

Who benefits

GIVEN THE VITAL ROLE of plant genetic resources in food security, all of humanity will benefit from the use of plant genetic resources that the Treaty makes possible. A number of actors in society will gain particular benefits from the Treaty, both directly and indirectly.

Farmers

Farmers are the primary custodians and developers of genetic diversity for food and agriculture. The Treaty recognizes this through its provisions on Farmers' Rights (Art. 9), which recognize the rights of farmers to benefit from the resources they develop, to protect associated traditional knowledge, and to participate in relevant decision-making regarding these resources. In addition, through the Treaty farmers can get access to desirable traits from outside their immediate location, to enhance the productivity and resilience of their production systems. In India and Nepal, for example, farmers have worked with formal breeders to evaluate crosses between drought-resistant selections and local varieties that taste good and command high prices at market. The farmers identified several crosses that out-performed their local varieties while retaining the preferred flavour. Productivity and incomes increased.

Farmers will also benefit from the new crop varieties produced by dedicated plant breeders. Improved varieties can give the farmer a range of benefits that may go beyond the particular crop itself. For example, drought-resistant varieties can both contribute to food security and result in scarce water resources being more available for other crops that need them.

Breeders

All plant breeding is based on bringing together favourable combinations of traits that meet the needs of farmers. Breeders in the public and private sectors alike usually maintain a small working collection of plant genetic resources to meet their short-term requirements. New and unforeseen challenges, however, often require breeders to look further afield. Under the Treaty, a range of the genetic resources most important for food security will be available under agreed standard terms for breeding and research. In addition, the Treaty provides for the development and strengthening of a Global Information System that will make it easier for breeders to access and use such resources.

Processors

Farmers are generally the target market for breeders' efforts, but food processors also benefit from the provisions of the Treaty. Improved varieties may, for example, possess qualities that result in less energy being required to process them, a cost saving for food processors that may be passed on to the final consumers, benefiting them too. Entirely new products are another possible benefit.

Consumers

In the literal sense of "those who eat," consumers are probably the most important group that will benefit from the Treaty. More secure food supplies, potentially at lower cost, will benefit all. The Treaty can also help to deliver enormous benefits by making diets more nutritious. Around the world, some two billion people, mostly women and young children, suffer the debilitating effects of diets deficient in micronutrients. Genetic resources can be used both to increase dietary diversity through new crops, and to increase the nutrient value of existing crops. The Treaty will help breeders and farmers to gain access to genetic resources that contain improved nutritional characteristics and to incorporate them into locally adapted varieties.

The Value of Plant Genetic Resources

PLANT GENETIC RESOURCES ARE THE RAW MATERIAL used by plant breeders to create new crop varieties. It is exceedingly difficult to ascribe a purely economic value to any particular plant genetic resource. While the market value of a new variety of wheat is reasonably easy to calculate, the contribution to that value of any one characteristic derived from an individual genetic resource must remain a matter of conjecture.

In a few cases the benefits are clear. A single wild relative of the tomato contributed genetic resources that increased the solids content of processing tomatoes by 2.4%. This has been worth US\$ 250 million a year in the state of California alone, because it reduces energy needs in processing.

Improved productivity

More often, one can only conclude that the primary value of plant genetic resources for food and agriculture lies in the fact that they can be used to improve productivity.

Growing populations and shrinking farm lands require the world to increase food production. Changing environmental conditions, such as drought or outbreaks of pests and diseases, also call for new and better adapted crop varieties. Plant genetic resources are an essential component of all such improvements. More than three-quarters of the increased crop productivity of the past 30 years is the result of breeding. And despite a 70% growth in world population, agriculture today provides over 15% more calories per person than it did 30 years ago. This is a formidable achievement. Although the rate of population growth is now slowing, the world will continue to depend upon plant genetic resources to cope with future demands.

An additional factor is that while we know that more mouths will need more food, we do not know in detail what other challenges agriculture will face. Such challenges could be biotic (e.g., new pests and diseases) or abiotic (e.g., climate change and other environmental pressures) or simply changes in consumer demand. This gives plant genetic resources an incalculable insurance value as the primary source of the qualities that agriculture will need to adapt to unforeseen changes.

Sustainability and other benefits

Plant genetic diversity provides a basis for adapting agriculture to different environments and their constraints. As such, conservation and breeding efforts together can help tackle certain challenges to environmental sustainability associated with agriculture.

The diversity of plants and their traits is also the basis of good nutrition, and many social and cultural values. The exchange of plant genetic material across nations and continents contributes greatly to inter-cultural dialogue.

The importance of exchange

Most crop breeding efforts depend on the exchange of globally sourced material. In a survey of the different genetic lines that were used in wheat breeding programmes for the developing world, about 30-40% of the parent materials came from another country. Homing in on one particular quality, disease resistance, the survey looked at an ongoing efforts to breed durable resistance to rust diseases into wheat varieties. Breeders called on plant genetic resources from the Southern Cone and Andean regions of South America, Mexico, Guatemala, North America, East Africa, North Africa, Spain, Portugal, the Middle East, the Nile valley, Europe, Australia and New Zealand.

Put simply, no country's breeding efforts would amount to much without the ability to access and use genetic resources from around the world.

Breeders, farmers and society at large all need to be able to access, exchange and use the value inherent in plant genetic resources for food and agriculture to meet humanity's future requirements.

The Global Crop Diversity Trust

THE GLOBAL CROP DIVERSITY TRUST is a foundation for food security. Its unique mission is to ensure the conservation, in perpetuity, of the world's most important collections of crop diversity conserved in genebanks, and to promote the availability and use of this biological diversity. Financial resources for maintaining collections of crop diversity are often a low priority in national budgets, consequently genebank facilities may be starved of the resources needed to guarantee conservation. The Trust will provide sustained funding to ensure that farmers and breeders can draw on these collections to improve crops and strengthen food security. To do this, the Global Crop Diversity Trust will assemble an endowment, the income from which will be used to meet the operational costs of maintaining the crop diversity of the world's major crops, forever.

In 2004, the Trust was formally established as an independent international organization, with the International Plant Genetic Resources Institute (IPGRI) and the Food and Agriculture Organization of the United Nations (FAO) as co-sponsors. To date, twenty-two countries have signed the Trust's establishment agreement and the organization has already raised approximately US\$ 60 million from a variety of donors. The Trust has also disbursed its first grants to cover some of the key upgrading and capacity-building needs of priority collections identified in the context of the crop and regional strategy development process. It will make its first grants in support of the long-term conservation of priority collections in late 2006.

The Treaty and the Trust

FAO's intergovernmental Commission on Genetic Resources for Food and Agriculture welcomed the establishment of the Trust, as an essential element of the funding strategy of the International Treaty on Plant Genetic Resources for Food and Agriculture. The Governing Body of the Treaty and the Global Crop Diversity Trust are expected to enter into a formal relationship agreement in June 2006 in Madrid. This provides for the Governing Body to give policy guidance to the Trust and to appoint four members to the Trust's Executive Board. It also recognizes the Trust Board's executive independence to manage the operations and activities of the Trust.

Setting priorities

The Trust will be a valuable partner in the international effort to build a more effective, efficient and sustainable conservation system for crop diversity. Today there are more than 1 400 genebanks around the world holding more than 6 million samples. Identifying collections that are eligible to receive funding from the Trust is a significant challenge. For this reason, the Trust is supporting a process to develop a series of regional and crop-specific conservation strategies. In addition to fostering collaboration and greater rationalization in conservation, the strategies, spearheaded by some of the world's leading crop experts, will identify the most important and neediest collections of crop diversity, which should be given priority for funding.

The regional strategies will identify opportunities for collaboration and coordination, as well as upgrading and capacity-building needs, while the crop strategies will identify the subsets of total global holdings that contain the widest and most important genetic diversity of the crop concerned, as a basis for rationalization. Nine regional strategies are currently under development and will be completed by the end of 2006. Of the 36 planned crop strategies, 19 will be completed by the end of 2006.

Securing the long term future of the world's crop diversity collections will be no small feat. But with a relatively small amount of sustained funding, this can be done and the vision that began just a few years ago with the International Treaty will become a reality.

The Global Crop Diversity Trust's website address is <http://www.croptrust.org>

The Funding Strategy: pooling efforts and resources to meet a global commitment

FINANCIAL RESOURCES for the implementation of the Treaty are to be found through its Funding Strategy. The Funding Strategy is not itself a fund or mechanism, but a plan that will mobilize a wide variety of resources to support crop diversity projects and programmes, particularly in developing countries and those in economic transition.

The Funding Strategy aims at the implementation of all elements of the Treaty. For example, Articles 5 and 6 of the Treaty deal with the conservation and sustainable use of genetic resources. In this context, gathering information about existing crop diversity, through surveys and inventories, will be one important activity. Providing support to farmers and local communities to manage and conserve diversity on their farms will be another. A key aspect of all activities will be capacity-building.

Although the text of the Treaty provides for a Funding Strategy, it does not set out the details of it. The Governing Body will consider a draft text and resolution on the implementation of the Funding Strategy at its first meeting.

Basic principles of the Funding Strategy

The major focus of the Funding Strategy will be to provide the resources necessary to enable developing countries and countries with economies in transition to conserve and sustainably use their own genetic resources and those that they obtain through the Treaty's Multilateral System of Access and Benefit-Sharing. Among the main providers of resources will be developed country Contracting Parties. Other resources will come from international funds, bodies and organizations. For example, the Global Crop Diversity Trust will be an essential element of the Funding Strategy. Other possible providers of resources include the Global Environment Facility (GEF), the Consultative Group on International Agricultural Research (CGIAR), and the World Bank. Mandatory and voluntary contributions resulting from the commercialization of crop diversity from the Treaty's Multilateral System will also provide funds for the Funding Strategy.

The draft Funding Strategy contains both resources under the control of the Governing Body and resources that are not. Most financial resources are unlikely to be directly controlled by the Governing Body, for example, resources made available by international organizations and bodies. Such organizations and bodies will, however, be encouraged to use the priorities set out in the Funding Strategy when allocating resources, within the terms of their own mandates, to activities relevant to the implementation of the Treaty.

A shared responsibility

The International Treaty represents an unprecedented, global commitment by governments to meet the food security needs of a growing world population. The success of the Treaty depends on securing the financial resources needed to implement its activities. Contracting Parties to the Treaty and the wider community will have to work together to secure these resources. Adopting the Treaty's Funding Strategy is a critical step in this direction.

The importance of being used

THE FUNDAMENTAL PURPOSE OF THE INTERNATIONAL TREATY is to enable people to make use of plant genetic resources for food and agriculture. Conservation alone is not enough. Plant genetic resources are only of value when they are used. Indeed, conservation and use, far from being contradictory as they are sometimes understood to be, are mutually reinforcing: if plant genetic resources are useful, they will be conserved, and if they have been conserved they continue to be available for use. Article 6 of the Treaty states that Contracting Parties will work to promote the sustainable use of plant genetic resources for food and agriculture and offers a list of the kinds of activities that would meet these obligations.

Plant breeding

Plant genetic resources are the raw material of plant breeding efforts and will continue to be the foundation of food security.

We use them to improve yields and quality, and to face plant diseases and climate change and meet evolving human needs. Rust pathogens of wheat, for example, cause enormous losses to harvests around the world. Fungicides offer a measure of control, but high costs limit their usefulness to poor farmers in developing countries. The environmental and health effects of fungicides are also a concern. Starting in the early 20th century, formal breeders introduced various resistance genes, most of which came from landraces and wild relatives of wheat. Those genes, however, rapidly lost their value, as the rust fungi mutated. Breeders screened existing collections of wheat for genes that would confer more durable resistance. One such resistance, found in a single variety, was quickly incorporated into more than half of the varieties grown in the 1990s.

New forms of disease will require breeders to use plant genetic resources to find new resistance genes. Asian soybean rust, an emerging threat, is estimated to cost up to US\$ 2 billion a year in the United States alone. Researchers have yet to find genetic resistance; when they do, it will come from plant genetic resources.

Other uses

Article 6 also recognizes several other ways besides formal breeding in which the sustainable use of plant genetic resources for food and agriculture may be promoted. Individual farmers and farming communities have been breeding crops since the dawn of agriculture. Policy support is needed to enable greater diversity within farming systems. Such diversity is a key component of food security, buffering yields against harmful events. In pursuing greater diversity in farming systems, the Treaty also calls for research that will make more diversity available to farmers to use themselves and in concert with the formal sector to improve the sustainability and productivity of their systems.

In the context of both formal and participatory plant breeding, the Treaty encourages broadening the genetic base of crops. This is intended to mitigate the effects of crop improvements, which, in delivering higher yields, can also reduce genetic diversity, so limiting a variety's potential to evolve and adapt to changed circumstances in the future.

Similarly, the Treaty recognizes the importance of local crops, varieties and underutilized species. In some cases — for example buckwheat and cassava — the crops concerned are grown widely around the world, but are used very locally for subsistence and traded at nearby markets in small quantities. Other crops — such as teff in Ethiopia — are enormously important within a restricted geographical area. The Treaty calls on countries to ensure that such crops and underutilized species (which are often highly nutritious) can be used and are not excluded from farming systems or markets.

Enabling use

Using plant genetic resources means accessing and exchanging resources, because countries and regions are highly interdependent. The aim of the Treaty's Multilateral System of Access and Benefit-sharing is to enable use.

Moreover, the Treaty, through its Funding Strategy, recognizes the importance of giving practical help to developing countries to use plant genetic resources for food security and economic growth. This means building capacity, sharing technologies, and setting up information systems to support crop development.

The state of plant genetic diversity

ASSESSING THE AMOUNT of plant genetic resources for food and agriculture that exist in the world today is very difficult. Farmers and breeders have developed diversity over centuries in an ever-evolving process that is hard to track and to record. In addition, many national collections of plant genetic resources for food and agriculture suffer from poor documentation, making it harder to determine the material they contain.

In 1996, FAO in collaboration with the International Plant Genetic Resources Institute (IPGRI) and other Centres of the Consultative Group on International Agricultural Research (CGIAR), worked with countries to assess the state of the world's crop diversity. The Report on the State of the World's Plant Genetic Resources for Food and Agriculture, which was adopted by 150 countries in 1996, is the most comprehensive survey to date of the status of the world's crop diversity, and has provided the scientific and technical baseline for the Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture, a supporting component of the International Treaty.

Loss of crop diversity

The loss of crop diversity has many causes. Thousands of traditional crop varieties have disappeared beneath cities or through natural disasters such as floods and erosion. Modern agriculture has led farmers to abandon their heterogeneous traditional crop varieties in favour of modern and improved, but often uniform varieties.

Although much diversity has been conserved in genebanks, it is practically impossible to know exactly how much has been lost over the years. However, we have some indicative examples. In South Korea, 74% of the most common crop varieties in 1985 had been replaced by 1993. Of the 10 000 wheat varieties in use in China in 1949, only 1 000 were still being used in the 1970s. In Malaysia, the Philippines and Thailand, local varieties of rice, maize and fruit are being replaced with improved varieties. Many of Chile's local potato varieties have been lost and 35 of Peru's 90 species of wild potato can no longer be found in the wild. Varieties of barley native to Ethiopia are on the verge of extinction.

Genebank conservation

Approximately six million accessions of crop diversity are stored in collections around the world. Around 10% of these accessions are held in trust collections maintained by the CGIAR Centres and other international institutions: this means that they do not belong to the Centres and institutions, but are held on behalf of the world community under agreements signed with FAO. New agreements are now to be signed with the Treaty's Governing Body. Under these agreements, these institutions have a legal obligation to protect the collections and to make the material and information about it available to users.

It is impossible to say how representative such collections are of total crop diversity. Many national genebanks still lack full documentation, information that is vital for genebanks to be useful. Tracking the state of the world's crop diversity is an ongoing task. The International Treaty recognizes this, and provides for the Governing Body to work closely with FAO's Commission on Genetic Resources to continue monitoring the state of the world's crop diversity. The second Report on the State of the World's Plant Genetic Resources for Food and Agriculture is expected to be completed by the end of 2008.

A global food basket

ALL COUNTRIES IN THE WORLD are interdependent when it comes to plant genetic resources for food and agriculture. Each relies largely on others for the genetic basis of its major food crops and so for food security. For example, a plate of pasta with tomato sauce – a typically Italian dish – 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.

But primary centres of diversity (where a crop originated) are not the only important source of crop diversity. Crops grown and cultivated outside the countries where they originated often create other centres of diversity. These ‘secondary’ centres of diversity are also important. So is the diversity in genebanks. Although their diversity originated in farmers’ fields, genebank collections have become the first port of call for breeders and farmers in need of plant genetic resources.

Studies on the flow of plant genetic resources from the CGIAR Centre collections have shown that every country in the world is a major net beneficiary of access to germplasm. In the 1970s, the participating countries requested approximately four samples for every sample they contributed. In 1992, this ratio rose to 60 to 1. More than 40 countries have been able to recover from the Centre collections materials that they had lost.

The interdependence of countries stresses the importance of having a legal framework that can facilitate and support the exchange of plant genetic resources for food and agriculture. The Treaty’s Multilateral System of Access and Benefit-sharing provides that legal framework.

Around the regions

Maize is one of the world’s three most important staple crops, especially for millions of people living in sub-Saharan Africa. It originated in South America, where it has its primary centre of diversity but the United States is now the largest producer of maize. The US is also home to one of the world’s largest genebank collections of maize.

In Africa, Nigeria and the Democratic Republic of Congo are among the five highest producers of cassava, a staple crop for more than 200 million Africans in 31 countries. Cassava originated in South America.

The diets of millions of people in the southern Mediterranean are based on wheat, which comes originally from Central and West Asia, where it has its primary centre of diversity. A wild relative of wheat from the Eastern Mediterranean was used to increase the protein content of bread and durum wheat. During the early 20th century, wheat rust caused severe losses to millions of farmers. Breeders have called on plant genetic resources from all over the world, in continuing efforts to develop disease-resistant varieties.

Nearly 100 million tonnes of banana and plantain are produced globally every year. India is the major producer and a primary centre of diversity for banana, but the highest rate of consumption for bananas is in East Africa. Recent reports have shown that wild bananas in India are severely threatened by deforestation. Experts at FAO are calling for a systematic exploration and collection of wild bananas from remaining habitats, in an effort to safeguard this vital resource.

Sugar is a major source of calories in almost all countries in the world. The Pacific region is one of the primary centres of sugar cane diversity, but in countries such as Papua New Guinea this diversity is under threat, as farmers are increasingly replacing indigenous varieties with modern cultivars.

History of the Treaty

THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE owes its origins to, and replaces, the *International Undertaking on Plant Genetic Resources*. This was a voluntary agreement adopted by FAO in November 1983 and was the first international instrument to deal specifically with the conservation and sustainable use of plant genetic resources “of economic and/or social interest, particularly for agriculture”. The Undertaking was the first time the international community provided a policy framework for any aspect of genetic resources for food and agriculture. It was overseen by the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA), an intergovernmental body to which 168 countries belong.

The Undertaking 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. The Undertaking attracted widespread support, but also some reservations. Some countries saw conflicts between the free availability of plant genetic resources under the Undertaking and the protection afforded by Plant Breeders’ Rights. There was also unease about intellectual property regimes that rewarded formal breeders, while ignoring the contributions of generations of farmers to the development and conservation of the very plant genetic resources on which breeders depended.

Towards a new agreement

These concerns were addressed in a series of Agreed Interpretations of the Undertaking, which were adopted in 1989. These sought to balance the rights of breeders and farmers. They recognized that Plant Breeders’ Rights were not inconsistent with the Undertaking, and simultaneously recognized Farmers’ Rights, which are now enshrined in the International Treaty. They also recognized the sovereign rights of nations over their genetic resources.

At the same time, negotiations were proceeding towards the adoption of the Convention on Biological Diversity (CBD). The CBD entered into force in December 1993, and affirmed the sovereignty over genetic resources of the State in which they are found, the State being responsible for granting access to others on mutually agreed terms. Access to plant genetic resources for food and agriculture thus became subject to bilateral agreements between countries of origin and those who wished to make use of the resources.

Recognizing that the CBD did not deal with pre-existing *ex situ* collections nor with Farmers’ Rights, the Conference that adopted the CBD asked FAO to address this question, a request given additional force in Agenda 21. In 1993, the FAO Conference accordingly launched the revision of the Undertaking, in harmony with the CBD, and asked its inter-governmental Commission on Genetic Resources for Food and Agriculture to act as the forum.

The negotiations were complex and sensitive. Success finally came when the FAO Conference adopted the Treaty by consensus on 3 November 2001. The FAO Director-General hailed it as the first international treaty of the twenty-first century, and of the third millennium.

Preparing for the First Governing Body

The FAO Commission on Genetic Resources for Food and Agriculture also acted as the Interim Committee for the Treaty, and prepared the first session of the Governing Body. It negotiated and has submitted to the Governing Body the drafts of the Treaty’s Rules of Procedure and Financial Rules, and of the Treaty’s Funding Strategy for priority activities, plans and programmes, in particular in developing countries. It also prepared the draft Standard Material Transfer Agreement, through which the Multilateral System of Access and Benefit-sharing will operate, and the model agreement by which the Future Harvest Centres and other relevant international institutions will bring their *ex situ* collections under the Treaty.

The International Treaty entered into force on 29 June 2004, ninety days after the deposit of the fortieth instrument of ratification. As the Governing Body begins its work, over 100 countries have deposited instruments of ratification.

The Treaty and the CGIAR

CGIAR collections

Some of the Treaty's most significant provisions relate to the germplasm collections of the Future Harvest Centres of the Consultative Group on International Agricultural Research (CGIAR). Between them, the Centres hold approximately 560 000 accessions of crop diversity. These collections are invaluable 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; their materials and information about them are available, under specific terms, to anyone who asks for them. This is vital for the future of agriculture, because all countries are highly interdependent, and the exchange of plant genetic resources is crucial.

Safeguarding humanity's heritage

In 1989, the FAO Commission on Genetic Resources called for the creation of an International Network of Ex Situ collections. In 1994, eleven of the Future Harvest Centres signed agreements with FAO, placing most of their collections into the International Network, "in trust for the benefit of the international community". More recently, regional collections of the International Coconut Genetic Resources Network (COGENT) held by the governments of Brazil, Cote d'Ivoire, India, Indonesia and Papua New Guinea, as well as the Tropical Agricultural Research and Higher Education Centre (CATIE), also became part of the International Network.

The Centres 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 (MTA) that accompanies each request for samples binds the recipient to the same terms.

Agreements with the Treaty

A large part of the material held by the CGIAR Future Harvest Centres is of the crops listed in Annex 1 of the Treaty. For this reason, it is crucial to ensure that this material comes under the Treaty's Multilateral System of Access and Benefit-sharing. The Treaty, in Article 15, calls on the Centres to sign fresh agreements with the Governing Body, to bring their collections under the purview of the Treaty. Under these new agreements, material held by the Centres of crops included in Annex 1 of the Treaty will be made available in accordance with the Multilateral System. Material collected before 29 June 2004 (the date the Treaty came into force), which is not listed in Annex 1, will be made available under the MTA currently used by the Centres under the in-trust agreements with FAO. Material not included in Annex 1, received by the Centres after 29 June 2004, will be made available on terms agreed between the Centre and the country where the material originated.

The Treaty also provides for Contracting Parties to give facilitated access to plant genetic resources for food and agriculture of the crops in Annex I of the Treaty to the CGIAR Centres that have signed the agreements with the Governing Body.

Other relevant international institutions are also invited to sign such agreements with the Governing Body.

Farm Animal Genetic Resources

DOMESTIC ANIMALS supply roughly one third of human food needs and are a critically important component of the livelihoods of 70% of the world's rural poor. Animal genetic resources face many of the challenges that face plant genetic resources. Plants are addressed by the International Treaty on Plant Genetic Resources for Food and Agriculture. Policy-making for farm animal genetic resources is not yet as far advanced.

Farm animal genetic resources include all animal species that are of interest to people in terms of food and agricultural production, and their wild relatives. They encompass roughly 40 species (and 10 000 breeds) that have been domesticated over the past 12 000 years. Farm animals, like plants, are suffering genetic erosion, although there is less information available on animal genetic resource losses than on plants. Evidence for the number of breeds that have existed, their genetic make-up, and how that has changed over time, is scant. It has been estimated that 16% of breeds were lost during the 20th century, and that 22% of mammal breeds and 48% of bird breeds are at risk of imminent extinction. About 70% of livestock breeds today are found in developing countries.

The uses of farm animal genetic resources

In some farming systems, animals contribute motive power for transport and other activities such as ploughing. In all systems, they are vital for their ability to convert inedible plants and animals into forms that humans not only eat but also often favour. Animals also represent mobile livelihood assets that can be accumulated. They may be insurance against the hardest times and are often important aspects of their owners' social and cultural lives.

In favourable areas, the productivity of farm animals can be greatly increased by changes not only in husbandry techniques but also by bringing in genetic resources. The livestock industry in developed countries is geared to using elite animals (especially males) in a continual effort to improve productivity and other traits. Such strategies have also been exported to developing countries, often with good results. However, they often lead to a drastic reduction of the genetic diversity needed to face unpredictable environmental changes and human needs. In more marginal areas, adaptive traits such as disease resistance, drought tolerance, thriftiness, and so on may also be more important. There is a risk that imported genetic resources undermine these qualities, which assume even greater importance when conditions change. International flows of Farm Animal Genetic Resources have been important in the expansion of more productive systems in developing and developed countries, but require closer regulation to ensure that they do not threaten the resilience and adaptability of indigenous breeds.

Towards policies for farm animal genetic resources

The international community is aware that farm animals require sound policies, based on accurate data. In 1999, the intergovernmental Commission on Genetic Resources for Food and Agriculture asked FAO to develop a Global Strategy for the Management of Farm Animal Genetic Resources. This will include compiling the first Report on the State of the World's Animal Genetic Resources. Country reports have been received from 170 countries and a first draft of the Report will be considered by the Commission at its 2007 meeting. The Report will then be finalized at the First International Technical Conference on Animal Genetic Resources, to be held in Switzerland in September 2007. This process, which aims to lead to globally agreed policies, has been welcomed by the Parties to the Convention on Biological Diversity (CBD).

Supporting components of the Treaty

MECHANISMS ALREADY EXIST to promote the conservation and use of plant genetic resources for food and agriculture. These create a supportive environment for the Treaty, and are recognized in Part V of the Treaty as “supporting components”.

Supporting components lie outside the institutional structure of the Treaty, but provide essential support for the proper implementation of the Treaty and its objectives. They include the *Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture*, collections of crop diversity held by the Future Harvest Centres of the Consultative Group on International Agricultural Research (CGIAR) and other relevant international institutions, international plant genetic resources networks, and the World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture (WIEWS).

The Global Plan of Action

The *Global Plan of Action* was prepared on the basis of the first Report on the *State of the World's Plant Genetic Resources for Food and Agriculture*, and was formally adopted by 150 countries at the Leipzig International Technical Conference in June, 1996. It is a ‘rolling’ plan, under the guidance of the FAO Commission on Genetic Resources for Food and Agriculture, to be periodically reviewed and updated to reflect evolving priorities for the conservation and sustainable use of Plant Genetic Resources for Food and Agriculture. The *Global Plan of Action* lists 20 priority activity areas critical to ensure sustainable use and conservation. These are organized around four main themes: *in situ* conservation and development, *ex situ* conservation, plant genetic resources use, and institutions and capacity-building.

The Treaty regards the *Global Plan of Action* as an essential scientific and technical framework for action on plant genetic resources for food and agriculture at national and international levels. By calling on Contracting Parties to promote the effective implementation of the Global Plan of Action, the Treaty imbues the Global Plan of Action with greater significance.

Genebank Collections and plant genetic resources networks

The Future Harvest Centres of the CGIAR hold important collections of crop diversity “in trust” for humanity. A high percentage of this material consists of landraces and crop wild relatives, material that is particularly rich in diversity. This combination of factors makes the CGIAR genebanks particularly valuable, and a vital resource for any international system promoting conservation and use. Article 15 of the Treaty recognizes the value of these collections and calls on the Future Harvest Centres of the CGIAR, and other relevant international institutions, to sign agreements with the Governing Body of the Treaty to bring the material in their collections under the Treaty.

Plant genetic resources networks can be highly effective platforms for exchanging scientific and technical knowledge and expertise, collaborating on research, and exchanging plant genetic resources. They are crucial mechanisms to implement the objectives of the Treaty and the *Global Plan of Action*. The Treaty recognizes the important role that Contracting Parties can play in building strong and comprehensive networks: Article 16 encourages Parties to strengthen existing networks and extend their coverage and membership.

Global Information System

Proper documentation is necessary for genebank collections to be useful. It is also vital to assist countries in their efforts to conserve and use plant genetic resources. And yet, most national collections suffer from poor documentation, limiting the exchange of information. The Treaty calls on Contracting Parties to develop and strengthen a Global Information System to facilitate the exchange of information on plant genetic resources for food and agriculture, and to cooperate with the FAO Commission on Genetic Resources in periodic reassessments of the state of the world's plant genetic diversity. Existing information systems include FAO's World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture, and the CGIAR's System-wide Information Network for Genetic Resources (SINGER).

Farmers' Rights

THE EMERGENCE OF AGRICULTURE, and with it of civilization, roughly 10 000 years ago started the process of domestication, by farmers, of the plants and animals that today feed the world. Agriculture emerged independently in different continents, in what are called "the centers of origin" of crops and farm animals. When our ancestors started to identify, collect, farm and disseminate those agricultural species, a process was set afoot of mutual adaptation between humans and the plants they grew, and between these plants and their environment. While we depend on cultivated plants to satisfy the basic human need for food, crops depend on humanity for their continued existence: much of their genetic diversity can only survive through continued human use and conservation.

Plant genetic resources for food and agriculture are essentially human-made. Local and indigenous communities and farmers have guided their evolution, which ensured that diversity was not only maintained but even increased over time. The main curators of these unique heritage have been small farmers with their traditional knowledge. The world's inherited portfolio of plant genetic diversity that is available at present is the result of this farmers' work over many generations, and is the foundation to our food and agriculture. Farmers, the scientific community and commercial plant breeders, continue to build upon this rich asset to again and again adapt our crops to the society's changing needs.

In 1989, the FAO Conference formally recognized that unnumbered generations of farmers in all over the world had conserved, improved and made available plant genetic resources for food and agriculture, and that the contribution of those farmers had not been sufficiently recognized or rewarded. This was the basis for Farmer's Rights. It was the first recognition by a United Nations body of the important role that farmers and communities play as curators of plant genetic diversity. The adoption of the International Treaty on Plant Genetic Resources for Food and Agriculture in November 2001 again puts the question of Farmers' Rights before the international community.

In its Article 9, the International Treaty recognizes the enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world. It gives governments the responsibility for implementing Farmers' Rights, and lists measures that could be taken to protect and promote these rights:

- ⌘ the protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- ⌘ the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and
- ⌘ the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

The International Treaty also recognizes the importance of supporting the efforts of farmers and local and indigenous communities in the conservation and sustainable use of plant genetic resources for food and agriculture, including through a funding strategy. In this strategy priority will be given to the implementation of agreed plans and programmes for farmers in developing countries, especially in least developed countries, and in countries with economies in transition, who conserve and sustainably utilize plant genetic resources for food and agriculture.