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LEGAL STATUS OF BASE AND ACTIVE COLLECTIONS
OF PLANT GENETIC RESOURCES

Follow-up to the recommendations of the

First Session of the Commission

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I. INTRODUCTION

1. At its first session in March 1985, the Commission on Plant Genetic Resources requested the Director-General "to prepare, in consultation with interested countries and with the competent organizations in the United Nations system, a document examining the present legal situation related to ex situ base collections and make, where appropriate, recommendations on any provisions considered necessary to further the objectives of the Undertaking" (CPGR/85/REP, para. 29). The Commission also recommended, in connection with ex situ conservation, that "additional attention be given to improving access to and utilization of these resources by developing countries, including appropriate legal considerations" (CPGR/85/REP, para. 70). At its first meeting in June 1986, the Working Group of FAO Commission on Plant Genetic Resources "requested that the study also include consideration of the rights of the owners of the source material used by plant breeders, especially the rights of farmers in the countries where collections have been made" (AGPS/PGR/86, para. 21).

2. This document which has been prepared in response to the above request, is based partly on data contained in the archives of the Legislation Branch of the Legal Office, but mainly on the documentation and information furnished by Member Nations and by gene banks. Fifty-two gene banks (out of the 88 which were approached) and about a quarter of the Member Nations have furnished material.

3. The document reviews the sources of law relating to plant genetic resources, the institutional aspects of gene banks on which information has been obtained, the procedure for the reception and collection of germplasm by gene banks, and the question of the ownership of the plant genetic resources maintained in gene banks. The access to and availability of plant genetic resources held in gene banks is then treated, indicating any legal impediments or restrictions thereto. The implications of the International Undertaking for ex situ base collections are examined next and certain areas of possible conflict with national legislation are highlighted. Finally, some suggestions are made for furthering the objectives of the Undertaking and for improving access to and utilization of plant genetic resources by developing countries. The study does not deal with the question of farmers' rights, referred to in paragraph 1 above, owing to the lack of documentation or information on the subject. This matter is covered in document CPGR/87/4.

II. GENERAL CONSIDERATIONS

(i) The various categories of plant genetic resources

4. Genetic diversity occurs through random changes in genes referred to as mutations. This genetic diversity is essential to the survival of most living species under natural conditions. It permits adjustment to changing environmental conditions by the utilization and recombination of already available genetic characteristics. This process is referred to as natural selection. In the context of the evolution of crops from wild plants in natural ecosystems to modern crop varieties in farmers' fields, plant genetic resources can be classified into the following categories:

(a) Wild relatives

5. Wild relatives, being the products of Nature, are generally found around the centres of origin of crop species, though some wild species have achieved a wider distribution.

(b) Weedy, relatives

6. Many of the modern crop plants appear to have originated from weedy species, adjusted to growth in disturbed habitats. The latter often form a botanical bridge between wild relatives and modern plant varieties and may have a wider distribution than wild relatives.

(c) Primitive cultivars/land-races

7. Primitive cultivars and land-races are synonymous terms. These are plants that have evolved throughout the centuries as a result of both natural and human selection. They moved with man from the centres of origin as agriculture developed, adapting to new environments and cultural practices and achieving distribution far beyond their wild and weedy relatives, also extending into the temperate regions of Europe, Asia and North America.

8. Land-races are for most characteristics less variable than wild relatives. However, there is considerable genetic diversity among land-races which have adapted to specific environments. These so-called "adaptive complexes" are of great interest to plant breeding as they provide ready-made characteristics determining their suitability for particular environments or use. Hence, local or regional land-races are the main source material for most plant breeding programmes, at least in the early stages.

(d) Modern varieties

9. Modern varieties are the result of plant breeding. The objective of plant breeding is to produce plants that satisfy more closely man-determined requirements for particular characteristics such as yield, quality, growing period, appearance. This is achieved generally by crossing genetically different plants, thus creating populations in which segregation for various combinations of characters occurs. Through rounds of selection and crossing the variation of the

succeeding generations is reduced to what is considered the optimum plant type. In the elaborate process which may take several years, very large numbers of plant offspring with common parentage are tested, and then segregated for parental characteristics in various combinations. The end-product is a variety that satisfies certain pre-determined criteria. A necessary result of this process is that the variety has a high degree of genetic uniformity. Nevertheless, there still is considerable diversity, as well as a combination of useful characteristics, in modern varieties, and this makes them, together with land-races, a major resource for plant breeding.

(ii) Use of plant genetic resources in breeding programmes

10. Modern varieties are created to make optimal use of the environment and to meet specific demands. Measures that allow control of certain environmental conditions, such as plant nutrition by fertilizers, water availability by irrigation, attacks by specific pests and diseases by chemical control, or resistances and tolerances in the crop, and other measures extend the area in which particular varieties can be grown. Nevertheless, climatic factors broadly limit the suitability of individual varieties.

11. Most advanced breeding programmes make extensive use of already available advanced varieties, selectively improving only specific characteristics that fall short of the perceived optimum for that environment. Only when further improvement from such material is difficult to achieve, will breeders consider other material (such as wild relatives for specific resistances, tolerances to moisture stress, tolerance to low temperature). The price to be paid generally is a longer and therefore more costly breeding programme.

12. Hence, whereas the total genetic diversity range of a crop and related wild and weedy species is important in a general sense, the actual value for plant breeding depends largely on available information on specific characteristics and overall adaptation to certain environments. Governmental institutes, among which gene banks and occasionally, on a much smaller scale, private companies, generally aim at sampling available genetic diversity by collecting numerous but small samples of wild and weedy populations, land-races or bred varieties. Such collections therefore in no way endanger the availability of the material at the source of origin (a wild population or stock of a bred variety). Genetic erosion takes place primarily through disturbance of natural habitats (for instance, by deforestation or by agricultural development) or by replacement of land-races or varieties by newly bred varieties.

13. The concern over genetic erosion is nevertheless fully justified in so far as deforestation and desertification processes on the one hand, and agricultural development and newly bred varieties on the other, increasingly threaten the continued existence of wild populations and land races, also in centres of diversity of the various crops. The need to safeguard threatened genetic diversity by collection of material and its conservation in gene banks is therefore well recognized.

III. SOURCES OF LAW

14. Interest in plant genetic resources ex situ is a fairly recent development. This explains the scarcity or the absence of legislation in most countries. In countries that have legislated on the subject, no provision is made for the systematic management of plant genetic resources ex situ, beyond the specific arrangements for the establishment and organization of gene banks. On the other hand, there is substantial national legislation dealing with sectors which are related to that of plant genetic resources. This is the legislation on seeds, on plant breeders' rights and on plant protection. In many cases such legislation covers certain aspects of plant genetic resources and, indirectly, may be relevant to the question of the legal status and operation of gene banks.

(i) Seed legislation

15. The aim of seed legislation is to promote the production and marketing of good seed and other planting material in order to improve crop production, thus protecting the interests both of the producer and of the user of propagating material. Seed legislation deals with the production processes and the characteristics demanded of the propagating material, as well as with the genotype of the plants of which propagating material becomes available for crop production. Since the quality of seed and planting material is a determining factor in cultivation of crops, it is in the farmer's interest that certain criteria be met. Seeds should be seeds of the crop or cultivar the farmer intends to grow, should be free of weeds and should have good germination capacity.

16. However, the cultivation results are not exclusively determined by the quality of the propagating material itself. For a plant's performance is restricted by its genetic characteristics. All plant characteristics including those that are important for cultivation are directly related to the genotype of the plant. Consequently, seed legislation may also contain provisions with respect to plant genotypes, and gene pools of specific varieties or cultivars. Such provisions have the purpose of identifying varieties which are intended for the market, and of checking on trueness to variety and varietal purity of the propagating material. For recognition purposes, the legislation quite often links a denomination to each variety. The identified, denominated varieties may be registered in lists, which indicate the varieties that may be grown, or are recommended for cultivation and their agricultural value.

17. The actual quality control, which normally takes place during the production and marketing stage, results in "certified" propagating material. The control is performed by or under the authority of certification agencies.

18. Seed legislation offers guarantees with respect to the quality of propagating material itself as well as to the plant variety to which the material belongs. Generally, such legislation is applicable both to primitive cultivars (land-races) and to modern varieties developed by breeders, which quite often contain a more or less uniform genetic structure adapted to the current requirements of agriculture and, thus, a decreased genetic diversity.

19. Since seed legislation concerns the quality of material that is used for propagation or cultivation purposes, it does not cover its use for scientific purposes. Collecting, maintaining and multiplying plant material for conservation purposes, as well as releasing that material to other conservation institutions or to breeding programmes, generally tend to be considered scientific activities. Hence, seed legislation does not expressly cover gene bank activities proper.

(ii) Plant breeders' rights

20. Plant breeding started to become a sophisticated science and industry in the early part of the twentieth century. By frequent crossing and back-crossing of different plants, followed each time by a process of selection of the potentially best results, new plant genotypes are created which, it is hoped, are better suited to the needs of agriculture and the requirements of the consumer.

21. In order to stimulate plant breeding, ways and means were sought to protect the interests of plant breeders and to provide them with an incentive to make their results available to society. Thus, in the wake of the patent protection given to industrial property rights, including inventions and industrial designs, several countries introduced legal protection for new plant varieties. Generally, national legislators considered that industrial patent laws, designed to protect technical inventions, could not be suitably applied to living matter. For these reasons, certain countries enacted special plant variety protection legislation, whereas others adapted their patent system by legislation and case-law to the particular needs of plant variety protection.

22. Thus, in the United States, protection is provided by special patents covering plant varieties, whereas many Western European countries have enacted specific plant breeders' rights legislation. The International Convention for the Protection of New Varieties of Plants (hereinafter referred to as the UPOV Convention) was concluded in Paris in 1961. The Convention aims at promoting the protection of new plant varieties by means of the same basic rules. It also seeks to ensure that nationals of one State party to the Convention enjoy, when applying for plant variety protection in another State party to the Convention, the same treatment as nationals of that State. The following States are parties to the Convention, as revised in 1972 and 1978, and are members of the Union for the Protection of New Varieties of Plants (UPOV),

constituted by the said Convention: Belgium, Denmark, France, Germany (Federal Republic of), Hungary, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, South Africa, Spain, Sweden, Switzerland, United Kingdom. Two more states have signed but not yet ratified the Convention 1/. The States Parties to the Convention undertake, inter alia, to apply its provisions in their national legislation. The Convention recognizes plant breeders rights, defines the scope and period of protection and lays down the conditions for the granting of such rights 2/.

23. Plant variety protection legislation exists in a number of other countries which are not parties to the Convention (Argentina, Austria, Chile, Finland, Germany (Democratic Republic), Kenya, Poland, Republic of Korea, Romania, U.S.S.R., Yugoslavia 3/, and Zimbabwe 4/), while in certain countries the introduction of such legislation is under consideration 5/.

24. Agriculture continuously requires plants with new characteristics: for higher yield, better resistance against disease, labour saving and other features. Many of these characteristics depend on the genotype of the plant. The results of breeding programmes are usually plants with a combination of characteristics which does not exist in nature. In fact, they represent new genotypes. It is for these products of breeding, usually called plant varieties, that plant variety protection may be granted.

25. In connection with applications for plant variety protection, the breeding results must undergo scrutiny in order to ensure that they meet the prescribed criteria, in particular, that they represent genotypes not already existing elsewhere in the world. For this purpose, elaborate field and laboratory tests are carried out, which may take several years. In the course of these tests, the breeding results are checked against a large reference collection of varieties. The application for protection, as well as the maintenance of the rights granted, are subject to the payment of fees.

26. To obtain a plant breeder's right or other variety protection title, the variety must meet a number of botanical criteria: it must be distinct from already existing varieties and it must be homogeneous and stable. Agricultural value is sometimes an additional requirement. The criterion of distinctness prevents rights being granted in respect of varieties "whose existence is a matter of common knowledge at the time

1/ Canada, Mexico.

2/ UPOV Convention, Articles 1, 5 and 6.

3/ COAG/83/10, Appendix 5 (Document submitted to the Seventh Session of the Committee of Agriculture, March 1983).

4/ Zimbabwe: Plant Breeders' Rights Act, 1973, and regulations made thereunder.

5/ Canada, Turkey.

when protection is applied for" 1/. The criterion of homogeneity signifies that a single plant breeder's right should not cover several genotypes and that the product should be uniform. This does not prevent protected varieties being mixed before being put on the market. In fact, this is common practice for certain grasscrops. Such is the case also with composed varieties (multilines). The requirement of stability is to ensure that a right is not granted in respect of a variety, of which the genetic structure is still changing.

27. According to the provisions of the UPOV Convention, the effect of a plant variety protection title is that the prior authorization of the breeder is required for the commercial production and marketing of propagating material of the variety concerned 2/. The right is restricted, to those countries where it has been granted and is of limited duration 3/, usually 20 to 25 years. The authorization of the breeder is not required for the utilization of the new variety as an initial source of variation for the purpose of creating other new varieties or for the marketing of such varieties. Such authorization is required, however, when the repeated use of the new variety is necessary for the commercial production of another variety.

28. As with patents, national laws contain provisions to ensure that this exclusive right is not misused. In particular provisions concerning ample exploitation of the protected variety and compulsory licenses are common 4/. These provisions oblige the holder of the right to produce and offer for sale sufficient propagating material of the protected variety. If he fails to do so, designated authorities are empowered to grant licenses. Such restrictions, imposed for reasons of public interest, are explicitly allowed by the UPOV Convention 5/.

1/ UPOV Convention, Article 6(1)(a).

2/ UPOV Convention, Article 5(1).

3/ UPOV Convention, Article 8.

4/ e.g.:

- Denmark: Law No. 205 of 16 June 1962, as amended, on the Protection of Plant Breeders' Rights, Articles 15a and 15b.
- France: Law No. 70-489 of 11 June 1970 on the Protection of New Plant Varieties, Article 12 (in respect of varieties essential to human or animal life).
- Hungary: Law No. II of 1969, as amended, on the Protection of Inventions by Patents, Section 21.
- Ireland: Plant Varieties (Proprietary Rights) Act, 1980, Section 8.
- Israel: Law No. 5733-1973, as amended, on the Rights of the Breeders of Plant Varieties, Section 41.
- Netherlands: The Seeds and Planting Material Act of 6 October 1966, Articles 42, 43 and 45.
- Sweden: Plant Breeders' Rights Law of 27 May 1971, as amended, Articles 27, 28 and 29.
- United Kingdom: Plant Varieties and Seeds Act 1964, as amended, Section 7.
- United States of America: Plant Variety Protection Act of 24 December 1970), as amended, Section 44.

5/ Article 9: "The free exercise of the exclusive right accorded to the breeder may not be restricted otherwise than for reasons of public interest".

29. It is evident that breeders will only claim plant variety protection rights for products that are to be placed on the market, that is, their finished varieties. With respect to all kinds of half products, which breeders develop from wild and cultivated plants (the so-called advanced breeders' lines) and which are not to be released on the market, there would be little purpose in applying for a protection title. Moreover, most of these would not meet the criteria of distinctness, homogeneity and stability.

(iii) Plant protection legislation

30. The protection of crops against pests and diseases, at the national and at the international level, plays a vital role in increasing food production. With increased international exchanges of agricultural products, protection at the international level has become even more important. In addition, crop intensification and genetic manipulation have increased plant vulnerability to pests and diseases. This explains the attention that is being paid to international aspects of plant protection. The International Plant Protection Convention, approved by the FAO Conference at its Sixth Session in 1951 and ratified by more than 80 countries, responds to a universally recognized need 1/. Under the Convention, the contracting states undertake to issue and accept the International Phytosanitary Certificate and to ensure that their basic laws and quarantine regulations comply with the provisions of the Convention.

31. The laws and regulations on plant protection legislation naturally also apply to the transfer and exchange of plant genetic resources. In fact, the term "plant" is given a broad interpretation in the plant protection legislation of most countries; not only are the plants themselves included, but also the living parts thereof, bulbs and seeds (Canada, Federal Republic of Germany, Guyana, Malawi, Thailand, United Kingdom) 2/. The International Plant Protection Convention also gives a very broad definition of "plant": living plants and parts thereof, including seeds in so far as the supervision of their importation may be deemed necessary by contracting parties 3/. As a consequence of the inclusion of plant genetic resources within the scope of the plant protection legislation, many protection laws and regulations (import and export licenses, frontier inspections, phytosanitary certificates, disinfection operations where necessary, international quarantine measures, refusal of entry for reasons related to plant protection) may affect the transfer and exchange of plant genetic resources.

(iv) Legislation concerning plant genetic resources held ex situ

32. The countries that have furnished information on this subject have indicated that they do not have legislation specifically dealing with plant genetic resources ex situ. Consequently, the norms or legal standards governing the status of gene collections, the ownership of genetic material,

1/ The amendments to the Convention, approved by the FAO Conference in 1979, designed to bring the provisions of the Convention up to date, have not yet entered into force.

2/ See Plant Protection Legislation, FAO Legislative Study No. 28, Rome 1984, p. 17.

3/ International Plant Protection Convention, Art. II, 1.

the obligation to deposit or to maintain such material in a gene bank, and the modalities regarding its availability or accessibility, have to be sought mainly in the instruments of establishment and in the statutes and bye-laws of each gene bank.

33. Seed legislation, plant breeders' rights legislation, and phytosanitary legislation, which may be and often are relevant have already been referred to above. In addition, provisions relating to plant genetic resources, their collection, conservation and use, may be contained in a heterogeneous variety of laws, in which the question of plant genetic resources is only marginal. Few examples of such laws have been furnished, but where they contain relevant provisions they are referred to in the appropriate sections of this document.

(v) Legal instruments establishing gene banks

34. There are various forms of legal instrument establishing gene banks, depending on the character of the gene bank in question. A number of States may conclude an agreement to set up an international gene bank. This is the case of the Nordic Gene Bank, created by an agreement of cooperation between five Nordic countries 1/. However, most gene banks are national in character and established by national law or pursuant to policy declarations of the responsible national authority. The type of legal instrument establishing the gene bank depends on the level of the authority which creates the gene bank, as well as on whether it belongs to the public or the private sector.

35. Some gene banks are created by a national act or government decree, e.g. the Austrian Gene Bank 2/, the "Instituto Colombiano Agropecuario" 3/; the International Institute of Tropical Agriculture of Nigeria 4/, the Institute of Scientific and Technological Research of Thailand 5/, and the Royal Botanic Gardens, Kew, of the United Kingdom 6/.

36. Other gene banks are a part of the national administration and, therefore, are governed by the general administrative rules and procedures. This is the case, among others, of the Australian Wheat Collection, of the New South Wales Department of Agriculture; the Division of Tropical Crops and Pastures, which is a Division within the Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia; the "Banco de Germoplasma" of the Ministry of Agriculture in Spain; and the Agricultural Research Directorate in the Ministry of Agriculture of Syria.

1/ The Nordic Gene Bank for Agricultural and Horticultural Plants was established on 1 January 1979, by the Nordic Council of Ministers, representing Denmark, Finland, Iceland, Norway and Sweden.

2/ Austria: Act on Federal Agricultural Institutes, Federal Law Gazette No. 230/1982).

3/ Colombia: Decreto No. 1562 of 1962.

4/ Nigeria: Federal Government of Nigeria Decree No. 32 of 1967 and No. 27 (amendment) of 1974).

5/ Thailand: Thailand Institute of Scientific and Technological Research Act, B.E. 252.2 (1979).

6/ United Kingdom: National Heritage Act 1983.

37. In other cases, the gene bank is an institute or a department of a university and is governed by the legal instruments or legislation establishing the university, or laid down by the university itself. Such are the "Banco de Genes de la Universidad Austral" of Chile, the Institute for Genetic Improvement and Seed Production of the University of Turin, Italy, and the Plant Germ-Plasm Institute of the Faculty of Agriculture of Kyoto University, Japan.

38. There are also certain gene banks that have been created under private law. Thus, the "Instituto de Investigaciones Agrarias" (INIA) of Chile is a private law corporation created by several institutions ("Instituto de Desarrollo Agropecuario", "Corporación de Fomento de la Producción", "Universidad de Chile", "Pontificia Universidad Católica de Chile", "Universidad de Concepción"). The Central Rice Research Institute, India, is a unit of the Indian Council of Agricultural Research (ICAR) which is a registered society under the provisions of the Societies Registration Act. Information has also been received of two private organizations in Switzerland, which conserve plant genetic resources, namely, the association "Fructus" and the "Association pour l'arboretum du Vallon de l'Aubonne".

IV. INSTITUTIONAL ASPECTS

(i) Notion of "ex situ" collection of plant genetic resources or "gene bank".

39. The essential purpose of ex situ collections of plant genetic resources is to conserve artificially, away from their usual habitat, the natural genetic diversity of plants, particularly in respect of varieties which are in danger of extinction. Such collections do not normally include samples of commercial varieties which are found on the market. Their primary activities are the collection of the material, its custody, and providing for access to it. Secondary activities, which do not concern directly the conservation of genetic diversity, but which enlarge knowledge of it, are the evaluation and documentation of the collected material: these activities are designed to improve access to the stored material in the interest of breeding programmes.

40. Such collections are either base collections or active collections. Base collections are concerned with long-term storage of the material, and are not meant to be used as a routine source for distribution. Material is only removed from base collections for regeneration when seed viability has started to decline below an acceptable regeneration standard, or when stocks of an accession are no longer available from an active collection. Active collections are for medium-term storage, and are concerned with distribution, multiplication and evaluation: storage conditions are less stringent because seeds are not stored for long periods 1/.

1/ CPGR 85/4, December 1984, p. 1.

(ii) National gene banks

41. Most gene banks have been established and are operated under national law or pursuant to policy declarations of the responsible national authority. Although there are some gene banks established under private law, the great majority of the gene banks are integrated into the national administration. Consequently, the policy concerning all aspects of genetic conservation is mostly laid down by the national authorities.

42. Thus, the Austrian Gene Bank is a federal establishment under the Minister of Land and Forests; the National Centre for Genetic Resources (CENARGEN) of Brazil is part of the system of agricultural research of the Ministry of Agriculture; the "Instituto Colombiano Agropecuario" is a public establishment, with administrative autonomy but falling within the competence of the Minister of Agriculture; the Agricultural Research Institute (ARI) of Cyprus is a Government Department of the Ministry of Agriculture and Natural Resources; the Research Institute for Crop Production of Czechoslovakia is subject to the Ministry of Agriculture and Food and has the status of a state enterprise; the "Instituto Nacional de Investigaciones Agropecuarias" (INIA) of Ecuador is an autonomous institution falling within the competence of the Minister of Agriculture and Livestock; in France, the "Institut National de la Recherche Agronomique" is a public institution under the authority of the Minister responsible for research and the Minister responsible for agriculture; the "Institute of Crop Science and Plant Breeding" of the Federal Republic of Germany forms part of the Federal Research Centre of Agriculture, which is an institution under public law and falls within the competence of the Federal Minister of Food, Agriculture and Forestry; the Plant Genetic Resources Unit, Agricultural Research Centre, of Iraq, has been established by the Ministry of Agriculture and Agrarian Reform; the Agricultural Research Organization (ARO) of Israel is operated as a unit of the Ministry of Agriculture; the "Instituto Nacional de Investigaciones Forestales y Agropecuarias" of Mexico is a "dependency" of the Secretary of Agriculture and Water Resources; the "Banco de Germoplasma Vegetal" of Spain constitutes part of the "Centro de Conservación de Recursos Fitogenéticos" of the Ministry of Agriculture; in Syria the Agricultural Research Directorate is one of the central organs in the Ministry of Agriculture; the Aegean Regional Agricultural Research Institute (ARARI) of Turkey operates under the Ministry of Agriculture, Forestry and Rural Affairs.

(iii) International gene banks

43. The term "international", applied to gene banks, can be understood in two different senses. In the strict sense, this applies to gene banks which are established and managed by two or more countries. The countries concerned are jointly responsible for the activities of the gene bank, such as financing, collection of material, maintenance, multiplication, evaluation, documentation and the policy for release of material. Inevitably, the gene bank activities will be primarily oriented to the common needs of the countries involved. An example of such an international gene bank is the Nordic Gene Bank which is a joint undertaking of the five Nordic countries:

Denmark, Finland, Iceland, Norway and Sweden. Furthermore, intergovernmental cooperation agreements concerning activities of national gene banks may create a stable framework for co-operation which is similar to an international gene bank in the strict sense (e.g. the agreement on cooperation in the field of safeguarding of plant genetic resources concluded between the Netherlands and the Federal Republic of Germany). The basic characteristics of an international gene bank in the strict sense can also be found in the "Centro Agronómico Tropical de Investigación y Enseñanza" (CATIE), Costa Rica. Although CATIE is an "asociación civil" under Costarrican law, created by Agreement between the Government of Costa Rica and the "Instituto Interamericano de Cooperación para la Agricultura" (IICA), the Members of CATIE are international legal persons; they are: LICA, which is an intergovernmental organization, the Government of Costa Rica, and the Member Governments of LICA. In June 1985 the Members were the Governments of Costa Rica, Guatemala, Honduras, Nicaragua, Panama, the Dominican Republic, and IICA.

44. The term "international" may also be understood in a looser sense. This applies to a certain category of gene banks which, because of their international support and objectives and their relative autonomy within the host country, cannot be considered simply as national banks. On the other hand, they cannot be considered "international" in the strict sense, since they are not created by a formal treaty concluded among States or other international legal persons, and their activities are not directed by States or such other international legal persons.

45. This is the specific case of the gene banks managed by International Agricultural Research Centres (IARCs) supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR comprises some 50 countries, international and regional organizations and private foundations and is sponsored by FAO, the International Bank for Reconstruction and Development (World Bank), and the United Nations Development Programme (UNDP). Notwithstanding this international support and their enjoyment of certain international privileges, the IARCs are usually national corporations, established and operating under the law of their host state.

46. From the information received and the documentation available, certain features of these IARC's may be highlighted, as follows:

The "Centro Internacional de Agricultura Tropical" (CIAT), Colombia, was created under an Agreement between the Government of Colombia and the Rockefeller Foundation. It is an autonomous, non-profit, tax-exempt, philanthropic institution, organized according to Colombian law 1/ and has the legal personality necessary to carry out its activities within and outside Colombia. The Centre may be dissolved and its property may be sold by decision of the Board of Directors in accordance with Colombian law.

47. The "Centro Internacional de Mejoramiento de Maiz y Trigo" (CIMMYT), Mexico, was established in 1963 by agreement between the Minister of Agriculture and Livestock of Mexico and the Rockefeller Foundation, and in

1/ Colombia: Agreement between the Government of Colombia and the Rockefeller Foundation for the establishment of the CIAT, 10 November 1967; Decreto No. 301, 7 March 1968; "Estatutos", 21 October 1.970.

1966 became a civil partnership 1/. The partnership is Mexican and, consequently, is subject to Mexican law and the jurisdiction of the Mexican courts. The said Minister guarantees the freedom of operation of the Centre.

48. The "Centro Internacional de la Papa" (CIP), Peru, is a non-profit entity of a scientific character with financial and administrative autonomy, organized in accordance with Peruvian law 2/.

49. The Charter of the International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria, was drawn up by the World Bank, FAO and UNDP in 1975. The Centre is an autonomous, non-profit, international institute 3/.

50. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India, was established under an agreement between the Government of India and the Ford Foundation 4/. It is an autonomous, international, philanthropic, non-profit institute, and possesses full juridical personality. The international status of the Institute is ensured by the Government of India issuing suitable notifications as contemplated in Clause 3 of the United Nations (Privileges and Immunities) Act, 1947, extending the operation of some articles of this Act to the Institute.

51. The International Institute of Tropical Agriculture (IITA), Nigeria, has been established under Nigerian Law as a corporate person, which is autonomous, non-profit, tax-free and international in character 5/.

52. The International Rice Research Institute (IRRI), Philippines, is organized as an autonomous, philanthropic, non-profit corporation. It enjoys tax-exemption and is accorded the status, prerogatives, privileges and immunities of an international organization by the Government of the Philippines 6/.

1/ Mexico: Civil Partnership Agreement of April 1966 (with amendments up to 1980).

2/ Peru: Statutes for the International Potato Centre (CIP), 23 May 1972.

3/ Charter of ICARDA, November 1975, as amended (June 1976).

4/ India: Constitution of ICRISAT, 5 July 1972; Assignment and assumption agreement between the Ford Foundation and the ICRISAT, 20 February 1973; Memorandum of Agreement between the Government of India and the Ford Foundation, acting on behalf of the Consultative Group on International Agricultural Research, for the establishment of an ICRISAT, 17 February 1978.

5/ Nigeria: Decree No. 32 of 1967, amended by Decree No. 27 of 1974; Bylaws of the IITA, established under Decree No. 32 of 1967, as amended in 1974 and 1980.

6/ Philippines: Articles of incorporation and Bylaws of the IRRI, as amended (1983).

(iv) Direction and internal control of gene banks

53. In order to be able to determine the legal status of gene banks it is important to define their directing and controlling authority, i.e. the source of policy formulation and implementation. Thus, the various gene banks reviewed may be distinguished according to the following categories:

(a) International banks in strict sense

54. The only known examples of this category are the Nordic Gene Bank and CATIE. The Nordic Gene Bank, established by the Nordic Council of Ministers, is governed by a Board, consisting of one member from each of the five Nordic countries. The term of service is two years. The Chairman and Vice-Chairman are elected from among the Board members and the chairmanship rotates among them. The Board is responsible for all the activities of the Bank: in particular, it is to determine the guidelines for the Bank's activities and its annual programme of work, ensure that the applicable rules are observed, issue such additional rules and directives as are deemed to be necessary, and be responsible for financial management.

55. The Board is advised by a Committee on Gene Bank Matters. This Committee represents the plant breeders, the botanical-scientific institutes, and other interested groups of the member countries. The Committee is an expert body, which prepares and makes proposals to the Board on matters concerning the work of the Gene Bank. The day-to-day work of the Gene Bank is carried out by the director, with the assistance of an assistant director - both appointed by the Board, upon nomination by the Committee on Gene Bank Matters.

56. As regards CATIE, its governing bodies are the Assembly, the Board of Directors ("Consejo Directivo"), the Director and several Committees. The "Junta Interamericana de Agricultura" of the IICA acts as the Assembly of the CATIE. The Board of Directors is composed of the Minister of Agriculture and Livestock of Costa Rica, the Director General of the IICA, two representatives of the Regular Members of the CATIE, and one representative of the "Junta Interamericana de Agricultura". The Director is elected by the Board of Directors by majority of 2/3 for a term of four years; he is eligible for reelection for one additional term.

(b) The International Agricultural Research Centres (IARCs)

57. Up-to-date information has been received in respect of only four IARCs. This is summarized as follows: the "Centro Internacional de Agricultura Tropical" (CIAT), Colombia, is under the direction of a Board of Trustees composed of no more than 17 members. Some of these are ex officio members: the Minister of Agriculture, the Rector of the National University, the Director General of the "Instituto Colombiano Agropecuario", and the Director General of CIAT. Of the remaining members, at least nine must be elected by serving members of the Board (one at least must be Colombian); these nine members are elected for a term of three years and can be reelected for only one consecutive term of three years. Thus, the Board is autonomous and self-perpetuating to a certain extent.

58. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India, operates under the authority of a Governing Board, consisting of not more than 15 members as follows: three members nominated by the Government of India for such terms as the Government of India may specify; three members nominated by the CGIAR for three-year terms; the Director of the Institute "ex officio"; six to eight members-at-large with relevant interests and qualifications, from countries or areas being served, selected by the CGIAR's sub-committee on ICRISAT, also for three-year terms.

59. The affairs of the International Institute of Tropical Agriculture (IITA), Nigeria, are administered by a Board of Trustees composed of not less than nine and not more than 15 members made up as follows: the Permanent Secretary of the Ministry of Agriculture and Natural Resources; two members appointed by the Federal Executive Council of Nigeria; two members (one appointed by the Ford Foundation and one by the Rockefeller Foundation); the Director of the Institute; additional members who are from tropical African areas (other than Nigeria), South and Southeast Asia, Latin America and the Caribbean, or who are eminent specialists in tropical agriculture. These members are elected by the Board with the approval of the Government of Nigeria.

60. The International Rice Research Institute (IRRI), Philippines, is a corporation with 15 members. The Minister of Agriculture, the President of the University of the Philippines, and the Director General of the IRRI are members "ex officio". The remaining 12 members are elected at large from qualified reputable individuals coming from the international community, primarily from rice-producing countries and from donor entities; three of these members-at-large are elected with the concurrence of the CGIAR. Each year four members-at-large are elected by a majority vote of all members present for a term of three years. No member-at-large shall serve for more than two consecutive terms of three years.

61. From the description of the structure of these four IARCs, and the composition of their governing bodies it appears that the national authorities of the host country are well represented, generally at a very high level, on the Governing Board or Board of Trustees. This would indicate that national interests and policy are duly taken into account. On the other hand, there are several members of the Board elected from the international community because of their individual competence. This is likely to foster an international approach. Therefore, irrespective of their legal status, these IARCs cannot be considered simply as national institutions. Therefore, the gene banks maintained by IARCs are neither under the exclusive control of any given State or national authority, nor in the private sector. Their status is, in fact, sui generis.

(c) Gene banks integrated in the national administration

62. As already noted, most gene banks are under the direct control of the national authorities. Thus, a description of the internal organization of such gene banks would not seem necessary, since it is apparent that the national administration is both the source of policy formulation and the authority responsible for its implementation. Examples of this category of gene bank have been given above.

(d) Gene banks depending on a University

63. The information available as regards the administrative structure of these institutes is scarce. The Institute for Genetic Improvement and Seed Production of the University of Turin, Italy, is directed by the Rector of the University and by its Administrative Board. No specific information has been received concerning the "Banco de Genes de la Universidad Austral", Chile, nor on the "Plant Germ-Plasm Institute" of the Faculty of Agriculture of Kyoto University, Japan.

(e) Gene banks created under special agreements

64. The "Instituto Nacional de Investigaciones Agropecuarias" (INIA), Chile, is a private law corporation created by five institutions, which are termed "Founding Members", and by other members which may be accepted as such by an Extraordinary General Assembly of the Founding Members.

65. The Institute is directed by a Board ("Consejo") composed of the Minister of Agriculture, who acts as Chairman; the Executive President of the INIA; the Director of the "Oficina de Planificación Agrícola"; four members ("consejeros") designated by the Minister of Agriculture; one member designated by the Founding Members; and one member designated from among the professional staff of the INIA. All the members ("consejeros") are elected for a term of three years and may be re-elected. The decisions are generally taken by majority vote. The Board is to put into practice the decisions of the General Assembly of the Founding Members; it directs the institute and can dispose of its property; designates, from among three candidates proposed by the Executive President, the General Manager. The Executive President of the INIA is appointed and may be removed by the President of the Republic.

(v) Institutional connections among gene banks

66. In some cases the legal instrument establishing an institution that maintains a gene bank contains provisions concerning the relationship with other organizations which may include other gene banks. For instance, the Charter of the International Centre for Agricultural Research in Dry Areas (ICARDA) states that "the Centre shall, within each host country, establish a cooperative relationship with the relevant national organizations and institutes charged with the responsibility of promoting agricultural research including government ministries, universities, agricultural research and training institutes and agricultural planning and policy-making bodies" and that "the Centre shall establish a cooperative relationship with such national, regional and international organizations engaged in research into agricultural problems as the Centre may consider necessary for the realization of its objectives or for the furtherance of international agricultural research generally". The Constitution of ICRISAT contains similar provisions.

67. Furthermore, cooperation with the International Board for Plant Genetic Resources (IBPGR) generally involves exchange of information and material with all participating gene banks. The IBPGR operates through arrangements made with existing institutions with which it contracts for specific projects (whether collection, conservation, evaluation, documentation or training). These institutions are, principally, the IARCs, the Regional Centres and the National Programmes.

68. Finally, arrangements between gene banks may be concluded bilaterally. For instance, according to the information received from a member of the Board of Trustees of the International Rice Research Institute (IRRI), Philippines, the IRRI and the national gene banks in India and Japan have agreed on a division of labour with respect to the conservation of Indian and Japanese types of rice.

V. RECEPTION OR COLLECTION OF GERMPLASM BY GENE BANKS

(i) Objectives and scope

69. Gene banks have as their main objective the preservation for posterity of genetic resources threatened by extinction, the documentation of genetic resources in general, and the support of plant breeding and plant science by the provision of basic material and information. Gene bank activities should be viewed in the perspective of a much wider time span than that of plant breeding activities. Gene banks are essentially concerned with the preservation of genetic diversity, whereas the aim of plant breeding is to obtain genetic homogeneity by utilizing this genetic diversity. Gene bank and breeding work are therefore quite distinct 1/.

70. Although the characteristic feature of gene banks, specifically base collections, is the conservation ex situ of plant genetic resources, gene banks may be and often are associated with breeding institutes, and may thus include in their active collections the offspring of the collected material, which is obtained through crossing or other forms of reproduction. By collecting, maintaining and releasing recombinations of genes from material already present in the collection, gene banks would in fact be functioning rather like plant breeding institutes.

71. Gene banks normally concentrate on a limited number of plant species. The choice in each particular case is determined by a number of factors, inter alia the immediate or potential danger of genetic erosion, the importance of the crop to the country, plant breeding requirements, the existence or otherwise of other collections with the relevant germplasm, considerations of international cooperation. Regarding the latter point, this international cooperation has to some extent been institutionalized through the arrangements set up by the CGIAR/IBPGR, whereby certain gene banks are designated as centres for particular crops.

72. It would appear that most gene banks in developed countries do not maintain either commercial varieties in current use or special genetic stocks such as breeders' lines in their base collections. The kind of material usually held consists of land-races of cultivated plants indigenous to the country; wild and weedy species and primitive cultivars collected in developing countries; material received from other institutes throughout the world, on the basis of reciprocity; and obsolete material, i.e. in respect of varieties which are to all intents and purposes no longer in trade and, of course, no longer protected.

1/ Flemming Yndgaard and Ebbe Kjellquist - "Economic aspects of Genebank Conservation", International Board for Plant Genetic Resources (IBPGR) Newsletter No. 58.

(ii) Collection procedures

73. Gene banks obtain their material by collecting it directly, in response to requests, by way of exchange, or as a spontaneous donation. The material may come from other gene banks, or from other institutes, or from private persons. In the case of collecting missions supported by the IBPGR it is usually agreed that the material collected be made available when required for scientific purposes.

74. Expeditions, within the country or abroad, are organized to collect germplasm, in particular, wild and related species present in situ in centres of origin of the species, as well as cultivated plants. This is indeed one of the principal ways of building up collections in gene banks. Samples taken are small and should not lead to genetic erosion. Thus, in Turkey the procedure for collection requires that preliminary surveys be conducted in areas identified as rich in the plant genetic material to be collected. Afterwards, teams of experts composed of biologists, breeders and botanists are sent to more specific sites in the region surveyed, and the natural conditions of the area where the respective gene material is collected are noted. The researchers are required to indicate on a map the site where the gene material is collected, together with such information as the altitude of the site and distances to certain market points. This kind of study is conducted once every few years to provide guidance to other researchers. The plant genetic materials collected in this way are brought to the institute concerned and registered with the relevant data.

75. Foreign expeditions to collect material are usually organized in consultation with the local authorities, and are carried out jointly with local scientists. Thus it was that in 1980 the Bolivian authorities were associated with, and Bolivian scientists participated in an expedition organized by the Federal Republic of Germany/Netherlands Potato Department of the Genebank at Braunschweig-Völkenrode to collect primitive cultivars and wild species of the potato 1/. The International Institute of Tropical Agriculture (IITA) also organizes plant exploration missions to collect germplasm material directly from farmers' fields in African countries with the participation of local scientists or technicians. The International Crops Research Institute (ICRISAT) also collects germplasm directly in various countries with the permission of the governments concerned and through joint expeditions with counterpart scientists in those countries. In Turkey, foreign researchers are required to conduct their studies and to collect gene material with the participation of Turkish experts. In Brazil, there is actual legislative provision for the authorization and supervision by the National Research Council of scientific expeditions by foreign institutions or individuals, in an official or private capacity, and for the appointment of representatives of the National Research Council to accompany the expeditions 2/.

1/ Louis J.M. van Soest and Walter Hondelmann, Taxonomy and Resistance of Wild Species and Primitive Forms of Potatoes Collected in Bolivia: Results, of a German-Dutch Expedition in 1980.

2/ Articles 4 and 6 of Decree No. 65.057 of 26 August 1969, approving the regulations for permission to conduct scientific expeditions in Brazil and other provisions.

(iii) Duplication of material collected

76. It appears to be the practice for foreign expeditions to leave duplicate samples of all the material collected, thus enriching local ex situ collections. For example, as a result of the collecting activities of the expedition to Bolivia, referred to above, some 500 accessions were made in the Federal Republic of Germany/Netherlands Potato Collection, including five previously undescribed varieties. The genetic base of the Bolivian germplasm in the gene bank was considerably broadened. Furthermore, from every sample collected, a sub-sample was provided to the Bolivian active collection, besides another sub-sample to the Centro Internacional de la Papa (CIP) in Lima, Peru. The Royal Botanic Gardens, Kew and the National Vegetable Research Station, Wellesbourne, too, in their foreign expeditions, offer 50 per cent of all material collected to the appropriate authorities in the host country, before removal of the seed to the United Kingdom. ICRISAT also shares all germplasm samples collected with the country in which the collections are made. In the Brazilian legislation cited above, provision is made for the material selected on scientific expeditions to be inventoried and for specimens to be retained in the country for inclusion in the collections of Brazilian official institutions 1/.

77. It should also be noted that the IBPGR has laid down certain principles whereby collecting missions supported by IBPGR are expected to leave samples of the material collected in the host country and to include local scientists "to the extent possible" in the collecting missions, if these are not locally organized 2/. Various governments and institutions have advised that they follow these principles. For example, according to information received from Switzerland, collection of material in foreign countries is carried out in conformity with IBPGR principles.

VI. OWNERSHIP OF PLANT GENETIC RESOURCES IN GENE BANKS

78. The question of the ownership of the plant genetic material held in gene banks may now be examined on the basis of the documentation and information furnished by the gene banks themselves or by Governments.

(i) Government or State ownership

79. In many, if not in the majority of cases, in respect of which data have been received, the plant genetic resources held in gene banks are considered to be the property of the Government or the State. Thus, in Colombia the germplasm held in the Instituto Colombiano Agropecuario is considered to be the property of the State. In Cyprus, the Agricultural Research Institute is a government department, and the active germplasm collection held there belongs to the government. In Czechoslovakia, the plant genetic resources maintained in the Research Institute of Plant Production and the collections of other institutes in the country are the property of the State. As regards the Federal Republic of Germany, plant genetic resources

1/ Decree No. 65.057 of 26 August 1969, Article 13.

2/ The IBPGR in its Second Decade: an Updated Strategy and Planning Report - IBPGR, 1984, p.8.

entrusted to the Institute for Crop Science and Plant Breeding, at Braunschweig-Völkenrode are the property of the Federal Republic. In Indonesia, the collections maintained by the National Biological Institute are considered to be the property of the government. In the case of Israel, the plant genetic resources in the gene bank of the Agricultural Research Organization, which is operated as a unit of the Ministry of Agriculture, belong to the nation. In Japan, there are various research institutes with collections of plant genetic resources: these are affiliated to the Ministry of Agriculture, Forestry and Fisheries, and the germplasm maintained therein may be assumed to belong to the government. As regards the material held at the Plant Germplasm Institute of the Faculty of Agriculture of Kyoto University, this is considered the property of the government, since the University is a State University. The Netherlands Gene Bank in Wageningen is also a government institution and the material held in the base collection there may be assumed to be Government property. In Nigeria, the plant genetic resources entrusted to the National Horticultural Research Institute are the property of the Federal Republic of Nigeria. In New Zealand, the plant genetic resources held in collections of the Department of Scientific and Industrial Research are owned by the government. The germplasm collection of the Plant Breeding and Acclimatization Institute in Radzikow, Poland, is also owned by the State. In Switzerland, most of the collections of plant genetic resources are the property of the Federal Agricultural Research Station or of the growing section of the Ecole Polytechnique Fédérale de Zurich (EPFZ). As regards the regular collections of plant genetic resources received for long-term storage at the National Seed Storage Laboratory, Fort Collins, these are the property of the government of the United States. In Zimbabwe, the plant genetic resources stored by the Crop Breeding Institute are the property of the government.

(ii) Ownership vested in gene bank or its parent body

80. In several other cases, according to the information received, the ownership of the plant genetic resources is vested in the gene bank where the material is kept or its parent body - such gene bank or parent body being part of the Government apparatus or a statutory body with its own legal personality. Thus, in Australia, the plant genetic resources of the Tropical Crops and Pastures Division of the Commonwealth Scientific and Industrial Research Organization (CSIRO) - a statutory authority of the Commonwealth of Australia - are the property of the CSIRO. There are also a number of other collections maintained by various State departments responsible for agriculture. The Austrian Gene Bank for cultivated plants, which operates as a central national base collection, has its seat in the Federal Institute for Plant Production: the Institute does not have its own legal personality, and is subject to the authority of the Minister of Agriculture. In Chile, the plant genetic resources of the gene bank of the Universidad Austral are the property of the University. In Costa Rica, the plant genetic resources entrusted to the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) are the property of the Centre.

81. In France, there are various research stations holding plant genetic resources, which operate under the Institut national de la recherche agronomique (INRA): in the relevant legislative enactment, INRA is defined as a national public institution of scientific and technological character placed

under the authority ("tutelle") of the Minister responsible for research and the Minister responsible for agriculture, and from the range of functions assigned to it, it can be deduced that it has full authority to dispose of the plant genetic material developed by it. In Ghana, the Crops Research Institute, which has a germplasm collection, is deemed to be a research institute (one of several) established by the Council for Scientific and Industrial Research (CSIR). The CSIR is a body corporate established by Decree, and all the property of the Crop Research Institute is vested in the CSIR. In India, the Central Rice Research Institute is a Unit of the Indian Council of Agricultural Research (ICAR). The latter is a registered society under the Societies Registration Act, its ex officio President is the Minister of Agriculture, and it is financed mainly by the government. Ownership of the germplasm maintained by the Institute appears to be formally vested in ICAR. In Iraq, the ownership of the plant genetic resources held by the Plant Genetic Resources Unit is vested in the State Board for Applied Agricultural Research. In Italy, the Istituto di miglioramento genetico e produzione delle sementi is part of the University of Turin and has no legal personality of its own: the germplasm collection maintained there is the property of the University or of the National Research Council, a para-statal institution. In Turkey, the plant genetic material maintained in the base collection of the Aegean Regional Agricultural Research Institute (ARARI) is owned by ARARI itself and is registered in its name: ARARI operates under the authority of the Ministry of Agriculture, Forestry and Rural Affairs. The John Innes Institute in the United Kingdom is a foundation which is operated as a charity and owns the plant genetic resources entrusted to it.

(iii) Ownership not clearly determined

82. With respect to several other gene banks, the question of the ownership of plant genetic resources maintained therein is not clear, according to the information received, or has not been given much attention. For example, in the case of the Nordic Gene Bank, it is supposed that the plant genetic material there belongs to it, since it is a legal person. However, "the situation could also be construed as one whereby the material received from other entities is held in trust by the NGB for the benefit of the research and breeding community". In the case of the "Instituto Nacional de Investigaciones Agropecuarias" (INIAP) of Ecuador, it is stated that, although no absolute ownership exists of plant genetic resources, INIAP has many collections (mainly active) in its charge. As regards the plant genetic resources entrusted to the Instituto Nacional de Investigaciones Forestales y Agropecuarias (INIFAP) of Mexico, the information received was to the effect that they are of public utility and that the Federal Government is their depositary ("depositario"). The Thailand Institute of Scientific and Technological Research provides facilities for both medium and long-term storage: the question of the ownership of plant genetic resources entrusted to it has not yet been tackled. As regards the Malaysian Agricultural Research and Development Institute, there are no legal provisions on the ownership of plant genetic resources: the issue of ownership has not arisen. In the United Kingdom, the Royal Botanic Gardens at Kew consider that the institute is the custodian of all the material in the base collection which is held in trust for the scientific community and, through it, for the benefit of mankind. However, it is understood that, from a legal point of view, the physical material belongs to the institute unless specific conditions are attached to the material at the time of deposit. The same may be said of the legal status of the collection of the National Vegetable Research Station, Wellesbourne, which belongs to the British Society for the Promotion of Vegetable Research.

(iv) Ownership of collections maintained by IARCs

83. Concerning the ownership of the germplasm collections maintained by the International Agricultural Research Centres (IARCs), the legal position remains unclear. The charters and legal documents available do not generally contain explicit provisions governing the ownership of plant genetic resources. From the replies received from the IARC's approached for information and documentation, the picture that emerges is as described hereunder.

84. The Centro Internacional de Agricultura Tropical (CIAT) in Colombia and the International Rice Research Institute (IRRI) in the Philippines do not consider themselves the owners of the material, but rather the custodians or depositaries thereof. In that context, however, it is not clear on behalf of what legal persons the material is held and whether these institutes' freedom to dispose of such material is limited by any rights retained by third parties. The International Centre for Agricultural Research in Dry Areas (ICARDA) in Syria states that the Centre is the custodian of the germplasm, without explicitly excluding ownership. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India considers that the Institute is the owner of the plant genetic resources which it has collected or received, although its Constitution does not contain any explicit provision on the subject. The International Institute for Tropical Agriculture (IITA) in Nigeria states that the Institute has been established under Nigerian Law as a corporate person, and works on the basis that it owns, like all other acquired assets, any genetic material in its possession.

85. It should be borne in mind that the above answers represent the position of the Directors or Boards of the IARCs. There is no certainty that, if a legal dispute regarding the ownership of material actually arose, a court would support this position. In fact, the lack of legal provisions in the documents under which IARCs have been established generates an element of uncertainty in the settlement of the problem of ownership. Since the IARCs are mostly national corporations established and operating under the law of their host state, the ownership of the plant genetic resources would be, in principle, governed by the national law applicable to the IARCs concerned.

(v) Ownership situation in synthesis

86. The position with regard to the ownership of plant genetic resources in gene banks may be summarized as follows. The material held in Government gene banks or in those of public institutions belongs (subject to any specific exceptions) to the State or to the individual public institution. In either situation, in practical terms, ownership and control are vested in the State. Only in a few instances is the precise question of legal title unclear. The situation with regard to the IARCs is more unclear still. In this context may be viewed those gene banks which consider themselves the custodians or depositaries of the germplasm held there. There are also, of course, ex situ collections of plant genetic resources held by private corporations, but little information about them is available. Since they are not under Government control, they fall outside the scope of this study.

VII. TRANSFER AND EXCHANGE OF GERMPLASM

87. Transfer and exchange of germplasm normally takes place out of active collections, which are in fact established for the release of germplasm, apart from other purposes. Only in exceptional cases is the material provided from base collections. Besides exchange between gene banks, germplasm is transferred for scientific purposes, including plant breeding. It does not appear that the statutes of gene banks or other regulations governing their operation prohibit them from transferring germplasm to institutes or persons abroad. Neither seed legislation nor plant breeders' rights legislation deal specifically with transfer and exchange of germplasm for scientific purposes. Plant quarantine regulations, on the other hand, may well have the effect of impeding or restricting such transfer and exchange. There are, however, other types of impediment or restriction, which have been reported, and these are summarized below.

88. Plant genetic resources in the public sector in Australia, maintained by State departments or by the CSIRO, may be supplied at discretion to any individual or organization considered to have a genuine interest in them, subject to availability of germplasm and availability of resources to meet requests. The germplasm is freely available, in small quantities, to bona fide plant breeders or Institutes. Requests for large numbers of samples may require special arrangements and perhaps financial support, and some lines may only be released for research purposes. Supply of bulk seed is only by special negotiation. In the case of the Gene Bank of Austria, "genetic material is delivered by all institutes concerned, theoretically without restrictions. As regards the access or utilization of the genetic material, there are neither legal obstacles nor other restrictions".

89. Base collections in Canada are held only at the Plant Gene Resources of Canada (PGRC) Office, while working collections are held at the Agriculture Canada Research Offices. The policy for the release of germplasm by Agriculture Canada is that seed or stock material of all varieties licensed and released for use by producers in Canada will be available when requested by plant breeding agencies in the public or private sectors. Genetic seed stocks on hand, and in use by the plant breeders will be available when requested by plant breeding agencies. Non-released varieties or selections that form part of the plant breeding material, such as disease-resistant strains, are included in this category. However, as a general policy, advanced filial generations, selections or non-released varieties in preliminary trials, and breeding lines, will not be released. Nevertheless, the plant breeders, on authority from their directors, may release limited quantities of this material. Such a policy is considered necessary in order to allow for special reciprocal cooperative arrangements that the breeder may have with breeders of other agencies. Breeding lines, and non-released varieties, received from cooperating scientists in foreign countries or from private firms in Canada, will only be released under conditions specified by such cooperators. As regards the release of

varieties developed by Agriculture Canada, the overall policy is aimed at ensuring that the varieties are distributed as efficiently and as widely as possible, thus making their full impact on the industry. The basic principle is that, because varieties are developed by public funds, all growers have equal access to them at equitable costs. Most varieties are licensed before they are released to growers. The procedures for release are modified from time to time, as conditions and circumstances warrant. Such procedures will be influenced by current developments, including the proposed legislation on plant breeders' rights.

90. In the case of the Instituto de Producción y Sanidad Vegetal of the Universidad Austral of Chile, and the Instituto Nacional de Investigaciones Agropecuarias of Ecuador there are no restrictions on transfer and exchange except for those determined by plant health requirements. Freedom of exchange is also recognized by the Instituto Agropecuario of Colombia, and the international scientific community has free access to the germplasm maintained there, the only limiting factors (besides quarantine regulations) being the quantity of material available and, with some items, the mailing costs. The Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) of Costa Rica also allows free access to its germplasm collections. There are no restrictions in respect of access to and utilization of the germplasm collection of the Agricultural Research Institute (ARI) of Cyprus: the germplasm is utilized by ARI breeders and has also been provided to several institutes in other countries on request. For the transfer of germplasm only a phytosanitary certificate is needed. No fees have been charged so far for handling, multiplication and dispatch of the material: however, if requests increase significantly in the future, the question of fees may have to be raised. In Czechoslovakia, free access is allowed to the plant genetic resources maintained in the Research Institute of Plant Production, as well as to those of other institutions in the country - except in respect of newly-bred materials (not yet registered as cultivars) and special initial breeding materials created in Czechoslovakia (which can be provided if there is the author's approval). In Finland, the research institutes concerned with plant breeding usually release their research material for research purposes without any special restrictions.

91. In the case of the Institute of Crop Science and Plant Breeding at Braunschweig-Völkenrode in the Federal Republic of Germany, there is no legal impediment or restriction with regard to the transfer and exchange of plant genetic resources: the only limiting factor would be the shortage of the material requested. However, current breeders' lines in respect of protected varieties (which are only exceptionally included in the base collection) may not be released. The Crops Research Institute of Ghana and the National Horticultural Research Institute, Nigeria, advise that they follow the procedure set out by the IBPGR as regards transfer and exchange of plant genetic resources: these are freely available without restriction for plant breeding, scientific and development purposes. The Central Rice Research Institute, India, supplies germplasm on request to other institutes outside the country, with the implied understanding that similar requests will be reciprocated: there are no legal restrictions on the subsequent utilization of such rice germplasm once this has been supplied.

92. Regarding the material in the National Biological Institute of Indonesia, this can be freely transferred and exchanged, except for certain species in respect of which an export permit is required. For wild species, such as native orchids, the regulation is meant to protect such species from genetic erosion, while for cultivated species, such as tobacco, sugar cane and cocoa, these measures have been introduced in order to allow the Ministry to have a means of control on the possible illegal outflow of improved varieties/clones. According to the regulations of the gene bank of Iran (which is a division of the Seed and Plant Improvement Institute), there is no restriction on bilateral cooperation for the exchange of plant genetic material and information. In Israel, the transfer and exchange of germplasm from the gene bank of the Agricultural Research Organization is permitted, but is under the control of the National Board for Plant Genetic Resources. As regards material deposited by breeders or geneticists for conservation at the cold storage facilities of the gene bank, this may be transferred only with the approval of the owner of the material. The Institute for Genetic Improvement and Seed Production of Turin, Italy, also advises that there are no legal restrictions on access to or transfer of material from its collection. In the case of the Plant Germplasm Institute of Kyoto University, Japan, there is no legal impediment to the transfer and exchange of plant genetic resources. As regards the Agricultural Research and Development Institute of Malaysia, there are no legal provisions governing the transfer or exchange of germplasm: the exchange of rice germplasm material is unrestricted.

93. In Mexico there is no restriction on the release of germplasm, when this is composed of materials not improved by INIFAP, i.e. materials in which no plant improvement work has been carried out. There is no restriction either on wild relatives of cultivated plants originated in Mexico. As for improved varieties which have been developed by INIFAP, the transfer and/or exchange is on condition that the recipient uses them exclusively for research and, if he wishes to exploit them commercially, he must obtain the permission of the Secretariat for Agriculture and Water Resources. The situation with regard to germplasm held by the Department of Scientific and Industrial Research (DSIR) of New Zealand is that there is no legal impediment to, or restriction on access, except with respect to selections and lines involved in active breeding programmes, and selections or cultivars received from other breeders on the understanding that they will not be distributed.

94. Regarding the Nordic Gene Bank, access to and utilization of the material maintained there is "free for the purposes of bona fide research and breeding, but not for mere multiplication, nor for the establishment of parallel gene banks". Concerning the ex situ collections in Poland, the only restriction on transfer and exchange is in respect of breeders' lines and mutants (special genetic stocks). Subject to the principle of reciprocity, there is no restriction to the exchange of material held in the ex situ collections in Switzerland. Exceptionally, a plant breeder may deposit material on the express understanding that it is not released without his authorization: in such a case, the person requesting the material will be referred directly to the breeder.

95. In Syria, there are no legal impediments to or restrictions on the utilization for scientific purposes of the germplasm of the active collection of the Agricultural Research Centre. As regards the Thailand Institute of Scientific and Technological Research, there is no legal impediment to or restriction on the access to and utilization of the germplasm collection. Certain government regulations prohibit the export of the planting material of several fruit crops and the import of others: these being all vegetatively propagated plants, the prohibition does not apply to the gene bank's operation. The material maintained at the Aegean Regional Agricultural Research Institute (ARARI) in Turkey is freely available also, with the exception of tobacco, figs, grapes, hazelnuts and pistachio, which are subject to certain laws and regulations.

96. Regarding the collections in the United Kingdom at the Royal Botanic Gardens, Kew and the National Vegetable Research Station, Wellesbourne, there are no legal restrictions on the distribution of the material, provided that sufficient seed is available. In compliance with an IBPGR requirement, if the material stored is not available from an active collection, it will be made freely available from the base collection to any professionally qualified institution or seriously interested individuals. As for the John Innes Institute, germplasm collected or donated to the Institute is freely available without any legal impediment and free of charge to any other geneticist, plant breeder or organization interested in genetics and plant breeding. Material generated in the Institute's own breeding programmes, which either forms new varieties or may be advanced generation material likely to lead to new varieties, can only be released through the National Seed Development Organization (NSDO). This is an official organization set up to sell and disseminate the products of plant breeding programmes of State Institutes in the United Kingdom. The United States is committed to the free exchange of germplasm for research purposes. However, it does not agree that improved elite varieties and breeding lines should be available without restriction. In the case of the Crop Breeding Institute of Zimbabwe, the exchange of germplasm is limited to base unimproved germplasm: in terms of a legally binding agreement, the Seed Cooperative Company of Zimbabwe Ltd. has sole right to the varieties released by the Crop Breeding Institute.

Policy followed by IARCs

97. The Centro Internacional de Agricultura Tropical (CIAT) furnishes samples of germplasm to organizations and individuals without discrimination, often without even requiring payment for the costs of multiplication and freight. In case of consignments to countries with plant breeders' rights legislation, written agreements are entered into with a view to ensuring that the consignee does not apply for exclusive rights in the country.

98. The Centro Internacional de la Papa (CIP) makes material from its collection freely available to all countries in world desiring it.

99. The germplasm collection of the International Centre for Agricultural Research in Dry Areas (ICARDA) is available without reservation to the global community of germplasm users. ICARDA's policy is to distribute, upon legitimate request, the Centre's germplasm for research related to increasing food production and for other scientific purposes.

100. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), on request, distributes plant germplasm to scientists, both public and private, in any country in the world and to other gene banks, whether national or international. This is done at no cost. In addition, ICRISAT will carry out without cost computer searches for traits desired by the author of the request.

101. There is no restriction on the access to and utilization of any available germplasm material maintained or produced by the International Institute of Tropical Agriculture (IITA). This is "freely available to any users seriously interested in it". As for transfer and exchange, no charge is normally made for small quantities. However, from time to time, requests are received for large shipments of planting materials in the range of 10 Kgs. and above. In such cases, handling and airfreight charges are recovered from the consignees.

102. The International Rice Research Institute (IRRI) makes its germplasm available to all who are interested in improving rice production. No legal impediment or restriction has been imposed on the access to and the utilization of such germplasm by scientists or growers in any country. The only technical problem is that occasionally IRRI is not in a position to supply the desired quantity of seed.

VIII. THE INTERNATIONAL UNDERTAKING ON PLANT GENETIC RESOURCES

103. The Undertaking draws its inspiration from the principle that plant genetic resources are a common heritage of mankind. A corollary of this principle is that such resources should be freely available for plant breeding and scientific purposes, for the benefit of the present and future generations of mankind. There has been a remarkable consensus with regard to this principle or axiom, which the controversies over other aspects of plant genetic resources have left inviolate. Indeed, in none of the replies received from Governments and gene banks is the principle itself challenged. Where differences, real or apparent, have emerged, these have been concerned with the application of the principle, or its interpretation.

104. In several of its Articles, the Undertaking deals directly or indirectly with, or has implications for, ex situ collections of plant genetic resources. It is these various Articles which will now be briefly reviewed and, in the context of the information received regarding the legal aspects of ex situ collections, their significance will be highlighted.

(i) Objective (Article 1)

105. The objective of the Undertaking, under Article 1, is "to ensure that plant genetic resources of economic and/or social interest, particularly for agriculture, will be explored, preserved, evaluated and made available for plant breeding and scientific purposes". This is also, basically, the objective of most gene banks on which information has been received, though these may have other subsidiary objectives as well, such as seed multiplication, training of technicians, etc.

(ii) Definitions (Article 2.1(a))

106. Article 2.1(a) defines plant genetic resources as "the reproductive or vegetative propagating material of the following categories of plants:

- (i) cultivated varieties (cultivars) in current use and newly developed varieties;
- (ii) obsolete cultivars;
- (iii) primitive cultivars (land races);
- (iv) wild and weed species, near relatives of cultivated varieties;
- (v) special genetic stocks (including elite and current breeders' lines and mutants)".

107. This definition is not accepted by certain Governments as it stands, in the context of their adherence to the Undertaking. Further, it would appear that many gene banks in developed countries would not give the term "plant genetic resources" as wide a scope, at any rate in so far as their base collections are concerned. The kind of material maintained in such collections, it would appear, consists essentially of primitive cultivars or wild races, wild and weedy species, and obsolete varieties. These gene banks do not normally conserve cultivated varieties in current use (including protected varieties), since these are obtainable on the market. & for current breeders' lines, these are not usually included in base collections: the question of access to such material, if maintained by a gene bank, is dealt with below.

(iii) Exploratory missions (Article 3)

108. Article 3 prescribes that Governments will organize or arrange for exploratory missions to identify potentially valuable plant genetic resources, particularly those in danger of extinction in the country concerned. Nothing in the documentation received would suggest that governments would have any legal difficulties in conforming to the provisions of this Article, though clearly such missions would have to comply with the applicable Government procedures.

(iv) Availability of plant genetic resources (Article 5)

109. Article 5, which deals with the crucial issue of the availability of plant genetic resources, states that it will be the policy of governments and institutions adhering to the Undertaking to allow access to samples of plant genetic resources under their control and to permit their export "for

the purposes of scientific research, plant breeding or genetic resource conservation": these samples are to be made available "free of charge, on the basis of mutual exchange or on mutually agreed terms".

110. With regard to the latter clause, there would not appear to be any conflict whatsoever between the Undertaking and the legal provisions governing gene banks or their practice with regard to the supply of samples on request. Notwithstanding the costs involved in the custody, storage, cataloguing, periodic testing, etc. of plant genetic material, and the costs of the administrative arrangements for the processing of requests, preparation, package, mailing and freight, it does not appear that any charge is being made for the supply of samples - unless the quantity supplied is unusual. In any case, the application of a modest charge for such services would not be inconsistent with the Undertaking, which envisages the supply of samples on request, not only free of charge, but also on the basis of mutual exchange or on mutually agreed terms.

(a) Protected varieties

111. The more fundamental question of access and export raises more serious issues. These refer, first of all, to cultivated varieties in current use and newly developed varieties (para (a)(i) of Article 2.1. of the Undertaking). Apart from the fact that such varieties are not normally held in base collections, governments would not be able to dispose of such varieties or allow access to them, if they were protected by plant breeders' rights. Thus, in countries with legislation on plant breeders' rights, such legislation would constitute a legal impediment to the unrestricted access to or transfer of protected varieties. These varieties would have to be obtained from the respective holders of the plant breeders' rights or their licensees, because they are not under government control, unless the title holder of the variety in question is a government establishment. Nevertheless, the problem here is perhaps more apparent than real, as the protected varieties are available on the market, and can be freely used for further breeding work.

(b) Special genetic stocks

112. The other main difficulty that has arisen with regard to the Undertaking has been with regard to "special genetic stocks, including elite and current breeders' lines and mutants" (Article 2.1(a)(v)), and many governments have expressed reservations with respect to this clause. Such material is generally not conserved in gene banks, and, where it has been, the gene bank does not normally have the legal authority to dispose of it, since it belongs to the breeders. Thus, in the countries concerned, the impediment to free availability would not be the plant breeders' rights legislation, but rather general principles relating to the ownership of property embodied in the law of the country. It should be noted that, in the advanced stages of a plant breeding programme, the material is commercially sensitive and its release would benefit the breeder's competitors who could profit unfairly from his original investment. Further, the parent material used in crosses to produce the breeder's working material is generally available, and such material would contain all the genes available in any derivations from that material.

(v) Access to base collections (Article 7.2)

113. Article 7.2 of the Undertaking requires institutions holding plant genetic resources, whenever requested by FAO, to make material in their base collections available to participants in the Undertaking, for the purposes of scientific research, plant breeding or genetic resource conservation. It would not appear that this supply of material is recognized as one of the normal functions of base collections. Such material is supplied from active collections. Only if such material is not available in an active collection, is recourse had to base collections.

114. The same Article 7.2, in the context of the proposed network of base collections in gene banks under the auspices of FAO, refers to base collections for which Governments or institutions are responsible. Article 5 also refers to adhering Governments and institutions having plant genetic resources under their control. Clearly, institutes belonging to Governments or under government control could be made to conform to various provisions of the Undertaking, if the governments concerned themselves accepted them. However, commercial or private undertakings holding collections of plant genetic resources remain outside the scope of the Undertaking.

(vi) Phytosanitary Legislation (Article 10)

115. Mention has been made of plant protection laws and regulations which tend to restrict the transfer and exchange of plant genetic resources. Such phytosanitary measures are consistent with the Undertaking, as they are envisaged in Article 10 thereof.

(vii) Conclusions

116. In conclusion, it would seem that if the discrepancies between certain provisions of the Undertaking and the legislation of certain States were to be removed, two options would be theoretically open.

117. The first option would be for the governments concerned to consider abrogating or modifying their plant breeders' rights legislation. This would still leave unresolved the question of acquired rights of the title holders. With regard to special genetic stocks of private breeders, which are not covered by variety protection titles and which have not been released, they could only be acquired by the State as a donation, by purchase or through expropriation.

118. It is doubtful whether the abrogation of plant breeders' rights legislation would be feasible. Indeed the Commission on Plant Genetic Resources, at its first session in March 1985, "agreed that in the development of an international network on plant genetic resources, as specified in Article 7.1(a) of the Undertaking, the legitimate interests of plant breeders should be taken into account" 1/. Furthermore, it would not appear that, in practice, plant breeders' rights necessarily constitute a

1/ Report of the Commission on Plant Genetic Resources, ref. CPGR/85/REP paragraph 72.

legal impediment to the free access to, and availability of plant genetic resources, for the purposes of scientific research, plant breeding and conservation. The UPOV Convention, and national legislation related to it, require the breeder's prior authorization only if the propagating material of the protected variety is to be used for commercial purposes. It is significant that the authorization of the holder of a plant breeder's right is not required either for the utilization of the variety protected by that right as an initial source of variation for the purpose of creating other varieties, or for the marketing of such other varieties. Such saving clause is not applicable, however, when the propagating material of the protected variety has to be repeatedly used for the production of another variety (hybrid breeding).

119. This provision in the UPOV Convention 1/ by virtue of which a protected variety may be used for breeding a new variety constitutes a safeguard which should be borne in mind in the light of certain world trends in favour of extending the application of patent law to plant breeding. According to the European Patent Convention, industrial patents may not be granted in respect of plant varieties. Breeding processes are not patentable either, if they are essentially of a biological nature. Patents may be granted only in respect of processes which are essentially non-biological and in respect of microbiological processes and their products. If the line of demarcation concerning the application of patent law, drawn in the European Patent Convention 2/, were removed, the effect would be largely to nullify the safeguard contained in the UPOV Convention, whenever new plant varieties were created with the aid of biotechnological processes. Thus, in this respect, recent techniques in genetic engineering and the modification of genetic material by biochemical means are extremely relevant to the issue of access to, and availability of, plant genetic resources.

120. The second option would be for consideration to be given to the introduction of certain limited amendments to the Undertaking. These would relate to the provision concerning special genetic stocks - Article 2.1(a)(v) - and those relevant to plant breeders' rights - Articles 2.1(a)(i), 5 and 7.2 - in respect of which certain governments consider that insufficient regard is paid in the Undertaking to the legitimate interests of plant breeders. The question of amending the Undertaking is dealt with also in document CPGR/87/4.

121. With respect to plant genetic resources comprised within the meaning of Article 2.1.(a)(ii) to (iv), it would appear that - except for particular species in the case of individual countries - the principles embodied in the Undertaking are in large measure observed. However, in order to further the objective of improving access to plant genetic resources by developing countries, FAO's monitoring role might be enhanced. For instance, institutes or persons failing to obtain access to material in gene banks might inform FAO of such occurrence. Gene banks refusing a request for germplasm may be invited to notify FAO of such refusal and furnish the reasons.

1/ Article 5.3.

2/ Article 53(b).

All such cases would be evaluated by FAO, and reported periodically to the Commission for Plant Genetic Resources. It is also possible to envisage specific agreements between FAO and the IARC's and other gene banks to promote observance of the principle of free access to germplasm held in them, and to prescribe the procedures for dealing with requests.

122. Access of developing countries to plant genetic resources would also be improved by the establishment of national or regional gene banks in those countries, and by the expansion of those already in existence. Another means of assisting developing countries in this field would be by strengthening their plant breeding capacity, as well as by contributing to the setting up of an infrastructure for seed multiplication and distribution. Donor countries may contemplate furnishing aid to developing countries in the plant genetic sector in recognition of their indebtedness for the germplasm received or collected from the centres of diversity. Such cooperation between developed and developing countries would be fully in line with the principles set out in Article 6 of the Undertaking.