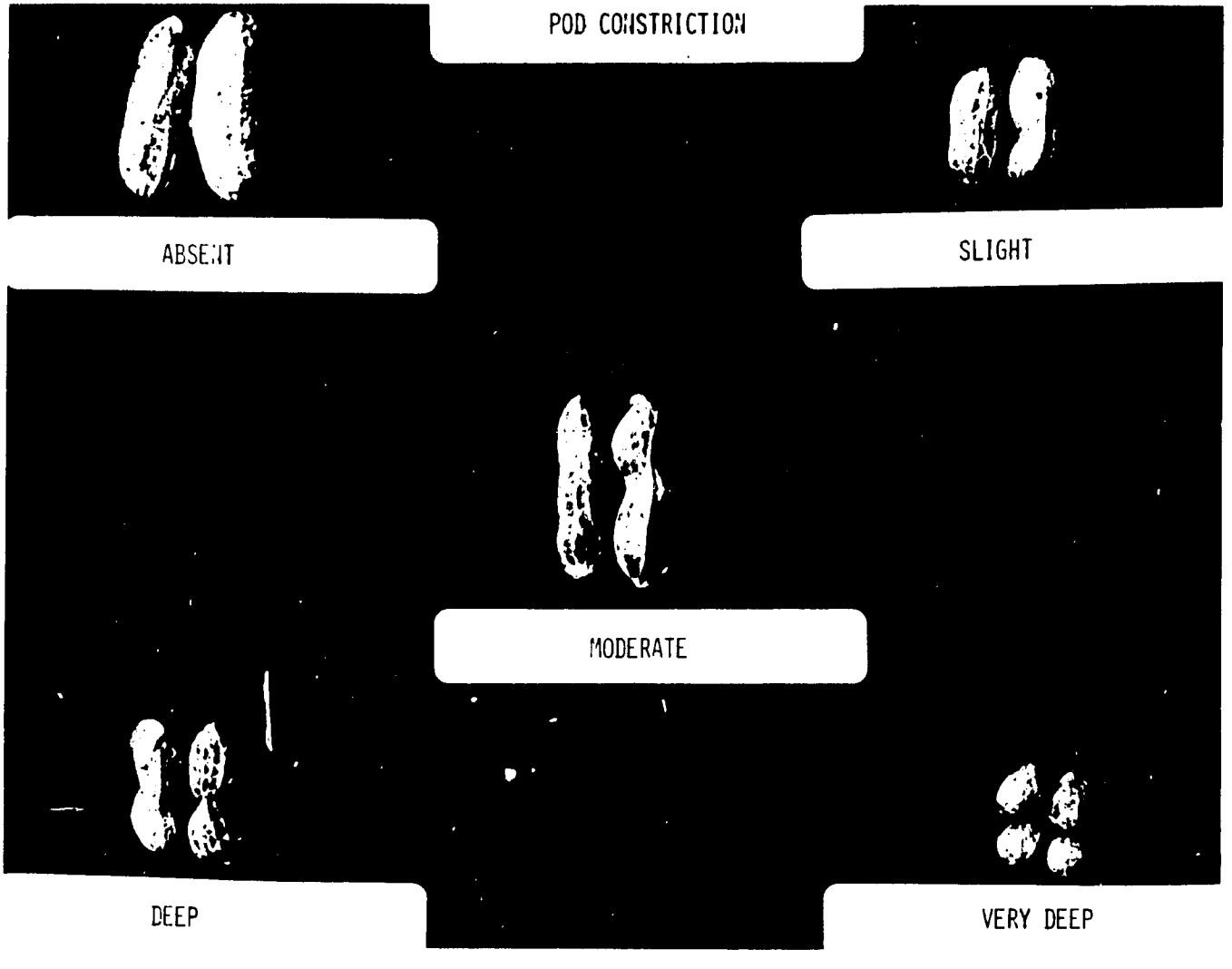
The need to relate developments under (a) to the practical realities of genetic resources work implies that a substantial part of the relevant research should be done in developing countries where the plant materials are available.

Support to conservation on vegetatively propagated species

The Board has supported the establishment of living collections of coconuts and bananas in the Philippines as regional collections for Southeast Asia and important parts of the world collections. Support has also been given to Brazil to maintain a collection of perennial species of Arachis.

At its seventh meeting in March 1980 the Board considered a consultant's technical report prepared by Dr. Lyndsey A. Withers on Tissue Culture Storage for Genetic Conservation. The Board agreed in principle to move ahead and support the limited amount of research necessary for the fuller development of the global programme of the IBPGR. The technicalities will be further discussed at the FAO/UNEP/IBPGR Technical Conference in April 1981.

The support for research will, of necessity, be limited and the Board will draw on the recommendations of its technical working groups. An IBPGR Working Group on Grape, which met in 1978, recommended the support of research on the long-term storage of grape in vitro. During 1980 the Board agreed to support a project at the CSIRO Division of Horticultural Research, Adelaide, Australia. This has examined a series of cultivars of Vitis vinifera and the hybrid rootstock, V. caribaea, V. amurensis, V. vinifer, V. rupestris x V. berlandieri and V. labrusca. The project was just underway in the latter part of 1980 and results will be reported in the Annual Report for 1981.



INFORMATION

The establishment of information systems for the documentation of plant genetic resources is an essential complement to the international efforts of the Board in ensuring the collection and conservation of plant genetic resources. These collection and conservation efforts would have little value if the collections were not adequately documented and if this information were not readily accessible to the users; first for monitoring the collection and conservation process, and second to communicate information, thereby facilitating the distribution and use of material on request. The development of international information systems is likely to play a major catalytic role in inducing a better organization and management of the existing collections and in identifying gaps which in turn will call for further exploration and conservation work. For these reasons the IBPGR continues to devote a substantial portion of its resources to information work.

From 1975 through 1979, most of the Board's work on information was performed under contract by the Information Sciences/Genetic Resources Program (IS/GR) of the University of Colorado at Boulder, USA. During this period the IS/GR Program promoted, on behalf of the Board, a worldwide awareness among collectors, curators and breeders of the need for effective data handling procedures and provided valuable experience in the use of different techniques of genetic resources data management.

The Board's contract with IS/GR ended in 1979, at which time the information work became the direct responsibility of the Secretariat. This necessitated an increase in the Secretariat staff of an information officer and a technical assistant.

The primary tasks of the Board in its information activities are:

(1) The assembly of directories of existing genetic resources collections, crop by crop. In 1980, directories were published for root crops (with emphasis on tropical crops), food legumes, wheat and maize. Work on other crops progressed and directories for rice, sorghum, millets, barley, oats and rye, forages and some major industrial crops will be published in 1981. Work has been started on the preparation of directories for the major vegetable crops and for the major tropical fruits. These will be published in 1982. The published directories will be kept up-to-date by the Secretariat as new information, corrections or revisions are received, and it is expected that revised editions of the directories will be published within approximately two years of the first editions. For all crops attempts are made to itemize genetic resources collections and not breeding material.

(2) The development of crop descriptor lists. To be able to exploit the variability available within germplasm collections, a plant breeder requires information on accession characteristics as a basis for selecting breeding material. The traits of accessions need to be described and the data made available. A distinction between the terms "characterization" and "evaluation" is now

made. Basic botanical description can be termed "characterization" whereas assessment for agronomic performance can be termed "evaluation". The information gathered in the process of characterization and made available to plant breeders should include "passport" and morphological data on individual accessions. Passport data is defined as the information recorded by the collector of the germplasm sample together with all the names and numbers known to have been associated with the sample. In most cases the collector's number assigned in the field is the only information that can be used to identify the large number of duplicates in some collections. The traits characterized should have high heritability, i.e. be visible whenever and wherever an accession is grown. They should also be of use to a plant breeder in indicating potentially useful material. This work should be done by those people maintaining genetic resources, i.e. the curators. However, in-depth screening (i.e. evaluation) should be done by crop improvement teams. Breeders and their multi-disciplinary co-operators look for agronomically important variability in germplasm. This includes, for example, disease and pest resistance, dwarfness or cold and drought tolerances, etc. Generally, these characters require well-designed analyses for their determination. To date, part of the difficulty in utilizing the variability in existing collections has been the inability to satisfactorily classify the accessions.

During 1980 descriptor lists were published for: apricot, beets, coffee, **Colocasia**, cotton, maize (revised), mung bean, rice (in collaboration with IRRI), sorghum (in collaboration with ICRISAT), tropical fruits (revised - for mango, durian, rambutan, Lansium and jackfruit) and yams. Those published before 1980 can be found in Appendix V. Work is proceeding on finalizing descriptor lists for the following crops: **Allium**, almond, **Amaranthus**, barley, **Capsicum**, cassava, cruciferous crops, cocoa, cucurbits, eggplants, grape, groundnut (in collaboration with ICRISAT), lupins, pearl millet (in collaboration with ICRISAT), **Momordica**, okra, olive, peach palm, **Phaseolus**, pigeonpea (in collaboration with ICRISAT), quinua, safflower, sesame, soyabean, sweet potato and tomato. Most of these will be published in 1981. The results of the Pilot Wheat Evaluation Project (see p. 67) were used by the Wheat Advisory Committee in revising the wheat descriptors list, which will be published in 1981. Preparations were made for a meeting in 1981 of scientists working with winged bean germplasm to revise winged bean descriptors.

(3) The provision of technical assistance to national and regional organizations in their germplasm data management work. The Secretariat provided two consultancies to assist TISTR in starting a computerized data management system for the collections held, in particular, winged bean and tropical fruits. This work will be extended in 1981.

During 1980 arrangements were made for the IBPGR to supply the national programme of Greece, based at the Cereals Institute, Salonika, with a micro-computer and assist in the production of data management procedures and the initial data preparation for the computer. At the same time the IBPGR installed a package in the Ministry of Agriculture mainframe computer in Athens so that the Cereals Institute could be linked with a terminal. Crops dealt with by the Greek national programme include wheat, pulses, beet, cotton and tobacco.

The work started in 1979, reported in the 1979 Annual Report, at ARARI, Izmir, Turkey, continued into 1980. EXIR and its Report Generator had to be amended to run on the Ege University computer. This was carried out by IS/GR and the programmes were successfully installed during May 1980. Data prep-

aration for the material collected in Turkey since 1970 was continued by ARARI staff and should be complete by March 1981, when an inventory of this material will be produced using EXIR. EXIR will also be used for producing lists of accessions for multiplication, regeneration and exchange. Very little characterization or evaluation data were available in 1980 and these data are not yet in machine readable form.

The Secretariat initiated co-operation with the Plant Genetic Resources Center in Ethiopia and GTZ, Federal Republic of Germany, the bi-lateral donor, for developing a documentation system for the PGRC.

With the participation of the Secretariat, the Government of India organized a National Workshop on Documentation of Plant Genetic Resources at the NBPGR, New Delhi in November 1980. The Workshop recommended the urgent introduction of data management systems for germplasm collections, the development and use of standardized descriptor lists and the use of a national unique identifier for germplasm accessions. The importance of data concerning germplasm accompanying the samples whenever it is exchanged was stressed. The Workshop recommended that the IBPGR's assistance be considered by the Government of India in its genetic resources programme. As a result the Secretariat hopes to assist with the documentation of wheat, rice, maize, cotton and other crops.

During the first meeting of the Governing Board of the FAO/UNDP ECP (see p. 39), held in Geneva, the Secretariat arranged several activities concerning documentation. A display illustrating various aspects of documentation and genetic resources data management was mounted by Dr. B. Ford-Lloyd (UK). A demonstration of a small, low cost computer system for flexible data management was given by Dr. S. Blixt (Sweden). Dr. Blixt also presented a paper on Genebank Information Systems which emphasized that the modernization and introduction of computer systems at genebanks and the introduction of new technology would inevitably lead to a diversity of systems in use at co-operating genebanks. This should not lead to an inability to exchange data in machine readable form, provided that standard characteristics for the media used in data exchange can be defined and agreed descriptor lists are used. In this way each genebank could choose the software that would be most suitable for its own computing machinery and the expertise available to adopt and use such software.

The work started in 1979 by IS/GR in assisting in the organization of data held at CENARGEN (Brazil), INIA (Mexico), INTA (Argentina) and CATIE (Costa Rica) was continued in 1980 by a consultant, with the cooperation of the Instituto Nacional Agropecuario (INIAP - Ecuador) and the International Agricultural Development Service (IADS - USA). Microcomputer systems developed by IS/GR were donated to CENARGEN, INIA and INTA. Some hardware problems were found with most of these systems on delivery but they are now operating successfully.

The system at CENARGEN will be mainly used for data entry; the bulk of the data processing will be on an IBM 370/145. Initial documentation work has begun on soyabeans, rice, cotton, cowpea, cassava, maize and banana. By using the computer it is intended to produce catalogues with collection, introduction, characterization and evaluation data as well as lists of accessions for distribution and multiplication.

INIA also uses an IBM 370/145 as well as a micro-computer for genetic resources documentation. The Genetic Resources Unit cooperates with the Biometrics Unit of INIA for this purpose. Data on over half of the 9,144 maize accessions have been stored in machine readable form. These data include information on colour, texture of grain,

race and collection site. Data on 67 descriptors for about 6,000 Phaseolus vulgaris accessions are being organized and entered into the computer. This material derives from the transfer of material from pre-existing organizations as well as INIA collecting teams, and so the data, which have been recorded in many different ways, are being standardized.

In CATIE a high priority has been given to documenting the collections. Data were originally collected on specially designed forms and then transferred to edge-punched cards. These data are now being transferred to an IBM 5110 micro-computer. The number of accessions/descriptors used for individual crops are: Cacao (250/61), Cucurbita (400/29), Chayote (100/21), Cassava (150/42), Capsicum (50/34), Phaseolus (200/26), Pejibaye (40/41), Miscellaneous (100/26).

In 1981 the same consultant will be used to expand the IBPGR documentation activities to other countries of Latin America.

Training

Arrangements were made for a three-month training course to be held early in 1981 in the use of computers in genetic resources documentation at the Germplasm Institute, Bari, Italy. The course will be for 10-12 students at the technician level.

During 1980 fellowships were awarded to two trainees for documentation. One from Greece is to work with Prof. T. Bogyo at Washington State University, Pullman, USA for three months, the other, from the Philippines, travelled to the Office of the Plant Gene Resources Canada (PGR), Ottawa to investigate the use of computers in plant genetic resources work with the taxono-

mists, statisticians and programmers in Ottawa.

Pilot Wheat Evaluation Project

In response to a recommendation made by the IBPGR Wheat Advisory Committee and its subcommittee on descriptors, the Board initiated a multi-site pilot wheat evaluation project in 1978. A total of 200 spring and 200 winter wheat accessions were obtained from three genebanks and samples of each were sent with planting and scoring instructions to seven research institutions in Europe, Africa, Latin America and Asia.

By the end of 1980 results had been received from INIA (Argentina), EMBRAPA (Brazil), FAL (Federal Republic of Germany) and NBPGR (India). No data are expected from the three other institutions.

The aims of the project were: (a) to learn more about the potential of particular genotypes; (b) to identify the problems of evaluating data by computer processing; and (c) to help improve international cooperation in genetic resources conservation and evaluation.

The purpose of the project was not to duplicate the efforts of the various international nurseries of modern varieties. The material used in the project represented samples from the thousands of landrace populations conserved in the major wheat genebanks.

The importance of passport data accompanying germplasm samples when exchanged could be seen from the fact that there were at least two pairs of duplicates in the 400 samples.

The descriptors used in the project were based upon the IBPGR Wheat and Aegilops Descriptor List, but no single cooperating centre recorded all the data requested, very few descriptors were recorded at all of the four centres and one descriptor ('Drought resistance') was not recorded anywhere.

The project was discussed by the Wheat Advisory Committee in January 1981 where it was noted that the project had highlighted many of the organizational difficulties in conducting multi-site evaluation of primitive material. A major result of the project was the production of a revised wheat descriptor list by the Committee, based on an analysis of the data and comments from INIA, EMBRAPA, FAL and NBPGR.

TRAINING

Support to university courses

The International Post-graduate Training Course on Conservation and Utilization of Plant Genetic Resources directed by Prof. J.G. Hawkes at the University of Birmingham, UK has been supported by IBPGR since 1976 to enable more students from developing countries to attend. In part, UNEP funds to the IBPGR have been used for this purpose. The M.Sc. course was initiated in 1969 in order to comply with the needs expressed by the FAO Panel of Experts on Plant Exploration and Introduction.

The University of Birmingham, after close consultation with the IBPGR Secretariat, decided in 1979 to offer short specialist courses. These were revised in 1980 and two are now offered: 1) Crop Plant Diversity - its Exploration and Conservation, and 2) Genetic Resources Evaluation, Utilization and Data Preparation and Management. The short courses were developed for candidates with some experience in genetic resources work who will specialize in certain aspects and who normally cannot be released for long periods. The total number of students who attended either the one-year or the short course, from 1969 to 1980-81, is 144. These students came from 43 countries (36 developing and 7 developed).

For the 1979-80 session, the following students participated: Bangladesh (1), Bhutan (1), France (1), Greece (1), India (1), Indonesia (1), Kenya (2), Nepal (2), Nigeria (2), Peru (1), the Philippines (1), Uganda (1), the United Kingdom (2) and Zimbabwe (1). IBPGR/UNEP fellowships were awarded to the candidates from Bhutan, Greece, India and Nepal.

Countries represented during the 1980-81 session were: Brazil (1), Ghana (1), India (1), Indonesia (2), Pakistan (1), the Philippines (1), Sri Lanka (1), Uganda (1) and the United Kingdom (3). The nominees from Brazil, Ghana, India, Pakistan, Sri Lanka and Uganda are re-receiving IBPGR/UNEP fellowships. In addition, the IBPGR also awarded some fellowships to candidates attending the short training courses.

When the initial grant was made, the IBPGR thought that it was perhaps possible that enough people would be trained by 1982. In 1980 the Board decided to reassess the situation because it was apparent that more training was required. The Chairman-elect and member-elect, Professors L. Kåhre and J.P. Cooper respectively, reviewed the course and their report will be discussed

at the eighth meeting of the IBPGR in February 1981.

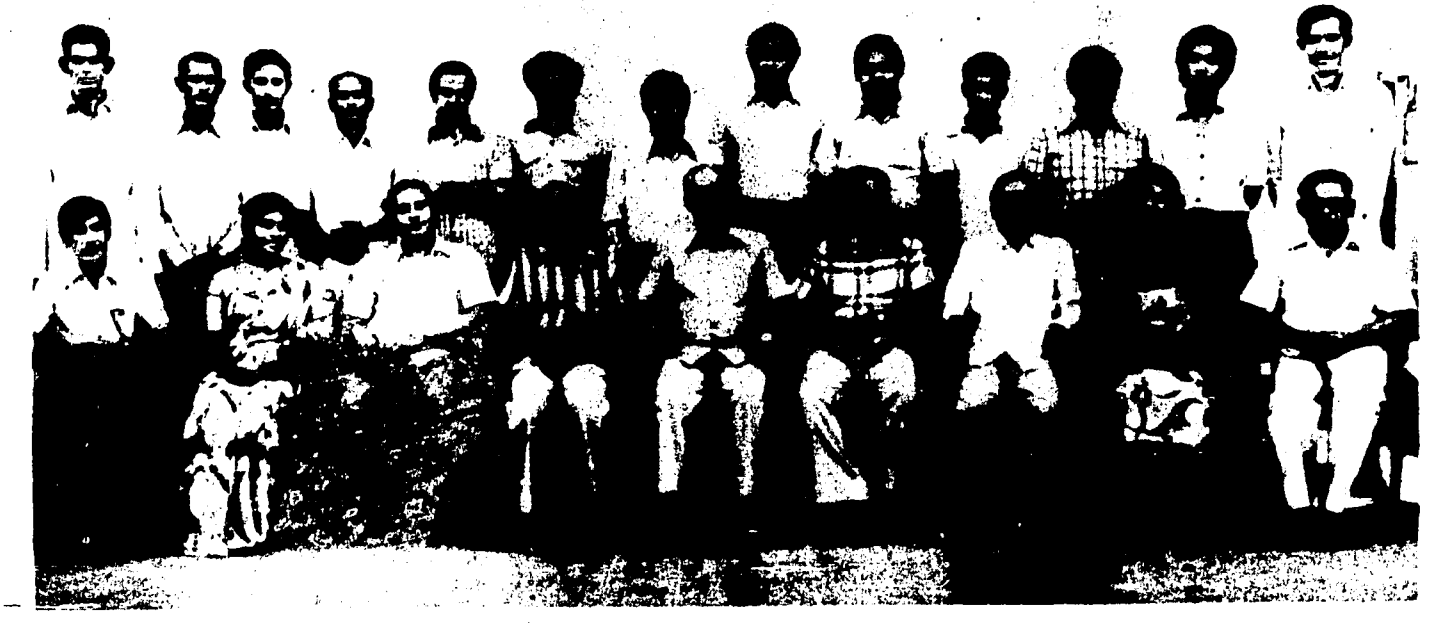
In general the report shows that there will be a continuing need for expertise in the principles and practice of conservation of genetic resources for at least the next five years. The number of genebanks in many parts of the world is increasing and this is reflected in the number of applicants to both the M.Sc. course at Birmingham and the short courses there and elsewhere. The development of new techniques such as tissue culture, data processing etc., also emphasizes the need for specialized training.

The review panel welcomed the opportunities for practical experience afforded by the setting up of a new genebank at NVRS, Wellesbourne (located some 30 kilometres from Birmingham University). This can provide both on-the-job training for all the students and possibilities for thesis work on particular topics.

It was recognized that the short courses meet an important need for those students working in the field of plant genetic conservation, but who are unable to leave their posts for long periods. It is encouraging to note that a number of former students of the M.Sc. course have been able to establish successfully short courses for their own regions and that, in their turn, certain of the short-course students have themselves joined the M.Sc. course at a later date. This means a valuable network of types of training.

Short technical courses

During 1980 the IBPGR Secretariat, in association with a number of national and international centres, organized the following regional and inter-regional short technical courses:



Training course in South Asia, Sept.-Oct. 1980

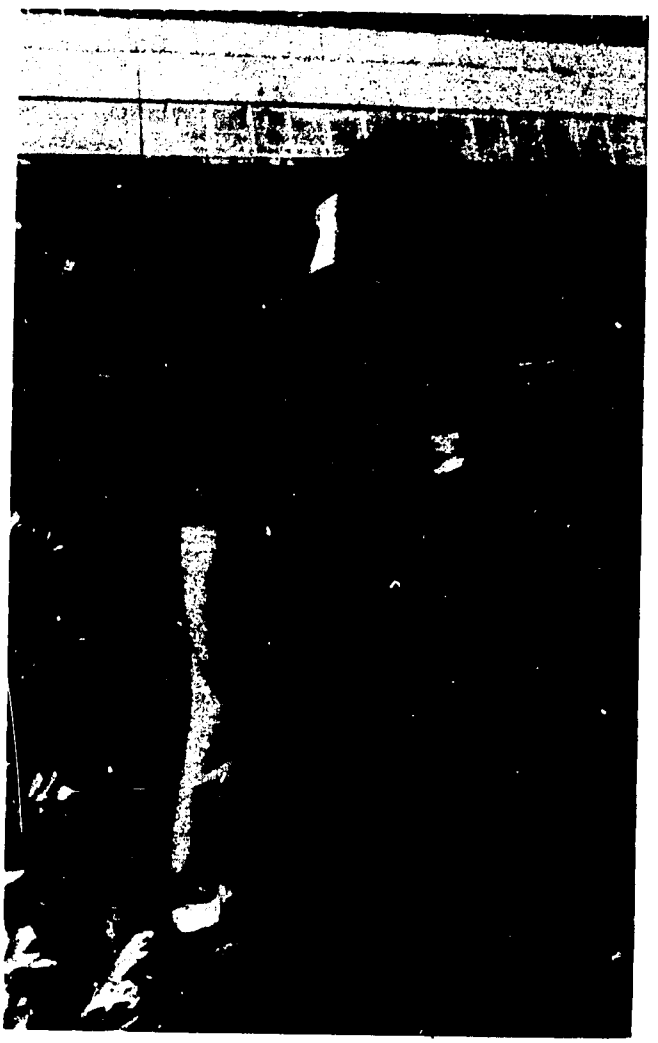
(1) Genetic Resources Conservation - a Training Course for African Research Workers and Technicians (18 February - 26 March 1980) This training course was for Anglophone African nationals and was organized by IITA, in collaboration with the IBPGR, in Ibadan, Nigeria, to fulfil a recommendation of the Association for the Advancement of Agricultural Science in Africa (AAASA) Workshop in 1978 (see Annual Report, 1978, pp. 28-29). Thirteen persons from six countries attended the course, viz: Ghana (2), Kenya (1), Liberia (1), Nigeria (6), Sierra Leone (1) and Uganda (2). The syllabus of the course covered all major aspects of genetic resources activities: theory occupied 23 percent of the time and practicals, including exploration work, 77 percent.

(2) Training Course on Crop Genetic Resources with major emphasis on collecting techniques (4 April - 10 May 1980) INIA (Pergamino), Argentina organized a short training course in Spanish for graduate students from Southern Cone countries of Latin America. Twenty-two students from the following countries participated: Brazil (4), Bolivia (2), Paraguay (1), Venezuela (1) and Argentina (14).

(3) Collection, Evaluation and Management of Wheat and Barley Germplasm (13-25 April 1980) In accordance with the recommendations of the IBPGR Wheat Advisory Committee, a short training course on wild wheat and barley germplasm was organized by the Secretariat in close association with ICARDA in Aleppo, Syria. The Cereal Improvement and Training Programmes of ICARDA jointly made all arrangements for the training course and the IBPGR Regional Officer, Dr. J.R. Witcombe, participated to the fullest degree. Invitations were sent by the Director General of ICARDA to 25 countries in Asia and Africa and these resulted in the participation of students from Cyprus (1), Ethiopia (1), Greece (2), India (1), Iraq (1), Pakistan (2), Saudi Arabia (1), Spain (1), Syria (2), Tunisia (2), Turkey (1) and the Yemen Arab Republic (1).

A manual of the lectures presented at the above training course is under preparation.

(4) Collection and Conservation of Perennial Crops (30 June - 25 July 1980) A short training course for South and Southeast Asian countries on germplasm collection and conservation of perennial crops was organized by TISTR and the Northern Regional Agricultural Development Centre on the recommendation of the IBPGR Southeast Asia Regional Committee and in association with the IBPGR Regional Officer, Prof. R.B. Singh. The training course was sponsored by the Thai National Plant Genetic Resources



Committee and the IBPGR provided funds. The theoretical classes were held at Chiang Mai and the practical training in the field at various other centres in Thailand. Twenty scientists from Bangladesh, Burma, India, Indonesia, Malaysia, Nepal, Papua New Guinea, the Philippines, Sri Lanka and Thailand participated.

(5) Plant Exploration and Collection Techniques (17 September - 16 October 1980) The second ICAR/IBPGR South Asian Training Course on Plant Exploration and Collection was organized by Dr. K.L. Mehra and was held at New Delhi under the auspices of the National Bureau of Plant Genetic Resources (NBPGR). The IBPGR Secretariat issued invitations to all countries in the South Asian region and also to Indonesia and Thailand. Ten participants attended: Bangladesh (2), India (5), Indonesia (1), Sri Lanka (1) and Thailand (1).

(6) Evaluation and Utilization of Root and Tuber Crops Germplasm (24 November - 12 December 1980) This course was organized by PCARR at PRCRTC at Baybay, Leyte. The IBPGR sponsored the course as part of the Southeast Asia Programme.

Several scientists from the Philippines, two each from Indonesia, Malaysia, Papua New Guinea and Thailand and five participants from the Pacific region attended the course.

(7) Short Training Course in Seed Technology for Genebanks (9-20 September 1980) In addition to the above short courses, since 1978 the Board has supported a short course on aspects of seed technology as they relate to the practical procedures undertaken by genebank managers. This is organized by the School of Agriculture at the University of Edinburgh, Scotland, UK, and a number of agricultural research stations also participate in the teaching. When this course was organized for the first time in 1978, participants attended from various parts of the world. Commencing in 1979 it was found expedient for the students from developing countries who were participating in the post-graduate training course at the University of Birmingham, UK to attend it at the end of their course. This course has been found to be a useful adjunct to the Board's support to the University of Birmingham, and students have greatly benefited from the practical experience gained.

Ethiopia: Agricultural Extension Officer conversing with a group of local farmers

Mr. Richard H. Demuth, Chairman, IBPGR 1974-80 (on right)
handing over to the new Chairman, Prof. L. Kåhre

ADMINISTRATION

Membership and board meetings

The membership of the Board during 1980 is shown on p. v. Of the new members elected to serve for three-year terms commencing 1 January 1980, Dr. E. Alvarez-Luna (Mexico) resigned due to heavy commitments. At the end of 1980 Dr. N. Chomchalow (Thailand), Dr. G. de Bakker, Vice-Chairman (Netherlands), Prof. G. Fischbeck (FRG), Dr. A.B. Joshi (India) and Prof. L. Kåhre (Sweden) completed their terms.

On the recommendation of the Board, the CGIAR elected Dr. C. Bishop (Canada), Prof. J.P. Cooper (UK), Prof. H.K. Jain (India) and Prof. G.T. Scarascia-Mugnozza (Italy) to serve for three-year terms commencing 1 January 1981, and Dr. F. Cardenas-Ramos (Mexico) to replace Dr. E. Alvarez-Luna for the remainder of his term of membership. In addition, Dr. N. Chomchalow was re-elected for a second three-year term.

The Board met in Rome 4-7 March 1980 and the Executive Committee also met in Rome on 3 March, 5-7 May and 1-3 Dec. During 1980 Dr. N. Chomchalow, Prof. E. de Langhe and Dr. Q. Jones joined the Executive Committee to increase the size of the Committee for 1980 thereby providing continuity in view of the upcoming retirement of three members at the end of the year.

Elected members of the IBPGR serve in their personal capacities. Although in some cases members report to donors, the Board has agreed that any donor may, if it so desires, send an observer to attend the Board meetings. The Board has expressed the hope that donors will designate as observers persons having a professional interest in the work of the IBPGR. At the seventh meeting of the Board in March 1979, observers from France, Canada, Italy and the USA participated. In addition the Board agreed that observers from Mexico and the USSR could attend.

Chairman

Mr. R.H. Demuth informed the Board that he would retire at the end of 1980 and in March the Board drew up a short-list of candidates. After consultation with the Director General of FAO, the Board elected Prof. L. Kåhre to serve as Chairman commencing 1 January 1981.

Mr. Demuth has chaired the Board since its creation in 1974 and both his devotion and leadership have been greatly appreciated.

Secretariat

It was reported in the Annual Report for 1979 that the Secretariat had been substantially strengthened in that year. During 1980 the headquarters Secretariat reached a complement of six scientists, three administrative assistants, four secretaries and one clerk.

The work of the Secretariat is supplemented by numerous consultants and temporary secretarial help to cope with the increasing workload of the Board. In addition, field staff have been appointed to help some regional programmes, in particular Southwest Asia, Southeast Asia, Latin America and the Mediterranean.

The Executive Secretary of the IBPGR also heads the FAO crop genetic resources group, the staff of which serve

the Board's programme.

The composition of the Secretariat is shown in Appendix I.

Committees

The Crop Advisory Committees of the Board were appointed to serve, in the first instance, for a three-year period which expired in 1979. At its meeting in 1979, the Board reviewed and revised the composition of the committees with a view to ensuring wide representation of the breeding communities concerned and to introduce some rotation of membership. The present composition of the Crop Committees is shown in Appendix II.

The first Regional Committee recognized by the Board is that approved by the governments participating in the regional programme for Southeast Asia; its membership is shown in Appendix III.

Publications

A list of current IBPGR publications is contained in Appendix V. Of these, the joint FAO/IBPGR Newsletter has already established itself as a means of widely disseminating notes and news of crop genetic resources activities all over the world.

Quinquennial review

The Technical Advisory Committee (TAC) of the CGIAR organized a quinquennial review of the IBPGR during 1979. The review panel presented a report to TAC in 1980 and the final report was endorsed by the CGIAR at its meeting in Manila in October 1980.

The seventh meeting of the IBPGR discussed the report and agreed with the major conclusions and recommendations. The Board discussed the implications of these and during 1980 a number were implemented.

The review panel concluded that, in general, the IBPGR had fulfilled its remit well, having: generated interest in and awareness of genetic resources conservation in many countries; furthered the cause at the technical level by means of meetings and publications; and supported collecting and conservation activities in diverse crops, especially the staple cereals. The Board's role is catalytic and must remain so; it can promote, encourage, initiate and help but could not (with any conceivable funding) itself build and sustain the developing genetic resources conservation network. The IBPGR's functions are thus international in the widest possible sense.

The panel noted that the IBPGR's achievements in the quinquennium under review owed much to the efforts of Board members themselves, to a vigorous Executive Committee and, perhaps above all, to the devoted directorial labours of the Secretariat.

Specifically the Board was asked to increase its support to research and its work on perennial crops, to increase the number of its regional officers and to consider certain administrative changes.

APPENDIX I

MEMBERS OF THE SECRETARIAT

Dr. J.T. Williams
Executive Secretary
Plant Production and
Protection Division
FAO, Rome, Italy

Headquarters

Dr. N. Murthi Anishetty
Assistant Executive Secretary

Ms. E. Bennett
Agricultural Officer
Genetic Resources

Dr. J.T. Esquinas-Alcázar
Agricultural Officer
Genetic Resources

Mr. C.W. Howes
Genetic Resources Officer
(Information)

Ir. D.H. van Sloten
Genetic Resources Officer
(Horticulture)

Mrs. C. Gorelli
Programme Assistant

Mr. B.T. McLean
Editorial Assistant

Mr. G. Sayour
Research Assistant

Mrs. V. Ascione-Sindery
Secretary

Mrs. J.M. Buccini
Secretary

Miss D.E. Quaye
Secretary

Mrs. S. Saint-Rossi
Secretary

Miss M. Bonomi
Clerk

Regional staff

Southwest Asia

Dr. K.S. Dodds
Senior Consultant
Southwest Asia Programme
c/o the Secretariat, FAO, Rome

Dr. J.R. Witcombe
Technical Officer
Southwest Asia Programme
c/o ICARDA, Aleppo, Syria

Latin America

Dr. W.F. Kugler
Senior Consultant (until 31/3/80)
Latin America
c/o INTA, Buenos Aires, Argentina

Southeast Asia

Prof. R.B. Singh
Regional Officer
Southeast Asia
c/o FAO Regional Office,
Bangkok, Thailand

Mrs. S. Savigamin
Secretary

Mediterranean

Mr. W.G. Ayad
Technical Assistant
Germplasm Institute, Bari, Italy

Mr. A. Damania
Technical Assistant
Germplasm Institute, Bari, Italy

Mrs. P. Damania
Secretary

Honorary Coordinator

Prof. E. Porceddu
IBPGR Mediterranean Programme
Germplasm Institute, Bari, Italy

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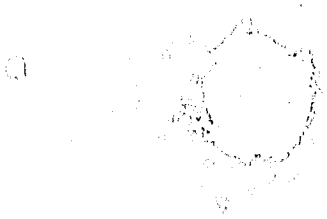

APPENDIX II

CROP ADVISORY COMMITTEES

MAIZE

Chairman:

Dr. W.L. Brown
President
Pioneer Hi-Bred International Inc.
1206 Mulberry Street
Des Moines, Iowa 50308
USA

Members

Dr. A. Brandolini
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Bergamo, Italy

Dr. G. Popow
Head, Plant Breeding Section
Federal Agricultural Research Station
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Switzerland

Dr. E.W. Sprague
Dr. K. Finlay (Alternate)
CIMMYT
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Dr. R. Sevilla
Director, Programa de Maiz
Universidad Nacional Agraria
La Molina
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Lima, Peru

Dr. Joginder Singh
Coordinator Maize Improvement Project
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RICE

Chairman:

Dr. T.T. Chang
International Rice Research Institute
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Members:

Dr. T.H. Johnston
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Dr. J. Kawakami
National Institute of Agricultural Sciences (NIAS)
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Yatabe-machi
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APPENDIX II
(continued)

RICE (continued)

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Cuttack 753006
India

Dr. B.H. Siwi
Central Research Institute
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Department of Agriculture
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Bogor
Indonesia

SORGHUM AND MILLETS

Chairman:

Dr. Glenn W. Burton
Research Leader USDA-ARS-SR
Georgia Coastal Plain Experiment
Station
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USA

Co-chairman:

Dr. B. Gebrekidan
Leader
Ethiopan Sorghum Improvement
Programme
Addis Ababa University
College of Agriculture
P.O. Box 414
Nazareth, Ethiopia

Members:

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India

Prof. A.F. Bilquez
Technical Advisor
Délégué Général à la Recherche
Scientifique et Technique du Sénégal
Bambey
Senegal

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Professor of Plant Cytogenetics
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Professor of Eminence and Head
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APPENDIX II
(continued)

PHASEOLUS

Chairman:

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Members:

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Centre National de Recherches
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Dr. F. Cárdenas-Ramos
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Prof. R.J. Marechal
Department of Plant Science
for Tropical Regions
Faculty of Agricultural Science
University of Gembloux
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Dr. C. Vieira
Departamento de Fitotecnia
Escola Superior de Agricultura
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Brazil

WHEAT

Chairman:

Prof. Dr. W. Hondelmann (until June 1980)
Genebank
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Mr. J. Bingham (from December 1980)
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APPENDIX II
(continued)

WHEAT (continued)

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Italy

Dr. M.V. Rao
Project Coordinator
All-India Coordinated Wheat
Improvement Project
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Prof. K. Yamashita
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Dr. J.P. Srivastava
International Centre for
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APPENDIX III

MEMBERSHIP OF THE REGIONAL COMMITTEE FOR SOUTHEAST ASIA

Member:	Alternate:
INDONESIA	
Dr. Setijati Sastrapradja Director National Biological Institute P.O. Box 110 Bogor	Dr. B.H. Siwi Central Research Institute for Agriculture Jalan Mordeka 99 Bogor
MALAYSIA	
Mr. N.T. Arasu Malaysian Agricultural Research and Development Institute University Pertanian Post P.O. Box 202 Serdang, Selangor	Dr. K.G. Singh Deputy Director Crop Protection Service Branch Department of Agriculture Jalan Gallagher Kuala Lumpur
PAPUA NEW GUINEA	
Mr. Kana Aburu Agronomist Department of Primary Industry P.O. Box 2417 Konedobu Port Moresby	
PHILIPPINES	
Dr. Ramón V. Valmayor Deputy Director General for Programs and Operations Philippine Council for Agriculture and Resources Research (PCARR) Los Baños Laguna	Dr. Emil Q. Javier Vice Chancellor The University of the Philippines at Los Baños College Laguna
THAILAND	
Dr. N. Chomchalow Chairman Deputy Governor and Director of Agriculture Applied Scientific Research Corporation of Thailand 196 Phahonyothin Road Bangkhen, Bangkok 9	Mr. P. Polprasid Director Foreign Agricultural Relations Division Ministry of Agriculture and Cooperatives Rajadamnern Ave. Bangkok, Thailand

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APPENDIX IV

MEMBERSHIP OF CROP WORKING GROUPS AND CONSULTATIONS ON THE GENETIC RESOURCES OF SPECIFIC CROPS HELD IN 1980

CASSAVA[1/]

(In view of the difficulties in organizing this meeting and the inability of several invited participants to attend, a further Working Group will meet in the future)

Members:

Dr. C.O. Goedert
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S.A.I.N. - Parque Rural -
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CEP 70.000 - Brasilia - D.F.
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Cassava Program
CIAT
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Cali
Colombia

COCOA[2/]

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Dr. J. Soria V.
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Ir. H. Toxopeus
Stichting voor
Pantenverdeling S.V.P.
Gebouw de Haaff
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6700 AC Wageningen
Netherlands

Members invited but unable to attend:

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GERDAT
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34032 Montpellier Cedex
France

Dr. V.A. Martinson
Ghana Cocoa Research Institute
P.O. Box 8
Tafo, Ghana

1/ CIAT Staff and Drs. L. Lopez ICA, Bogotá and V.M. Patiño, Botanic Garden, Cali provided substantial contributions at the request of CIAT.

2/ Dr. E.P. Imle, USDA and Messrs. G. Trout and R.T. O'Connell of ACRI provided substantial contributions at the request of the co-hosting institute.

APPENDIX IV
(Continued)

CRUCIFEROUS CROPS

Members:

Dr. I.J. Anand
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India

Dr. P. Crisp
National Vegetable Research Station
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Prof. C. Gómez Campo
Departamento de Biología Vegetal
Escuela T.S. Ing. Agrónomos
Universidad Politecnica
Madrid 3
Spain

Dr. S. Nishi
Director
Vegetable and Ornamental Crops
Research Station
Ishinden-Ogoso
Tsu-City
Japan

Dr. R.T. Opeña
Plant Breeder and Program Leader
The Asian Vegetable and Development
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Taiwan

Ir. H. Toxopeus
Stichting voor Plantenveredeling S.V.P.
Gebouw de Haafi
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6700 AC Wageningen
Netherlands

Prof. P.H. Williams
University of Madison-Wisconsin
Department of Plant Pathology
1630 Linden Drive
Madison, Wisconsin 53706
USA

Members invited but unable to attend:

Dr. Chu Ming Kai
Director
Vegetable Research Institute
Chinese Academy of Agricultural Science
Beijing
China

Dr. P.P. Khanna
NBPGR
IARI Campus
New Delhi - 110012
India

SWEET POTATO

Chairman:

Dr. Alfred Jones
Geneticist
U.S. Vegetable Laboratory
2875 Savannah Highway
Charleston, South Carolina 29407
USA

Members:

Dr. Daniel F. Austin
Department of Biological Sciences
Florida Atlantic University
Boca Raton, Florida 33431
USA

Dr. John Bouwkamp
Department of Horticulture
University of Maryland
College Park, Maryland 20742
USA

SWEET POTATO[1/] (continued)

Dr. S.K. Hahn
International Institute for Tropical Agriculture (IITA)
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Ibadan
Nigeria

Dr. J. Moyer
Pathologist
Department of Plant Pathology
North Carolina State University
Raleigh, North Carolina 27650
USA

Dr. Ruben Villareal
Plant Breeder
Asian Vegetable Research and Development Center (AVRDC)
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Shanhua, Tainan 741
Taiwan

Dr. Douglas E. Yen
Professorial Fellow
Research School of Pacific Studies
Australian National University
P.O. Box 4
Canberra, A.C.T. 2600
Australia

Members invited but unable to attend:

Dr. Dalmo C. Giacometti
CENARGEN/EMBRAPA
Norte Parque Rural
C.P. 10.2372
Brasilia, D.F.
Brazil

Ing. A. Rodríguez Nodals
Centro de Mejora de Semillas Agámicas (CEMSA)
Apartado 6
Santo Domingo, Villa Clara
Cuba

Dr. Satoshi Sakamoto
Kyushu National Agricultural Experiment Station
Nishigoshi
Kumamoto 861-11
Japan

1/Drs. P.D. Dukes and J.M. Schalk of the US Vegetable Laboratory and D.G. Lovell of Experiment, Georgia provided substantial contributions at the request of the co-sponsoring Laboratory.

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APPENDIX V

IBPGR PUBLICATIONS [1/]

General

Report of the first meeting IBPGR, Rome, June 1974

The Conservation of Crop Genetic Resources, edited by Eleanor Lawrence (1975)

Priorities among Crops and Regions (1976)

A Review of Policies and Activities 1974-78 and of the Prospects for the Future (1979)

Treatise on Plant Health and Quarantine in International Transfer of Genetic Resources, edited by W.B. Hewitt and L. Chiarappa (1977) (Available from CRC Press Inc., 2255 Palm Beach Lakes Blvd., West Palm Beach, Florida 33409, USA.)

Crop Genetic Resources Field Collection Manual by J.G. Hawkes (1980) cosponsored by the European Association for Research on Plant Breeding (EUCARPIA)

Crops

Wheat Genetic Resources: Proceedings of an International Symposium held 14-22 July 1975 (1976) (Available from the N.I. Vavilov Institute of Plant Industry, Leningrad, USSR - this publication was sponsored by the IBPGR and the V.I. Lenin Academy of Agricultural Sciences.)

Tropical Vegetables and their Genetic Resources by G.J.H. Grubben and edited by H.D. Tindall J.T. Williams (1977)

Proceedings of the IRRI/IBPGR Workshop on the Genetic Conservation of Rice, held 12-15 December 1977 (1978) (Available from the International Rice Research Institute, P.O. Box 933, Manila, Philippines.)

Genetic Resources of Bananas and Plantains (1978) [2/]

Coconut Genetic Resources (1978) [2/]

Coffee Genetic Resources (1980) [2/]

Fruits, translated from the Indonesian Buahuahn, 1977 (1980)

1/ Available on request from the Secretariat (unless otherwise indicated) in Rome by writing to the Executive Secretary, IBPGR Secretariat, FAO, 00100 Rome, Italy.

2/ Also contain descriptors.

APPENDIX V
(continued)

Descriptors[1/]

Cultivated Potato	(1977)	
Wheat and *Aegilops*	(1978)	
Winged Beans	(1979)	
Tropical Fruits	(1979)	and revised (1980)
Sorghum	(1980)	(in collaboration with ICRISAT)
Colocasia	(1980)	
Yams	(1980)	
Cotton	(1980)	
Mung Bean	(1980)	
Apricot	(1980)	
Beets	(1980)	
Maize	(1980)	
Rice	(1980)	(published by IRRI in collaboration with IBPGR)

Regions

Plant Genetic Resources of Southeast Asia, edited by J.T. Williams, Ch. Lamoureux and Wulijarni-Soetjipto (1975) (Available from the National Biological Institute, Bogor, Indonesia - this publication was partly sponsored by IBPGR.)

A Cooperative Regional Programme in Southeast Asia (1977)

Proceedings of Southeast Asian Workshop on Genetic Resources (1977) (Available from the Philippine Council for Agriculture and Resources Research, Los Baños, Laguna, Philippines.)

Report of the First Meeting of the IBPGR Regional Committee for Southeast Asia (1978)

Report of the Second Meeting of the IBPGR Regional Committee for Southeast Asia (1979)

Report of the Third Meeting of the IBPGR Regional Committee for Southeast Asia (1980)

Report of the IBPGR Workshop on South Asian Plant Genetic Resources (1978)

Report of the IBPGR Regional Meeting on the Mediterranean Germplasm Programme (1979)

1/ See also under Crops for descriptor lists for banana, coconut and coffee.

APPENDIX V
(continued)

Conservation

Report of a Working Group on Engineering, Design and Cost Aspects of Long-term Seed Storage Facilities (1977)

Seed Stores for Crop Genetic Conservation (1978)

The Storage of Recalcitrant Seeds - Achievements and Possible Approaches by M.W. King and E.H. Roberts (1979)

Seed Technology for Genebanks (1979)

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1975	1977	1979

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2 Root Crops (1980) by A.B. Damania and J.T. Williams

3.I Wheat (1980) by W.G. Ayad, Jane Toll and J.T. Williams

3.II Maize (1980) by W.G. Ayad, Jane Toll and J.T. Esquinas-Alcazar

3.III Rice (1980) by Jane Toll, N. Murthi Anishetty and W.G. Ayad

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APPENDIX VI

STATEMENT OF ACCOUNT FOR 1980
(expressed in US dollar equivalents)

Receipts		
Balance as at 1 January 1980		849,466.84
Various Government contributions	2,985,462.98	
Interest credited in 1980	99,983.19	
		3,085,446.17
		3,934,913.01
Deduct:		
Cash expenditure 1980		
Personal services	629,381.09	
Official duty travel	409,124.31	
Contractual services	1,296,426.39	
General Operating expenses	46,311.84	
Supplies and materials	45,057.19	
Furniture and equipment	62,643.51	
Fellowships, grants and contributions	155,391.08	
	2,644,335.41	
Project servicing costs		
14% on US $192,491.80	26,753.56	
Commitments		
Incurred during 1980 (up to 15 December)	376,705.64	
Total expenditure and commitments - 1980	3,047,794.61	
Unliquidated commitments from previous years	506,850.36	
		3,554,644.97
Balance at 31 December 1980		380,268.04

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APPENDIX VII

1980 CONTRIBUTIONS RECEIVED[1/]
(As at 31 December 1980)

	In US dollars
Australia	77,623.00
Belgium	82,392.98
Canada	129,021.00
Denmark	51,929.45
France	79,993.75
Germany, Federal Republic of	290,838.30[2/]
Italy	30,000.00[3/]
Japan	400,000.00
Netherlands	150,000.00
Norway	110,000.00
Sweden	168,472.00
United Kingdom	300,195.00
United States of America	750,000.00
World Bank (IDA)	364,997.50
TOTAL	2,985,462.98

1/ 1980 pledge not received from UNEP.

2/ Includes $16,008.30 representing a special contribution to the Wellesbourne Genebank and $51,347 being the first instalment of the 1981 pledge (received on 31 December 1980).

3/ 1979 pledge received in 1980.

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APPENDIX VIII

IBPGR GRANTS[1/]

(Funds committed in 1980)

	Total Commitment (US dollars)
Collecting and related activities	
Brazil: Collection of groundnut germplasm in remote regions of Brazil (Centro Nacional de Recursos Genéticos, Brasilia)	36,800
Chile: Exploration and collection of maize (Instituto de Investigaciones Agropecuarias, Santiago)	20,636
Colombia: Collection and preliminary evaluation of wild potato species in Colombia (Instituto) Colombiano Agropecuario, Bogota)	11,595
Cyprus: Collection of *Vicia faba* (Agricultural Research Institute, Nicosia)	5,000
France: Continuation of project initiated in 1979 for the collection of cotton germplasm in Latin America (Institut de Recherches du Coton et des Textiles Exotiques, Paris)	39,675
France: Collection of rice germplasm in Guinea (Conakry) (Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières, Paris)	26,200
France: Study on the Genetic Resources of *Abelmoschus esculentus* (okra) and Related Species (Office de la Recherche Scientifique et Technique Outre-mer, Paris)	37,000
ICRISAT: Collection in Ethiopia and East Africa of pigeonpea and cereals germplasm	10,000
India: Collection of coconut germplasm in the Pacific (Central Plantations Crops Institute, Kasaragod)	25,000
Indonesia: Collection and evaluation of wild banana germplasm (Indonesian National Committee for Plant Genetic Resources, Bogor)	25,000
Indonesia: Collection of soyabean germplasm in eastern Indonesia (Indonesian National Committee for Plant Genetic Resources, Bogor)	24,000
Indonesia: Exploration and collection of root and tuber crops (Indonesian National Committee for Plant Genetic Resources, Bogor)	25,000
Indonesia: Survey and collection of coconut germplasm (Indonesian National Committee for Plant Genetic Resources, Bogor)	25,000

1/ This does not represent a full list of IBPGR expenditures during the year.

APPENDIX VIII
(continued)

Collecting and related activites (contd.)	Total Commitment (US dollars)
IRRI: Continuation of project initiated in 1978 for the collection of indigenous rice germplasm in South and Southeast Asia	20,000
Israel: Collection of wild legumes (University of Jerusalem, Jerusalem)	14,500
Israel: Collection of wild lentils native of Southern Europe and wild relatives of other pulses (University of Jerusalem, Rehovot)	3,000
Mexico: Collection of *Capsicum* spp. in five regions of Mexico (Centro de Investigaciones Agricolas del Bajío, Celaya)	8,000
Netherlands: Study on Genetic Resources of Tropical and Sub-tropical Fruits and Nuts and Plan of Action (Royal Tropical Institute, Amsterdam)	74,460
Papua New Guinea: Collection of traditional leafy vegetables and yams in Sepik and Madang Provinces (Lowlands Agricultural Experiment Station, Keravat)	5,500
Peru: Collection and evaluation of maize germplasm in the Southern Cone of South America (Universidad Nacional Agraria, Lima)	43,066
Peru: Exploration and collection of *Lycopersicon* spp. particularly in the Rio Marañon Valley (Universidad Nacional Agraria, La Molina)	13,858
Philippines: Collection of winged bean germplasm (Institute of Plant Breeding, University of the Philippines, Los Baños)	5,120
Portugal: Collection of Gramineae and Leguminosae with particular emphasis on *Secale* and *Lupinus* (Instituto Nacional de Investigacao Agraria, Oeiras)	8,344
Spain: Collection of Leguminosae with special emphasis on *Lupinus* (Instituto Nacional de Investigaciones Agrarias, Madrid)	8,344
Spain: Collection of maize races in different regions of Spain (Instituto Nacional de Investigaciones Agrarias, Madrid)	30,000
Sudan: Collection of traditional wheat in the Jebel Marra area (Gezira Research Station, Wad Medani)	7,400
Thailand: Collection of amaranth germplasm (Fang Horticultural Experiment Station, Chiang Mai)	5,000
Thailand: Collection of eggplant germplasm (Kasetsart University, Bankok)	10,300
Thailand: Collection of indigenous vegetables (Fang Horticultural Experiment Station, Chiang Mai)	5,000

APPENDIX VIII
(continued)

	Total Commitment (US dollars)
Collecting and related activities (contd.)	
Thailand: Exploration and collection of Dioscorea (Thailand Institute of Scientific and Technological Research, Bangkok)	10,000
Thailand: Exploration and collection of upland rice in Thailand (Kasetsart University, Bangkok)	5,000
UK: Study on the Genetic Resources of *Allium* spp. and Plan of Action (National Vegetable Research Station, Wellesbourne)	6,540
Training	
ICARDA: Training course on Collection, Maintenance and Utilization of Wheat and Barley Germplasm	35,000
India: Training Course on Plant Genetic Resources Exploration and Collection (Indian Council for Agricultural Research, New Delhi)	35,979
Italy: 1981 Training Course on Genetic Resources Documentation (Germplasm Institute, Bari)	40,000
Philippines: Training Course on Evaluation and Utilization of Root and Tuber Crops (Philippine Council for Agriculture and Resources Research, Los Baños)	22,000
Thailand: Training Course on Collection and Conservation of Perennial Crops (Thailand Institute of Scientific and Technological Research, Bangkok)	25,800
UK: Allocation to the International Training Course on Conservation and Utilization of Plant Genetic Resources, for students from developing countries (University of Birmingham)	54,206
UK: Training Course in Practical Seed Technology for Genebank Personnel (School of Agriculture, Edinburgh)	12,465
Conservation	
Australia: Study on the in vitro storage of grape (Division of Horticultural Research, CSIRO, Adelaide)	21,063
Bangladesh: Provision of equipment for medium-term seed storage facilities (Bangladesh Agricultural Research Institute, Dacca)	64,956

APPENDIX VIII
(continued)

	Total Commitment (US dollars)
Conservation (contd.)	
Greece: Seed storage facilities for conservation of genetic resources in Greece and for other countries of the Mediterranean (Salonika, Cereal Institute)	40,000
IUCN: Position paper on *in situ* conservation of crop genetic resources	16,600
Philippines: Establishment of a coconut germplasm resources centre (Philippine Coconut Authority, Manila)	10,000
Philippines: Maintenance of the Southeast Asia banana germplasm resources centre (Philippine Council for Agriculture and Resources Research, Los Baños)	11,000
Philippines: Transfer of banana germplasm from Thailand to the Southeast Asia Banana Germplasm Resources Centre (Philippine Council for Agriculture and Resources Research, Los Baños)	5,000
UK: Determination of regeneration interval in orthodox seeds and investigation into the long-term storage of recalcitrant seeds (University of Reading)	20,000
UK: Study on the *in vitro* genetic conservation of *Theobroma cacao* (School of Agriculture, Nottingham University)	16,400
UK: Support to the establisment of a vegetable genebank to store seed of tropical vegetables (National Vegetable Research Station, Wellesbourne)	50,000

APPENDIX IX

ACRONYMS USED IN THE REPORT

AAASA	-	Association for the Advancement of Agricultural Science in Africa
ACRI	-	American Cocoa Research Institute
ARARI	-	Aegean Regional Agricultural Research Institute (Turkey)
AVRDC	-	Asian Vegetable Research and Development Center
BARI	-	Bangladesh Agricultural Research Institute
CARDI	-	Caribbean Agricultural Research and Development Institute
CATIE	-	Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)
CDI	-	Cotton Development International
CENARGEN	-	Centro Nacional de Recursos Genéticos (Brasil)
CGIAR	-	Consultative Group on International Agricultural Research
CIAB	-	Centro de Investigaciónes Agrícolos del Bajío (Mexico)
CIAT	-	Centro Internacional de Agricultura Tropical
CIMMYT	-	Centro Internacional de Mejoramiento de Maiz y Trigo
CIP	-	Centro Internacional de la Papa
CNPMS	-	Centro Nacional de Pesquisa de Milho e Sorgo (Brazil)
CNR	-	National Research Council (Italy)
CSIRO	-	Commonwealth Scientific and Industrial Research Organization (Australia)
ECP	-	European Cooperative Programme for the Conservation and Exchange of Genetic Resources for Plant Breeding (UNDP/FAO)
EEC	-	European Economic Community
EMBRAPA	-	Empresa Brasileira de Pesquisa Agropecuária
EUCARPIA	-	European Association for Research on Plant Breeding
EXIR	-	Executive Information Retrieval
FAL	-	Federal Agricultural Research Centre (F.R. Germany)
FAO	-	Food and Agriculture Organization of the United Nations
GREMPA	-	Groupe de Recherches et d'Etudes Méditerranéen Pour l'Amandier
GTZ	-	German Agency for Technical Cooperation (F.R. Germany)

APPENDIX IX
(continued)

ACRONYMS

IADS	-	International Agricultural Development Service (USA)
IAN	-	Instituto Agronomico Nacional (Paraguay)
IARC	-	International Agricultural Research Centre
IARI	-	Indian Agricultural Research Institute
IBPGR	-	International Board for Plant Genetic Resources
IBTA	-	Instituto Boliviano de Tecnología Agropecuaria
ICA	-	Instituto Colombiano Agropecuario
ICAR	-	Indian Council of Agricultural Research
ICARDA	-	International Center for Agricultural Research in the Dry Areas
ICRISAT	-	International Crops Research Institute for the Semi-Arid T pics
IGRC	-	International Genetic Resources Centre
IICA	-	Instituto Interamericano de Ciencias Agrícolas (OAS)
IIRB	-	Institut International de Recherches Betteraves
IITA	-	International Institute of Tropical Agriculture
INIA	-	Instituto Nacional de Investigaciones Agrarias (Spain)
INIA	-	Instituto Nacional de Investigaciones Agrícolas (Mexico)
INIA	-	Instituto Nacional de Investigaciones Agropecuarias (Chile)
INIAP	-	Instituto Nacional Agropecuario (Ecuador)
INRA	-	Institut National de la Recherche Agronomique (France)
INTA	-	Instituto Nacional de Tecnología Agropecuaria (Argentina)
INTSOY	-	International Soybean Program
IOCC	-	International Office of Cocoa and Chocolate
IRAT	-	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (France)
IRCT	-	Institut de Recherches du Coton et des Textiles exotiques (France)
IRRI	-	International Rice Research Institute
IS/FR	-	Information Sciences/Genetic Resources Program

APPENDIX IX
(continued)

ACRONYMS

IUBS	-	International Union of Biological Sciences
IUCN	-	International Union for Conservation of Nature and Natural Resources (Switzerland)
IVT	-	Institute for Horticultural Plant Breeding (Netherlands)
JAC	-	Junta del Acuerdo de Cartagena (Peru)
LPPP	-	Central Research Institute for Agriculture (Indonesia)
MAFF	-	Ministry of Agriculture, Forestry and Fisheries (Japan)
MAB	-	Man and the Bioshphere Programme (Unesco)
MARDI	-	Malaysian Agricultural Research and Development Institute
NBPGR	-	National Bureau of Plant Genetic Resources (India)
NIAS	-	National Institute of Agricultural Sciences (Japan)
NIHORT	-	National Horticultural Research Institute (Nigeria)
NSSL	-	National Seed Storage Laboratory (USA)
NVRS	-	National Vegetable Research Station (UK)
OAS	-	Organization of American States
OAU	-	Organization of African Unity
OIV	-	Office International de la Vigne et du Vin (France)
ORSTOM	-	Office de la Recherche Scientifique et Technique d'Outre Mer (France)
PCARR	-	Philippine Council for Agriculture and Resources Research
PGR	-	Plant Gene Resources of Canada
PGRC	-	Plant Genetic Resources Center (Ethiopia)
PRCRTC	-	Philippine Root Crops Research and Training Center
RTI	-	Royal Tropical Institute (Netherlands)
SABRAD	-	Society for the Advancement of Breeding Researches in Asia and Oceania
SEA-USDA	-	Science and Education Administration - US Department of Agriculture
SPC	-	South Pacific Commission
SVP	-	Foundation for Agricultural Plant Breeding (the Netherlands)

APPENDIX IX
(continued)

ACRONYMS

TAC	-	Technical Advisory Committee
TISTR	-	Thailand Institute of Scientific and Technological Research
UNA	-	Universidad Nacional Agraria - La Molina (Peru)
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environment Programme
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
UPOV	-	International Union for the Protection of New Varieties of Plants
USAID	-	United States Aid for International Development
USDA	-	United States Department of Agriculture
VIR	-	N.I. Vavilov Institute of Plant Industry (USSR)
VOCRS	-	Vegetable and Ornamental Crops Research Station (Japan)
WARDA	-	West African Rice Development Association

RESUME

Les cinq comités consultatifs sur les cultures (blé, maïs, riz, sorgho et mils et haricots *Phaseolus*) qui travaillent en coopération avec les CGIAR compétents assurent la liaison entre le Conseil et l'ensemble des chercheurs spécialisés dans chaque culture. En 1980, ils ont donné des avis au Conseil sur les propositions de missions de prospection; les comités du maïs et des haricots *Phaseolus* se sont réunis pour examiner les travaux en cours.

Des progrès notables ont été réalisés en 1980 dans la compilation des listes de toutes les entrées des principaux centres de ressources génétiques conduisant à la publication de répertoires des collections pour les légumineuses alimentaires, les tubercules et racines, le blé et le maïs.

En 1980, divers groupes de travail et consultations d'experts ont été organisés pour recommander au Conseil un plan d'action générale concernant la patate douce, le manioc, le cacao et les crucifères. Ces travaux faisaient en partie suite à une décision du Conseil tendant à porter plus d'attention aux plantes multipliées par voie végétative. Des groupes de travail d'experts et des comités consultatifs sur les cultures se sont antérieurement mis d'accord sur des listes minimales de descripteurs pour diverses cultures prioritaires. En 1980, des listes ont été établies pour l'abricot, les betteraves, le café, le coton, le haricot mungo, le riz (en collaboration avec l'IRRI), le taro, le sorgho (en collaboration avec l'ICRISAT) et l'igname; des listes révisées ont été établies pour le maïs et les fruits tropicaux.

Le Conseil a appuyé et organisé une série de prospections prioritaires dans les régions ci-après: Méditerranée, Asie du Sud-Ouest, Asie du Sud, Asie du Sud-Est, Afrique de l'Est, Afrique de l'Ouest, Amérique centrale et Amérique du Sud.

Le Conseil a décidé en 1980 d'élargir ses activités régionales en nommant des experts en Afrique de l'Est, en Afrique de l'Ouest et en Amérique latine en 1981.

Une nouvelle initiative a été prise au sujet des fruits tropicaux et le programme du Conseil sur les légumes a été accéléré en 1980. Une enquête mondiale sur les ressources génétiques du blé a été achevée en 1980 et l'enquête sur les collections de fourrages a beaucoup progressé. Le Conseil prépare, en collaboration avec les centres en cause, un réseau d'institutions chargé d'entretenir les grandes collections de base de semences pour les principales cultures vivrières. Ce réseau a été élargi en 1980 et le Conseil a financé diverses installations d'entreposage.

Le Conseil a participé à l'étude et à la mise en place dans divers pays de systèmes documentaires appropriés pour la conservation et la récupération d'informations sur les principales collections de ressources phytogénétiques.

En 1980, le Conseil a continué de soutenir la formation aux niveaux technique et supérieur, afin d'accroître les effectifs de personnel formé au travail sur les ressources phytogénétiques dans les pays en développement. Plusieurs stages rapides ont été organisés et le Conseil a offert des bourses de formation.

En 1980, le Conseil a commencé à préparer un plan d'action à long terme qui sera publié sous forme de rapport de stratégie et de planification en 1981.

En outre, le Conseil a décidé, en principe, de soutenir des recherches limitées dans les domaines où les résultats obtenus accéléreraient ses activités pratiques.

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RESUMEN

Los cinco comités asesores sobre cultivos (para trigo, maíz, arroz, sorgo y mijo, y *Phaseolus*) que actúan en cooperación con el correspondiente centro internacional de investigación agrícola sirven de puente entre el Consejo y la comunidad global de científicos que se ocupan de cada uno de estos cultivos. En 1980, asesoraron al Consejo sobre propuestas para recolección de germoplasma y los Comités del maíz y de *Phaseolus* examinaron los trabajos en curso.

En 1980, se progresó considerablemente en la compilación de listas de entradas en los principales centros de recursos genéticos para los cultivos más importantes, lo que permitió la publicación de listas con direcciones de colecciones de leguminosas grano, raíces y tubérculos, trigo, y maíz.

En 1980, se reunieron varios grupos de trabajo y consultas de expertos para asesorar al Consejo sobre acciones globales respecto a la batata, yuca, cacao y crucíferas. Esto permitío prestar más atención a los cultivos de propagación clonal.

Los grupos de trabajo y los comités asesores sobre cultivos elaboraron listas mínimas de descriptores para varias especies agrícolas prioritarias. En 1980, se prepararon estas listas para albaricoque, remolacha, café, algodón, frijol, mango, arroz (en colaboración con el IRRI), taro, sorgo (en colaboración con el ICRISAT) y ñame; además, se revisaron las listas ya existentes para el maíz y los frutos tropicales.

El Consejo apoyó y organizó una serie de recolecciones prioritarias en las siguientes regiones: Mediterráneo, Asia sudoccidental, Asia meridional, Asia sudoriental, Africa oriental, Africa occidental y América central y meridional.

En 1980, el Consejo acordó ampliar sus actividades regionales mediante el nombramiento en 1981 de oficiales regionales en Africa oriental, Africa occidental y América Latina.

También se adoptó una nueva política sobre frutas tropicales y se aceleró el programa del Consejo sobre hortalizas.

Se dio fin en 1980 a un estudio mundial sobre recursos genéticos del trigo y progresó considerablemente un estudio sobre colecciones de forrajes.

El Consejo ha designado, previa consulta con los centros interesados, una red de instituciones encargadas del mantenimiento de las principales colecciones mundiales de semillas de los cultivos alimenticios más importantes. La red se amplió en 1980 y el Consejo financió varias instalaciones de almacenamiento.

El Consejo colaboró en el desarrollo e instalación de sistemas apropriados de documentación en varios países para el almacenamiento y recuperación de información sobre colecciones importantes de recursos genéticos agrícolas.

En 1980, el Consejo siguió apoyando la capacitación a nivel técnico y de postgraduados, con objeto de ampliar los efectivos de personal capacitado para trabajos sobre recursos genéticos en los países en vias de desarrollo. Se organizaron varios cursillos y el CIRF proporcionó cierto número de becas.

En 1980, el Consejo comenzó la preparación de un plan de acción a largo plazo, que dará a conocer en 1981 con la publicación de un informe sobre estrategia y planificación.

Además, el Consejo acordó apoyar la realización de investigaciones de carácter limitado en sectores donde los resultados pueden acelerar los trabajos prácticos del Consejo.