

INTERNATIONAL COLLABORATION IN PLANT GENETIC RESOURCES: THE ROLE OF IBPGR

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ABSTRACT

Since its inception, almost 20 years ago, international collaboration has played a central role for IBPGR in carrying out its mission to strengthen the conservation and use of plant genetic resources. Such collaboration is necessary as IBPGR possesses neither genebanks nor research facilities.

An examination is made of the variety of forms and functions of present and future international collaboration, including: 1) a shift from IBPGR's direct involvement in collection and conservation in the early years towards collaboration with national programmes to assist them to conserve and use plant genetic resources (PGR) more effectively; 2) increased emphasis on a variety of network forms including regional networks and crop-based networks that encourage conservation and use of PGR among countries in a region; 3) focus on clarifying and advising on issues which may be constraints in collaboration including guidelines for the safe movement of germplasm, on policies regarding sovereignty of germplasm and intellectual property rights, formulating standards for more efficiently conserving germplasm in genebanks and developing standard systems for documenting germplasm accessions; 4) closer collaboration with other international agricultural research centres (IARCs) and other international organizations as centres for expertise and regional training on PGR; 5) strengthening the PGR component of existing networks such as the Bamboo and Rattan Network; 6) developing collaborative arrangements or contracting with universities in developed or developing countries, institutions to carry out research and development on topics such as genetic diversity study, management of landraces, community-based conservation, or recalcitrant seeds; 7) collaboration with donor organizations to secure funds for both IBPGR and national programme institutions.

The advantages of this collaborative mode of operation include

increased flexibility to respond to changing conservation needs and opportunities, and cost effectiveness in a world where PGR must be sustainably conserved in the face of limited funding.

Changes in IBPGR management and strategy, including increased decentralization to 5 regional offices will facilitate improved regional collaboration. The Asia, Pacific and Oceania region is particularly decentralized with a regional office based in Singapore and coordination offices in Beijing and New Delhi.

It is expected that IBPGR's emphasis on international collaboration should facilitate greater regional involvement and strengthening of such institutions as NPGRC.

An example is presented of the achievements from collaboration through the Regional Committee for South-East Asia (RECSEA).

EARLY ACHIEVEMENTS

The International Board for Plant Genetic Resources was founded almost 20 years ago, as a result of concern over the scale of genetic erosion and an increasing recognition of the potential value of the genetic resources that were being lost. The eloquence of advocates such as Frankel (1975) helped to establish how plant genetic resources could be conserved through the exploration, collection, conservation and documentation on a global basis. Thus, the broad mandate for IBPGR has always been clear to advance the conservation and use of plant genetic resources for the benefit of present and future generation (IPGRI, 1993a).

IBPGR was established as a small secretariat under FAO in Rome in 1974, but soon emerged as a sister centre in the Consultative Group on International Agricultural Research (CGIAR) system. From the beginning, IBPGR placed high priority to collect in areas and for species most threatened by genetic erosion, and to insure their conservation and documentation in a network of genebanks in international centres and national programmes around the world. Other early activities were focussed on promoting public awareness of plant genetic resources through meetings, publications and training. Support to research aimed at developing better techniques for conservation started during the first 5 years of IBPGR's existence.

The results of these activities in the recently published IPGRI Strategy (1993a), have been impressive.

- Almost 200,000 samples of germplasm have been collected on missions

sponsored by IBPGR.

IBPGR's scientific and technical support to national genetic resources programmes has contributed to the establishment in over 100 countries of *ex situ* conservation facilities comprising national and international storage facilities for germplasm of particular crops (Figure 1). Standards for characterizing and documenting germplasm accessions were developed. Over 70 standardized descriptor lists were developed, which are widely used around the world. Seven volumes in a series of Directories of Germplasm Collections, listing the germplasm holdings of specific crops held around the world, have been published.

Almost 1500 trainees on different aspects of plant genetic resources have been sponsored by IBPGR, 60% of whom continue to work on some aspects of plant genetic resources.

IBPGR has published over 200 publications including newsletters, research textbooks and conference proceedings.

Research supported by IBPGR resulted in seed storage methods and *ex situ* seed bank storage and management guidelines being developed. *In vitro* conservation methods for many vegetatively propagated species are also a practical reality. Collaboration between IBPGR and FAO on plant pathology and quarantine resulted in the publication of a rapidly growing list of widely used guidelines for safe movement of germplasm. Research on genetic diversity, conservation technology and regeneration, has resulted in significant advances in conservation strategies and techniques.

RESPONSE IN A CHANGING WORLD

Political, demographic, economic and environmental changes can affect biodiversity and plant genetic resources. The continued expansion in the world population, expected to reach 7 billion by the year 2010, with most increase expected in the Asian region, will require increase in food production never before achieved. Increased industrialization and climate change are likely to result in changes in agriculture. Plant genetic resources will play a key role in meeting the challenges posed by these changes.

At the same time, issues of accessibility and national sovereignty of plant genetic resources are topics of hot debate and concern, most recently as a result of the UNCED Convention on Biodiversity signed by most countries of the world. Rapid advances in biotechnology can offer improved methods for collecting, conservation, measuring genetic diversity, disease indexing,

gene transfer and DNA storage. At the same time, there is an increasing trend in some parts of the world to apply intellectual property protection and other form of patents in order to restrict the availability of certain plants, genes or technologies in order to make their commercial exploitation more attractive.

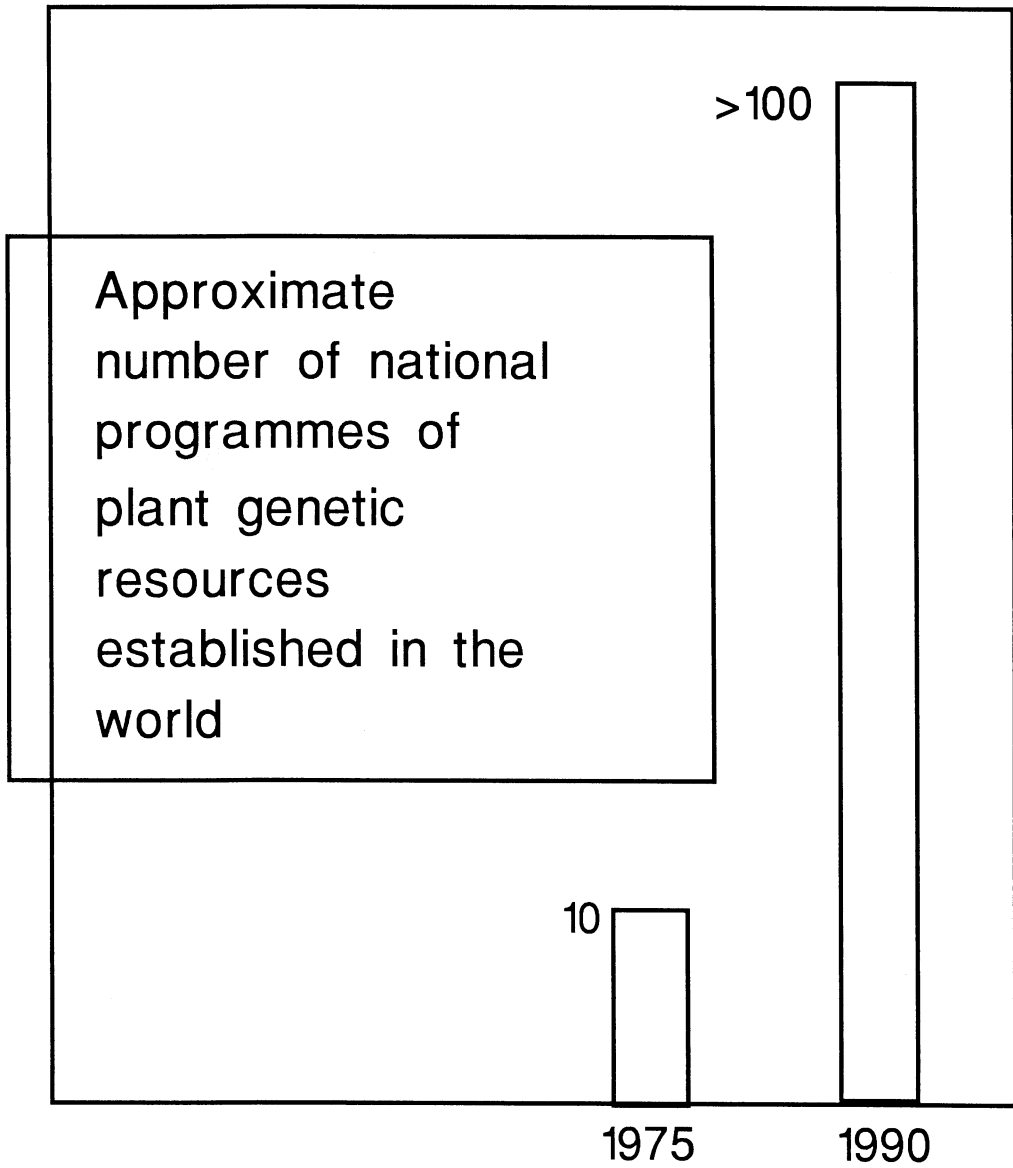


Figure 1. Increase in national plant genetic resources programmes.

These challenges are of critical importance both to IBPGR and to national programmes. Flexibility and responsiveness in addressing these issues are essential. IBPGR is now prepared to emerge as a fully independent International Plant Genetic Resources Institute (IPGRI) and has developed a strategy document (IPGRI, 1993a) and a medium-term plan up to 1998 (IPGRI, 1993b). These documents contain a framework for IPGRI's future programme and activities.

It is foreseen that IPGRI's core programme budget will remain very limited, but there are likely to be opportunities to identify sources of external funding and to develop collaborative activities with a number of partners.

The fact that IBPGR has moved away from directly controlling and organizing collecting, seed handling and gene bank storage puts the Institute in a better position to function as a true partner in collaborative activities.

PARTNERS IN COLLABORATION

The strategy document (IPGRI, 1993a) describes collaboration with a variety of partners including National Programmes, CGIAR centres and other international agricultural research institutes, United Nations agencies, regional organizations, non-governmental organizations, and the private sectors.

National Programmes

IPGRI's first and perhaps most important objective is "to assist countries particularly developing nations to assess and meet their needs for plant genetic resources conservation, and to strengthen links with users". Specific collaboration with national programmes can include: assisting in assessing the needs of a national programme regarding plant genetic resources conservation and use; advising on national priorities and plans, and national committees or coordinating systems; providing scientific, technical and policy advice; providing training opportunities; contracting of research projects to appropriate national institutes; assisting in rescue collecting; encouraging the adoption of standards in genebank management and quarantine; assisting in raising public awareness and in securing adequate funding for national PGR activities.

IPGRI accepts a global responsibility but recognizes that it will not be able to devote equal attention to all countries. Priority will be given to countries which: attach importance to the development of their forestry and

agricultural sectors; demonstrate a willingness to strengthen their own activities on the conservation and use of plant genetic resources; are willing to participate in regional or international efforts and, possess significant diversity of plant genetic resources.

The specific areas where collaboration between a national programme and IBPGR might be expected to develop is shown diagrammatically in Figure 2. This diagram emphasizes the importance of assessment of priorities and commitments of resources and capabilities by both partners. External funding may be required for some but, not necessarily all collaborative activities.

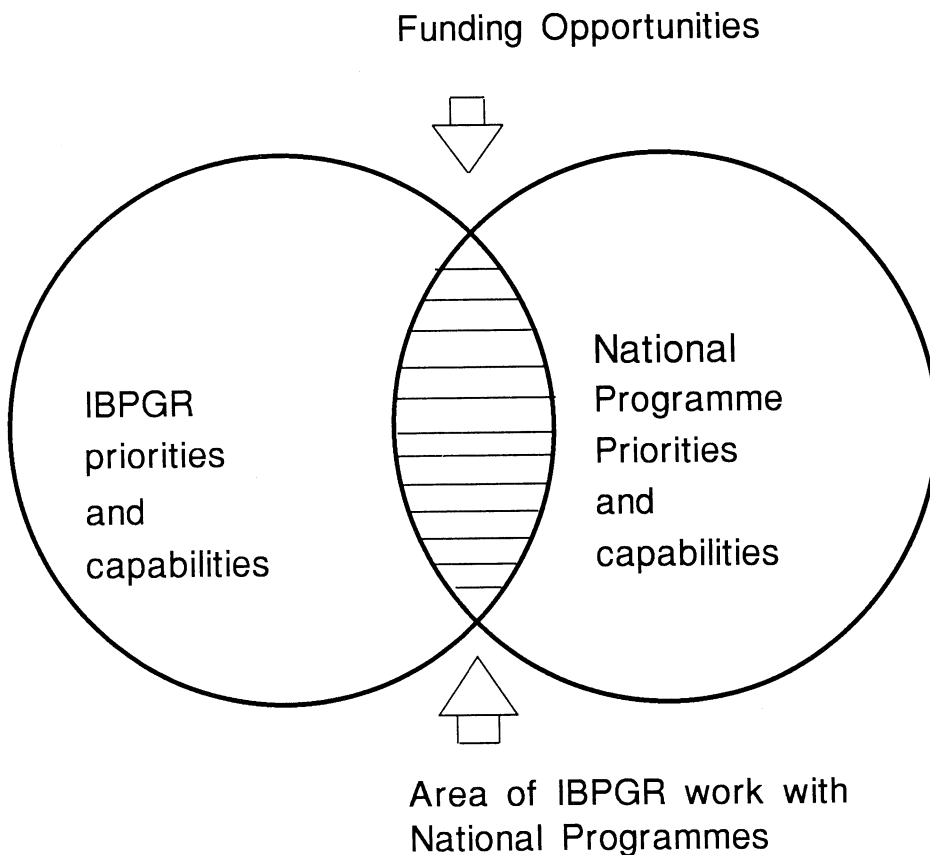


Figure 2. Identification of IBPGR work with National Programmes.

Consultative Group on International Agricultural Research (CGIAR)

The other International Agricultural Research Centres in the CGIAR

system such as IRRI, AVRDC, and ICRISAT collectively hold a large part of the world's *ex situ* food crop genetic resources. An Inter-Centre Working Group on Plant Genetic Resources provides a mechanism for collaboration among the centres. As these centres move toward partnerships with national programmes, opportunities for collaboration to involve IBPGR will increase. The newly created Centre for International Forestry Research (CIFOR) may develop linkages with IBPGR on a forestry genetic resources programme.

F. A. O. of the United Nations

FAO is a key participant in work on plant genetic resources in both crops and forest species. As IPGRI achieves independence as an institute, collaboration with FAO in implementing the International Undertaking on Plant Genetic Resources will continue. A Memorandum of Understanding between FAO and IPGRI establishes clear roles for each organization for future collaboration. IBPGR will assist FAO to encourage countries to bring their collections into the International Network of Base *Ex Situ* Collections.

Regional Programmes

Regional programmes such as the Regional Committee (on plant genetic resources) for Southeast Asia (RECSEA), will continue to be important partners in collaborative activities. This is discussed below under the heading of Networks.

Non- Governmental Organizations (NGOs)

NGOs have made impressive progress in stimulating a critical examination of plant genetic resources conservation objectives and approaches by international and national organizations and by farmers themselves. IBPGR hopes to work much more closely in the future with such organizations. As an example, the regional NGO known as SEARICE and IBPGR plan to work together to better understand farmers and local users' strategies in conserving and using semi- and non-cultivated plant species in Laos.

Private Sector

Public and private seed companies, and commercial biotechnology companies may become partners with IBPGR in specific activities in the future to work on specific aspects of PGR conservation and use.

FORMS OF COLLABORATION

The second objective of the IPGRI strategy is "to strengthen and contribute to international collaboration in the conservation and use of plant genetic resources". Collaboration can take several forms.

Regional and Crop Networks are important mechanisms or tools for IBPGR that can bring together groups of people, organizations or countries to share information or other resources so that each derives greater benefit than had the resources been used in any other way.

Networks can vary greatly in complexity, but the identification of common priorities among members (Figure 3) can form the basis for effective and sustained collaboration. Generally a commitment for funding, and an agreement on one of the members, or a separate centre to function in a coordination role, or a "hub", is necessary.

Regional Genetic Resources Networks have been established in Europe, Latin America, Southern Africa, and West Asia and North Africa, and Southeast Asia. Regional networks allow countries within a region that share agro-ecological conditions to develop common activities on genetic resources. IBPGR staff can interact effectively as a member of these networks and often help play a coordination role. Work to conserve and use specific crops or commodity species can be carried out by working groups under these networks.

In this region, RECSEA can be used as an example of a regional genetic resources network. RECSEA first began functioning as a committee of IBPGR in 1975, bringing together country representatives from Thailand, Philippines, Indonesia, Malaysia and Papua New Guinea. With strong funding support, some impressive results were achieved. National Plant Genetic Resources Committees were formed in each participating country. Over 13,000 collections were made and shared among the 5 member countries. For example, a regional field genebank for bananas was established in the Philippines on behalf of all RECSEA members. A RECSEA newsletter (later to become the IBPGR regional newsletter) was established. Support channelled through RECSEA was used to establish or strengthen genebanks in each participating country. During 1984-1987, working groups were set up to address the conservation food legumes, tropical fruits, roots and tubers, maize, sugar cane, and coconut and oil palm. Posters were displayed and meetings were held to raise public awareness about plant genetic resources in these countries. As this committee makes the transition to a network,

IBPGR is working with RECSEA in assisting with communications, helping to seek

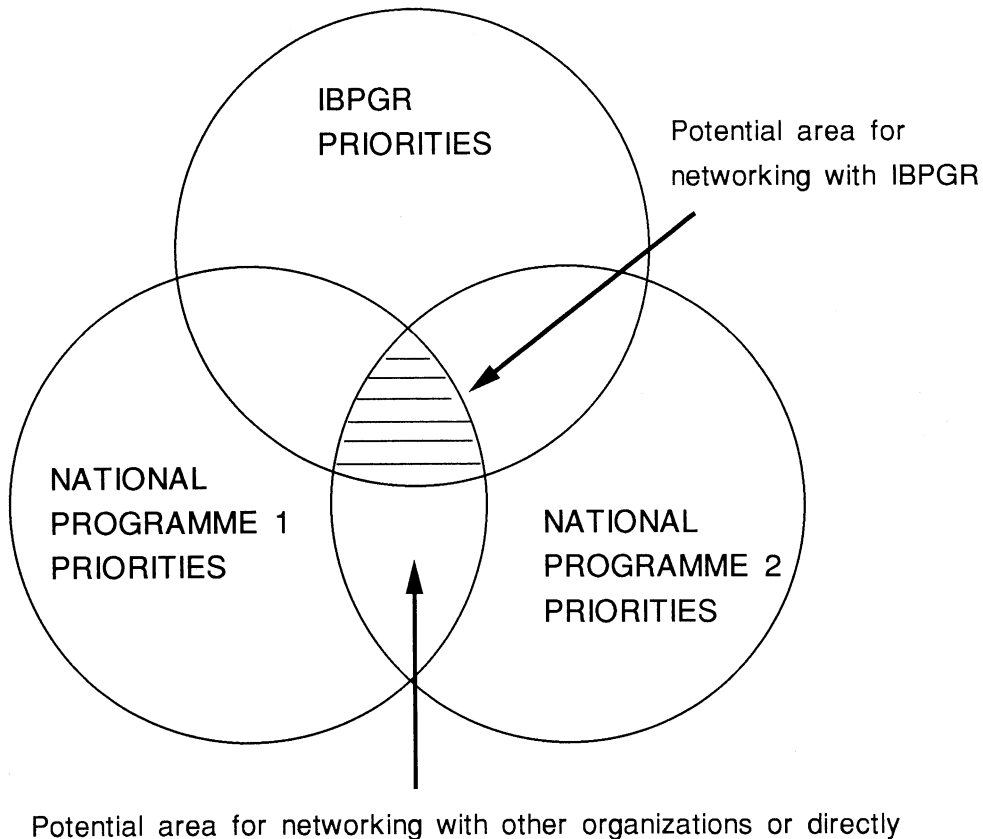


Figure 3. Identification of areas for networking between IBPGR and National Programmes.

funds and in making links with other IBPGR regional projects.

Crop Networks are concerned with the conservation, documentation and use of a particular crop, on a global or regional basis. A national programme, or in some cases an International Centre, acts as the coordinator. The development of a common database of the germplasm holdings of each participating country is seen as a necessary first step to enable further exchange and collaboration. Crop networks for beta, rice, okra, maize, barley, coconut, cassava, sweet potato, medics and groundnut have been initiated. IBPGR support was committed only for the initiation period for each of these networks. IBPGR is now considering how such networks might function more

sustainably.

IBPGR support may be given to help strengthen the genetic resources component of a network that is already functioning. For example the International Bamboo and Rattan Network (INBAR), now based in Delhi, is primarily concerned with improving the utilization and production of these non-timber forest species. IBPGR is now set to provide complementary support for research in genetic diversity that can help in better planning of extractive reserves and *in situ* conservation.

Many of the research activities in which IBPGR is engaged can help both regional and crop networks function more effectively. Up-to-date information and advice can be provided on guidelines for safe movement of germplasm, the base collection network; standards for genebanks including "ultra dry seed technology" and regeneration; methods for conserving recalcitrant seeds or vegetatively propagated species; systems for documenting collections; methods for assessing genetic diversity and efficient collecting strategies and advise on policy and public awareness, including questions of sovereignty and intellectual property protection of germplasm or genes.

Research collaboration on new methods or techniques for the better conservation and use of plant genetic resources is an important part of IBPGR's overall programme. On some topics, such as ultra dry seed, or methods to measure genetic diversity, many institutions around the world may be presently carrying out research, or have strong capability in these areas. In such cases, IBPGR can encourage information exchange and collaboration among these institutions and help guide the overall direction of the research to insure maximum effectiveness. Such collaboration can be termed "topic-based networking".

Funding is an important element to ensure continued progress in research and conservation activities. As mentioned earlier, IBPGR core funds are extremely limited, and national programmes and international Centres are expected to provide funding to conserve and use the germplasm that they hold. However, plant genetic resources is a topic of concern to many donor organizations. The increased awareness about the importance of conserving our global environment, particularly after the UNCED Conference and the Convention on Biodiversity, has resulted in greater potential for funding for national and international activities to conserve plant genetic resources. IBPGR is prepared to assist its partners in developing proposals to secure funds to carry out important collaborative activities.

ORGANIZATIONAL CHANGES IN IBPGR

As IBPGR prepares to become an independent institute, a number of organizational and management changes have been undertaken. The former Research and Field Programmes of IBPGR are now managed under 8 Groups. Three Groups focussing on thematic areas, namely Genetic Diversity; Germplasm, Maintenance and Use; and Documentation, Training and Information, are based in Rome, while 5 regional groups: Sub-Saharan Africa, West Asia and North Africa, the Americas, Europe and Asia, the Pacific and Oceania, have regional offices located within their regions, and are responsible for regionally-based activities.

Binding these Groups together are a set of projects in which all programme activities are funded and carried out. Each project involves at least 2 different groups and many involve the collaboration of 4 groups or more.

The Regional Office of the Asia, Pacific and Oceania Group is based in Singapore and now consists of 4 professional staff. Coordinating offices are located in Delhi and Beijing to look after activities in South and East Asia respectively. Regionally-based projects that have been developed now include national programme support, the coconut network, underutilized crops, tropical fruit trees, taro and yam, genebank regeneration studies, and support to strengthen other networks including bamboo and rattan, alliums, rice, groundnuts, okra and sweet potato.

Increased decentralization of the IBPGR programme, project set and activities is an important management principle. Increased responsibility to formulate and manage activities in the regional offices, is allowing IBPGR to move closer to its partners in developing truly collaborative activities with emphasis on responding to national programme needs.

With the strong emphasis on collaboration in the region from IBPGR and the exciting new developments in the strengthening of the plant genetic resources programmes in Taiwan, there are good prospects for closer collaboration among IBPGR, NPGRC and other organizations.

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