Consultative Group on International Agricultural Research

Revised Priorities among Crops and Regions

International Board for Plant Genetic Resources

Cover drawn by Maria Bonomi

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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

REVISED PRIORITIES AMONG CROPS AND REGIONS

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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, which was established by the CGIAR in 1974, is composed of its Chairman and 15 members; 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.

IBPGR Executive Secretariat
Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
Via delle Terme di Caracalla, Rome 00100, Italy

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INTRODUCTION

1. The International Board for Plant Genetic Resources (IBPGR) was established by the Consultative Group on International Agricultural Research (CGIAR) to ensure that genetic variability in economic species of plants is conserved so that it can be used by plant breeders, and by research workers interested in the evolution of cultivated plants and of agriculture itself. To this end the IBPGR is developing international collaboration among the members of a global network of institutions active in the exploration, collection, conservation, documentation and use of plant genetic resources.

CRITERIA FOR PRIORITIES AMONG CROPS AND REGIONS

2. The criteria listed in paragraphs 3 and 5 are not set out in order of priority, but taken together they are intended to provide a coherent framework for decisions about priorities.

Criteria for priorities among crops

3. Individual species or groups of species have been selected for attention and assigned priority according to the following criteria:

(a) the risk that genetically diverse materials of the species and their wild relatives will be lost in the future, particularly the near future, as a result of change and development in agriculture and land use including the introduction of new varieties. Since such changes are generally local, a species or group may have high priority in one country or region and lower priority elsewhere;

(b) the economic and social importance of the materials to be collected measured in terms of their present usefulness and importance (volume or value of production and trade, numbers of people depending on or using them), as well as their expected, intended or potential contributions to development (including the improvement of human diets and the income and well-being of farmers and other rural people) and the economic and social progress of mankind;

(c) the recognized requirements of plant breeders and research workers, in both developing and developed countries, for genetically diverse materials (including advanced breeding lines), and the expected significance in economic and social development of the improved types and varieties of crops they will be able to produce with these materials; and

(d) the size, scope and quality, including documentation, of existing collections.

These criteria were used as a means of determining priorities in the initial stages of the Board's work. They are still valid.

4. Species which are important for the purposes set out in 3(b) and 3(c) above have priority over species from which it might be possible to develop new economic cultigens in the future, but the Board will consider proposals relating to wild plant materials which are or seem likely to be critically important for development and human welfare.

Priorities among regions

5. Regions have been selected for attention and assigned priority according to the following criteria:

(a) that they contain significant genetic diversity of one or more crops or species selected according to the criteria outlined in paragraph 3;

(b) that change and development in agriculture, and/or change in land use, are occurring in them at such a rate, that if nothing is done, genetically diverse materials are likely to be lost; and

(c) that widespread crop failures have occurred or are imminent, or reasonably to be expected, on such a scale that diverse materials are likely, if nothing is done, to be lost.

BASIC CONSIDERATIONS FOR ACTION

6. For each species or group of species, the Board attempts to ascertain who the leading scientific workers are (geneticists, breeders, crop botanists and others) and where they work, what activities or institutions relevant to germplasm resources (including germplasm committees) already exist, what collections exist, where the uncollected resources of genetically diverse materials are, and where the crop concerned is continuously able to out-cross with wild relatives. Further, it arranges consultations among the scientists concerned to determine their needs. These consultations among the leading workers will generate a framework for collaboration in the work of collection, conservation, documentation and use of genetic resources in the groups concerned.

7. For each region in which the Board supports action on genetic resources, it will seek to ensure that the appropriate national, regional and international agricultural research and genetic resources institutions are associated in appropriate ways in the work of collection, and in the characterization of accessions, environments and adaptations, and that they share in the distribution of the materials collected. Where

an international or regional centre undertakes genetic resources activities sponsored by the IBPGR, it will be expected, to the greatest practicable extent, to organize those activities in cooperation with the appropriate national research institutes and to seek their fullest possible participation. Where it is necessary to do so, the Board will assist in the further development of these institutions, particularly at the national level, so that they can participate fully in the global network.

8. Although a region may be selected because it contains one or more important species, the fact that it is also an area of development may well mean that many other useful, though perhaps less important, species are also affected. Wherever practicable, the collecting programmes should attempt to include these species also.

9. In some regions, physical facilities for storage and evaluation are unlikely to be available initially. Often, however, the programme will have to be fielded urgently based on whatever institutions may be available. Whether or not the programme includes the development of a new permanent national or regional genetic resurces centre, will evidently depend on circumstances, needs, possibilities, costs and other constraints and will have to be determined separately in each case. Where an international institute already exists in the region, it may well be the appropriate base both for planning and organizing the field collecting and for arranging for the more permanent conservation and evaluation activities, at least for those crops for which it has been assigned global or regional research responsibility, within the system of International Agricultural Research Centres by the CGIAR.

10. The materials collected should normally be shared among the appropriate national regional and international institutes and other appropriate institutions in other nations.

11. One or more centres will be designated for long-term conservation of genetic resources materials collected. All materials and the information about them should be freely available.

CROP PRIORITIES

12. Priorities assigned are a guide to immediate action on the basis of the Board's best judgement. The priorities in this section have been refined in the light of recommendations of Advisory Committees, Working Groups and appropriate specialists. In Table 1 a number of the world's more important crop species or groups of species are set out. For each, the priority assigned (in the light of the criteria set out above) is indicated. Four degrees of priority have been used:

First priority	1
Second priority	2
Third priority	3
Lesser priority	4

In addition the Board may, from time to time, take emergency action in respect of a particular crop, usually in a restricted area, if rapid agricultural development, changes in land use, drought, disease or some other unforeseen event or calamity necessitates urgent genetic conservation.

13. In addition, the Board wishes to study certain crops or groups of crops further before assigning a priority: these are designated 'S' in Table 1.

14. Only in part do these priorities reflect an assessment by the Board of the importance of the crop, now or in the future. They are substantially influenced by the amount and quality of existing genetic resources work on it, and the extent of the current risk that important genetic resources may soon be lost. This does not, however, exclude collection of wild species and related taxa of no immediate economic importance, where they seem likely to be important for crop improvement.

15. Of the crops or groups of crops listed in Table 1, over 50 are assigned priority 1 at least in particular regions. The remainder have priorities 2, 3 or 4. Several groups of crops have been designated for further study (S category). This category includes tree fruits and nuts, forage crops, and medicinal and drug plants.

TABLE 1. PRIORITIES AMONG CROPS 1/

CEREALS

PRIORITY 1	
Wheat	Although much collecting has been carried out material still remains to be collected in the Mediterranean, Southwest Asia and the Himalayas
PRIORITY 2	
Sorghum	In view of the sizeable collections assembled at ICRISAT from tropical Africa, priority 2 seems appropriate. However, wild races

1/ Including with the name of the crop, wild and cultivated genera and species.

CEREALS (cont.)

PRIORITY 2 (cont.)	
Sorghum (cont.)	of sorghum continue to have priority 1 throughout Africa and cultivated sorghums from West Africa, China and parts of Southeast Asia remain priority 1.
Pearl millet (Pennisetum)	In view of the work carried out in 1976-80, priority 2 seems appropriate. Nonetheless pearl millet is a priority 1 in Chad, North Africa and parts of India and Pakistan
Finger millet (Eleusine)	Priority 1 in Africa and Asia
Foxtail millet (Setaria (italica)	Priority 1 in China
Fonio millet (Digitaria sp.)	
Rice	Because of the outstanding work of IRRI, especially in Asia, priority 2 seems appropriate for rice in general but collections of rice in tribal areas in India, Indochina, China and the Pacific have priority 1
Barley	Priority 1 in China, Southwest Asia and North Africa
PRIORITY 3	
Maize	Priority 1 in the Himalayas, China and Northeast Brazil, Venezuela and the Guyanas
Grain Amaranth	Priority 2 in the Andean zone
Oats	
Quinoa	Priority 1 in the Andean zone
Rye	
Proso millet or common millet (Panicum miliaceum)	
Barnyard millet (Echnichloa crus-galli)	

CEREALS (cont.)

PRIORITY 4

Teff (*Eragrostis*)	High local priority
Kodo millet (*Paspalum scrobicalatum*)	High local priority
Little millet (*Panicum miliare*)	High local priority

FOOD LEGUMES
(including vegetable types where applicable)

PRIORITY 1

Phaseolus beans	A broader range of genetic diversity is required for breeding programmes. In addition, agricultural land-use patterns are changing rapidly in Central and South America, which may lead to the disappearance of many traditional cultivars of *Phaseolus*

PRIORITY 2

Groundnut	Priority 1 in South Asia, Southeast Asia and Central America
Soyabean	Priority 1 in China, Indonesia and parts of Southeast Asia
Cowpea (*Vigna unguiculata*)	Priority 1 in South Asia and West Africa
Yardlong bean (*Vigna unguiculata* spp. *sesquipedalis*)	Priority 1 in Southeast Asia
Winged bean (*Psophocarpus tetragonolobus*)	Priority in Pacific and South and Southeast Asia
Chickpea	Priority 1 in Southwest Asia
Greengram (*Vigna radiata*)	Priority 1 in South and Southeast Asia
Blackgram (*Vigna mungo*)	Priority 1 in South and Southeast Asia

FOOD LEGUMES (cont.)

PRIORITY 2 (cont.)

Moth bean (*Vigna aconitifolia*)	
Rice bean (*Vigna umbellata*)	

PRIORITY 3

Pigeonpea (*Cajanus*)	
Pea (*Pisum*)	
Broad bean (*Vica faba*)	Priority 1 in Mediterranean
Lentil	Priority 1 in Southwest Asia
Bambara groundnut (*Voandzeia*)	Priority 2 in West Africa
Vigna angularis	
Vigna trilobata	

PRIORITY 4

Lupin	Priority 1 in Andean cone
Velvet bean (*Mucuna* sp.)	
Dolichos and *Lablab* species	
Jack bean and sword bean (*Canavalia* spp.)	
Kersting's groundnut (*Kerstingiella geocarpa*)	
Cluster bean (*Cyamopsis tetragonoloba*)	
African yam bean (*Sphenostylis stenocarpa*)	

ROOT AND TUBER CROPS
(including vegetable types where applicable)

PRIORITY 1	
Cassava	
Sweet potato	
PRIORITY 2	
Potato	Potatoes have a priority 2 because a large amount of material has already been collected and is conserved by CIP
PRIORITY 3	
Yam	Priority 1 in Pacific
PRIORITY 4	
Taro and aroids	Priority 1 in Pacifc
Minor South American tuber crops	Priority 1 in Andean zone
Minor African tuber crops	

OIL CROPS

PRIORITY 2	
Oil palm (*Elaeis melancocca*)	In restricted areas of South America
Coconut	Priority 1 in Southeast Asia and Pacific
Oilseed brassicas	Priority 1 in South Asia and China
PRIORITY 3	
Oil palm (*E. guineensis*)	
Safflower	

OIL CROPS (cont.)

PRIORITY 3 (cont.)

Sunflower

Olive

PRIORITY 4

Niger seed (*Guizotia abyssinica*)

Sesame

FIBRE CROPS

PRIORITY 2

Cotton

PRIORITY 3

Jute

PRIORITY 4

Kenaf (*Hibiscus cannabinus*)

FIBRE CROPS (cont.)

PRIORITY S

Flax

Linseed

STARCHY FRUITS

PRIORITY 2

Starchy banana and plantain	Priority 1 in Pacific, Southeast Asia and West Africa

PRIORITY 3

Breadfruit and jackfruit	High priority in South and Southeast Asia and priority 1 in Pacific

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SUGAR CROPS

PRIORITY 2

Sugar beet and related sp.	Beet, in general, has priority 2, but priority 1 is assigned to the genetic resources of Beta which are being lost rapidly in parts of Turkey and the Mediterranean
Sugar cane	Priority 1 in Pacific, South and Southeast Asia

RUBBER

PRIORITY 2

Rubber (Hevea brasilensis)	New germplasm is required to provide varieties resistant to South American leaf blight disease (SALB). With increased and improved communication between Latin American and Asian and African regions, spread of this disease is almost a certainty.

RUBBER (cont.)

PRIORITY 2 (cont.)	
Rubber (Hevea brasilensis) (cont.)	Furthermore, fear of accidental introduction of SALB from the Brazilian forest regions into the main areas of production in Africa and Asia has to date limited plant exploration activiy

BEVERAGES

PRIORITY 1	
Coffee	New germplasm is needed of Coffea arabica because of coffee berry disease and coffee rust. Clearing in West Africa may similarly lessen the availability of genetic diversity of C. canephora in that region
PRIORITY 2	
Cocoa	The development of the Amazon region is reducing genetically diverse cocoa material which will be most useful in breeding for disease resistance and higher yields. Cocoa is an important shareholders' crop for a major share of their export earnings. In general the priority is 2 but for Criollo varieties it is 1 because of the potential of this material
PRIORITY 4	
Tea	
OTHER	
Grape	See miscellaneous crops

TROPICAL AND SUBTROPICAL FRUITS AND TREE NUTS

PRIORITY 2	
Desert banana	Priority 1 in Southeast Asia
Citrus	Priority 1 in South and Southeast Asia
Mango	Priority 1 in Southeast Asia
PRIORITY 3	
Avocado	Priority 1 in Central America and 2 in Andean zone
Cashew	Priority 2 in South Asia
Date	Priority 2 in Southwest Asia
Fig	Priority 2 in Southwest Asia
Papaya	Priority 2 in Central America and Andean zone
Pineapple	
PRIORITY 4	
Peach palm	Priority 1 in parts of Latin America
PRIORITY S	
Other tropical fruits and tree nuts	Lansium, durian and rambutan are priority 1 in Southeast Asia. Annona and Passiflora sp. are priority 1 in Andean zone

TEMPERATE FRUITS AND TREE NUTS

PRIORITY 2	
Apple	Priority 1 in Southwest Asia
Pear and Quince	Priority 1 in Southwest Asia
Peach and Nectarine	

TEMPERATE FRUITS AND TREE NUTS (cont.)

PRIORITY 3	
Apricot	Priority 2 in Southwest Asia
Cherry	Priority 2 in Southwest Asia
Plum	
Strawberry	
PRIORITY 4	
Almond	Priority 2 in Southwest Asia
Walnut	Priority 2 in Southwest Asia
PRIORITY S	
Other temperate fruit and tree nuts	Pomegranate is priority 2 in Southwest Asia

VEGETABLES

PRIORITY 1	
Tomato (*Lycopersicon esculentum* and related species)	
PRIORITY 2	
Amaranth (*Amaranthus* spp.)	Priority 1 in West Africa and South and Southeast Asia
Brassicas (*Brassica campestris*, *B. juncea*, *B. oleracea*)	Priority 1 in China, South and Southwest Asia and Mediterranean
Cucurbits (*Cucurbita* spp.)	Priority 1 in Latin America
Eggplant (*Solanum melongena* and related species)	Prioirty 1 in South and Southeast Asia and West Africa

VEGETABLES (cont.)

PRIORITY 2 (cont.)

Okra (*Abelmoschus esculentus* and related species)	Priority 1 in the Pacific
Onion (*Allium* spp.)	Priority 1 in Southwest Asia
Pepper [Chilli] (*Capsicum* spp.)	Priority 1 in Latin America, South and Southeast Asia
Radish (*Raphanus sativus* and related species)	Priority 1 in Southwest Asia

PRIORITY 3

Bitter gourd (*Momordica charantia* and related species)	Priority 1 in Southeast Asia
Ethiopian mustard (*Brassica carinata*)	
Sokoyokoto (*Celosia argentea*)	
Swede, rapekale (*Brassica rapus*)	
Globe artichoke (*Cynara scolymus*)	High priority in Mediterranean

PRIORITY 4

Bottle gourd (*Lagenaria* spp.)	Priority 2 in Latin America
Carrot (*Daucus carota*)	
Chaya (*Cnidoscolus chayamansa*)	
Chayote (*Sechium edule*)	Priority 1 in Central America
Cucumber, gherkin (*Cucumis sativus*)	
Fluted pumpkin (*Telfairia*)	
Indian or Ceylon spinach (*Basella alba*)	

VEGETABLES (cont.)

PRIORITY 4 (cont.)

Jute Mallow (Corchorus olitorius)	
Kangkong (Ipomoea aquatica)	Priority 1 in Southeast Asia
Lettuce (Lactuca sativa)	
Muskmelon, Cantaloupe (Cucumis melo)	Priority 1 in Southwest Asia
Watermelon (Citrullus lanatus)	
Spinach (Spinacia oleracea)	Priority 1 in Southwest Asia

MISCELLANEOUS CROPS

PRIORITY 2

Trees for fuel wood and environmental stabilization, particularly in arid and semi-arid zones	

PRIORITY 3

Grape	This includes wine, table and raisin. High priority is accorded to collection in China, the Himalayas, Central Asia, Southwest Asia and the Mediterranean

PRIORITY S

Forage crops	
Medicinal and drug plants	

REGIONAL PRIORITIES

16. Fourteen regions are identified although the developed countries of North America, Europe and Oceania - other than the Mediterranean countries and the Central Asian Soviet Republics - are not included in these regions even though many nations, institutes and breeders in them are cooperating in the Board's work.

17. The grouping of countries into 14 regions is based largely on logistic considerations. Though it might be valuable to organize field programmes on an ecological or phytogeographical basis, in practice most regions include a range of ecological zones. Since exploration and collection will always be conducted by or in cooperation with national governments, the regions listed below consist of groups of adjacent nations sharing very broadly similar geographical situations.

Mediterranean (Albania, Algeria, Cyprus, Egypt, France, Greece, Italy, Libya, Malta, Morocco, Portugal, Spain, Tunisia and Yugoslavia)

Southwest Asia (Iraq, Israel, Jordan, Lebanon, Syria, Turkey and the nations of the Arabian Peninsula)

Central Asia (Afghanistan, Iran, Pakistan and the Soviet Republics of Central Asia)

South Asia (Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka)

Southeast Asia (Indonesia, Malaysia, Philippines, Papua New Guinea, Thailand, and the nations of Indochina)

Pacific islands

East Asia (China, Japan, the Koreas and Mongolia)

Ethiopia

Eastern Africa (Botswana, Burundi, Kenya, Lesotho, Malawi, Madagascar, Mozambique, Ruanda, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe and the islands off Eastern Africa)

Western Africa (Angola, Benin, Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, the former Spanish Sahara, Togo, Upper Volta and Zaire)

Central America (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama); and Mexico, the Caribbean and the Guyanas

Brazil

Andean zone (Bolivia, Colombia, Ecuador, Peru and Venezuela)

Southern South America (Argentina, Chile, Paraguay and Uruguay)

18. Priorities have been assigned to these regions (Table 2) in accordance with the criteria set out in paragraph 6 of this paper.

TABLE 2. REGIONAL PRIORITIES

PRIORITY 1	
	Mediterranean
	Southwest Asia
	Central Asia
	South Asia
	Ethiopia
	Central America
PRIORITY 2	
	Southeast Asia
	East Asia
	Western Africa
	Brazil
	Andean zone
PRIORITY 3	
	Pacific islands
	Eastern Africa
	Southern South America

GENERAL COMMENTS

The global network

19. The priorities among crops and regions lead directly to the two principal dimensions of the world-wide genetic resources network. The first of these genetic resources dimensions is geographical, based on genetic resources institutions and activities in individual nations, associated together in the most appropriate ways, in any one region, into a cooperative regional programme. Within such a cooperative programme, one centre (which may or may not be an International Agricultural Research Centre) might be assigned coordinating, storage or other functions for one or more crops or groups of crops, and so become accepted as a regional centre. This whole dimension relates to the collection and conservation of material, to be evaluated and documented in collaboration with the main users of genetic resources.

20. These users are grouped together in the second dimension, which is based on crops or groups of crops. This dimension will link together the leading scientists and breeding or other institutions of the world concerned with each of the priority crops. The IBPGR Advisory Committees and Working Groups provide essential linkages in this dimension.

21. An important set of linkages between the two dimensions will be provided by the Board's information programme which helps specialists on individual crops and on methods for storing and retrieving information.

Flexibility

22. The Board will continue to use the priorites established as a set of general guidelines in its decisions about programmes of exploration and collection in the field, and about the development of a global network of genetic resources centres for crops and for geographical locations, countries or regions. It recognizes that within individual crops, the needs and possibilities will vary from region to region. It also recognizes that emergencies can arise, sometimes with little warning, and that, in a changing world, social, economic, agricultural and rural change can lead in a few years to the replacement, over substantial areas, of old crops and cultivars by new ones. Changes in the needs of plant breeders, as new objectives, new problems or new techniques arise, may also alter priorities, sometimes quite rapidly. For these reasons, the Board will keep its priorities under review, and modify them as situations develop; it will also use them in as flexible and sensitive a manner as is compatible with the efficient use of scarce resources such as money, experts, facilities and equipment.