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THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

TECHNICAL ADVISORY COMMITTEE

Forty-Second Meeting, Rome (Italy), 16-24 March 1987

PLANT GENETIC RESOURCES IN THE CGIAR

(Agenda Item 9)

Proposed Objectives of the Discussion

Attached for TAC consideration is the paper on the role of the CGIAR in activities relating to plant genetic resources, as revised by the TAC-Centers Ad-Hoc Working Group on Plant Genetic Resources established at TAC 41 in Washington, D.C. The group took into account the comments made by TAC and Center Directors. It also discussed some additional issues and made recommendations.

TAC is requested to review the revised document and approve the recommendations.

TAC SECRETARIAT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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THE ROLE OF THE CGIAR IN ACTIVITIES RELATING TO PLANT GENETIC RESOURCES

Background

The collection of different plants is as old as their cultivation. Their organized collection and maintenance also have a long history, often associated with wealth and patronage. From the eighteenth century onwards, the creation of botanic gardens, such as those at Kew in the United Kingdom, served both to stimulate widespread interest in genetic diversity and to facilitate the introduction of plants to different countries and environments.

Organized plant breeding, which dates from the nineteenth century, also stimulated the collection and preservation of different genetic stocks. At the instigation of governments and scientists, collection and preservation expanded in the twentieth century, particularly after the second world war, but these efforts were mainly confined to the industrialized countries. Up to this time, practically all of the work was motivated primarily by the desire to exploit genetic diversity for human benefit, be it for crops, timber or ornamentals.

The idea of genetic diversity being a natural resource that should be conserved arose as a consequence of the population explosion and gained momentum with the spread of modern varieties. Not only were the natural habitats of plants being destroyed by the expansion of agriculture, but landraces were fast disappearing as they were replaced by new, high-yielding varieties.

Plant Genetic Resources in the Global Context

International recognition of the need for the conservation of plant genetic resources found its first significant expression through the scientific meetings sponsored by the Food and Agriculture Organization of the United Nations (FAO) and the International Biological Program in the early 1960's and the creation by FAO in 1965 of a "Panel of Experts". Meanwhile, those International Agricultural Research Centers (IARCs) which preceded the CGIAR began their plant genetic resources activities. Largely at the suggestion of FAO, the Consultative Group on International Agricultural Research (CGIAR) also became involved and, in 1972, the Technical Advisory Committee (TAC) to the CGIAR convened a working group of international scientists whose recommendations eventually led to the establishment of the International Board on Plant Genetic Resources (IBPGR) in 1974.

In recent years the CGIAR has become increasingly active in plant genetic resources activities. The CGIAR has given highest priority to the essential elements of collection and preservation of plant genetic materials in germplasm banks through both direct and catalytic efforts. Currently, the CGIAR commodity Centers hold collections of their mandated food crops, related wild species and tropical pastures. The work of the CGIAR on plant genetic resources is

characterized by the extent of its global networks run in collaboration with national systems.

More recently, greater awareness among nations of the dangers of genetic erosion and the benefits of conservation have served, amongst other things, to highlight the policy and political aspects of these problems. One consequence has been the inauguration of the International Undertaking on Plant Genetic Resources in 1983 and the creation of the associated Commission under the auspices of FAO. With the establishment of the FAO Commission on Plant Genetic Resources, the complementary nature of its activities with those of the CGIAR have become progressively more apparent. Ways of strengthening the fruitful collaboration that could develop from these complementary activities will no doubt evolve as a consequence of joint consideration of global needs.

Meanwhile the CGIAR has indentified a need to define more precisely its future role in the support of work on genetic resources. In its review of CGIAR Priorities and Future Strategies, TAC recommended that the CG System should continue to develop the strength of its crop genetic resource conservation activities, with increased attention to the characterization and documentation of germplasm collections. TAC also recommended significant increase in resources allocated to germplasm activities. In addition it urged for active promotion by the CGIAR of path-breaking research on improving the effectiveness of long-term storage of germplasm.

In general, the evolving strategies within the CGIAR are towards closer integration of the activities it supports and greater collaboration between the IARCs and other Centers involved in plant genetic resources activities on the global scene. This paper discusses these principles in relation to the need to review the role of the CGIAR in its future support for work on plant genetic resources.

More detailed background information can be found in the 1982 Integrative Report published by the CGIAR; the TAC Report of the Second External Program and Management Review of the IBPGR, published by TAC in 1986; "The IBPGR in its Second Decade", published by the IBPGR Secretariat in 1984; the 1985 TAC Review of CGIAR Priorities and Future Strategies to be published by TAC; J.G. Hawkes (1985): Plant Genetic Resources - CGIAR Study Paper, ISSN 0257-3148, No. 3; as well as in annual reports of the IBPGR and individual Centers.

The Role of the IBPGR

Although the IBPGR is one of the family of institutions supported by the CGIAR, it is being treated separately here because of its primary and specific responsibility to further the study, collection, preservation, documentation, evaluation and utilization of plant genetic resources. It also acts as a catalyst both within and outside the CGIAR System. Furthermore, its mandate extends beyond the plant species handled by the other IARCs.

The initial aim of the IBPGR was to establish a global network of centers working on plant genetic resources. In over a decade this developed into programs on genetic resources in over 100 countries.

IBPGR provided stimulation and assistance on all aspects of collection, documentation and description of materials and training.

These types of assistance have been provided both to Centers within the System and to institutions outside it, with the expectation that all of these institutions would assume the long-term responsibilities for the work. As far as the CGIAR Centers are concerned, TAC has already accorded high priority to the allocation of core funding for this purpose, but Centers vary in the extent to which the desirable work has been implemented.

Regarding the IBPGR, the initial phase of its activities has now reached a reasonable state of fulfilment. While more work on similar lines still needs to be done, there is an urgent need to consolidate what has already been achieved. Standards of storage and recording vary greatly, much of the material collected has not been evaluated and some even lacks meaningful descriptions. There are unresolved problems relating to seed health, germination, long-term storage (particularly of vegetatively propagated species), regeneration of stocks (mainly with reference to crosspollinated species) and to the definition of the extent to which collection is necessary to sample a given gene pool adequately. All of these problems require research, discussion and clarification.

The potential impact of new technologies emerging from the biological sciences must also be kept under review in a range of contexts that relate to the conservation of genetic resources. There are implications for several aspects of the work, including storage, disease indexing, characterizing and classification, as well as use. As techniques for gene manipulation become more powerful and general, attitudes might well change, especially on aspects such as the extent to which it is necessary to preserve in base collections the widest possible range of minor variants.

The Role of the CGIAR Commodity Centers

Currently, the CGIAR supports work on genetic resources through both the IBPGR and the commodity Centers. Although these institutions already make a major contribution to the total international effort in plant genetic resources, there is a need to consider whether or not their collective effort could be strengthened through closer collaboration. In this context, it would be necessary to define more precisely their individual and collective responsibilities and to review the mechanisms for the pooling and sharing of knowledge and experience both within the System and outside it. It would also be necessary to review the legal basis for the custodianship of the plant germplasm preserved by the IARCs, as well as the policy regarding access to it.

Meanwhile, TAC and Center Directors must consider the future role of the commodity CGIAR Centers, both with respect to the different ways in which individual Centers have interpreted their responsibilities and to the need to integrate their activities. Although all Centers have supported work on genetic resources, there is some divergence in the extent to which they have invested their own resources in the work. In general, the IARCs have played a service function rather than a

research function. Most of the IARCs are understaffed in their genetic resources activities. In this connection there is a need for up-to-date information on the current status of gene-banks within the system and the extent to which they conform to IBPGR guidelines.

Information available on the involvement of Centers in base and working collections of their mandated crops is summarized in Table 1. Differences reflect not only different levels of investment but also differences in the extent of the involvement of other organizations in the preservation of these crops as well as differences in complexity, as between inbreeders and outbreeders, for example, or between vegetatively reproduced crops and those produced from seed.

As Centers become progressively less involved in the production of finished or semi-finished varieties, the supply of less advanced germplasm to national systems will become increasingly important. Consequently, the CGIAR needs to have a clear policy on its support for base collections of the mandated crops of the Centers. There may also be a need to review the relationships between base collections outside the System and working collections within it.

Consideration should also be given to ways in which the capacity and total expertise on plant genetic resources within the System could be used more effectively. Although the genetic resource units (GRUs) at individual CGIAR Centers have been concerned only with their mandated crops and related species, they now represent a valuable reservoir of expertise and experience that is more widely relevant to problems of conservation. There are few better places where trainees from developing countries can obtain on-the-job experience and the senior staff are well placed to give advice and assistance to genetic resources units in national systems. Moreover, the Centers are also in a strong position, particularly if the staffing situation for germplasm activities were improved, to contribute to research on problems related to the conservation of genetic resources through both their GRUs and other relevant programs of work, such as those in plant breeding and plant physiology.

At present, however, there is no mechanism for the collective expertise of the whole CGIAR System to be orchestrated and used. Moreover, there is a need to define more clearly the respective roles of the IBPGR and the nine major commodity Centers, namely CIAT, CIMMYT, CIP, ICARDA, ICRISAT, IITA, ILCA, IRRI and WARDA, in all aspects of this wide involvement in the conservation of genetic resources. In this connection, the proposed Inter-Center Seminar on Genetic Resources should provide a good opportunity to discuss these issues and make recommendations.

Cooperation with other Centers for Plant Genetic Resources

Similar considerations apply, to a greater or lesser extent, to cooperation with national centers for plant genetic resources in developing countries. To the extent possible, CGIAR institutions should work towards the adoption of similar strategies and procedures when dealing with national centers.

Likewise, it is desirable that the CGIAR institutions should actively collaborate with other international organizations, such as the Asian Vegetable Research and Development Center (AVRDC) and the International Network for the Improvement of Banana and Plantain (INIBAP), as well as with centers for plant genetic resources in the industrialized countries.

In all such relationships, there should be a pooling and sharing of knowledge. Moreover, needs for collection, evaluation, research and training would be better defined following some generally agreed strategies for collaboration rather than attempting to resolve them on a purely ad hoc basis.

The Development of Mechanisms for Collaboration

The foregoing considerations point to the need to collect information, to encourage the establishment of more formal mechanisms for communication and to consider ways of more active cooperation. To this end, an ad hoc working group was nominated by TAC and the Center Directors to make recommendations. The ad hoc group, consisting of 2 TAC Members and five Center representatives (CIAT, CIMMYT, IBPGR, ICRISAT and IRRI) met in Rome on 17 February 1987 to discuss the issues.

Among other matters, the ad hoc group discussed the proposed Inter-Center Seminar which had been provisionally scheduled for 21-25 September, 1987. The group recognized the desirability of proceeding as rapidly as possible with the proposed work, but saw no possibility of bringing forward the dates of the Seminar. Accordingly, after considerable discussion, the group agreed that it would be preferable to initiate the work as soon as possible through the suggested Working Group. The Seminar could then be postponed in order that the internal issues affecting CGIAR Centers, could be at least partly resolved before exposing them to a wider audience.

Recommendations

The ad hoc group recommends:

1. that an Inter-Center Working Group on Genetic Resources be established to consist of one representative of each of the ten Centers involved in work on plant genetic resources, namely CIAT, CIMMYT, CIP, IBPGR, ICARDA, ICRISAT, IITA, ILCA, IRRI and WARDA;

2. that the working group should have powers to co-opt additional members for specific discussions, as appropriate;

3. that a TAC representative should be present as an observer at all meetings of the working group;

4. that the working group should have the following terms of reference:

The purpose of the Inter-Center Working Group on Plant Genetic Resources is to consider in depth and make recommendations to TAC and

the Center Directors on relevant issues including the following:

(i) the establishment of formal mechanisms within the CGIAR System for assembling information, reviewing responsibilities and improving communication and identifying further issues in all matters related to the conservation of plant genetic resources;

(ii) the respective roles of the IBPGR and the commodity Centers in the System's contribution to its stated goal;

(iii) the development of mechanisms for inter-Center collaboration in working with national systems in the collection, evaluation and storage of germplasm, as well as in training;

(iv) the feasibility of establishing computer networks for data exchange;

(v) base collections for mandated crops, working relations between collections inside and outside the System and the adequacy of replicated storage of collections;

(vi) custodianship, security and legal status of collections and policies regarding acces to them;

(vii) the development of mechanisms for liaison with the Secretariat of the FAO Commission on Plant Genetic Resources;

(viii) problems of plant health and quarantine;

(ix) the definition of specific problems in research; capacity for research within the System and how this might best be exploited;

(x) the importance of wild and primitive species (relative to other accessions) in work on genetic resources by the commodity Centers;

(xi) the scale and continuity of funding of work on genetic resources at the commodity Centers, in relation to long-term needs and the security of collections;

(xii) the dissemination of information and the promotion of public awareness in matters related to the conservation of genetic resources.

5. The ad hoc group further recommends that the first meeting of the Inter-Center Working Group on Plant Genetic Resources be held in June, 1987 and that the proposed Inter-Center Seminar be postponed. It is envisaged that, at its first meeting, the Working Group would plan details of the Seminar which would be arranged to coincide with the second meeting of the Working Group.

Table 1. Activities in Plant Genetic Resources at the IARCs

Center	Major Genebank Activities
CIAT	Phaseolus*
	cassava*
	forages*
CIMMYT	bread wheat
	durum wheat
	triticale*
	barley
	maize*
CIP	potato*
	sweet potato*
IBPGR	–
ICARDA	barley*
	chickpea*
	durum wheat*
	faba bean*
	lentils*
	forages*
ICRISAT	sorghum*
	pearl millet*
	pigeonpea*
	chickpea*
	groundnut*
	minor millets* (6 species)
IITA	cowpea*
	maize
	African rice*
	sweet potato, cassava, yam
	soyabean, Bambara groundnut
ILCA	forages*
IRRI	rice*
WARDA	rice

* Functioning or proposed base Centers.