Underpinning the foundations of food production: the SGRP and conservation of genetic resources

ADDING ANIMALS TO THE EQUATION

Around the world, farmers use some 40 or more animal species, with about 6500 recognizable breeds or strains. However, only a handful of these species and strains account for almost all animal agriculture around the world. That exposes animal husbandry to even greater risks of genetic erosion and narrow genetic base than those that plague crops.

FAO has conducted an extensive survey of the status of domestic animal diversity, which reveals that 1350 strains—a third of the total—are at risk of extinction. Within the CGIAR system, ILRI, the International Livestock Research Institute, in Kenya, and ICARDA, the International Center for Agricultural Research in the Dry Areas, in Syria, lead activities on farm animal diversity. An important focus of conservation is to encourage farmers to value and use indigenous breeds. ILRI has shown that local breeds, for example the N'Dama cattle originally found in West Africa, and the Red Maasai sheep of Kenya, are often more resistant to diseases that seriously affect imported specialized breeds. Farmers who cannot afford the husbandry needed by imported breeds may do better to use their local strains.

FISH BASE

Information on aquatic genetic resources has been even more inadequate, inaccessible and unstructured than that on land animals. FAO, IUCN and the World Fish Center (ICLARM) worked with many other stakeholders to produce FishBase and ReefBase to remedy these deficiencies. These resources are available to all users on the Internet and are distributed as low-cost CDs and books. (www.fishbase.org/home.htm and www.reefbase.org/database/default.asp)

The CGIAR System-wide Genetic Resources Programme links the genetic resources programmes and activities of the Future Harvest Centres in a partnership whose goal is to maximize collaboration. It is hosted at the headquarters of the International Plant Genetic Resources Institute in Rome. Future Harvest Centres contribute to food security by breeding varieties that deliver better results for the poorest farmers of the world. Recognising that such breeding depends absolutely on the continued survival of existing diversity of crops and animals and their wild relatives, the SGRP devotes considerable energy to the conservation, management and use of genetic resources.

COLLECTIONS HELD IN TRUST

The CGIAR system is the largest holder of genetic resources in the world. Of the 16 Centres, 11 have genebanks that between them retain more than half a million samples of crops, forages and agroforestry species. About three-quarters of the samples are traditional varieties and landraces and wild and weedy relatives. This material contains huge reserves of diversity, which makes it particularly valuable for future crop improvement.

The CGIAR's global system of genebanks was founded in a climate of free exchange of material. The FAO's 1983 International Undertaking on Plant Genetic Resources upheld this ideal, stating that germplasm was a "common heritage of mankind" and should be freely available to all without restriction. However, the Convention on Biological Diversity (CBD), signed in Rio de Janeiro, Brazil, in 1992, recognized national sovereignty over the plant genetic resources found within a country's borders, while encouraging countries to give others access to genetic resources, albeit with prior consent on agreed terms for sharing any benefits that might accrue. The centres believe strongly that—for the species they are concerned with—multilateral access arrangements are preferable to bilateral agreements between partners, and one response to the CBD has been to develop the In-Trust Collections.

Each of the 11 centres that holds samples signed an agreement with FAO to guarantee that materials remain freely available. The centres claim no intellectual property rights over the material they hold in trust, and no-one who uses that material can restrict access to it. The agreements provide a mechanism for all FAO member governments to ensure that the centres perform their approved function of maintaining the designated collections in trust.

The centres send out about 150 000 germplasm samples each year, more than a quarter of the total holdings. National genebanks that have lost their collections through war or natural disasters have been able to call on the In-Trust Collections to re-establish their agricultural base. A preliminary analysis shows that more than 80% of the samples sent out from the In-Trust Collections go to developing countries.

Maize genetic diversity. CIMMYT

SECURE FACILITIES TO SAFEGUARD RESOURCES

FACTS

- A study by IFPRI and CIMMYT in 1999 showed that it costs just US$ 0.27 to multiply a sample of an inbreeding crop such as wheat for a year. US$ 7.02 maintains it forever.
- Maize, an outbreeding crop, requires a very large number of plants; each sample costs US$ 2.05 to save for a year, and US$ 53.50 to conserve in perpetuity.
- Vegetatively propagated species, such as cassava, can cost more than US$ 25 a year to conserve each variety.

One of the functions of the SGRP, established in 1994, is to ensure that CGIAR genebanks can continue to meet their obligations under the in-trust agreements with FAO. A series of internal and external reviews indicated that funding constraints had severely curtailed the abilities of the genebanks to operate effectively and threatened their long-term security. In 1999 the SGRP, with guidance from the CGIAR's Technical Advisory Committee, examined the costs of fully upgrading the operations of the 11 genebanks so that they meet internationally agreed best standards, and then maintaining them in perpetuity.

The study concluded that it would cost US$ 21 million to upgrade all the CGIAR genebanks. The upgrading could be carried out over a period of five years, after which the annual running costs of the genebanks would be US$ 7.4 million a year, compared with US$ 7.0 million today. The additional expenditure would, however, result in a much improved genebank system that would be able to honour its pledges to safeguard genetic resources.

On behalf of the SGRP, and in close collaboration with FAO, IPGRI is launching a major initiative to ensure the development and sustainability of a rational system for the management of genetic resources around the world. This system would include national and regional as well as international collections of genetic resources.

Seed packets store genetic resources in trust for the world.

IPGRI

GLOBAL INTERDEPENDENCY FOR LOCAL SUSTAINABILITY

Studies by FAO show that most countries depend on crops that originated outside their own region for more than 90% of their food. The future development of agriculture in all parts of the world—for example to cope with challenges of climate change and newly evolved pests and diseases—will require secure access to the genetic qualities inherent in existing diversity. The use of these genetic resources can be encouraged in two ways; through bilateral agreements between donors and recipients, or through a multilateral system with an agreed set of rules accepted by all countries and codified in a treaty. The CGIAR supports the concept of a multilateral system for a variety of reasons, including the fact that it is efficient and simpler to operate.

For example, if a country wishes to gain access to existing diversity for rice, it would have to make separate bilateral agreements with each of the more than 100 countries that hold samples. A multilateral system gives access to all the thousands of varieties held in trust by the International Rice Research Institute (IRRI) under a single agreement.

SGRP has worked with data supplied by CGIAR genebanks to chart the flows of germplasm around the world. While many conclusions have been drawn from these studies, one example highlights the global interdependence of local agriculture. The International Maize and Wheat Improvement Center (CIMMYT) distributes more than 11 tonnes of cereal seed samples a year, three-quarters of it to developing countries. From 1966 to 1997, 6 of every 7 new spring wheat varieties released in developing countries had CIMMYT varieties in their ancestry. It is important to note that this does not represent a narrowing of the genetic base for spring wheat. CIMMYT varieties recombine vast amounts of diverse material from around the world. A recent study indicates that the genetic diversity of parents in the pedigrees and the overall diversity of genes in CIMMYT varieties have both increased considerably over the past 30 years. What is true of wheat is also true of many other crops managed by the CGIAR genebanks under the FAO in-trust agreements.

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