

Legal issues in plant germplasm collecting

2

Co-sponsors

No country is self-sufficient in plant genetic resources, and until recently this was thought to be sufficient to ensure the free flow of germplasm among nations. However, the concepts of ownership, sovereignty and intellectual property rights (IPR) have increasingly been invoked of late in discussions of how best to conserve and use plant genetic resources. This has resulted from the growing realization that germplasm has real economic value. At the same time, awareness has grown that the repercussions of overexploitation of natural resources, of the extinction of species and the disappearance of crop landraces, of environmental damage and of habitat destruction can be global, transcending national boundaries and short-term financial considerations. The legal context of germplasm collecting has as a result become more complex. This chapter will briefly describe this evolving debate and how it affects germplasm collecting.

Towards an international system for *ex situ* germplasm conservation

A strategy evolved in the 1970s to deal with the problem of the conservation of plant genetic resources based on the concept of a worldwide system of gene banks providing a combination of long-term seed storage in base collections and short- or medium-term storage in active collections (Box 2.1). First the Food and Agriculture Organization (FAO) and later the International Board for Plant Genetic Research (IBPGR), with the support of a panel of experts, asked adequately equipped gene banks around the world to accept the responsibility for the long-term conservation of the global or regional base collections of given crops. The

Box 2.1**Some definitions**

Base collections of germplasm are stored at low temperature for long-term, secure conservation. Accessions are only removed:

- for regeneration, when their viability has declined below an acceptable standard;
- to provide material for an active collection for regeneration, if the stocks held by the active collection are more than two or three regeneration cycles removed from the original material;
- when stocks of an accession are no longer available from an active collection.

Currently, base collections are only maintained for orthodox seeds. In contrast to recalcitrant seeds, which die if so treated, orthodox seeds may be dried to low moisture content, sealed in airtight containers and stored at low temperature (usually 0°C to -20°C) for considerable periods. *In vitro* base gene banks are currently at the research stage.

In contrast, material in **active collections** is continuously being removed, whether for regeneration, multiplication, characterization, evaluation or distribution. Currently, active collections are maintained for orthodox seed, which are dried and stored at temperatures above 0°C but below 15°C. *Ex situ* collections of living plants under field or nursery conditions are often called **field gene banks**. In general, they fall within the category of active gene banks and are used for material which would be difficult to maintain as seeds (e.g. species with recalcitrant seeds) or when it is desired to maintain particular genotypes. *In vitro* active gene banks are currently at the pilot stage.

Working collections are also called breeders' collections or research collections. Storage of material in these collections is usually under ambient conditions or in air-conditioned rooms. They may include special genetic stocks such as breeders' lines and mutants.

expectation was that close cooperation between the global base collection of a given crop and the many active collections of the crop gene pool around the world would develop. Active collections would deposit a duplicate set of their holdings of a particular species in an appropriate base collection. There would also be safety storage of duplicates of base collection accessions in at least one other gene bank, preferably in another country.

Such a system of base and active collections is not yet fully operational. One of the main reasons is that it requires extensive movement of germplasm among countries, and this has presented problems. Countries have an understandable wish (indeed, duty) to protect their agriculture and natural habitats from outside pests, including weeds and diseases. Germplasm consignments may be contaminated with pests, or the plant itself may be a potential pest. Under the provisions of the *International Plant Protection Convention* (IPPC) of 1951, this may result in legal restrictions on germplasm movement (Chapter 17). Constraints also arise, however, because germplasm has value. If something is perceived as having value, sooner or later ownership will be claimed

over it and restrictions put on its availability. On the other hand, the relatively unimpeded flow of germplasm and information is necessary for the efficient conservation and use of plant genetic resources.

As is discussed below, a resolution to this debate has been sought within the FAO Global System for the Conservation and Utilization of Plant Genetic Resources, which has tried to provide

- a forum for discussion, the Commission;
- a flexible international framework, the Undertaking;
- the beginnings of a financial mechanism, the Fund.

The ownership of germplasm

Plant breeders' rights

Genetic resources have sometimes been thought of as a common good, the common heritage of humanity. In commercial plant breeding, however, genotypes have economic value. With the commercialization of agriculture and the increasing importance and development costs of modern, scientifically bred varieties, plant diversity is becoming an ever more valuable resource. The costly efforts that have had to be undertaken to safeguard the plant breeder's raw material have added further value to the germplasm kept in gene banks. To protect this investment, plant breeders' rights (PBR) are granted by some countries to plant breeders to exclude others from producing and selling propagating material of a protected variety for a period of 15–25 years. A protected improved variety is legally 'owned' by the breeder.

This principle is enshrined in the *Convention of the International Union for the Protection of New Varieties of Plants* (UPOV Convention). In order to be eligible for PBR protection, a variety must be distinct, uniform and stable in its essential characteristics and not yet commercialized. The maintenance of free availability of genetic resources was an important objective when the UPOV Convention was drawn up. The so-called breeders' exemption allows plant breeders to use without restriction protected varieties in the production of new varieties. At the same time, farmers are allowed the reusable part of the harvested material of protected varieties as seeds for the next year's planting (farmers' exemption).

In a recent revision of the UPOV Convention (UPOV, 1991), however, an optional restriction of the farmers' exemption has been introduced giving individual countries the choice of whether or not to grant farmers the right to save seeds for future sowing. There are currently 21 member countries which have adopted this revised UPOV Convention, mainly European countries, the USA, Canada and Japan. For most developing countries, the benefits of membership do not as yet outweigh the drawbacks, in the form of administrative costs and loss of access to protected varieties (Belcher and Hawtin, 1991). However, the recently

concluded agreement on trade-related intellectual property rights (TRIPs) negotiated during the Uruguay Round of talks under the General Agreement on Tariffs and Trade (GATT) requires signatory nations to introduce legislation for intellectual property protection of plant varieties. Argentina and Paraguay were the first developing countries to begin the process of becoming signatories to the UPOV Convention. Other developing countries (e.g. Chile and Cuba) already have analogous legislation.

Patent rights

PBR is not the only IPR system which has been brought into play. The emergence of modern biotechnology has diffused the definition of plant genetic resources to include not only whole plants but their individual constituent elements, down to tissues, genes or even fragments of deoxyribonucleic acid (DNA). Biotechnological research, an important output of which is crop varieties, is increasingly being undertaken by private institutions or results from the growing relationship between universities and public institutions on the one hand and private industry on the other. The industrial complex generally considers the traditional protection of varieties through PBR inadequate in a biotechnological age. A number of industrialized countries have responded to this argument by considering the expansion of the definition of patentable material to include plants or parts thereof.

Patent rights can be granted to inventors to exclude others from imitating, manufacturing, using or selling a patented process or product for commercial use for a period of usually 17–20 years. In return for the patent, the inventor discloses how the invention works, so that knowledge is available to the public. In order to obtain a patent, the process or product has to be novel, useful and non-obvious. Furthermore, the patent must relate to a technology for which patents are permitted. Many countries do not grant patents on pharmaceuticals and some prohibit patents on agricultural innovations.

Innovations on living organisms are in many countries not patentable, but this is changing (Belcher and Hawtin, 1991). In the USA patents have been granted for specific plant and animal varieties. In contrast to PBR, patent protection could give the patent holder the authority to restrict use of the patented variety for breeding purposes. Patent protection is also available in a number of countries for plants that contain a novel gene. To qualify, the gene must not be found in nature; it must be novel in the sense that it was created by the inventor or transferred to a species in which it is not found naturally (Barton and Siebeck, 1991). Such patents on genes seem to imply that the holder of the patent could prohibit others from engaging in unauthorized commercial activity involving any plant material of the protected species. This protection might even be extended to closely related species to which the protected gene could be transferred through conventional breeding

techniques (Barton, 1991). An even more controversial development is the granting by the US Patent and Trademark Office of a patent on a plant characteristic, irrespective of the process by which the characteristic was arrived at.

To some extent in reaction to these trends, the concept of national sovereignty began to be invoked by countries to assert ownership of germplasm of certain species within their borders which were deemed to be important to the national interest. Examples are the restricted availability of germplasm of coffee from Ethiopia, rubber from Brazil, spices from Indonesia, black pepper from India and pyrethrum from Kenya. Some countries established a practice of releasing germplasm only in exchange for training, technology or other kinds of support of the national programme. This policy has found an echo in FAO's Code of Conduct for Plant Germplasm Collecting and Transfer and the *Convention on Biological Diversity* (CBD) (see below).

The FAO global system for the conservation and utilization of plant genetic resources

As part of the developing debate, discussions took place during the 1983 FAO Conference which led to a resolution establishing the Commission on Plant Genetic Resources as a global forum where the donors and users of germplasm, of funds and of technology could meet on an equal footing to try to resolve the kinds of issues outlined above. The Commission has since met in 1985, 1987, 1989, 1991 and 1993. Its Secretariat is provided by the Plant Production and Protection Division of FAO.

One of the main tasks of the Commission is monitoring the implementation of the principles of the International Undertaking on Plant Genetic Resources, a non-binding agreement also drawn up in 1983. Its aim is to ensure that these resources – especially species of present or future economic and social importance – are identified, collected, conserved, evaluated and made available without restriction. Since 1983, 110 countries have adhered to the Undertaking (140 countries are either members of the Commission or have adhered to the Undertaking). In accordance with one of its articles and a memorandum of understanding between the two organizations, gene banks featuring in the IBPGR (now the International Plant Genetic Resources Institute (IPGRI)) register of base collections are beginning to be incorporated into a network of base collections under the auspices and/or jurisdiction of FAO.

In the Undertaking, plant genetic resources are taken to include: cultivated varieties in current use and newly developed; obsolete cultivars; primitive cultivars (landraces); wild and weedy species, near relatives of cultivated varieties; and special genetic stocks (including elite and current breeders' lines and mutants). Many industrialized countries opposed the view that special genetic stocks should be the object of the agreement. They argued that these cannot be freely exchanged as national legislation in these countries provides for private property rights on crop varieties in the form of PBR and patents. Many

developing countries, on the other hand, argued that special genetic stocks are largely derived from germplasm originating from within their boundaries, and that these genetic resources should be made available for free, just as the relatively unimproved germplasm originally was.

These problems were discussed by the second and third sessions of the Commission and there was full consensus on how to overcome them. Two resolutions of the FAO Conference of 1989 were added as Annexes to the Undertaking, providing an 'agreed interpretation'. They recognize not only plant breeders' rights but also farmers' rights, as the legitimate demands of, respectively, the donors of technology and those of germplasm, both of whom are to be compensated for their contributions. Originally based on the principle that plant genetic resources are part of the common heritage of humanity, with its Complementary Resolutions and Annexes, the Undertaking is now based on the principle of the sovereign rights of nations over the plant genetic resources within their borders.

Following the recommendations of the Undertaking, an International Fund for Plant Genetic Resources was officially established by FAO in 1988. It is meant to provide a channel for governmental and non-governmental organizations and individuals to support the conservation and use of plant genetic resources. As such, it is expected to become a critical element in ensuring the equitability of the global system. The developing countries in particular recognize the Fund as an appropriate mechanism for the realization of rewards for breeding and maintaining landraces. The argument is that; just as scientists are rewarded for their labour in creating breeding lines and commercial varieties, farmers have a right to receive material compensation for their efforts over the centuries in conserving, improving and making available plant genetic resources.

The Fund is currently voluntary. A different approach was suggested by the results of the Keystone International Dialogue Series. The Keystone Centre, a US organization dedicated to the arbitration of conflicts, brought together interested parties from all sides of the debate in a series of discussions starting in 1988. Early sessions refined the concept of farmers' rights and recognized the role of informal innovation systems in generating and conserving plant genetic resources. The consensus report arising from the final plenary session in 1991 argued that any fund 'designed to act as an analog to breeders' rights and patents with mandatory royalty payments' should itself be mandatory (Belcher and Hawtin, 1991).

The 1991 session of the FAO Conference, in a resolution which forms a further Annex to the Undertaking, endorsed the principles of nations having sovereign rights over their plant genetic resources and of the availability of breeders' lines and farmers' breeding material (i.e. landraces) being at the discretion of their developers during the period of development. The resolution also endorsed the view that farmers' rights should be implemented through an international fund that would also

be used to support conservation and sustainable development of plant genetic resources. In order to determine the funding needed, FAO, IBPGR (now IPGRI) and other relevant organizations were asked to prepare a periodical report on the state of the world's plant genetic resources and a global plan of action on plant genetic resources. The Conference agreed that the first state of the world report and the plan of action will be prepared through the Fourth International Technical Conference on Plant Genetic Resources, to take place in 1996.

The contribution of the United Nations Conference on Environment and Development (UNCED)

The debate has not stopped at the admittedly vague dividing line between crop genetic resources and the wild flora. It has extended to biodiversity as a whole, playing a central role in the process leading up to (and following) the United Nations Conference on Environment and Development (UNCED), held at Rio de Janeiro, Brazil in June 1992.

The CBD was opened for signature at UNCED. It entered into force on 29 December 1993, when it was ratified by the thirtieth country. The CBD recognizes biodiversity as a 'common concern', rather than a common heritage, of humanity. Article 15 states that: 'Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.' It adds that access to genetic resources, where granted, shall be subject to the 'prior informed consent' of the donor of the genetic resources. National legislation should promote the 'fair and equitable' sharing of benefits from the commercial use of resources on 'mutually agreed terms'. Duesing (1992) (quoted by Gollin, 1993) summarizes Articles 15 and 16 as suggesting the following ways whereby a country can so benefit: (i) participation in research using the resource; (ii) receiving technology which embodies or uses the resource; and (iii) sharing the financial benefits realized from commercial exploitation of the resource. The World Conservation Union (IUCN) Environmental Law Centre (ELC) has prepared an explanatory guide to the CBD.

The CBD distinguishes between germplasm already collected and germplasm to be collected in accordance with its provisions. Germplasm collecting after the CBD's coming into force, in a country party to the CBD, is subject to the provisions of the CBD regarding national sovereignty. Several countries have started to develop the necessary national policies and legislation.

The Code of Conduct for Plant Germplasm Collecting and Transfer

In 1989, the FAO Commission requested its secretariat to prepare an International Code of Conduct for Plant Germplasm Collecting and Transfer. The Code is intended to form an important tool in regulating the collecting and transfer of plant genetic resources and their associated information (including indigenous knowledge), with the aim of

facilitating access to these resources and promoting their use and development on an equitable basis. Along with other international and regional organizations, national programmes and experts, IBPGR (as it then was) had an input into the Code of Conduct. A draft Code was presented to the FAO Conference in 1991, and while the Conference agreed, in general, with its contents, it noted that further elaboration by the Commission was necessary. A new version of the Code was adopted by the Commission in 1993. A copy is provided in this chapter's Appendix 2.1. Its guiding principle is that though 'the conservation of plant genetic resources is a common concern of humankind', 'nations have sovereign rights over their plant genetic resources in their territories'.

The basic provision of the Code is that countries should regulate germplasm collecting through the issuing of collectors' permits. These are quite separate from the export and import permits and phytosanitary certificates that countries currently require for the movement of plant material across borders, and which, as already mentioned, are discussed fully in Chapter 17. There is a parallel here with the CBD, whose Article 9 (taken together with Article 15) 'provides a basis for domestic regulation of access to biodiversity, through, for example, collectors' agreements and access restrictions' (Gollin, 1993). Article 14 of the Code enumerates the ways in which the benefits of germplasm collecting could be shared with local communities, farmers and host countries. In 1993, the FAO Commission on Plant Genetic Resources adopted a Revision of the International Undertaking on Plant Genetic Resources, subsequently endorsed by the FAO Council, recommending full harmonization of the Undertaking, including the Code, with the CBD.

The issue of permits for biodiversity research in general, including plant collecting, is discussed by Janzen *et al.* (1993). Laird (1993) and Downes *et al.* (1993) discuss what contracts for access to biodiversity might look like, in the light of both national and international law, including the CBD. Barton and Siebeck (1994) discuss how 'material transfer agreements' could be used by a country to regulate access to germplasm collected within its borders but stored in gene banks abroad, for example in a base collection.

Other relevant national and international legislation

One of the responsibilities of collectors (together with donors, curators and users of germplasm) that the Code of Conduct for Plant Germplasm Collecting and Transfer emphasizes is that of minimizing the adverse effect of collecting on the environment and on biodiversity. Article 9 of the CBD makes the same point. Collecting germplasm should not contribute to genetic erosion or damage the ecosystem. In fact, of course, many countries already have national laws restricting the

collecting of plant species, especially threatened species, protecting their habitats and regulating designated protected areas such as national parks. An analysis of national legislation protecting wild plants and their habitats is provided by Klemm (1993). Clearly, national private property laws will also affect access to particular sites and taking of specimens, but land may also be protected by traditional rules and customary law. These are incorporated into, or at least recognized by, national law in some countries. There are also two international agreements that are relevant to plant germplasm collectors in that they provide for the protection of sites, the *World Heritage Convention* (1972) and the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* (1971), also known as the *Ramsar Convention*.

The collecting and movement of threatened species and their products is subject to the provisions of another international treaty, the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES). CITES, which entered into force in 1975 and now has more than 115 member countries, bans commercial international trade in an agreed list of endangered species and regulates and monitors trade in others that might become endangered. CITES has established a worldwide system of controls on international trade in threatened species and their products by stipulating that government permits are required for such trade. Enforcement of CITES is the responsibility of member countries, usually via the customs service. Countries are required to establish management and scientific authorities for the purpose of enforcing CITES regulations and to submit reports, including trade records, to the CITES secretariat in Switzerland. To ensure effective enforcement, the secretariat acts as a clearing house for the exchange of information and liaison between the member countries and with other authorities and organizations. The World Conservation Monitoring Centre (WCMC) maintains a database on the international trade in CITES-listed species (Chapter 10).

There are also relevant international regulations in the area of documenting indigenous knowledge. The World Intellectual Property Organization (WIPO)/United Nations Educational, Scientific and Cultural Organization (Unesco) Model Law on Folklore may restrict the use of material such as photographs and recordings. Downes *et al.* (1993) discuss the relevance of such agreements as the *International Covenant on Economic, Social and Cultural Rights*, the *Draft Declaration of the Rights of Indigenous People*, the International Labour Organization's (ILO) Convention No. 169 and Unesco's *Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property*.

IUCN ELC maintains a database of national and international environmental conservation instruments, including wild plant species protection laws and regulations, which is available for consultation on request.

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APPENDIX 2.1**International Code of Conduct for Plant Germplasm Collecting and Transfer****Contents**

	<i>Articles</i>
Introduction	
Chapter I: Objectives and Definitions	1–2
Chapter II: Nature and Scope of the Code	3–5
Chapter III: Collectors' Permits	6–8
Chapter IV: Responsibilities of Collectors	9–11
Chapter V: Responsibilities of Sponsors, Curators and Users	12–14
Chapter VI: Reporting, Monitoring and Evaluating the Observance of the Code	15–16

Chapter I**Objectives and Definitions***Article 1: Objectives*

This Code has the following objectives:

- 1.1 to promote the conservation, collection and use of plant genetic resources from their natural habitats or surroundings, in ways that respect the environment and local traditions and cultures;
- 1.2 to foster the direct participation of farmers, scientists and organizations in countries where germplasm is collected, in programmes and actions aimed at the conservation and use of plant genetic resources;
- 1.3 to avoid genetic erosion and permanent loss of resources caused by excessive or uncontrolled collection of germplasm;
- 1.4 to promote the safe exchange of plant genetic resources, as well as the exchange of related information and technologies;
- 1.5 to help ensure that any collecting of germplasm is undertaken in full respect of national laws, local customs, rules and regulations;
- 1.6 to provide appropriate standards of conduct and to define obligations of collectors;
- 1.7 to promote the sharing of benefits derived from plant genetic resources between the donors and users of germplasm, related information and technologies by suggesting ways in which the users may pass on a share of the benefits to the donors, taking into account the costs of conserving and developing germplasm;
- 1.8 to bring recognition to the rights and needs of local communities and farmers, and those who manage wild and cultivated plant genetic resources and in particular to promote mechanisms:
 - (a) to facilitate compensation of local communities and farmers for their contribution to the conservation and development of plant genetic resources; and
 - (b) to avoid situations whereby benefits currently derived from plant genetic resources by these local communities and farmers are undermined by the transfer or use by others of the resources.

Article 2: Definitions

- 2.1 'Collector' means a legal or natural person that collects plant genetic resources and related information.
- 2.2 'Curator' means a legal or natural person that conserves and manages plant genetic resources and related information.

- 2.3 'Donors' means a country or legal or natural person that makes available plant genetic resources for collection.
- 2.4 'Farmers' rights' means the rights arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the international community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of their contributions, as well as the attainment of the overall purposes of the International Undertaking.¹
- 2.5 'Ex situ conservation' means the conservation of plant genetic resources outside their natural habitat.
- 2.6 'Genetic erosion' means loss of genetic diversity.
- 2.7 'In situ conservation' means the conservation of plant genetic resources in the areas where they have naturally evolved, and, in the case of cultivated species or varieties, in the surroundings where they have developed their distinctive properties.
- 2.8 'Plant genetic resources' means germplasm or genetic material of actual or potential value.
- 2.9 'Plant germplasm' or 'genetic material' means the reproductive or vegetative propagating material of plants.
- 2.10 'Sponsor' means a legal or natural person that sponsors, financially or otherwise, a plant collecting mission.
- 2.11 'User' means a legal or natural person that utilizes and benefits from plant genetic resources and related information.

Chapter II

Nature and Scope of the Code

Article 3: Nature of the Code

- 3.1 The Code is voluntary.
- 3.2 The code recognizes that nations have sovereign rights over their plant genetic resources in their territories and it is based on the principle according to which the conservation and continued availability of plant genetic resources is a common concern of humankind. In executing these rights, access to plant genetic resources should not be unduly restricted.
- 3.3 The Code is addressed primarily to governments. All relevant legal and natural persons are also invited to observe its provisions, in particular those dealing with plant exploration and plant collection, agricultural and botanical activities and research on endangered species or habitat conservation, research institutes, botanical gardens, harvesting of wild plant resources, agroindustry including pharmaceutical plants and the seed trade.
- 3.4 The provisions of the Code should be implemented through collaborative action by governments, appropriate organizations and professional societies, field collectors and their sponsors, and curators and users of plant germplasm.
- 3.5 FAO and other competent organizations are invited to promote full observance of the Code.
- 3.6 The Code provides a set of general principles which governments may wish to use in developing their national regulations or formulating bilateral agreements on the collection of germplasm.

¹This definition is extracted from the FAO Conference Resolution 5/89.

Article 4: Scope

- 4.1 The Code describes the shared responsibilities of collectors, donors, sponsors, curators and users of germplasm so as to ensure that the collection, transfer and use of plant germplasm is carried out with the maximum benefit to the international community, and with minimal adverse effects on the evolution of crop plant diversity and the environment. While initial responsibility rests with field collectors and their sponsors, obligations should extend to parties who fund or authorize collecting activities, or donate, conserve or use germplasm. The Code emphasizes the need for cooperation and a sense of reciprocity among donors, curators and users of plant genetic resources. Governments should consider taking appropriate action to facilitate and promote observance of this Code by sponsors, collectors, curators and users of germplasm operating under their jurisdiction.
- 4.2 The Code should enable national authorities to permit collecting activities within its territories expeditiously. It recognizes that national authorities are entitled to set specific requirements and conditions for collectors and sponsors and that sponsors and collectors are obliged to respect all relevant national laws as well as adhering to the principles of this Code.
- 4.3 The Code is to be implemented within the context of the FAO Global System on Plant Genetic Resources, including the International Undertaking and its annexes. In order to promote the continued availability of germplasm for plant improvement programmes on an equitable basis governments and users of germplasm should endeavour to give practical expression to the principles of farmers' rights.

Article 5: Relationship with the other legal instruments

- 5.1 The Code is to be implemented in harmony with:
 - (a) the Convention on Biological Diversity and other legal instruments protecting biological diversity or parts of it;
 - (b) the International Plant Protection Convention (IPPC) and other agreements restricting the spread of pests and diseases;
 - (c) the national laws of the host country; and
 - (d) any agreements between the collector, host country, sponsors and the gene bank storing the germplasm.

Chapter III

Collectors' permits

Article 6: Authority for issuing permits

- 6.1 States have the sovereign right, and accept the responsibility, to establish and implement national policies for the conservation and use of their plant genetic resources and, within this framework, should set up a system for the issuance of permits to collectors.
- 6.2 Governments should designate the authority competent for issuing permits. This authority should inform proposed collectors, sponsors and the other agencies of the government's rules and regulations in this matter, and of the approval process to be followed, and of follow-up action to be taken.

Article 7: Requesting of permits

To enable the permit issuing authority to arrive at a decision to grant or to refuse a permit, prospective collectors and sponsors should address an application to the issuing authority to which they:

- (a) undertake to respect the relevant national laws;

- (b) demonstrate knowledge of, and familiarity with, the species to be collected, their distribution and methods of collection;
- (c) provide indicative plans for the field mission – including provisional route, estimated timing of expedition, the types of material to be collected, species and quantities – and their plans for evaluation, storage and use of the material collected; where possible, the sort of benefits the host country may expect to derive from the collection of the germplasm should be indicated;
- (d) notify the host country of the kind of assistance, that may be required to facilitate the success of the mission;
- (e) indicate, if the host country so desires, plans for cooperation with national scholars, scientists, students, non-governmental organizations and others who may assist or benefit from participation in the field mission or its follow-up activities;
- (f) list, so far as it is known, the national and foreign curators, to whom the germplasm and information is intended to be distributed on the completion of the mission; and
- (g) supply such personal information as the host country may require.

Article 8: Granting of permits

The permit issuing authority of the country in which a field mission proposes collecting plant genetic resources should expeditiously:

- (a) acknowledge the application, indicating the estimated time needed to examine it;
- (b) communicate to the collectors and sponsors of the proposed collecting mission its decision. In case of a positive decision, conditions of collaboration be established as soon as possible before the mission arrives in the country, or begins fieldwork. If the decision is to prohibit or restrict the mission, whenever possible, the reasons should be given and, where appropriate, an opportunity should be given to modify the application;
- (c) indicate, when applicable, what categories and quantities of germplasm may or may not be collected or exported, and those which are required for deposit within the country; indicate areas and species which are governed by special regulation;
- (d) inform the applicant of any restrictions on travel or any modification of plans desired by the host country;
- (e) state any special arrangement or restriction placed on the distribution or use of the germplasm, or improved materials derived from it;
- (f) if it so desired, designate a national counterpart for the field mission, and/or for subsequent collaboration;
- (g) define any financial obligation to be met by the applicant including possible national participation in the collecting team, and other services to be provided; and
- (h) provide the applicant with the relevant information regarding the country, its genetic resources policy, germplasm management system, quarantine procedures, and all relevant laws and regulations. Particular attention should be drawn to the culture and the society of the areas through which the collectors will be travelling.

Chapter IV

Responsibilities of Collectors

Article 9: Pre-collection

- 9.1 Upon arrival in the host country, collectors should acquaint themselves with all research results, or work in progress in the country, that might have a bearing on the mission.
- 9.2 Before fieldwork begins, collectors and their national collaborators should discuss, and to the extent possible, decide on practical arrangements including: (i) collecting priorities, methodologies and strategies, (ii) information to be gathered during collection, (iii) processing

and conservation arrangements for germplasm samples, associated soil/symbiont samples, and voucher specimens, and (iv) financial arrangements for the mission.

Article 10: During collection

- 10.1 Collectors should respect local customs, traditions, and values, and property rights and should demonstrate a sense of gratitude towards local communities, especially if use is made of local knowledge on the characteristics and value of germplasm. Collectors should respond to their requests for information, germplasm or assistance, to the extent feasible.
- 10.2 In order not to increase the risk of genetic erosion, the acquisition of germplasm should not deplete the populations of the farmers' planting stocks or wild species, or remove significant genetic variation from the local gene pool.
- 10.3 When collecting cultivated or wild genetic resources, it is desirable that the local communities and farmers concerned be informed about the purpose of the mission, and about how and where they could request and obtain samples of the collected germplasm. If requested, duplicate samples should be also left with them.
- 10.4 Whenever germplasm is collected, the collector should systematically record the passport data, and describe in detail the plant population, its diversity, habitat and ecology, so as to provide curators and users of germplasm with an understanding of its original context. For this purpose, as much local knowledge as possible about the resources (including observations on environmental adaptation and local methods and technologies of preparing and using the plant) should be also documented; photographs may be of special value.

Article 11: Post-collection

- 11.1 Upon the completion of the field mission, collectors and their sponsors should:
 - (a) process, in a timely fashion, the plant samples, and any associated microbial symbionts, pests and pathogens that may have been collected for conservation; the relevant passport data should be prepared at the same time;
 - (b) deposit duplicate sets of all collections and associated materials, and records of any pertinent information, with the host country and other agreed curators;
 - (c) make arrangements with quarantine officials, seed storage managers and curators to ensure that the samples are transferred as quickly as possible to conditions which optimize their viability;
 - (d) obtain, in accordance with the importing countries' requirements, the phytosanitary certificate(s) and other documentation needed for transferring the material collected;
 - (e) alert the host country and the FAO Commission on Plant Genetic Resources about any impending threat to plant populations, or evidence of accelerated genetic erosion, and make recommendations for remedial action; and
 - (f) prepare a consolidated report on the collecting mission, including the localities visited, the confirmed identifications and passport data of plant samples collected, and the intended site(s) of conservation. Copies of the report should be submitted to the host country's permit issuing authority, to national counterparts and curators, and to the FAO for the information of its Commission on Plant Genetic Resources and for inclusion in its World Information and Early Warning System on PGR.
- 11.2 Collectors should take steps to promote observance of the Code by the curators and users to whom they have passed the germplasm which they have collected. Where appropriate, this might be by means of agreements with curators and users consistent with Articles 13 and 14.

Chapter V Responsibilities of Sponsors, Curators and Users

Article 12: Responsibilities of sponsors

- 12.1 Sponsors should take steps to ensure, as far as is possible and appropriate, that collectors of collecting missions which they sponsor abide by the Code, particularly Articles 9, 10 and 11.
- 12.2 Sponsors should, as far as is possible and appropriate, establish agreements with curators of the germplasm collected under missions that they sponsor to ensure that curators abide by the Code particularly Article 13. Such agreements should, as far as is possible and appropriate, ensure that subsequent curators and users of the collected germplasm also abide by the Code.

Article 13: Responsibilities of curators

- 13.1 In order to be able to identify in the future the origin of the samples, curators should ensure that the collectors' original identification numbers, or codes, continue to be associated with the samples to which they refer.
- 13.2 Curators of the collected germplasm should take practical steps to ensure, as far as is possible and appropriate, that future enquiries from the local communities and farmers who have provided the original material, and the host country, are responded to, and the samples of the plant germplasm collected are supplied upon request.
- 13.3 Curators should take practical steps, *inter alia* by the use of material transfer agreements, to promote the objectives of this Code including the sharing of benefits derived from collected germplasm by the users with the local communities, farmers and host countries as indicated in Article 14.

Article 14: Responsibilities of users

Without prejudice to the concept of farmers' rights, and taking into account Articles 1.7 and 1.8, users of the germplasm, should, to benefit the local communities, farmers and the host countries, consider providing some form of compensation for the benefits derived from the use of germplasm such as:

- (a) facilitating access to new, improved varieties and other products, on mutually agreed terms;
- (b) support for research of relevance to conservation and utilization of plant genetic resources, including community-based, conventional and new technologies, as well as conservation strategies, for both *ex situ* and *in situ* conservation;
- (c) training, at both the institutional and farmer levels, to enhance local skills in genetic resources conservation, evaluation, development, propagation and use;
- (d) facilitate the transfer of appropriate technology for the conservation and use of plant genetic resources;
- (e) support for programmes to evaluate and enhance local land races and other indigenous germplasm, so as to encourage the optimal use of plant genetic resources at national, subnational, and farmers and community level and to encourage conservation;
- (f) any other appropriate support for farmers and communities for conservation of indigenous germplasm of the type collected by the mission; and
- (g) scientific and technical information obtained from the germplasm.

Chapter VI

Reporting, Monitoring and Evaluating the Observance of the Code

Article 15: Reporting by governments

- 15.1 Governments should periodically inform the FAO Commission on Plant Genetic Resources of actions taken with regard to the application of this Code. When appropriate, this may be effected in the context of the yearly reports provided under Article 11 of the International Undertaking on Plant Genetic Resources.
- 15.2 Governments should inform the FAO Commission on Plant Genetic Resources of any decision to prohibit or restrict proposed collecting missions.
- 15.3 In cases of non-observance by a collector or sponsor of the rules and regulations of a host country regarding the collecting and transfer of plant genetic resources, or the principles of this Code, the government may wish to inform the FAO Commission on Plant Genetic Resources. The collector and sponsor should receive copies of this communication, and have the right to reply to the host country with copy to the FAO Commission. At the request of collectors or their sponsors, FAO may provide a certificate stating that no unresolved complaints are outstanding about them under this Code.

Article 16: Monitoring and evaluating

- 16.1 Appropriate national authorities and the FAO Commission on Plant Genetic Resources should periodically review the relevance and effectiveness of the Code. The Code should be considered a dynamic text that may be brought up to date as required, to take into account technical, economic, social, ethical and legal developments and constraints.
- 16.2 Relevant professional associations and other similar bodies accepting the principles embodied in this Code may wish to establish peer review ethics committees to consider their members' compliance with the Code.
- 16.3 At a suitable time, it may be desirable to develop procedures for monitoring and evaluating the observance of the principles embodied in this Code under the auspices of the FAO Commission on Plant Genetic Resources which, where invited to do so by the parties concerned, may settle differences that may arise.