Evolving Political Issues Affecting International Exchange of *Arachis* Genetic Resources

K. A. Williams* and D. E. Williams[1]

ABSTRACT

While plant genetic resources continue to be essential for world food security, the exchange of these resources between countries has become increasingly encumbered during recent years. The free and open access to genetic resources that previously was considered the "common heritage of mankind" has been fundamentally changed by international multilateral agreements that recognize national sovereignty over genetic resources. Since the entry into force of the Convention on Biological Diversity in 1993, many countries have implemented laws regulating access to their genetic resources. The development of legislation in several countries comprising the primary areas of origin and diversity of *Arachis* makes issues associated with germplasm exchange particularly relevant to investigators working with peanut. This paper describes some recent USDA experiences with obtaining access in Latin American countries harboring peanut genetic resources. Also discussed are implications and prospects for future international germplasm exchange, including aspects of collaborative research and benefit sharing with germplasm donor countries. Within this new political climate, the establishment of mutually beneficial precedents for accessing foreign genetic resources will be crucial for ensuring the continued exchange, conservation, and use of *Arachis* germplasm in the future.

Key Words: Convention on Biological Diversity, germplasm, legislation.

While a considerable amount of *Arachis* germplasm has been conserved in international collections, additional wild and cultivated materials are needed to cover the full spectrum of genetic diversity in the genus (Simpson, 1991; Williams, 2001). The additional materials can be obtained only through exchange with foreign genebanks and research institutions or by conducting new plant explorations. Most of the existing accessions in the U.S. National Plant Germplasm System (NPGS) and other *Arachis* germplasm collections were obtained when genetic resources were considered the common heritage of humankind and available without restrictions. Since the Convention on Biological Diversity (CBD) entered into force in 1993, the free and open access to genetic resources from other countries has largely become a thing of the past.

[1]Plant Exchange Office, Nat. Germplasm Resources Lab., USDA-ARS, Bldg. 003, Rm. 402, BARC-West, Beltsville, MD 20705 and Int. Plant Genetic Resources Inst., Regional Office for the Americas, AA 6713, Cali, Colombia, respectively.

*Corresponding author (email: kwilliams@ars-grin.gov).

This paper focuses on access to unimproved genetic materials and will not deal with material protected by intellectual property rights. Political issues affecting the international exchange of genetic resources are particularly relevant to access to peanut germplasm. This is because some of the first and most restrictive legislation regulating their access has been implemented in precisely those countries where *Arachis* genetic diversity is greatest.

The Convention on Biological Diversity

Before 1993, exchange of unimproved germplasm was open and unrestricted, and materials from most *ex situ* collections were freely available. Collectors of germplasm usually required only research permits from host countries, which did not specify how acquired materials could be used.

The regulation of access to genetic resources was fundamentally changed by the CBD, which became international law on 29 Dec. 1993. The CBD, now ratified by 179 countries, is an international treaty dealing with the conservation and sustainable use of biological diversity, and the sharing of benefits arising from the use of genetic resources (Convention on Biological Diversity, 1992). Governments that are parties to the CBD agree to take action to conserve biodiversity and use it sustainably in their countries.

Article 15 of the CBD recognizes that nations have sovereignty over their genetic resources, and provides that access to them is subject to prior informed consent from the national government and mutually agreed-upon terms on the sharing of benefits derived from their use or commercialization. The implementation of the CBD presents challenges for germplasm source countries, as well as for those desiring access to foreign genetic resources. Countries that are party to the CBD are directed to enact national legislation regulating access to genetic resources, although the procedures for implementing the laws have yet to be worked out in many countries. In addition, the CBD specifies that countries should create conditions to facilitate access to genetic resources, and not impose restrictions that impede use of those resources.

The International Undertaking on Plant Genetic Resources

Although the CBD is the current international legal framework for regulating access to foreign genetic resources, future access to genetic resources of some food crops likely will be governed by another impending international agreement. Because of the importance of agricultural biodiversity to world food security, the Conference of the Parties to the CBD charged the Food and Agriculture Organization (FAO) with resolving issues not addressed by the CBD regarding plant genetic resources for food and agriculture (FAO Commission on

Plant Genetic Resources, 1994). The FAO Commission on Plant Genetic Resources subsequently initiated the development of a multilateral system for the exchange of crop genetic resources in the form of a revised International Undertaking on Plant Genetic Resources (IU). The negotiations on the IU have centered on three issues--the scope of the agreement, the terms of access, and the nature of the sharing of benefits arising from use. Being considered is a list of about 35 crops, including peanut, which would be freely exchanged under the multilateral system. Since their initiation in 1994, the negotiations on the revision of the IU have been difficult and slow. The U.S. position in the negotiations is that germplasm exchange under the multilateral system should be kept as open as possible. Many other countries, however, favor a much more restricted system. When the IU is finally completed, it will likely become international law.

CGIAR Centers

Access to germplasm collections held in trust by the Consultative Group on International Agricultural Research (CGIAR) Centers, such as the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Center for Tropical Agriculture (CIAT), also is affected by international laws. Although the CBD does not cover access to *ex situ* collections of germplasm acquired before 29 Dec. 1993, germplasm obtained after that date by the CGIAR centers is subject to the terms of the CBD. The revised IU will make provisions for the CGIAR collections, including how pre-CBD collections will be treated.

In 1994, the CGIAR Center germplasm collections were brought into the FAO International Network of *Ex Situ* Collections, which formalized the Centers' status as trustees of germplasm for the international community (Hawtin *et al.*, 1997). The CGIAR Center germplasm placed under the auspices of FAO is termed "designated material" and generally includes all pre-CBD material and any post-CBD material that donors agree can go into the designated collections. The designated germplasm is distributed with the provision that recipients cannot claim legal ownership or seek intellectual property rights over the germplasm. Also, all subsequent recipients of the material are requested to honor the same conditions.

The USDA recently signed a Memorandum of Understanding (MOU) with ICRISAT establishing general terms of access to facilitate germplasm exchange (Shands and Bertram, 2000). ICRISAT maintains the largest peanut germplasm collection in the world, including over 12,000 accessions of wild and cultivated *Arachis*. Under the MOU, germplasm requested from ICRISAT by U.S. scientists will become part of the NPGS and will be freely available from the USDA curator under the same material transfer agreement (MTA) terms that the Centers use to cover their germplasm distributions. This will increase the efficiency of obtaining germplasm from ICRISAT because accessions will not need to be re-requested by different researchers and also will facilitate quarantine. The NPGS will provide germplasm to ICRISAT according to standard USDA policies. ICRISAT and USDA agree not to claim ownership or seek intellectual property rights on germplasm received and to inform anyone who receives the germplasm in the future that they have the same responsibilities. The USDA is working with a number of CGIAR centers to develop similar agreements.

Regional and National Legislation

All of the *Arachis* genetic diversity not present in the NPGS, ICRISAT, and CIAT collections can be found only in the various countries where national authorities control access. National legislation in response to the CBD has already been implemented in many of these countries. Of particular relevance for *Arachis* genetic resources is recent legislation enacted by the five countries of the Andean Pact, Bolivia, Colombia, Ecuador, Peru, and Venezuela. In 1996, the Andean Pact countries adopted Decision 391 of the Cartegena Agreement, which established the Common Regime on Access to Genetic Resources, a shared legislative framework that strictly regulates access to the genetic resources of the member countries (Comisión del Acuerdo de Cartegena, 1996). The five countries are currently enacting laws to implement the provisions of the Common Regime at the national level. Access to germplasm in these countries has suddenly become very complicated and already is having a serious negative impact on the conservation of peanut genetic resources.

USDA Plant Explorations Under the New Regime

In this constantly changing environment of regulation of access to genetic resources, the Plant Exchange Office (PEO) of USDA-ARS, in collaboration with the International Plant Genetic Resources Institute (IPGRI), is working to develop models that will facilitate continued foreign access to germplasm, particularly access associated with plant explorations supported by the USDA (Williams, 1998). A pro-active approach is being taken to establish favorable precedents that demonstrate the mutual benefits of collaborative germplasm conservation efforts and show how these can be achieved within the framework of the new legal regime.

Many germplasm donor countries believe that there has been an inequitable distribution of benefits derived from plant genetic resources obtained from their countries. Monetary benefits, such as payment of royalties, are often at the center of discussions on benefit sharing, while important non-monetary "in-kind" benefits go unrecognized or underappreciated (Secretariat of the Convention on Biological Diversity, 1998). Past USDA plant explorations have included non-monetary benefits to the host country such as paying the travel and equipment costs of the exploration, sharing half of the collected germplasm, preparation of herbarium specimens, and joint publication of research results. Today, additional non-monetary benefits may be necessary to obtain access to germplasm.

The approach taken by USDA and IPGRI to benefit sharing is that the additional support contributes to

conservation of plant genetic resources in the host country, preferably by strengthening the capacity of the national plant genetic resources program. Examples of recent plant exploration projects in Ecuador and Paraguay illustrate the successful combination of benefit sharing and access to germplasm.

Seed Increase and Characterization in Ecuador

Additional benefit sharing was associated with plant explorations for peanut landraces, conducted in cooperation with the National Department of Plant Genetic Resources and Biotechnology (DENAREF) of the Autonomous National Institute for Agricultural Research (INIAP) in Ecuador in 1995 and 1996. During the explorations, 200 samples of landraces, many previously unknown to science, were collected. Following the established norm, half of each sample was deposited with DENAREF in Ecuador and half was included in the NPGS collections. However, as is often the case in plant explorations, original samples collected were small and needed to be increased before being made available for distribution. By mutual agreement, a seed increase project was devised that would provide tangible benefits to both the U.S. and Ecuador. The collected peanut germplasm was increased and characterized at the INIAP Experiment Station in Portoviejo, Ecuador under contact to the USDA, replacing work that would ordinarily have been done in the U.S. Dr. Charles Simpson of Texas A&M Univ. went to Ecuador to train the Ecuadorians in peanut characterization methods using the USDA peanut descriptors (Pittman, 1995). The increased seed was divided between Ecuador and the U.S. No intellectual property rights were associated with the germplasm. As a result of this project, both Ecuador and the U.S. now have comprehensive and fully characterized collections of Ecuadorian peanuts for study and distribution. Other benefits resulting from the peanut explorations will accrue to Ecuador in the future, including a Geographical Information System that maps peanut genetic diversity and a catalog of Ecuadorian landraces, being produced in collaboration with Prof. Antonio Krapovickas of the Instituto de Botanica del Nordeste in Corrientes, Argentina. Projects such as this serve multiple purposes by advancing the knowledge and conservation of genetic resources, as well as encouraging continued germplasm exchange by demonstrating the value of international collaboration.

Ex situ Seed Storage for Paraguay

Another germplasm-access project is relevant to peanut genetic resources because of its occurrence in Paraguay, an important area of *Arachis* genetic diversity. In 1998, a plant exploration for *Capsicum* germplasm was conducted in Paraguay in cooperation with the Ministry of Agriculture and Livestock's National Agronomic Institute (IAN), the National University of Asunción, and the Bureau of National Parks and Wildlife. At present, Paraguay lacks a formal plant genetic resources program and adequate *ex situ* storage facilities. Through mutual agreement, access to *Capsicum* germplasm was associated with two main benefits to Paraguay. Because Paraguay has no genebank facilities of its own, an agreement was reached between the USDA and the Paraguayan government to store a portion of the collected germplasm at the USDA National Seed Storage Laboratory (NSSL) on behalf of Paraguay. The terms of the agreement include a commitment by USDA to monitor and regenerate the accessions should their viability fall below a minimal level. The agreement also specified other terms of access, including the stipulation that no intellectual property rights would be claimed on the germplasm. Because of their favorable experience with the *Capsicum* project, Paraguayan government officials now wish to expand the agreement with the USDA to include other crops, including peanut. Another benefit to Paraguay associated with this project was the training of a Paraguayan scientist. The collaborative relationship established between the USDA and Paraguayan scientists and authorities can be expected to facilitate future U.S. access to peanut germplasm in Paraguay, a country where much important collecting work remains to be done.

The examples from Ecuador and Paraguay demonstrate the flexibility and practicality of non-monetary benefit sharing. In-kind benefits to the host country, such as those described here, most likely will exceed the value of monetary benefits that eventually might result from any commercial gains derived from use of the germplasm acquired. These benefits comply with the intent of the CBD with regard to benefit sharing, and directly strengthen the host countries' capacity to conserve and use their own genetic resources.

Applications for Access in Other South American Countries

The USDA is currently in the process of requesting access to germplasm of wild *Arachis* populations in Bolivia that are being threatened by a new pipeline for natural gas. Bolivia recently has implemented national access legislation, closely adhering to the guidelines of the Andean Pact's Common Regime on Access. This is the first instance of a completed application for access to be processed under the new Bolivian regulations.

At the request of Bolivian authorities, the benefit sharing identified for this exploration includes support for the development of a plan for *in situ* conservation of the targeted *Arachis* populations. The process of applying for access to *Arachis* genetic resources in Bolivia is an example of the way permissions for access are likely to be processed in the other Andean Pact countries.

The USDA also has applications in progress for access to peanut genetic resources in Venezuela and Guyana. A similar initiative in Peru for potato genetic resources will shed light on the prospects of access to peanut germplasm from that country.

Conclusions

Access to foreign peanut genetic resources can no longer be taken for granted. Peanut researchers are being challenged to find ways to work within the new

international legal framework. The outcome of the USDA negotiations in Bolivia, Guyana, and Venezuela will be decisive for future U.S. access to peanut germplasm in these countries. Establishing positive precedents demonstrates the advantages of collaboration between countries in the conservation of genetic resources and will help to ensure the continuation of international exchange of *Arachis* germplasm in the next millennium.

Authors' note: After this manuscript was submitted, USDA learned from the Bolivian and Venezuelan authorities that, due to unresolved domestic policy issues, neither country is able to provide access to *Arachis* genetic resources at this time.

Literature Cited

Comisión del Acuerdo de Cartegena. 1996. Decisión 391: Regimen Común sobre Acceso a las Recursos Genéticos. Gaceta Oficial,año XII, no. 213, Lima, 17 July.

Convention on Biological Diversity. 1992. International Legal Materials 31: 822-841.

FAO Commission on Plant Genetic Resources. 1994. Revision of the International Undertaking: Mandate. Context, Background and Proposed Process. CPGR-Ex1/94/3. FAO, Rome.

Hawtin, G., J. Engels, and W. Siebeck. 1997. International plant germplasm collections under the Convention on Biological Diversity--Options for a continued multilateral exchange of genetic resources for food and agriculture, pp. 247-262. *In* K. E. Hoagland and A.Y. Rossman (eds.) Global Genetic Resources: Access, Ownership, and Intellectual Property Rights. Assoc. of Systematics Collections, Washington, DC.

Pittman, R.N. 1995. United States Peanut Descriptors. ARS-132, USDA-ARS, U.S. Gov. Print. Ofc., Washington, DC.

Secretariat of the Convention on Biological Diversity. 1998. Sharing the Non-Monetary Benefits of Agricultural Biodiversity. UNEP/CBD/COP/4/Inf. 24, CBD Secretariat, Montreal.

Shands, H.L., and R. Bertram. 2000. Access to plant germplasm in the CGIAR centers: An update. Crop Science-Soil Science-Agronomy News, March, p. 8.

Simpson, C.E. 1991. Global collaborations find and conserve the irreplaceable genetic resources of wild peanut in South America. Diversity 7: 59-61.

Williams, D.E. 2001. New directions for collecting and conserving cultivated peanut diversity. Peanut Sci. 28:136-141.

Williams, K.A. 1998. Plant Exchange Office leads way in establishing non-monetary benefit-sharing regimes. Diversity 14: 23-24.