International Treaty on Plant Genetic Resources for Food and Agriculture

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Summary

Plant genetic resources for food and agriculture (PGRFA) serve as the raw material used by plant breeders and farmers to create new crop varieties. As such, they are viewed by many as the foundation for modern agriculture and as essential for achieving global food security. The United Nations Food and Agriculture Organization estimates that more than three-quarters of the increased crop productivity of the past 30 years is the result of plant breeding, and that future global food security depends to a large extent on the continued improvement of food crops—for example, developing new varieties that are higher-yielding, resistant to pests and diseases, resistant to extreme weather events such as drought or flood, and/or regionally adapted to different environments and growing conditions. All countries of the world are interdependent when it comes to plant genetic resources for food and agriculture; each relies on others for the genetic basis of its major food crops and for its food security. Interdependence for major food crops—the measure of reliance on nonindigenous staple crop germplasm that comes from other parts of the world—is over 50% for most regions, and ranges from 67% to 84% for countries in central Africa and from 85% to 100% for countries in south Asia. The high degree of interdependence argues for free access by countries to a wide range of plant genetic resources from other regions, in order to ensure future crop improvement and continued gains in agricultural productivity globally.

The International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty on PGRFA) provides a general framework for conservation and sustainable use of plant genetic resources. The treaty sets up a multilateral system of access and benefit sharing, where all members, in exercise of their sovereignty, provide free (or nearly free) access to each other's plant genetic resources for research, breeding, conservation, and training. The multilateral approach allows members access to germplasm to promote food security and improve crop productivity, lowers transaction costs, and redistributes back to the governing body financial benefits derived from the commercial exploitation of the genetic resources.

Currently, 120 countries are parties to the treaty. The United States signed the treaty on November 1, 2002 (Treaty Doc. 110-19), and it was submitted by the Bush Administration to the Senate for advice and ratification on July 7, 2008. The Senate Foreign Relations Committee heard testimony in support of ratification on November 10, 2009, but to date no further action has been taken. Congress could assess several issues related to ratification of the Treaty on PGRFA, including the implications for the United States' position on the Convention for Biological Diversity; the implications for the United States' position on intellectual property rights; the expectations for future financial commitments under the treaty, especially for capacity-building in developing countries; and the potential implications, if any, for congressional proposals related to international agricultural research and development.

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Importance of Plant Genetic Resources for Food and Agriculture (PGRFA): Background and Issues

Humans depend on plant genetic resources for food and agriculture (PGRFA)[1] for many aspects of survival, including food, fuel, and fiber. A study conducted by the United Nations Food and Agriculture Organization (FAO) concluded that plants contribute the vast proportion of the world's food supply, particularly for developing countries in Africa, Asia and the Pacific.[2] At a global level, the total dietary energy and protein provided by plants is 84% and 63%, respectively, while animal sources contribute 16% and 37%, respectively (**Table 1**). Plant resources are even more critical in Africa, where about 93% of food energy and 79% of protein are derived from plant sources. The history of the development and use of PGRFA has been characterized by relatively rapid movements of domesticated crops and animals across and among continents, with ultimately a relatively small number of species representing a very high percentage of the daily diets of people around the world.[3] FAO estimates that four crops—rice, wheat, sugar (beet and cane), and corn—account for over 60% of human calorie intake from plants.

Table 1. Summary of Sources of Human Energy and Protein

(daily average intake of food energy (kcal) and protein (g))

	Food Energy		Protein	
	kcal	%	g	%
World				
Plant Sources	2,388	84.0	47.3	63.4
Animal Sources	445	16.0	27.3	36.6
Africa				
Plant Sources	2,177	92.9	45.4	79.1
Animal Sources	167	7.1	12.0	20.9
Asia and the Pacific				
Plant Sources	2,343	87.2	49.3	71.0
Animal Sources	343	12.8	20.1	29.0
Near East				
Plant Sources	2,441	88.1	54.7	73.1
Animal Sources	329	11.9	20.1	26.9

[1] The International Treaty on Plant Genetic Resources for Food and Agriculture defines PGRFA as "any genetic material of plant origin of actual or potential value for food and agriculture," where "genetic material" is further defined as "any material of plant origin, including reproductive and vegetative propagating material, containing functional heredity."

[2] Nutrition Division (FAO), *Nutritional Value of Some of the Crops Under Discussion in the Development of a Multilateral System*, Food and Agriculture Organization of the United Nations, Background Study Paper No. 11, Rome, Italy, April, 2001, ftp://ftp.fao.org/docrep/fao/meeting/015/j0748e.pdf.

[3] Jared Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (W. W. Norton, 1997).

	Food Energy		Protein	
	kcal	%	g	%
Europe				
Plant Sources	2,419	72.5	46.3	46.3
Animal Sources	916	27.5	53.6	53.7
Latin America and the Caribbean				
Plant Sources	2,271	81.0	38.7	52.7
Animal Sources	534	19.0	34.7	47.3
North America				
Plant Sources	2,655	72.7	42.1	37.5
Animal Sources	998	27.3	70.2	62.5

Source: Nutrition Division, Food and Agriculture Organization of the United Nations, Background Study Paper No. 11.

Notes: Food energy is the amount of energy in food that is available through digestion and is expressed above in kilocalories (kcal), where protein is expressed in grams (g).

PGRFA and Global Food Security

Many agricultural scientists and development practitioners believe that PGRFA are the foundation for modern agriculture and are essential for achieving food security. They say that much of the increase in food production over the last half-century can be attributed to innovations achieved through plant breeding, drawing on existing genetic resources. FAO estimates that more than three-quarters of the increased crop productivity of the past 30 years is the result of plant breeding. FAO and other agricultural experts believe that future global food security depends to a large extent on the continued improvement of food crops—for example, developing new varieties that are higher-yielding, resistant to pests and diseases, resistant to extreme weather events such as drought or flood, and/or regionally adapted to different environments and growing conditions. Crop improvement has also resulted in significant gains in the nutritional value of crop plants. Plant genetic resources serve as the raw material used by plant breeders and farmers to create new crop varieties.

Feeding a growing global population will require a significant increase in food production. Despite a 70% growth in world population, agriculture today provides over 15% more calories per capita than it did 30 years ago. By 2050 the world's population is estimated to reach 9.1 billion, 34% higher than today. About 70% of the world's population will be urban (compared to 49% today), and income levels will be higher than they are today. FAO estimates that farmers will need to increase production by at least 70% by 2050 to satisfy the demand for food due to population growth, urbanization, and rising incomes.[4]

[4] Food and Agriculture Organization of the United Nations, *How to Feed the World in 2050,* Rome, October 2009, http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf.

Plant Genetic Resources and Crop Improvement: The Case of Wheat vs. Corn

How will the world feed itself in the coming years? Many believe that conventional agriculture will continue to play a critical role, with cereal grains being of primary importance. The International Food Policy Research Institute (IFPRI) has predicted that by the year 2020, almost 96% of the world's rice consumption, two-thirds of the world's wheat consumption and almost 60% of the world's corn consumption will be in developing countries. Forecasts call for wheat to surpass rice in its dominant role in feeding the poor of those nations. It will likely become the most important cereal in the world, with corn close behind.

Wheat is one of the few truly global crops, grown all over the world. It belongs to the genus *Triticum*, which originated almost 10,000 years ago in the Fertile Crescent in central and west Asia (the Middle East). Hundreds of thousands of wild species, landraces, and local cultivars within the *Triticum* species constitute the "wheats" of the world. ("Landrace" refers to domesticated animals or plants adapted to the biological and cultural environment in which they originated or are commonly grown. They often develop naturally or from traditional breeding methods, and are thought to have more diverse characteristics than commercial varieties, allowing them to adapt to more variable and local environments.) Thousands of species of *Triticum* have been collected and are currently stored in genetic resources centers around the world. A study conducted by the International Center for Maize and Wheat Improvement (CIMMYT) found that the number of different landraces in pedigrees of modern wheat varieties has steadily increased during the past 30 years and that the geographical origin of the landraces has broadened. Going beyond rather general and poorly defined contributions to modern varieties, several specific genes that have made major impacts on wheats can be directly traced to contributions from genetic resources. One of the best-known examples of the use of plant genetics for crop improvement is the integration of dwarfing genes (e.g., genes that reduce plant height and tillering capacity, which ultimately prevent plant lodging) from a Japanese wheat cultivar to wheat varieties in Mexico by Dr. Norman Borlaug. Dr. Borlaug's work launched the so-called "Green Revolution," which led to higher-yielding wheat varieties, increased food security for millions, especially the poor in Latin America and Asia, and Dr. Borlaug's winning the Nobel Peace Prize in 1970. Other examples include the use of a wild relative of wheat from the eastern Mediterranean to obtain a gene that increases the protein content of bread and durum wheat. Breeders have also called on plant genetic resources from all over the world in continuing efforts to develop disease-resistant wheat varieties to a detrimental pathogen called wheat rust, which has caused severe losses to millions of farmers and threatens wheat production globally, including in the United States and Canada.

Unlike wheat, the use of genetic resources in corn improvement is not well documented globally, and is likely not as widespread. Although approximately 50,000 accessions of corn exist in germplasm banks around the world, most of these have never been adequately evaluated for useful traits. It has been estimated that less than 1% of the U.S. germplasm base is exotic. On a global basis, only around 5% of the available corn germplasm is commercially used. The untapped potential of these genetic resources is indicated to some extent by the progress that U.S. breeders have achieved through plant breeding. Through the development of improved varieties, breeders doubled U.S. corn yields between 1930 and 1966, and tripled 1930 yields by 1995.

At the same time, some in the agricultural community are concerned about the lack of genetic diversity in corn used for crop production. The widespread deployment of genetically uniform varieties increases susceptibility to diseases and pests and does not allow for stable yields in variable environmental conditions. Increases of 1.5%-2.0% per year of genetic gain for yield are still being achieved, but some question whether they can be sustained. The incorporation of exotic germplasm into adapted lines may give rise to additional hybrid vigor and higher yield potential. In addition, several studies have demonstrated that exotic germplasm contains significant variation for many quality traits. Because many of the genetic resources of maize have undergone extensive selection over centuries for indigenous uses such as feed, food, and fodder, a wealth of new qualities and characteristics remains to be discovered. In addition, wild relatives of corn such as teosinte and *Tripsacum* are also viewed as potential sources of novel characteristics.

Sources: David Hoisington, Mireille Khairallah, and Timothy Reeves, et al., "Plant Genetic Resources: What Can They Contribute Toward Increased Crop Productivity?," *Proceedings of the National Academy of Sciences*, vol. 96 (May 1999), pp. 5937-5943. M. Smale, P. Aquino, and J. Crossa, et al., *Understanding Global Trends in the Use of Wheat Diversity and International Flows of Wheat Genetic Resources*, CIMMYT, Economics Working Paper 96-02, Mexico City, 1996.

PGRFA and Interdependency

All countries of the world are interdependent when it comes to plant genetic resources for food and agriculture—each relies on others for the genetic basis of its major food crops and for its food security. Modern crops and forages have a multitude of parent materials, as exemplified by the development of rice varieties that are grown all over the world (**Table 2**). The diets of people around the world have evolved and adapted to such an extent that most countries and regions rely heavily on nonindigenous, imported germplasm of staple crops from other parts of the world. For example, corn is one of the world's three most important staple crops, especially for millions of people living in sub-Saharan Africa. Corn originated in South America, but the United States is the largest global producer of corn and holds one of the world's largest genebank collections of corn varieties. Cassava, which also originated in South America, is another major food source in Africa today, while African millets and sorghums are major food crops in South Asia and Latin America. The extensive cattle pastures of Latin America depend largely on African grasses. Alfalfa from southwestern Asia is now cultivated around the globe. A plate of pasta with red sauce, a dish typical in Italy, relies on crops that originated in South America (tomatoes) and in west and central Asia (wheat). The exchange of plant genetic resources has taken place over centuries, and without it few typical "local" meals would exist. A recent study concluded that for the major food crops, all regions were dependent on PGRFA from other regions to a high degree—over 50% for most regions.[5] Interdependence in central Africa ranges from 67% to 84%, and in south Asia ranges from 85% to 100%. No country in the study was ranked as completely self-sufficient. The high degree of interdependence argues for continued access by countries to a wide range of plant genetic resources in other regions as essential for crop improvement and the development of modern agriculture.

Table 2. Summary of International Flows of Rice Ancestors in Selected Countries

Country	Total landrace progenitors in all released varieties	Own landraces	Borrowed landraces
Bangladesh	233	4	229
Brazil	460	80	380
China	888	157	731
India	3,917	1,559	2,358
Indonesia	463	43	420
Nepal	142	2	140
Nigeria	195	15	180
Pakistan	195	0	195
Philippines	518	34	484
Thailand	154	27	127
United States	325	219	106
Vietnam	517	20	497

Source: Modified from Fowler and Hodgkin (2004).

Notes: The landrace progenitors listed are for a country's commercially released varieties only; they do not include local landraces grown on a noncommercial basis by farmers.

[5] Ximena Flores Palacios, *Contribution to the Estimation of Countries' Interdependence in the Area of Plant Genetic Resources*, Food and Agriculture Organization of the United Nations, Background Study Paper No. 7, Rome, Italy.

U.S. Approach to PGRFA

The U.S. food supply is based on intensive agriculture. Intensive agriculture benefits from genetic uniformity in crops, but it can also increase the potential for crop vulnerability to new pests, diseases, and environmental stresses. An example of that vulnerability occurred in 1970, when a widespread outbreak of a disease called southern corn blight hit from the southeastern United States into the Great Plains. The epidemic cost farmers 15% of the nation's corn crop that year because nearly all the corn planted was genetically susceptible to the fungus that caused the blight. Congress responded to this event by establishing the National Plant Germplasm System (NPGS) within the United States Department of Agriculture's (USDA's) Agricultural Research Service (ARS).[6] The NPGS is a national network of public agencies (federal and state agencies including more than 20 federal gene banks located across the country), private institutions, and individuals. It is the primary entity in the U.S. effort to conserve and use crop germplasm for crop improvement. With a collection that includes about 85 crops, the NPGS collects plant germplasm from all over the world. It is "devoted to the free and unrestricted exchange of germplasm with all nations and permits access to U.S. collections by any person with a valid use,"[7] such as for research or breeding, although medical and other uses are included. Germplasm users in other countries have the same privileges as those in the United States. According to ARS, this policy has "grown out of the belief that germplasm, like the oceans and air, is a world heritage to be freely shared for the benefit of all humanity."[8] Through these efforts, NPGS assists in improving the quality and productivity of crops in the United States and in the world.

The Germplasm Resources Information Network (GRIN) provides support to NPGS and gives germplasm users continuous access to databases for the maintenance of passport, characterization, evaluation, inventory, and distribution data important for the effective management and use of national germplasm collections. GRIN is also administered by ARS.[9]

In 1990, Congress authorized the establishment of a National Genetic Resources Program (NGRP). NGRP has the responsibility to acquire, characterize, preserve, document, and distribute to scientists germplasm of all life forms important for food and agricultural production, which, in addition to plants, includes animals, microbes, and invertebrates. The National Genetic Resources Advisory Council (NGRAC) advises and makes recommendations to the Secretary and Director of the NGRP. The NGRAC responds to national issues pertaining to the conservation and utilization of genetic resources for food and agriculture.

International Treaty on Plant Genetic Resources for Food and Agriculture

The International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty on PGRFA) provides a general framework for conservation and sustainable use of plant genetic resources. The treaty's preamble acknowledges that the conservation, exploration, collection,

[6] For more information, see the National Plant Germplasm System website at http://www.ars-grin.gov/npgs/.

[7] Agricultural Research Service, *Seeds for Our Future: The U.S. National Plant Germplasm System*, United States Department of Agriculture, Program Aid 1470, Washington, DC, 1996, http://sun.ars-grin.gov/npgs/Seeds_for_Our_Future_Revised_1996.pdf.

[8] Ibid.

[9] For more information, the Germplasm Resources Information Network website is at http://www.ars-grin.gov/.

characterization, evaluation, and documentation of PGRFA are essential for sustainable agriculture development and to meet the global goals of ending hunger and poverty, as stated in the Rome Declaration on World Food Security and the World Food Summit Plan of Action.[10] The treaty sets up a multilateral system of access and benefit sharing, where all members, in exercise of their sovereignty, provide free (or nearly free) access to each other's plant genetic resources for research, breeding, conservation, and training. The multilateral approach allows members access to germplasm to promote food security and improve crop productivity, lowers transaction costs, and redistributes back to the governing body financial benefits derived from the commercial exploitation of the genetic resources.[11] The treaty is unlike other international laws governing global genetic resources, such as the Convention on Biological Diversity (CBD; see text box below), which extends private or sovereign control and limitations over genetic resources through bilateral interactions, and which many feel is inappropriate for food and agriculture. By establishing a multilateral approach that provides for a standardized protocol and framework applying to all contracting parties, the treaty deals with access and benefit-sharing of agricultural biodiversity in a different way than they are treated under the CBD.

History of the Treaty

The treaty originated from and eventually replaced the International Undertaking on Plant Genetic Resources (IU),[12] a voluntary non-legally binding agreement adopted by FAO in 1983.[13] The IU was the first international instrument that sought "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."[14] The IU reflected the widely held view of the time that plant genetic resources were a heritage of humanity that should be available to all for research and breeding.

While the IU attracted considerable support,[15] some countries did not find the concept of free availability of genetic resources under the IU compatible with the intellectual property protection afforded by plant breeders' rights.[16] Some tension existed concerning farmers' rights, in that intellectual property regimes that rewarded formal breeders often ignored the contributions of

[10] Announced at the World Food Summit in November 1996, the Rome Declaration resulted in heads of state reaffirming "the right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger" and pledging "political will and our common and national commitment to achieving food security for all and to an ongoing effort to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015." For the full declaration text, see http://www.fao.org/docrep/003/w3613e/w3613e00.HTM.

[11] Michael Halewood and Kent Nnadozie, "Giving Priority to the Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture," in *The Future Control of Food*, ed. Geoff Tansey and Tasmin Rajotte (Earthscan, 2008).

[12] See ftp://ftp.fao.org/ag/cgrfa/iu/iutextE.pdf.

[13] Resolution 8/83, ftp://ftp.fao.org/ag/cgrfa/Res/C8-83E.pdf. The IU was overseen by the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA), an intergovernmental body to which 168 countries belong. The CGRFA acted as the interim committee for the treaty, and prepared the first session of the treaty's governing body.

[14] International Undertaking, Article 1.

[15] There were 113 countries that adhered to the International Undertaking.

[16] Plant breeders' rights (PBR), also known as plant variety rights (PVR), are rights granted to breeders of new varieties of plants that give them exclusive control over the propagating material (including seed, cuttings, divisions, tissue culture) and harvested material (cut flowers, fruit, foliage) of a new variety for a number of years. With these rights, the breeder can choose to become the exclusive marketer of the variety, or to license the variety to others. In order to qualify for these exclusive plant breeders' rights, a variety must be new, distinct, uniform, and stable.

generations of farmers to the development and conservation of the PGRFA that breeders utilize. Many critics were also concerned that any system addressing PGRFA should reflect more fully the sovereign rights that countries have over those resources. These concerns were addressed in a series of agreed interpretations of the IU,[17] adopted in 1989, that sought to balance the rights of breeders and farmers. A further conference resolution in 1991 reiterated the sovereign rights of states over their plant genetic resources.[18]

Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture

The Convention on Biological Diversity (CBD) is a legally binding treaty that was launched at the United Nations Conference on Environment and Development at the Rio "Earth Summit" in 1992. The CBD, which came into full force in December 1993, recognized for the first time in international law that the conservation of biological diversity is "a common concern of humankind" and an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources (terrestrial and aquatic). It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of benefits arising from the use of genetic resources, notably those destined for commercial use. It also covers the rapidly expanding field of biotechnology through its Cartagena Protocol on Biosafety, addressing technology development and transfer, benefit-sharing, and biosafety issues. The CBD's three primary objectives include (1) conservation of biodiversity; (2) sustainable use of its components; and (3) equitable sharing of the benefits from the utilization of genetic resources. The CBD currently has 191 parties, of which 168 are signatories. President Clinton signed the CBD on behalf of the United States in 1993, but to date it has not received a ratification vote on the Senate floor.

Many believed that the CBD approach, while important for the conservation of biodiversity on earth, was not relevant to plant genetic resources for food and agriculture (PGRFA). The CBD also did not deal with farmers' rights or with pre-existing *ex situ* collections of plant genetic materials stored outside their native habitat (typically through the collection and storage of germplasm in a seedbank or genebank), such as those held by the Consultative Group for International Agriculture Research (CGIAR) Centers and other international organizations. The special nature of PGRFA and the need to seek a special solution for these resources, separate from other genetic resources, was recognized by Resolution 3 of the Nairobi Conference that adopted the CBD in May 1992, by the Conference of Parties to the CBD itself, and in the preamble of the treaty. The CBD creates a series of specific commitments related to genetic resources, specifically access and benefit-sharing, typically on a bilateral basis, and its objectives are basically environmentally oriented. The Treaty on PGRFA, by contrast, deals specifically with the conservation and sustainable use of plant genetic resources for food and agriculture on a multilateral basis, and its objectives are more related to food security and agricultural productivity. Under the treaty, PGRFA are exchanged through a standard materials transfer agreement (SMTA) and shared freely for research, breeding, conservation, and training purposes. The treaty essentially carves out a special case within the overall CBD framework and provides for a multilateral approach to PGRFA.

While negotiations proceeded towards the adoption of the CBD,[19] the parties in an appendix to the Nairobi Final Act of the CBD resolved that there were outstanding issues on the interrelationship between the CBD and the promotion of sustainable agriculture. In 1993, the FAO Conference requested FAO to launch a revision of the IU to take into consideration the outstanding issues of access on mutually agreed terms to PGRFA, including *ex situ* collections[20] and the realization of farmers' rights, in harmony with the CBD, and asked its intergovernmental Commission on Genetic Resources for Food and Agriculture to act as the forum to negotiate between countries.

[17] FAO Resolutions 4/89 and 5/89.

[18] Conference Resolution 3/91.

[19] The CBD was signed in May 1992 and entered into full force in December 1993.

[20] *Ex situ* collections are plant genetic material that is stored outside of its native habitat, typically through the collection and storage of germplasm in a seedbank or genebank.

After seven years of complex and difficult negotiations, FAO members concluded the International Treaty on Plant Genetic Resources for Food and Agriculture. The treaty established the legal basis for the exchange of PGRFA, at least for those covered in Annex 1 by the multilateral system of access and benefits. The treaty was adopted by consensus by the 31st session of the FAO Conference on November 3, 2001,[21] and would enter into force 90 days after the ratification, acceptance, approval, or accession of the 40th country, which occurred on June 29, 2004. The treaty currently has 120 contracting parties (see **Appendix** for list).

The United States signed the treaty on November 1, 2002,[22] and it was submitted by the Bush Administration to the Senate for advice and ratification on July 7, 2008. In her letter of submittal to President Bush, Secretary Rice stated that "[a]ll interested agencies in the Executive Branch favor ratification of the Treaty, which can be implemented under existing authorities." The Senate Foreign Relations Committee heard testimony in support of ratification of the treaty on November 10, 2009, but to date no further action has been taken.[23]

Summary of the Main Components of the Treaty

Treaty Objectives

The fundamental purpose of the treaty is to enable individuals and nations around the world to make use of plant genetic resources for food and agriculture in order to ensure global food security. The two primary objectives of the treaty, as stated in Article 1, include:

- conservation and sustainable use of plant genetic resources for food and agriculture; and
- fair and equitable sharing of benefits derived from their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.

Summary of Treaty Provisions

The main components of the treaty are:

- general provisions relating to the conservation and sustainable use of plant genetic resources for food and agriculture;
- farmers' rights,
- the Multilateral System of Access and Benefit Sharing (MLS);
- supporting components;
- financial provisions; and
- institutional provisions.

[21] The draft treaty was adopted with 116 votes in favor, zero against, and two abstentions by Japan and the United States.

[22] Treaty Document 110-19.

[23] For more information about the treaty ratification process, see CRS Report 98-384, *Senate Consideration of Treaties*, by Betsy Palmer.

Conservation and Sustainable Use of PGRFA

The general provisions on the conservation and sustainable use of PGRFA apply to all PGRFA, not just those listed in Annex 1 of the treaty. The general provisions set a modern framework for the conservation and sustainable use of PGRFA drawing upon the Global Plan of Action (GPA) for the Conservation and Sustainable Use of PGRFA.[24] Article 5 sets out the main tasks that contracting parties are to carry out with respect to conservation, evaluation, and documentation of PGRFA. Similar to other CBD provisions, the responsibilities are placed on each contracting party, acting individually or, where appropriate, in cooperation with other contracting parties, and call for the promotion of an integrated approach to the exploration, conservation, and sustainable use of PGRFA. Article 6 requires the contracting parties to develop and maintain appropriate policy and legal measures that promote the sustainable use of PGRFA. Articles 7 and 8 deal with national commitments, international cooperation, and technical assistance.

According to analysis provided by the State Department in treaty transmittal documents, the treaty likely could be implemented in the United States under existing policies, programs, and statutory authorities, primarily those under the jurisdiction of USDA. The State Department analysis suggests that the activities described in Articles 5 and 6 are consistent with current U.S. practice and could be implemented using existing USDA authorities to operate the National Plant Germplasm System (NGPS) and for ARS's research activities derived from 7 U.S.C. §§ 1621-27, 2201, 2204, 3291, and 5841. Activities described in Articles 7 and 8 are also consistent with U.S. practice. The U.S. currently participates in the FAO; USDA provision of technical assistance to further the sustainability of global agriculture is currently provided pursuant to 7 U.S.C. § 3291; and USAID has provided program support for International Agricultural Research Centers and international organizations such as FAO to strengthen national agricultural research systems in developing countries pursuant to authority derived from the Foreign Assistance Act of 1961, as amended, 22 U.S.C. § 2220b. Further, the U.S. Patent and Trademark Office sponsors the Global Intellectual Property Academy,[25] which holds seminars for sponsored participants from developing countries and includes conservation and sustainable use of genetic resources.

Farmers' Rights

Article 9 of the treaty deals with farmers' rights and recognizes the contributions of local and indigenous communities and farmers to the conservation and development of plant genetic resources as a basis for food and agriculture production. Article 9 places the responsibility for realizing the rights of farmers on national governments. The provisions of Article 9 are neutral with respect to the issue of the right of farmers to save, use, exchange, and sell farm-saved seed, an issue that was hotly contested during the negotiations. The wording in the treaty recognizes implicitly that farmers may have rights under national law and that these should in no way be limited by the provisions in Article 9. The measures that contracting parties should take under Article 9 include the protection and promotion of:

[24] The Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture was adopted by the International Technical Conference on Plant Genetic Resources in June 1996. The GPA is an important element for the intergovernmental Commission on Genetic Resources for Food and Agriculture, which was established by FAO in 1983, to carry out its mandate. The plan is periodically updated in order to allow the commission to recommend new priorities and to promote the rationalization and coordination of efforts. The GPA can be found at http://www.fao.org/ag/AGP/AGPS/Pgrfa/Pdf/GPAENG.PDF.

[25] For more information, see http://www.uspto.gov/ip/training/index.jsp.

- traditional knowledge relevant to PGRFA;
- rights of farmers to participate equitably in the sharing of benefits arising from the utilization of PGRFA; and
- the right to participate in making decisions at the national level with respect to the conservation and sustainable use of PGRFA.

The United States acknowledges the importance of such recognition and consultation pursuant to various national and state laws, regulations, and orders. USDA has long conveyed extensive nonmonetary benefits to farmers through land-grant universities and extension services authorized under 7 U.S.C. §§ 301 et seq., 322 et seq. and 341 et seq. USDA also provided services specifically to indigenous communities through 7 U.S.C. § 3241 and 20 U.S.C. § 1059d.

Multilateral System of Access and Benefit Sharing

A key focus of the treaty is the Multilateral System of Access and Benefit Sharing (MLS), which was established both to facilitate access to genetic resources of major food crops and forage species and to share, in a fair and equitable way, the benefits arising from the utilization of these resources, in accordance with multilaterally agreed terms and conditions.

Article 11 specifies the PGRFA covered by the MLS as those that are listed on Annex I, are under the management and control of the parties, and are in the public domain. The list in Annex I covers 35 crops and 29 forages, including many major crops important to the United States for either domestic use or export. Many countries wanted a broad and comprehensive list of crops to be included in the MLS. Others wanted the MLS to start off with a more limited list of the most important crops. In theory, the negotiators agreed on a list of crops chosen according to their importance for food security and their interdependence. In practice, the list set out in Annex I was negotiated in part on the basis of the perceived interests of individual negotiating parties, with some crops important to food security being excluded, such as soybeans and groundnuts (peanuts).[26] Nevertheless, the list does include most of the major food crops, including cereals such as rice, wheat, maize, sorghum, and millets; grain legumes such as beans, peas, lentils, chickpeas, and cowpeas; roots and tubers such as potatoes, sweet potatoes, cassava, and yams; oil crops such as coconut, sunflower, and plants in the mustard family such as cabbage and broccoli; and fruits such as citrus, apple, and banana/plantain. Noticeable absences that would appear to fit the food security and interdependence criteria include soybeans, groundnuts (peanuts), sugar cane, wild relatives of cassava including the genus *Manihot*, several fruits, and tomato.[27] The MLS also includes PGRFA held in the *ex situ* collections of the Consultative Group on International Research (CGIAR) Centers as well as those held in other international institutions, by agreement with the governing body as referenced in Article 15.

The contracting parties are required to take appropriate measures to encourage natural and legal persons in their jurisdictions to include their holdings of Annex I PGRFA in the MLS. The

[26] Each country in the negotiations had the opportunity to exclude any crop from the list. In some cases, had countries agreed to include particular crops, this might have sparked reciprocal concessions from other countries on other crops.

[27] Gerald Moore and Witold Tymowski, *Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture*, The World Conservation Union (IUCN), IUCN Environmental Policy and Law Paper No. 57, Cambridge, UK, 2005, http://www.nature-worldwide.info/downloads/iucn/guide-treaty-plant-genetic-resources.pdf.

United States currently encourages private entities to deposit germplasm in the National Plant Germplasm System pursuant to authority derived from 7 U.S.C § 5841.

Article 12 creates the core obligation of the treaty, where parties are required to facilitate access to covered PGRFA. Parties are only obliged to provide access to PGRFA under the MLS when the PGRFA will be used solely for the purpose of research, breeding, and training for food and agriculture (not chemical, pharmaceutical, or other non-food or -feed industrial uses). Parties are to provide PGRFA expeditiously and for free or at a minimal charge, and also are to include available passport data for the PGRFA. Article 12 also notes that recipients shall not claim any intellectual property or other rights that limit access to PGRFA or their genetic parts or components, in the form received from the MLS. Recipients are required to continue to make accessed PGRFA available to the MLS under the terms of the treaty. This article also provides for a standard material transfer agreement (SMTA) between germplasm donors and recipients, which is to accompany any transfer of PGRFA under the MLS. The governing body adopted the text of the SMTA in June 2006.

The State Department analysis asserts that the obligations in Article 12 could be implemented in the United States using existing authorities, particularly through ARS, which maintains the National Plant Germplasm System, a network of more than 20 federal gene banks that operate under authority derived from 7 U.S.C. §§ 2201, 2204, 3125a, 3291, 5841, and 5924. Under these authorities, the USDA Secretary is authorized to provide, free of charge, samples of germplasm from the federal genebanks to any requestor, so long as such provision is not inconsistent with other laws or regulations. Also, the State Department analysis suggests that in the United States, any recourse required from contractual disputes arising from the SMTA would be available via existing authorities that allow for recognition and enforcement of arbitral judgments in the Federal Arbitration Act, 9 U.S.C. § 201 et seq.

Article 13 describes the types of benefit-sharing that may result from the provision of access to PGRFA. It recognizes that the provision of PGRFA itself is a major benefit to the world community. Other benefit-sharing takes the form of exchange of information, access to and transfer of technology, capacity-building, and financial benefit-sharing arising from the commercialization of PGRFA. Under the monetary benefit-sharing provision found in Article 13.2d(ii) and the SMTA adopted in June 2006, a recipient of PGRFA who commercializes a product incorporation material accessed from the MLS is to pay 1.1% of gross sales. Recipients who make such a product available without restriction to others for further research and breeding are encouraged but not required to make such a payment. The parties agree in this article that the benefits go back to the governing body and not to any individual country or entity, and that benefits should flow primarily to farmers in all countries who conserve and sustainably use PGRFA.

Again, the State Department suggests that Article 13 could be implemented using existing USDA authorities derived from 7 U.S.C. § 5841 to operate the National Plant Germplasm System. USDA currently provides technical assistance to further the sustainability of global agriculture pursuant to 7 U.S.C. §3291. USAID provides technical assistance for agriculture development in rural areas pursuant to the Foreign Assistance Act of 1961, as amended via 22 U.S.C. § 2151a.

Supporting Components

Part V of the treaty deals with supporting components, which are activities that lie outside the institutional structure of the treaty itself but provide essential support for proper implementation

of the treaty and its objectives. These include promoting the effective implementation of the Global Plan of Action, encouragement of international plant genetic resources networks, and development and strengthening of a global information system on PGRFA, including a periodic assessment of the state of the world's PGRFA.

Financial Provisions

Part VI of the treaty addresses financial resources. Article 18 states that parties are to implement a funding strategy that will assist in the implementation of the treaty's activities. The objectives of the strategy are to enhance the availability, transparency, efficiency, and effectiveness of the provision of financial resources for the treaty. Financial benefits from the commercialization of PGRFA under the MLS are included in the strategy, as well as finances made available through other mechanisms, funds, and bodies. These provisions state that the governing body may establish targets for funding and that the primary use of the resources are for the implementation of plans and programs under the treaty (e.g., providing resources to strengthen technical capacity and infrastructure to assist developing countries in treaty implementation). Voluntary contributions may be provided by parties and other sources, but the treaty does envisage mandatory payments over time by contracting parties.

Institutional Provisions

The treaty establishes a governing body composed of representatives from all contracting parties. The governing body acts as the supreme body for the treaty and provides policy direction and guidance for the implementation of the treaty and the MLS. All decisions of the governing body are taken by consensus, or, if it agrees to do so by consensus, the governing body can use another method of decision making for all matters other than amendments to the treaty and its annexes. The treaty also provides for the appointment of a Secretary of the Governing Body, who is appointed by the Director General of the FAO and is required to have the approval of the governing body.

Amendments to the treaty may be proposed by any contracting party and must be adopted by consensus of the parties present at the session of the governing body. Amendments come into force 90 days after two-thirds of the contracting parties ratify, accept, or approve them and apply only to those parties that have ratified, accepted, or approved them. The treaty provides for a dispute settlement mechanism and contains provisions for third-party mediation when negotiations fail. No reservations may be made to the treaty.

Table 3. Summary of the Main Components of the International Treaty on Plant Genetic Resources for Food and Agriculture

Part	Article	Main provisions
I Introduction	1	**Objectives**: Establishes that the objectives are the conservation and sustainable use of PGRFA and fair and equitable sharing of benefits arising from their use, in harmony with the CBD, for sustainable agriculture and food security.
	2	**Use of Terms**: Defines some key terms including "plant genetic resources for food and agriculture" (PGRFA) and "genetic material." PGRFA means any genetic material of plant origin of actual or potential value for food and agriculture; genetic material means any material of plant origin, including reproductive and vegetative propagating material, containing functional heredity.

Part	Article	Main provisions
	3	**Scope**: Establishes the scope of the treaty to apply to all PGRFA, not just those listed in Annex I to the treaty.
II General Provisions on Conservation and Sustainable Utilization of PGRFA	**4**	**General Obligations**: Requires parties to make sure their laws conform to their treaty obligations.
	5	**Conservation, Exploration, Collection, Characterization, Evaluation, and Documentation of PGRFA**: Lists the main tasks for contracting parties regarding PGRFA and calls for the promotion of an integrated approach to the exploration, conservation, and sustainable use of PGRFA.
	6	**Sustainable Use of Plant Genetic Resources**: Requires contracting parties to develop and maintain appropriate policy and legal measures that promote the sustainable use of PGRFA and gives a non-exhaustive list of the types of measures that may be included.
	7	**National Commitments and International Cooperation**: Requires contracting parties, where appropriate, to cooperate with other contracting parties and other relevant international organizations in the conservation and sustainable use of PGRFA.
	8	**Technical Assistance**: Promotes technical assistance to contracting parties, especially those that are developing countries.
III Farmers' Rights	**9**	**Farmers' Rights**: Recognizes farmers' rights, and the contribution made by farmers and local and indigenous communities to the conservation and development of plant genetic resources, and places the responsibility for realizing those rights on national governments. Elements include the protection and promotion of (1) traditional knowledge relevant to PGRFA; (2) rights of farmers to participate equitably in the sharing of benefits arising from the utilization of PGRFA; and (3) the right to participate in making decisions at the national level with respect to the conservation and sustainable use of PGRFA. The provision specifically states that "[n]othing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate."
IV Multilateral System of Access and Benefit Sharing	**10**	**Multilateral System of Access and Benefit Sharing (MLS)**: Recognizes the sovereign rights of nations over their own PGRFA, including that the authority to determine access to those resources rests with national governments. Further recognizes that the contracting parties agree to establish the MLS to facilitate access to PGRFA and to share, in a fair and equitable way, the benefits arising from the utilization of these resources.
	11	**Coverage of the Multilateral Systems**: Deals with the coverage of the MLS, specifying that the MLS covers a list of crops set out in Annex I of the treaty and is based on the criteria of their importance for food security and interdependence.
	12	**Facilitated Access to PGRFA within the Multilateral System**: Contracting parties agree to take the necessary legal or other appropriate measures to provide facilitated access through the MLS to other contracting parties and to legal and natural persons under their jurisdiction. Recipients of material through the MLS must not claim intellectual property or other rights that limit facilitated access to PGRFA or their genetic components. Facilitated access is to be accorded through the standard material transfer agreement (SMTA) adopted by the governing body of the treaty.
	13	**Benefit-Sharing in the Multilateral System**: Sets out the agreed terms for benefit-sharing within the MLS, recognizing that facilitated access to PGRFA itself constitutes a major benefit of the MLS. Other mechanisms for benefit-sharing include the exchange of information, access to and transfer of technology, capacity-building, and the sharing of benefits arising from commercialization.

Part	Article	Main provisions
V Supporting Components	**14**	**Global Plan of Action:**[a] Promotes the effective implementation of the Global Plan of Action and includes the encouragement of international plant genetic resources networks, and the development and strengthening of a global information system on PGRFA, including a periodic assessment of the state of the world's PGRFA.
	15	***Ex situ* Collections of PGRFA held by CGIAR Centers and others**: Deals with plant germplasm collections held by the CGIAR Centers and other international institutions in genebanks. The treaty calls on the CGIAR Centers to sign agreements with the governing bodies to bring their collections under the treaty, where CGIAR Center PGRFA listed in Annex I would be made available as part of the MLS. Non-Annex I materials would be made available according to a material transfer agreement adopted by the governing body previously.
	16	**International Plant Genetic Resource Networks**: Deals with cooperation with international plant genetic resource networks.
	17	**Global Information Systems on PGRFA**: Parties agree to establish a global information system to facilitate exchange of globally harmonized information, which is critical for the operation of the MLS and safeguarding of PGRFA.
VI Financial Provisions	**18**	**Financial Resources**: Parties agree to implement a funding strategy to assist in the implementation of the treaty's activities. The strategy aims to enhance the availability, transparency, efficiency, and effectiveness of the provision of financial resources for the treaty. It will include the financial benefits from the commercialization of plant genetic resources under the MLS, and also funds made available through other international mechanisms.
VII Institutional Provisions	**19**	**Governing Body**: Establishes a governing body composed of all contracting parties. The governing body is the supreme entity for the treaty and provides policy direction and guidance for the implementation for the treaty, especially the MLS. All decisions are taken by consensus, unless, by consensus, another method of decision making is agreed to for all matters other than amendments and annexes. The governing body is expected to maintain regular communication with other international organizations, especially the CBD, to reinforce institutional cooperation over genetic resources issues.
	20	**Secretary**: Provides for a Secretary of the Governing Body that shall be appointed by the Director-General of FAO with the approval of the governing body.
	21	**Compliance**: Deals with requiring at its first meeting consideration of cooperative and effective procedures and operational mechanisms to promote compliance with the provisions of the treaty and to address the issues of non-compliance.
	22	**Settlement of Disputes**: Provides a mechanism for dispute settlement and contains provisions for third-party mediation when negotiations fail.
	23	**Amendments to the Treaty:** May be proposed by any contracting party, shall be adopted by consensus of the parties present at the session of the governing body, and come into force 90 days after two-thirds of the contracting parties ratify, accept, or approve.
	24	**Annexes:** Includes Annex I, which lists the crops covered under the MLS; and Annex II, which deals with arbitration and conciliation.
	25-35	**Final Clauses:** Standard final clauses regarding signature, ratification, accession, entry into force (40 parties required), participation of member organizations of FAO (such as the European Community), withdrawal (with written notice, withdrawal shall take effect one year from the date of receipt of notification), termination, depository, and authentic texts. No reservations may be made to this treaty.

Source: CRS analysis, modified from Michael Halewood and Kent Nnadozie, "Giving Priority to the Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture," in *The Future Control of Food*, ed. Geoff Tansey and Tasmin Rajotte (Earthscan, 2008).

a. The Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture was adopted by the International Technical Conference on Plant Genetic Resources in June 1996. The GPA is an important element for the Intergovernmental Commission on Genetic Resources for Food and Agriculture, which was established by FAO in 1983, to carry out its mandate. The plan is periodically updated in order to allow for the commission to recommend new priorities and to promote the rationalization and coordination of efforts. The GPA can be found at http://www.fao.org/ag/AGP/AGPS/Pgrfa/Pdf/GPAENG.PDF.

Issues for Congress

Status of Treaty Implementation

Currently 120 countries are parties to the treaty (see **Appendix**). The United States signed the treaty on November 1, 2002 (Treaty Doc, 110-19), but no further action was taken on it until it was submitted to the Senate for advice and ratification by the Bush Administration on July 7, 2008. The Senate Foreign Relations Committee held a treaty hearing on November 10, 2009, which included testimony in support of ratification of the plant treaty, but no further action has been taken.[28]

Senior advisors from USDA have participated in the negotiations and subsequently in the governing body sessions, but they have served in observer roles only. Many experts in the field expect that the United States will become a party to the treaty and that the Obama Administration will take a fresh look at it. Several proponents of the treaty assert that the United States might provide needed leadership and resources in the areas of agricultural biodiversity conservation and use, international agricultural research and development, and global food security. Some believe that the United States' presence could help to foster more trust and goodwill between contracting parties, which has taken many years to develop, particularly among developing countries.

Others have suggested that some countries (such as Japan and China) may be more inclined to sign on to the treaty if the United States officially ratifies. In addition, the United States might also be able to provide leadership to resolve some outstanding tensions regarding more comprehensive inclusion of Annex 1 crops covered by the MLS.[29]

Critics claim that there is also a need for more resources and capacity strengthening to assist with treaty implementation and the realization of benefits, which have experienced slow progress since the treaty entered into force, especially for developing countries. Despite having signed on, many developing countries often lack the technical expertise, necessary infrastructure, or required resources to carry out effective implementation of the treaty.

One of the most widely cited accomplishments of the treaty to date is the inclusion of the CGIAR *ex situ* collection of agricultural biodiversity under the multilateral system (see text box below).

[28] Transcripts of the hearing testimony are available at the Senate Foreign Relations Committee website at http://foreign.senate.gov/hearings/hearing/20091110/.

[29] Currently soybeans, groundnuts, tomatoes, citrus, Manihot, and some other important food crops are not listed in Annex 1 owing to ongoing disputes between China, countries in Latin America, and others.

The crops listed in Annex 1 to the treaty that are covered by the MLS together contribute to about 80% of the world's total energy food supply. Collectively the CGIAR Centers hold about 600,000 accessions,[30] which account for an estimated 30%-60% of the world's crop diversity.[31]

The CGIAR Centers Under the Treaty

The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of country members, international and regional organizations, and 15 international agricultural research centers that mobilizes science to benefit the poor. The CGIAR was established in 1971 with support from the Ford and Rockefeller Foundations, the World Bank, FAO, and UNDP in response to the threat of widespread global famine. The CGIAR produces new crop varieties, knowledge, and other products that are made widely available to individuals and organizations working for sustainable agricultural development and global food security and nutrition throughout the world. For more information see http://www.cgiar.org.

Collectively the CGIAR Centers represent the largest concerted effort toward collecting, conserving, and utilizing global agricultural resources to promote global crop improvement and food security. Between them, the CGIAR Centers hold about 600,000 accessions, which account for an estimated 30%-60% of the world's crop diversity. The remaining germplasm are stored in other international, regional, and national gene banks, many of which collaborate closely with the CGIAR Centers. The materials in the CGIAR gene banks include traditional varieties and landraces, non-domesticated species, advanced cultivars, breeding lines, and genetic stocks. These collections are considered valuable to the global community for two main reasons. First, unlike most national and private collections, they are made up largely of farmers' landraces and local varieties, material that is particularly rich in diversity. Second, they are held in trust for the international community. Materials and information about them are available, under specific terms, to anyone who inquires. The CGIAR Centers have agreed not to claim legal ownership or to seek intellectual property rights over the material in their collections. They also agreed to maintain the collections to international standards and to provide samples of in-trust materials and information about the material. The material transfer agreement that accompanies each request for samples binds the recipient to the same terms. From 1980 to 2004, the centers distributed approximately 2.2 million samples and acquired approximately 370,000 accessions.

Article 15 of the treaty called on the centers to bring their collections under the purview of the treaty. Material held by the centers of crops included in Annex I of the treaty will be made available in accordance with the MLS. Material collected before June 24, 2004 (the date the treaty came into force), that is not listed in Annex I will be made available under the MTA currently used by the centers under the in-trust agreements with FAO. Material not included in Annex I received by the centers after June 29, 2004, will be made available on terms agreed between the center and the country where the material originated. The treaty also provides for contracting parties to give facilitated access to PGRFA of the crops in Annex I of the treaty to the CGIAR Centers that have signed the agreements with the governing body.

The CGIAR Centers have helped to rationalize the *ex situ* conservation of crop diversity around the world. The crop diversity collections managed and studied by the centers are considered by many to be the most important and best documented in the world. Throughout the seven years of treaty negotiation, the centers worked to ensure that the collections they hold in trust would be available to all users for research, breeding, and educational purposes. Both practically and legally, these now form the centerpiece of the multilateral system established by the treaty.

If the United States becomes a party to the treaty, some believe that other countries will expect the United States to contribute greater capacity-building resources for the conservation and use of agricultural biodiversity globally, and for the implementation of the MLS provisions by developing countries. Even though contributions are technically made on a "voluntary" basis, FAO does have an Indicative Scale of Contributions that provides a recommendation for how

[30] Distinct varieties of plants.

[31] Based on the FAO estimate that there are approximately 1 million to 2 million unique accessions globally. David Hoisington, Mireille Khairallah, and Timothy Reeves, et al., "Plant Genetic Resources: What Can They Contribute Toward Increased Crop Productivity?," *Proceedings of the National Academy of Sciences*, vol. 96 (May 1999), pp. 5937-5943.

much countries should contribute. There are a number of expectations and potential global commitments for the United States, but Congress may opt to consider the importance and implications of this treaty relative to other pending international issues and agreements—for example, the Convention on Biological Diversity.

The Convention on Biological Diversity

Article 1 of the treaty states explicitly that the objectives should be carried out "in harmony with the Convention on Biological Diversity." As discussed in the "History of the Treaty" section, the treaty was adapted from the International Understanding (IU) to meet identified gaps in the CBD process related to agricultural biodiversity. The CBD is the only comprehensive international agreement dedicated to the conservation and sustainable use of biodiversity. Only four nations are not parties to the CBD: Andorra, Iraq, Somalia, and the United States.

After extensive involvement by the United States in the six-year drafting and negotiation phases, President George H. W. Bush declined to sign the treaty when it opened for signatures at the 1992 Rio Earth Summit. In June 1993, President Clinton signed the CBD on behalf of the United States and transmitted the CBD to the Senate for advice and consent along with "seven understandings" to accompany the ratification instrument. He noted that existing federal, state, and local laws and programs were "sufficient to enable any activities necessary to effectively implement our responsibilities under the Convention" and that the "Administration does not intend to disrupt the existing balance of Federal and State authorities through the Convention." The Senate Foreign Relations Committee supported CBD ratification by a 16-3 bipartisan vote, subject to the seven understandings. However, the CBD never received a ratification vote on the Senate floor. The Senate has not revisited CBD ratification for 15 years.

Several environmental groups advocate for the U.S. ratification of the CBD because of their support for biological conservation and protection globally.[32] At the same time, other groups are opposed to ratification of the CBD because of the perceived potential restrictions imposed by the CBD on intellectual property rights and the position of the Cartagena Protocol on Biosafety[33] regarding biotechnology. The Cartagena Protocol, which is an international agreement on biosafety and a supplement to the CBD, claims to protect biological diversity from the potential and perceived risks posed by genetically modified organisms (GMOs). The Cartagena Protocol allows countries to invoke the "precautionary principle"[34] when considering the benefits and risks of new technologies such as biotechnology. For example, it allows countries to ban imports of genetically modified crops if they contend that there is not enough scientific evidence that the product is safe. They can also require exporters to label shipments containing genetically altered commodities such as corn or cotton. The United States has been a strong proponent of the use of biotechnology for agriculture and has argued in international trade venues against the blocking of U.S. commodities by the European Community and others because they contain GMOs.

[32] E.g., Defenders of Wildlife, Center for Biological Diversity, and Society for Conservation Biology; see http://www.defenders.org/resources/publications/programs_and_policy/international_conservation/the_u.s._and_the_convention_on_biological_diversity.pdf?ht=.

[33] Full text of the Cartagena Protocol can be found at http://www.cbd.int/doc/legal/cartagena-protocol-en.pdf.

[34] The precautionary principle, as generally defined, states that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action. The United States has opposed using it as a binding legal principle.

Congress could assess whether ratification of the Treaty for PGRFA would have any bearing on the United States' position on the CBD. While signing on to one does not require the United States to be a party to the other (e.g., becoming a party to the plant treaty without being a signatory on the CBD does not offer up any known policy contradictions), some maintain that consideration of the context and relationship of both treaties is a prudent approach.

Intellectual Property Rights

The State Department analysis suggests that the United States provide clarifying language to the governing body regarding some interpretations of the MLS provisions, especially those in Article 12 that describe the terms under which recipients accept the PGRFA. According to Article 12, recipients shall not claim any intellectual property or other rights that limit access to PGRFA or their genetic parts or components, in the form received from the MLS. The State Department analysis suggests notifying the governing body of the following upon deposit of its instrument of ratification: "The United States understands that Article 12.3d shall not be construed in a manner that diminishes the availability or exercise of intellectual property rights under national laws." Commercialization of plant genetic materials is allowable under the treaty, but parties must either provide free access to the material to all contracting parties or return 1.1% of gross sales of the commercialized material back to the governing body's "benefit-sharing" fund.

Funding Strategy

The treaty requires contracting parties to develop and implement a funding strategy for carrying out the treaty plans, programs, and activities, in particular to assist developing countries in implementing their commitments under the MLS and to build capacity to use and conserve plant genetic resources for food and agriculture. The current goal set by the governing body is to raise $116 million over the next five years. The governing body envisions that funding will come from voluntary contributions by developed country contracting parties, international funds, bodies and organizations such as the Global Crop Diversity Trust (see text box below), multilateral institutions such as the Global Environment Facility and the World Bank, and private organizations. Mandatory and voluntary contributions resulting from the commercialization of crop diversity from the treaty's MLS will also provide funds, for example, 1.1% of gross sales from the commercialized product. In the 2008 farm bill (P.L. 110-246), Congress authorized USAID to contribute $60 million to the Global Crop Diversity Trust from FY2008 to FY2012 to assist in the conservation of genetic diversity in food crops. To date, the United States has contributed $14.5 million to the trust, $2.5 million for operational support and $12.5 million for the trust's endowment. For FY2010, USAID has earmarked $10 million for the trust. A key question that arises is whether there will be increasing pressure for the United States to commit additional funds to the governing body, and if so, how much is appropriate for these causes.

What is less clear is how the funds are to be distributed and used. The benefit-sharing provisions give priority to the sharing of resources and benefits with farmers, especially in developing countries, but the details of how this objective would be implemented is not fully articulated. The governing body established a "Benefit-Sharing Fund," which initially distributed $500,000 to 11 projects in its first biennial cycle (2008-2009). These projects addressed one or more of the following priorities: (1) information exchange, technology transfer and capacity building; (2) managing and conserving plant genetic resources on-farm; and (3) the sustainable use of plant genetic resources. More detail may be sought about the longer term, and about a broader strategy for scaling up the use of treaty funds to support a coordinated, sustainable, and efficient set of

programs and activities that promote the conservation and use of PGRFA, especially by farmers in developing countries. More information may also be relevant on how the governing body will (or will not) coordinate with existing international partners, such as the CGIAR Centers and the Global Crop Diversity Trust, in carrying out the benefit-sharing objectives.

The Global Crop Diversity Trust

The Global Crop Diversity Trust is an independent international organization whose mission is to ensure the conservation and availability of crop diversity for food security worldwide. The trust was established in 2004 through a partnership between the United Nations Food and Agriculture Organization (FAO) and the Consultative Group on International Agricultural Research (CGIAR). For more information, see http://www.croptrust.org.

In 2006, the trust entered into a relationship agreement with the governing body of the Treaty on PGRFA. The agreement recognizes the trust as an "essential element" of the treaty's funding strategy in regard to the *ex situ* conservation and availability of plant genetic resources for food and agriculture. The trust leads an international effort to build a more effective, efficient, and sustainable conservation system for crop diversity by setting regional and crop-specific strategies, identifying key funding priorities, and providing core funding and technical assistance to support the implementation of the treaty, especially by developing countries. The trust has established an endowment, the income from which will be used to support the conservation of distinct and important crop diversity through existing institutions. To date, the trust has secured over $135 million from a wide array of donors, including $14.5 million from the United States, with another $10 million earmarked from USAID for FY2010. The trust's ultimate goal is to raise $260 million. The 2008 farm bill (P.L. 110-246) authorizes USAID to contribute $60 million to the trust's endowment over FY2008-FY2012, subject to appropriations of funds, and provided that the U.S. contribution does not exceed 25 percent of total contributions from all sources. Other major donors include Australia, Canada, Germany, Ireland, Norway, Sweden, Switzerland, United Kingdom, the Grains Research and Development Corporation (Australia), and several private corporations and foundations. A number of developing countries have also provided support, including Ethiopia and India.

The trust is also involved with the government of Norway and the Nordic Gene Bank in the establishment of the Svalbard Global Seed Vault. This facility will provide a safety back-up for existing genebank collections, which are vulnerable to war, civil strife, natural disasters, and even equipment failure and mismanagement. The vault has also been touted as providing a means for restoring agriculture in the event of a global catastrophe of some sort. It is designed to hold 3 million samples of different varieties of agricultural crops (in the form of seed).

Links to U.S. International Agriculture Research and Development Initiatives

The treaty and its objectives have been promoted extensively by international agricultural researchers and development practitioners as a critical factor for ensuring global food security. Yet several of the global food security initiatives proposed by the Administration[35] and Congress do not directly make the link between agricultural biodiversity conservation and use, and agricultural research, development, and economic growth. What, if any, are the links between these initiatives and the objectives and activities carried out by this treaty? Is there a reason to make the connection between these initiatives?

The Global Food Security Act of 2009 (S. 384 in the Senate and H.R. 3077 in the House) authorizes increased investment in agricultural productivity, infrastructure, science and technology, research, education, and extension for hunger and poverty alleviation. The bill emphasizes the importance of agricultural research in developing countries as the primary means

[35] For more about the Administration's Global Food Security Initiative, see CRS Report R40945, *The U.S. Global Food Security Initiative: Issues for Congress*, by Charles E. Hanrahan and Melissa D. Ho.

to increasing the productivity of smallholder farmers and seeks to strengthen the use of science and technology for agriculture in countries suffering from chronic food insecurity and poverty. At the same time, no mention is made about how any of these proposed programs might relate to the conservation and use of PGRFA, and the need for technical capacity-building in the development of PGRFA for crop improvement purposes, especially in developing countries.

Appendix. Parties to the International Treaty on Plant Genetic Resources for Food and Agriculture

As of February 24, 2010: 120

The following instruments have been deposited on the dates indicated.[36]

Participant	Signature	Ratification	Acceptance	Approval	Accession
Afghanistan					9/11/2006
Algeria					13/12/2002
Angola	10/10/2002	14/3/2006			
Argentina	10/6/2002				
Armenia					20/3/2007
Australia	10/6/2002	12/12/2005			
Austria	6/6/2002	4/11/2005			
Bangladesh	17/10/2002	14/11/2003			
Belgium	6/6/2002	2/10/2007			
Benin					24/2/2006
Bhutan	10/6/2002	3/9/2003			
Brazil	10/6/2002	22/5/2006			
Bulgaria					29/12/2004
Burkina Faso	9/11/2001	5/12/2006			
Burundi	10/6/2002	28/4/2006			
Cambodia	11/6/2002		11/6/2002		
Cameroon	3/9/2002	19/12/2005			
Canada	10/6/2002	10/6/2002			
Cape Verde	16/10/2002				
Central African Republic	9/11/2001	4/8/2003			
Chad	11/6/2002		14/3/2006		
Chile	4/11/2002				
Colombia	30/10/2002				
Congo, Republic of					14/9/2004
Cook Islands					2/12/2004
Costa Rica	10/6/2002	14/11/2006			

[36] Dates are given in the format day/month/year.

Participant	Signature	Ratification	Acceptance	Approval	Accession
Côte d'Ivoire	9/11/2001	25/6/2003			
Croatia					6/8/2009
Cuba	11/10/2002	16/9/2004			
Cyprus	12/6/2002	15/9/2003			
Czech Republic					31/3/2004
Democratic People's Republic of Korea					16/07/2003
Democratic Republic of the Congo					5/6/2003
Denmark	6/6/2002	31/3/2004			
Djibouti					8/5/2006
Dominican Republic	11/6/2002				
Ecuador					7/5/2004
Egypt	29/8/2002	31/3/2004			
El Salvador	10/6/2002	9/7/2003			
Eritrea	10/6/2002	10/6/2002			
Estonia					31/3/2004
Ethiopia	12/6/2002	18/6/2003			
European Community	6/6/2002			31/3/2004	
Fiji					9/7/2008
Finland	6/6/2002	31/3/2004			
France	6/6/2002			11/7/2005	
Gabon	10/6/2002	13/11/2006			
Ghana	28/10/2002	28/10/2002			
Germany	6/6/2002	31/3/2004			
Greece	6/6/2002	31/3/2004			
Guatemala	13/6/2002	1/2/2006			
Guinea	11/6/2002			11/6/2002	
Guinea-Bissau					1/2/2006
Haiti	9/11/2001				
Honduras					14/1/2004
Hungary					4/3/2004
Iceland					7/8/2007
India	10/6/2002	10/6/2002			
Indonesia					10/3/2006
Iran, Islamic Republic of	4/11/2002	28/4/2006			
Ireland	6/6/2002	31/3/2004			

Participant	Signature	Ratification	Acceptance	Approval	Accession
Italy	6/6/2002	18/5/2004			
Jamaica					14/3/2006
Jordan	9/11/2001	30/5/2002			
Kenya					27/5/2003
Kyrgyzstan					30/8/2009
Kiribati					13/12/2005
Kuwait					2/9/2003
Lao People's Democratic Republic					14/3/2006
Latvia					27/5/2004
Lebanon	4/11/2002	6/5/2004			
Lesotho					21/11/2005
Liberia					25/11/2005
Libyan Arab Jamahiriya					12/4/2005
Lithuania					21/6/2005
Luxembourg	6/6/2002	31/3/2004			
Madagascar	30/10/2002	13/3/2006			
Malawi	10/6/2002	4/7/2002			
Malaysia					5/5/2003
Maldives					2/3/2006
Mali	9/11/2001	5/5/2005			
Malta	10/6/2002				
Marshall Islands	13/6/2002				
Mauritania					11/2/2003
Mauritius					27/3/2003
Morocco	27/3/2002	14/7/2006			
Myanmar					4/12/2002
Namibia	9/11/2001	7/10/2004			
Netherlands	6/6/2002		18/11/2005		
Nicaragua					22/11/2002
Niger	11/6/2002	27/10/2004			
Nigeria	10/6/2002				
Norway	12/6/2002	3/8/2004			
Oman					14/7/2004
Pakistan					2/9/2003
Palau					5/8/2008
Panama					13/3/2006

Participant	Signature	Ratification	Acceptance	Approval	Accession
Paraguay	24/10/2002		3/1/2003		
Peru	8/10/2002	5/6/2003			
Philippines					28/9/2006
Poland					7/2/2005
Portugal	6/6/2002			7/11/2005	
Qatar					1/7/2008
Republic of Korea					20/1/2009
Republic of Serbia1	1/10/2002				
Romania					31/5/2005
Saint Lucia					16/7/2003
Samoa					9/3/2006
Sao Tome and Principe					7/4/2006
Saudi Arabia					17/10/2005
Senegal	9/11/2001	25/10/2006			
Seychelles					30/05/2006
Sierra Leone					20/11/2002
Slovenia					11/1/2006
Spain	6/6/2002	31/3/2004			
Sudan	10/6/2002	10/6/2002			
Swaziland	10/6/2002				
Sweden	6/6/2002	31/3/2004			
Switzerland	28/10/2002	22/11/2004			
Syrian Arab Republic	13/6/2002	26/8/2003			
Thailand	4/11/2002				
The Former Yugoslav Republic of Macedonia	10/6/2002				
Togo	4/11/2002	23 October 2007			
Trinidad and Tobago					27/10/2004
Tunisia	10/6/2002	8/6/2004			
Turkey	4/11/2002	7/6/2007			
Uganda					25/3/2003
United Arab Emirates					16/2/2004
United Kingdom	6/6/2002	31/3/2004			
United Republic of Tanzania					30/4/2004
United States of America	1/11/2002				
Uruguay	10/6/2002	1/3/2006			

Participant	Signature	Ratification	Acceptance	Approval	Accession
Venezuela	11/2/2002	17/5/2005			
Yemen					1/3/2006
Zambia	4/11/2002	13/3/2006			
Zimbabwe	30/10/2002	5/7/2005			

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